Farmland Hydro, L.P.
Charles W. Jenkins
Manager of Environmental and Safety Services

Green Bay Plant
County Road 640
Post Office Box 960
Bartow, Florida 33831
Tele: 941 533-1141
Fax: 941 533-8793

RECEIVED
APR 15 1999
BUREAU OF
AIR REGULATION

April 12, 1999

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

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

RE: **Notification of Actual Date of Initial Startup**
DEP File No. 1050053-019-AC

Dear Mr. Fancy:

According to the requirements of 40 CFR 60.7(a)(3), I am notifying you that we have started the new Sulfuric Acid Plant # 6 on Thursday, April 8, 1999.

If you have any questions or concerns, please give me a call at (941) 533-1141, extension 334.

Sincerely,

Charles W. Jenkins

Charles W. Jenkins
Manager of Environmental and Safety Services

CWJ:jp\65-99

cc: Doug Belle
Leif Bouffard
Doug Caraker
John Friedman

Department of
Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

March 8, 1999

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. C.M. Farris, Vice President, Operations
Farmland Hydro, L.P.
Post Office Box 960
Bartow, Florida 33831

Re: DEP File No. 1050053-023-AC
No. 6 Sulfuric Acid Plant – PSD-FL-243(A)

Dear Mr. Farris:

The Department reviewed your request dated December 31, 1998 to allow operation of the No. 3 Sulfuric Acid Plant (SAP) for a period of one month after the commencement of commercial operation of the new No. 6 SAP. The request is acceptable provided the planned temporary shutdown/turnaround of the existing No. 4 SAP encompasses the entire month. The permit is hereby revised as follows:

SPECIFIC CONDITION NO. 7

The existing No. 3 sulfuric acid plant (Emission Unit No. 003) shall cease operation and be permanently shut down 30 days after ~~when~~ a new No. 6 sulfuric acid plant commences commercial operations. During the 30-day period, the No. 3 sulfuric acid plant shall operate only when the No. 4 sulfuric acid plant is shut down for a turnaround.

A copy of this permit revision shall be filed with the referenced permit and shall become part of the permit. This permit modification is issued pursuant to Chapter 403, Florida Statutes. Any party to this order (permit modification) has the right to seek judicial review of the permit pursuant to Section 120.68, F.S., by the filing of a Notice of Appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the Clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice must be filed within thirty days after this order is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

Howard L. Rhodes, Director
Division of Air Resources
Management

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this PERMIT REVISION was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 3-9-99 to the person(s) listed:

Mr. C.M. Farris, Farmland *
Mr. Pradeep Raval, Koogler & Associates
Mr. Bill Thomas, SWD
Mr. Gregg Worley, EPA
Mr. John Bunyak, NPS

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Kim Tober 3-9-99
(Clerk) (Date)

Z 333 618 081

US Postal Service

Receipt for Certified Mail

No Insurance Coverage Provided.
Do not use for International Mail *(See reverse)*

Sent to CM Farris
Street & Number Farmland Hydro
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
1050053-023 AC 3-9-99
PSD-Fl-243a

PS Form **3800**, April 1995

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

Consult postmaster for fee.

3. Article Addressed to:
Mr. C M Farris, VP
Farmland Hydro, LP
P O Box 960
Bartow, Fl 33831

4a. Article Number
Z 333 618 081

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

7. Date of Delivery
3-12-99

5. Received By: *(Print Name)*
[illegible]

6. Signature: *(Addressee or Agent)*
X Denise Burney

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

PS Form **3811**, December 1994 102595-97-B-0179 Domestic Return Receipt

Is your R JRN ADDRESS com

side?

Thank you for using Return Receipt Service.

Farmland Hydro, L.P.

Charles W. Jenkins
Manager of Environmental and Safety Services

Green Bay Plant
County Road 640
Post Office Box 960
Bartow, Florida 33831
Tele: 941 533-1141
Fax: 941 533-8793

RECEIVED
FEB 26 1999
BUREAU OF
AIR REGULATION

February 24, 1999

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

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

RE: **Notification of Anticipated Date of Initial Start-up**
DEP File No. 1050053-019-AC

Dear Mr. Fancy:

According to the requirements of 40 CFR 60.7(a)(2), I am notifying you that we plan to start-up the new Sulfuric Acid Plant No. 6 on Tuesday, April 6, 1999. This is the date we expect to put sulfur on the burner.

If you have any questions or concerns, please give me a call at (941) 533-1141, extension 334.

Sincerely,

Charles W. Jenkins

Charles W. Jenkins
Manager of Environmental and Safety Services

CWJ:jp\34-99

cc: Bob Pyburn, FHLP
Leif Bouffard, FHLP
Doug Caraker, FHLP
John Friedman, FHLP

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

KA 123-97-02

December 31, 1998

RECEIVED
JAN 04 1999
BUREAU OF
AIR REGULATION

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

1050053-023-AC

Subject: Request For Permit Amendment
Farmland Hydro, L.P.
No. 6 Sulfuric Acid Plant
DEP File No. 1050053-019-AC, PSD-FL-243

Dear Clair:

This is a follow up to your telephone conversation with Pradeep Raval regarding a minor permit amendment of the above referenced permit.

Farmland began construction on the new plant on July 21, 1998. Specific Condition No. 7 of the above permit requires the permanent shutdown of the No. 3 Sulfuric Acid Plant (SAP) upon commencement of commercial operation of the new No. 6 SAP. It is requested that this permit condition be amended to allow operation of the No. 3 SAP for a period of one month after the commencement of commercial operation of the new plant, while the No. 4 SAP (identical to the No. 3 SAP) is shut down for a turnaround.

Please note that subsequent to the turnaround on No. 4 SAP, the No. 3 SAP will be permanently shutdown.

It is our understanding that you are not opposed to this proposal as one of the two identical plants (3 and 4) will be shut down when the No. 6 SAP commences commercial operation.

Enclosed is a check in the amount of $250 (permit amendment fee).

Thank you for your kind assistance in this matter. If you have any questions, please do not hesitate to call Pradeep or me.

Very truly yours,

KOOGLER & ASSOCIATES

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

JBK:par
Encl.

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

CC: S. Arif, BAR
EPA
NPS
SWD
POLK CO.

If IMAGESAFE™ logo in light gray tone is not present on back of document - Do not cash.

795

JOHN B. KOOGLER, P.A.
DBA KOOGLER & ASSOCIATES
4014 N.W. 13TH ST., 352-377-5822
GAINESVILLE, FL 32609

12/31 1998

63-2/630
00320

PAY TO THE ORDER OF Florida Dept of Environmental Protection $ 250.00

Two Hundred Fifty and 00/100 DOLLARS

Security features are included. Details on back.

First Union National Bank of Florida
Gainesville, Florida
24 Hour Information Service
1-800-735-1012

FOR Farmland Air permit Amendment

MP

[redacted] [redacted]

GUARDIAN ® SAFETY ©CLARKE AMERICAN BA

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

PROJECT

John R - F.Y.I. Make it if you can.
Kim - Reserve
Syed A - Your Project

OK -
upstairs
reserved.
Al

FAX TRANSMITTAL FORM

TO: Al Linero
Chuck Jenkins 941-533-8793

FAX NO.

FROM: John Koogler

DATE: 12/23/98 SENT BY:

The text being transmitted consist s of 1 page(s) PLUS this one. If you do not receive all of the pages or if there are difficulties with this transmission, please call (352) 377-5822.

REMARKS:

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

MEMORANDUM

VIA FAX

TO: Al Linero, FDEP
Charles Jenkins, Farmland

FROM: John Koogler

DATE: December 23, 1998

SUBJECT: Farmland Meeting

This memo is to confirm our meeting scheduled for January 14, 1999, at 10:00 a.m. at the FDEP office in Tallahassee, Florida. The purpose of the meeting is to discuss the startup strategy for Farmland's new sulfuric acid plant.

If you have any questions regarding this meeting, please do not hesitate to contact me at 352-377-5822.

c: Mr. Pradeep Raval

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF FINAL PERMIT

In the Matter of an
Application for Permit

Mr. C.M. Farris
Farmland Hydro, L.P.
Post Office Box 960
Bartow, Florida 33831

DEP File No. 1050053-019-AC
PSD-FL-243

Enclosed is the FINAL Permit Number PSD-FL-243 for the constructionof a new 2750 tons per day sulfuric acid plant (SAP 6) at the Farmland Hydro, L.P., Green Bay Facility, Polk County. This permit is issued pursuant to Chapter 403, Florida Statutes and in accorance with Rule 62-212.400., F.A.C. - Prevention of Significant Deterioration(PSD).

Any party to this order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, F.S., by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department of Environmental Protection in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000, and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 (thirty) days from the date this Notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

C.H. Fancy, P.E., Chief
Bureau of Air Regulation

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF FINAL PERMIT (including the FINAL permit) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 7-15-98 to the person(s) listed:

Mr. C.M. Farris, Farmland *
Mr. Brian Beals, EPA
Mr. John Bunyak, NPS
Mr. Bill Thomas, DEP

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52(7), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Kori Doker 7-15-98
(Clerk) (Date)

BEST AVAILABLE COPY

Is your **RETURN ADDRESS** completed on the reverse side?

SENDER:
- Complete items 1 and/or [illegible] 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 Addr
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
C. M. Farris
Farmland Hydro, LP
P O Box 960
Bartow, Fl 33831

4a. Article Number
P 265 659 389

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

7. Date of Delivery
7-20-98

5. Received By: *(Print Name)*
Jean Hicks

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

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

PS Form 3811, December 1994 102595-97-B-0179 **Domestic Return Receipt**

Thank you for

P 265 659 389

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail *(See reverse)*

Sent to C M Farris
Street & Number Farmland Hydro
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 7-15-98
1056053-019-AC
PSD-Fl-243

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 14, 1998

RECEIVED
JAN 16 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 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**

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

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

P 265 659 323
NO Green Card

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail *(See reverse)*

Sent to	Charles Jenkins
Street & Number	Farmland Hydro
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	1050053-019-AC PSD-FL-243 #6 3/27/98

PS Form **3800**, April 1995

March 26, 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:

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,

3 26

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

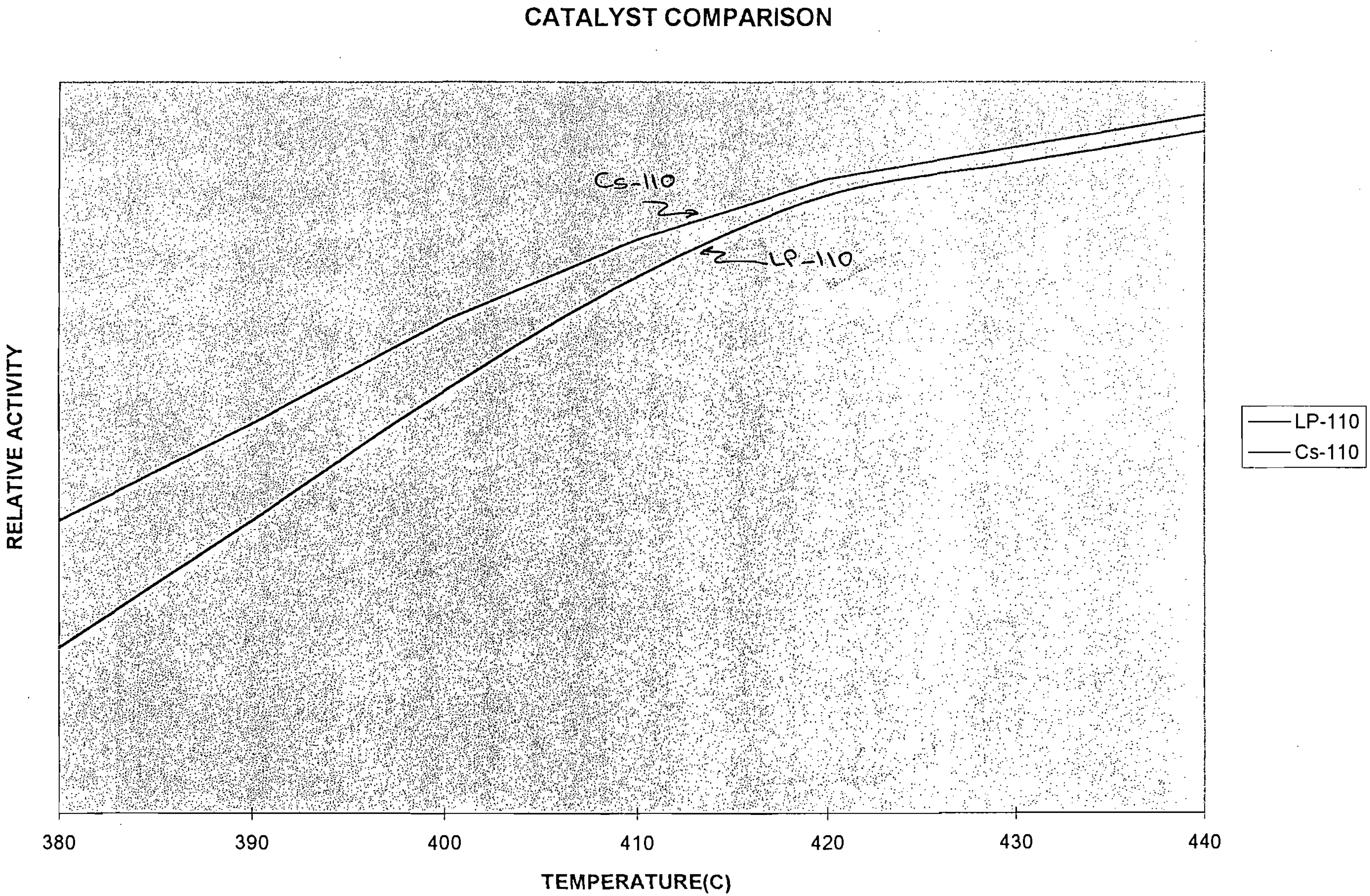
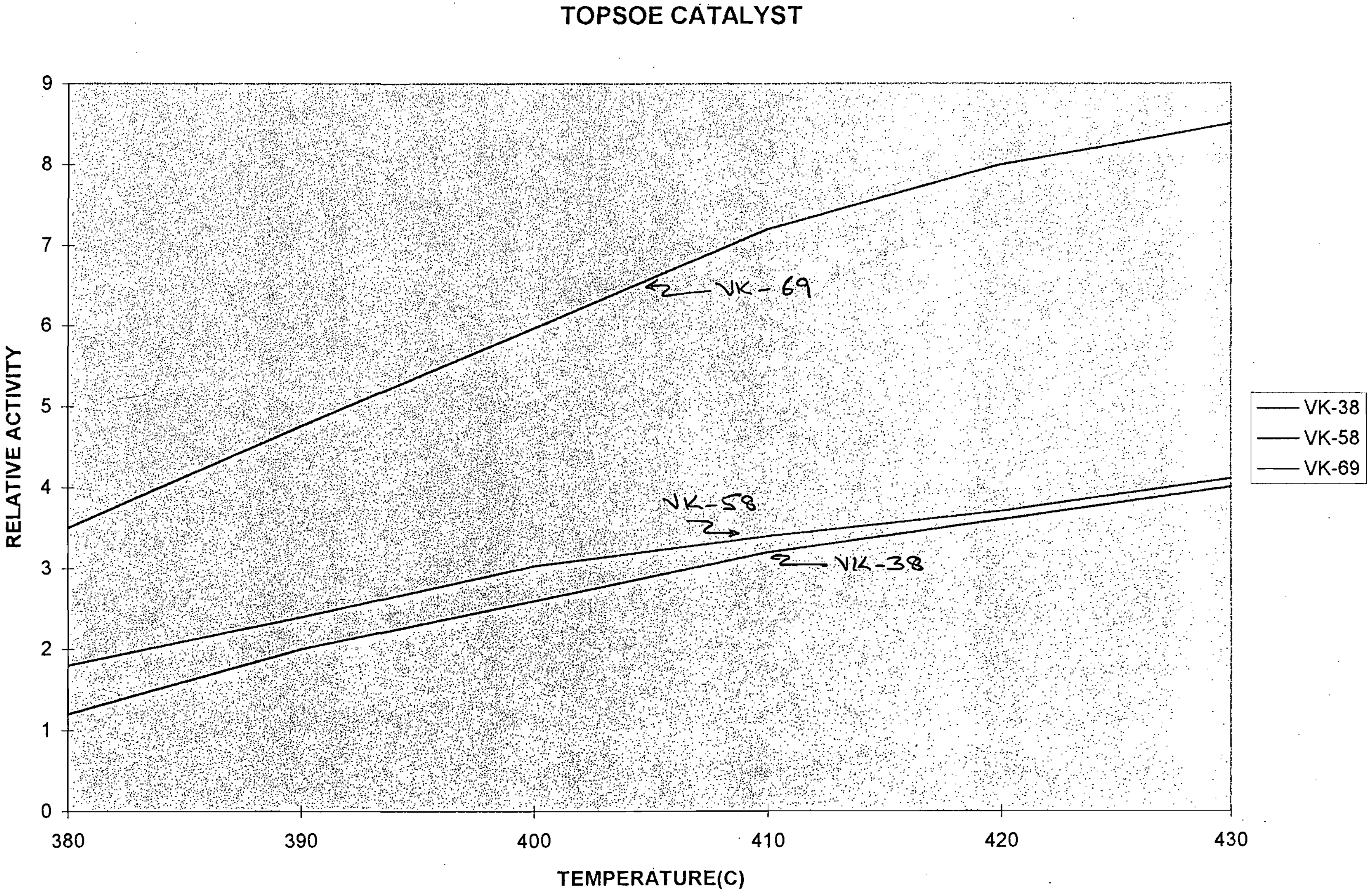

CATALYST COMPARISON
RELATIVE ACTIVITY
TEMPERATURE(C)
380
390
400
410
420
430
440
Cs-110
LP-110
LP-110
Cs-110

FIGURE 2



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

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

KA 123-97-02

March 12, 1998

RECEIVED
MAR 13 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 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).**

<u>RESPONSE</u>:

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

3. **Public access relative to air dispersion modeling.**

<u>RESPONSE</u>:

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 Atis Vavere

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.

DRAFT

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]

Is your **RETURN ADDRESS** completed on the reverse side?

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

Consult postmaster for fee.

3. Article Addressed to:

Charles W. Jenkins, Mgr.
Env. & Safety Services
Farmland Hydro
P O Box 960
Bartow, Fl
33831

4a. Article Number
P265 659 291

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

7. Date of Delivery
2-16-98

5. Received By: *(Print Name)*

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

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

PS Form **3811,** December 1994

Domestic Return Receipt

Thank you for using Return Receipt Service.

P 265 659 291

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail *(See reverse)*

Sent to
Charles Jenkins

Street & Number
Farmland Hydro

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
2-11-98
1050053-019-AC
PSD-Fl-243

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.

ATTACHMENT 1

UPDATED EMISSION RATE CALCULATIONS

KOOGLER & ASSOCIATES

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 = 13.1 lbs/hr
(SAM) 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:

S02 = 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 H2S04 production rates:

PM = 9.7 tpy x 1.1 = 10.7 tpy

S02 = 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

S02 = 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

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.	CLASS I AREA IMPACTS (1)(2)				CLASS II AREA IMPACTS (1)(2)			
DATA	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

	SULFUR DIOXIDE IMPACT ($\mu g/m^3$)					
MET	PSD			AAQS		
DATA	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 ANNUAL(1)	PSD 3-HOUR(2)	PSD 24-HOUR(2)	AAQS ANNUAL(1)	AAQS 3-HOUR(2)	AAQS 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.

your RETURN ADDRESS completed on the reverse side?

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

Consult postmaster for fee.

3. Article Addressed to:

Mr. C.M. Farris, VP-operations
Farmland Hydro, LP
4390 County Rd-640 West
Bartow, Fl
33830

4a. Article Number
P 265 659 350

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

7. Date of Delivery
5/22/98

5. Received By: (*Print Name*)
Jean Hicks

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

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PS Form **3800**, April 1995

Memorandum

Florida Department of
Environmental Protection

TO: Clair Fancy, Chief, BAR aaf for CHF 5/19

THRU: Al Linero, P.E. Administrator, NSRS A A Linero 5/19

FROM: Syed Arif, P.E. Syed Arif 5/14/98

DATE: May 14, 1998

SUBJECT: Farmland Hydro, L.P.
Green Bay Sulfuric Acid Plant No. 6
DEP File No. 1050053-019-AC; PSD-FL-243

Attached is the Public Notice package for the construction of a new 2750 tons per day (TPD) sulfuric acid plant. The new plant will replace the existing 2100 TPD No. 3 plant which will be permanently shut down. Control of sulfur dioxide (SO_2) emissions is accomplished by the process itself which is based on the conversion SO_2 to SO_3 and subsequent recovery as sulfuric acid product. The second absorption tower improves the efficiency of the process and also serves as the pollution control equipment The high efficiency mist eliminators together with proper plant operation serves to minimize sulfuric acid mist emissions. The nitrogen oxides emissions will be minimized by good combustion practices.

The BACT for SO_2 was determined to be 3.5 lb/ton on a three hour basis. This is the most stringent BACT determination for any sulfuric acid plant in Florida. The BACT for sulfuric acid mist emissions will still be 0.15 lb/ton which is consistent with other BACT in the state.

I recommend your approval and signature.

SA

Attachments

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

G.9 In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extend it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

G.10 The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

G.11 This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

G.12 This permit or a copy thereof shall be kept at the work site of the permitted activity.

G.13 This permit also constitutes:

(a) Determination of Best Available Control Technology *(X)*;
(b) Determination of Prevention of Significant Deterioration *(X)*; and
(c) Compliance with New Source Performance Standards *(X)*

G.14 The permittee shall comply with the following:

(a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

(b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application or this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

(c) Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;
2. The person responsible for performing the sampling or measurements;
3. The dates analyses were performed;
4. The person responsible for performing the analyses;
5. The analytical techniques or methods used; and
6. The results of such analyses.

G.15 When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

APPENDIX GC

GENERAL PERMIT CONDITIONS [F.A.C. 62-4.160]

G.1 The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

G.2 This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings or exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

G.3 As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey and vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

G.4 This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

G.5 This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

G.6 The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

G.7 The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

(a) Have access to and copy and records that must be kept under the conditions of the permit;
(b) Inspect the facility, equipment, practices, or operations regulated or required under this permit, and,
(c) Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

G.8 If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

(a) A description of and cause of non-compliance; and
(b) The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

permitted capacity; in this case, subsequent emissions unit operation is limited to 110 percent of the test load until a new test is conducted. Once the unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purpose of additional compliance testing to regain the authority to operate at the permitted capacity. **[Rule 62-297.310(2) and (3), F.A.C.]**

SUBSECTION 6.0 REPORTS AND RECORDS

6.1 Duration: All reports and records required by this permit shall be kept for at least (5) years from the date the information was recorded. **[Rule 62-4.160(14)(b), F.A.C.]**

6.2 Emission Compliance Stack Test Reports:

(a) A *test report* indicating the results of the required compliance tests shall be filed with the Permitting Authority as soon as practical, but no later than 45 days after the last sampling run is completed. **[Rule 62-297.310(8), F.A.C.]**

b) The *test report* shall provide sufficient detail on the tested emission unit and the procedures used to allow the Department to determine if the test was properly conducted and if the test results were properly computed. At a minimum, the test report shall provide the applicable information listed in **Rule 62-297.310(8), F.A.C.**

6.3 Excess Emissions Report: If excess emissions occur, the owner or operator shall notify the Permitting Authority within (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem. In addition, the Department may request a written summary report of the incident. Pursuant to the New Source Performance Standards, excess emissions shall also be reported in accordance with 40 CFR 60.7, Subpart A. **[Rules 62-4.130 and 62-210.700(6), F.A.C.]**

6.4 Annual Operating Report for Air Pollutant Emitting Facility: Before March 1st of each year, the owner or operator shall submit to the Permitting Authority this required report [DEP Form No. 62-210.900(5)], which summarizes operations for the previous calendar year. **[Rule 62-210.370(3), F.A.C.]**

SUBSECTION 7.0 OTHER REQUIREMENTS

7.1 Waste Disposal: The owner or operator shall treat, store, and dispose of all liquid, solid, and hazardous wastes in accordance with all applicable Federal, State, and Local regulations. This air pollution permit does not preclude the permittee from securing any other types of required permits, licenses, or certifications.

SUBSECTION 5.0 TEST REQUIREMENTS

5.1 Test Performance Within 60 days after achieving the maximum production rate at which these emission units will be operated, but not later than 180 days after initial startup and annually thereafter, the owner or operator of this facility shall conduct performance test(s) pursuant to 40 CFR 60.8, Subpart A, General Provisions and 40 CFR 60, Appendix A. No other test method shall be used unless approval from the Department has been received in writing. Unless otherwise stated in the applicable emission limiting standard rule, testing of emissions shall be conducted with the emission unit(s) operating at permitted capacity pursuant to Rule 62-297.310(2), F.A.C. **[Rules 62-204.800, 62-297.310, 62-297.400, 62-297.401, F.A.C.]**

5.2 Test Procedures shall meet all applicable requirements of the Florida Administrative Code Chapter 62-297. **[Rule 62-297.310, F.A.C.]**

5.3 Test Notification: The owner or operator shall notify the Permitting Authority in writing at least *(30) days* (initial) and *15 days* (annual) prior to each scheduled compliance test to allow witnessing. The notification shall include the compliance test date, place of such test, the expected test time, the facility contact person for the test, and the person or company conducting the test. The (30) or (15) day notification requirement may be waived at the discretion of the Department. Likewise, if circumstances prevent testing during the test window specified for the emission unit, the owner or operator may request an alternate test date before the expiration of this window. **[Rule 62-297.310 and 40 CFR 60.8, F.A.C.]**

5.4 Special Compliance Tests: When the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in Rule 62-204, 62-210, 62 -212, 62-296 and 62-297, F.A.C. or in a permit issued pursuant to those rules is being violated, it may require the owner or operator of the facility to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions units and to provide a report on the results of said tests to the Permitting Authority. **[Rule 62-297.310(7)(b), F.A.C.]**

5.5 Stack Testing Facilities: The owner or operator shall install stack testing facilities in accordance with **Rule 62-297.310(6), F.A.C.**.

5.6 Exceptions and Approval of Alternate Procedures and Requirements: An Alternate Sampling Procedure (ASP) may be requested from the Bureau of Air Monitoring and Mobile Sources of the Florida Department of Environmental Protection in accordance with the procedures specified in **Rule 62-297.620, F.A.C.**

5.7 Operating Rate During Testing: Unless otherwise stated in the applicable emission limiting standard rule, testing of emissions shall be conducted with the emissions unit operation at permitted capacity. Permitted capacity is defined as 90 to 100 percent of the maximum operation rate allowed by the permit. If it is impracticable to test at permitted capacity, an emissions unit may be tested at less than the minimum any liability for failure to comply with the conditions of this permit and the regulations. **[Rule 62-4.130, F.A.C.]**

3.3 Circumvention: The owner or operator shall not circumvent the air pollution control equipment or allow the emission of air pollutants without this equipment operating properly. **[Rules 62-210.650, F.A.C.]**

3.4 Excess Emissions Requirements **[Rule 62-210.700, F.A.C.]**

(a) Excess emissions resulting from start-up, shutdown or malfunction of these emissions units shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized, but in no case exceed two hours in any 24 hour period unless specifically authorized by the Permitting Authority office for longer duration. **[Rule 62-210.700(1), F.A.C.]**

(b) Excess emissions that are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure that may reasonably be prevented during start-up, shutdown, or malfunction shall be prohibited. **[Rule 62-210.700(4), F.A.C.]**

(c) In case of excess emissions resulting from malfunctions, the owner or operator shall notify Permitting Authority within one (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the problem; and the corrective actions being taken to prevent recurrence. **[Rule 62-210.700(6), F.A.C.]**

3.5 Operating Procedures: Operating procedures shall include good operating practices and proper training of all operators and supervisors. The good operating practices shall meet the guidelines and procedures as established by the equipment manufacturers. All operators (including supervisors) of air pollution control devices shall be properly trained in plant specific equipment. **[Rule 62-4.070(3), F.A.C.]**

SUBSECTION 4.0 MONITORING OF OPERATIONS

4.1 Determination of Process Variables

(a) The permittee shall operate and maintain equipment and/or instruments necessary to determine process variables, such as process weight input or heat input, when such data is needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.

(b) Equipment and/or instruments used to directly or indirectly determine such process variables, including devices such as belt scales, weigh hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value. **[Rule 62-297.310(5), F.A.C]**

- Landscaping or planting of vegetation.
- Use of hoods, fans, filters, and similar equipment to contain, capture and/or vent particulate matter.
- Confining abrasive blasting where possible.
- Enclosure or covering of conveyor systems.

NOTE: Facilities that cause frequent, valid complaints may be required by the Permitting Authority to take these or other reasonable precautions. In determining what constitutes reasonable precautions for a particular source, the Department shall consider the cost of the control technique or work practice, the environmental impacts of the technique or practice, and the degree of reduction of emissions expected from a particular technique or practice.

2.3 General Pollutant Emission Limiting Standards: **[Rule 62-296.320, F.A.C.]**

(a) The owner or operator shall not store, pump, handle, process, load, unload or use in any process or installation, volatile organic compounds or organic solvents without applying known and existing vapor emission control devices or systems.

(b) No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor.

NOTE: An objectionable odor is defined as any odor present in the outdoor atmosphere which by itself or in combination with other odors, is or may be harmful or injurious to human health or welfare, which unreasonably interferes with the comfortable use and enjoyment of life or property, or which creates a nuisance. [F.A.C. 62-210.200(198)]

SUBSECTION 3.0 OPERATION AND MAINTENANCE

3.1 Changes/Modifications: The owner or operator shall submit to the Permitting Authority(s), for review any changes in, or modifications to: the method of operation; process or pollution control equipment; increase in hours of operation; equipment capacities; or any change which would result in an increase in potential/actual emissions. Depending on the size and scope of the modification, it may be necessary to submit an application for, and obtain, an air construction permit prior to making the desired change. *Routine maintenance of equipment will not constitute a modification of this permit.* **[Rule 62-4.030, 62-210.300 and 62-4.070(3), F.A.C.]**

3.2 Plant Operation - Problems: If temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by fire, wind or other cause, the owner or operator shall notify the Permitting Authority as soon as possible, but at least within (1) working day, excluding weekends and holidays. The notification shall include: pertinent information as to the cause of the problem; the steps being taken to correct the problem and prevent future recurrence; and where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from

APPENDIX CSC

EMISSION UNIT(S) COMMON SPECIFIC CONDITIONS

SUBSECTION 1.0 CONSTRUCTION REQUIREMENTS

1.1 Applicable Regulations: Unless otherwise indicated in this permit, the construction and operation of the subject emission unit(s) shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of Chapter 403, F.S and Florida Administrative Code Chapters 62-4, 62-103, 62-204, 62-210, 62-212, 62-213, 62-296, 62-297; and the applicable requirements of the Code of Federal Regulations Section 40, Part 60, adopted by reference in the Florida Administrative Code regulation **[Rule 62-204.800 F.A.C.]**. Issuance of this permit does not relieve the facility owner or operator from compliance with any applicable federal, state, or local permitting requirements or regulations. **[Rule 62-210.300, F.A.C.]**

SUBSECTION 2.0 EMISSION LIMITING STANDARDS

2.1 General Particulate Emission Limiting Standards. General Visible Emissions Standard: Except for emissions units that are subject to a particulate matter or opacity limit set forth or established by rule and reflected by conditions in this permit, no person shall cause, let, permit, suffer, or allow to be discharged into the atmosphere the emissions of air pollutants from any activity, the density if which is equal to or greater than that designated as Number 1 on the Ringelmann Chart (20% opacity). **[Rule 62-296-320(4)(b)1, F.A.C.]**

2.2 Unconfined Emissions of Particulate Matter **[Rule 62-296.320(4)(c), F.A.C.]**

(a) The owner or operators shall not cause, let, permit, suffer or allow the emissions of unconfined particulate matter from any source whatsoever, including, but not limited to, vehicular movement, transportation of materials, construction, alteration, demolition or wrecking, or industrially related activities such as loading, unloading, storing or handling, without taking reasonable precautions to prevent such emission.

(b) Any permit issued to a facility with emissions of unconfined particulate matter shall specify the reasonable precautions to be taken by that facility to control the emissions of unconfined particulate matter.

(c) Reasonable precautions include the following:

- Paving and maintenance of roads, parking areas and yards.
- Application of water or chemicals to control emissions from such activities as demolition of buildings, grading roads, construction, and land clearing.
- Application of asphalt, water, oil, chemicals or other dust suppressants to unpaved roads, yards, open stock piles and similar activities.
- Removal of particulate matter from roads and other paved areas under the control of the owner or operator of the facility to prevent reentrainment, and from buildings or work areas to prevent particulate from becoming airborne.

The Department notes that Haldor-Topsoe claims its cesium line has an advantage over its non-cesium line at all typical operating temperatures. However the Haldor-Topsoe product is not an option for this project and the Department recognizes that the applicant has alternatives available to achieve emissions reflective of the Department's BACT determination.

The applicant will achieve the proposed emissions limits by improving the sulfur dioxide conversion of a traditional double absorption plant. The improvement over a traditional plant will be accomplished by an increase in the size of the converter; increase in the catalyst loading; increase in the 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. This is considered to be equivalent to BACT for sulfur dioxide. The emission limit of 3.5 pounds per ton of acid averaged over three hours is more stringent than the limit set for the Piney Point Plant where emissions are averaged over 48 hours.

Control options involving production of by-products or wastes have been rejected by Farmland. There is no indication that add-on control methods are competitive with process improvements that result in production of additional sulfuric acid. Recovery of sulfuric acid mist is an economic necessity as well as an environmental requirement. High efficiency mist eliminators are considered BACT for sulfuric acid mist.

The Department agrees with the applicant that the sulfur burning process utilized in the sulfuric acid plant inherently produces low NO_X emissions, and is considered BACT for NO_X.

COMPLIANCE METHODOLOGY:

Demonstration of compliance with the emissions limits shall be as required by Subpart H. These are EPA Reference Method 8 for SO_2 and SAM. EPA Methods 1, 2, and 3 shall be used to determine stack and flue gas properties. An initial and annual compliance test for NO_X using EPA Method 7E is required to verify the low emission rate projected in the application.

DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:

Syed Arif, P.E., Permit Engineer, New Source Review Section
Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended By:	Approved By:
C. H. Fancy, P.E., Chief Bureau of Air Regulation	Howard L. Rhodes, Director Division of Air Resources Management
Date:	Date:

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

BACT DETERMINATION PROCEDURE:

In accordance with Chapter 62-212, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

- Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.
- All scientific, engineering, and technical material and other information available to the Department.
- The emission limiting standards or BACT determination of any other state.
- The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically unfeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

BACT DETERMINATION BY DEP:

POLLUTANT	CONTROL TECHNOLOGY	EMISSION LIMIT
Sulfur Dioxide	Double Absorption	3.5 lb/ton 100% H_2SO_4
Sulfuric Acid Mist	High Efficiency Mist Eliminators	0.15 pounds per ton 100% H_2SO_4
Visibility	As Above and Process Controls	10 percent
Nitrogen Oxides	None - Low Fuel Nitrogen, Combustion Temperature	0.12 lb/ton 100% H_2SO_4 Applicant Estimate

DETERMINATION RATIONALE:

The BACT determination has been based on the established double absorption technology wherein the production process and the BACT are identical, thus eliminating the need for add-on control equipment. The applicant's BACT proposal for SO_2 is more stringent than the NSPS and previous BACT determinations.

The BACT determination for the permit issued on February 2, 1998 to Piney Point Phosphates, Manatee County serves as a basis for the evaluation of the new plant at Farmland, L.P. In the evaluation of the Piney Point plant, the Department concluded that an SO_2 emission limit of 2.4-3.2 pounds per ton of acid produced was feasible by using cesium-promoted vanadium catalyst in the final pass in place of conventional vanadium catalyst. According to Monsanto Enviro-Chem, the full service vendor, the optimum plant operating conditions for the Farmland project are such that the cesium promoted catalyst will not yield a reduction in SO_2 emissions. This is because the Monsanto cesium-promoted catalyst has an advantage over the non-cesium product only at lower temperatures.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

Sulfuric Acid Plant
Farmland Hydro, L.P.
PSD-FL-243 and 1050053-019-AC
Bartow, Polk County

BACKGROUND

The applicant, Farmland Hydro, L.P., proposes to replace the existing 2100 ton per day (TPD) No. 3 sulfuric acid plant (SAP) with a new 2750 TPD No. 6 SAP at the existing facility in Polk County.

The proposed project will result in "significant increases" with respect to Table 62-212.400-2, Florida Administrative Code (F.A.C.) of emissions of sulfur dioxide (SO_2), sulfuric acid mist (SAM), and nitrogen oxides (NO_X). The project is therefore subject to review for the Prevention of Significant Deterioration (PSD) and a determination of Best Available Control Technology (BACT) in accordance with Rule 62-212.400, F.A.C.

Descriptions of the process, project, ambient air quality effects, and rule applicability are given in the separate Technical Evaluation and Preliminary Determination issued with the Department's Intent and Public Notice package.

DATE OF RECEIPT OF A BACT APPLICATION:

The BACT application was received on November 20, 1997.

REVIEW GROUP MEMBERS:

Syed Arif, P.E.

BACT DETERMINATION REQUESTED BY THE APPLICANT:

POLLUTANT	CONTROL TECHNOLOGY	PROPOSED BACT LIMIT
Sulfur Dioxide	Double Absorption	3.5 pounds per ton 100% H_2SO_4
Sulfuric Acid Mist	Fiber Mist Eliminators	0.15 pounds per ton 100% H_2SO_4
Visibility	As Above and Process Controls	10 percent
Nitrogen Oxides	None - Low Fuel Nitrogen, Combustion Temperature	0.12 pounds per ton 100% H_2SO_4

The applicant has proposed to use the double absorption process and improved process control technology to achieve the proposed limits. These limits will be met by converting SO_2 produced into sulfur trioxide (SO_3), absorbing the SO_3 in circulating streams of sulfuric acid, and minimizing SAM formation and losses by process controls and high efficiency mist eliminators.

APPENDIX A
BEST OPERATIONAL START-UP PRACTICES FOR SULFURIC ACID PLANTS

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5. Warm Restart.

   a. Converter

   The inlet and outlet temperatures of the first two catalyst masses should be sufficiently high to ensure conversion. One of the following three conditions must be met:

   (1) The first two catalyst masses inlet and outlet temperatures must be at a minimum of 700°F; or.

   (2) Two of the four inlet and outlet temperatures must be greater than or equal to 800°F; or.

   (3) The inlet temperature of the first catalyst must be greater than or equal to 600°F and the outlet temperature greater than or equal to 800°F. Also, the inlet and outlet temperatures of the second catalyst must be greater than or equal to 700°F.

   Failure to meet one of the above conditions, requires use of cold start-up procedures.

   To allow for technologies improvements or individual plant conditions, alternative conditions will be considered by the Department in appropriate cases.

   b. Absorbing Towers.

   The concentration., temperature and flow of circulating acid shall be as near to normal conditions as reasonably can be achieved. In no event shall the concentration be less than 96 percent H_2SO_4.

APPENDIX A
BEST OPERATIONAL START-UP PRACTICES FOR SULFURIC ACID PLANTS

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1. Only one sulfuric acid plant at a facility should be started up and burning sulfur at a time. There are times when it will be acceptable for more than one sulfuric acid plant to be in the start-up mode at the same time, provided the following condition is met. It is not acceptable to initiate sulfur burning at one sulfuric acid plant when another plant at the same facility is emitting SO_2 at a rate in excess of the emission limits imposed by the permit or rule, as determined by the CEMs emission rates for the immediately preceding 20 minutes.

2. A plant start-up must be at the lowest practicable operating rate, not to exceed 70 percent of the designated operating rate, until the SO_2 monitor indicates compliance. Because production rate is difficult to measure during start-up, if a more appropriate indicator (such as blower pressure, furnace temperature, gas strength, blower speed, number of sulfur guns operating, etc.) can be documented, tested and validated, the Department will accept this in lieu of directly documenting of the suitable list of surrogate parameters to demonstrate and document the reduced operating rate on a plant-by-plant basis. Documentation that the plant is conducting start-up at the reduced rate is the responsibility of the owner or operator.

3. Sulfuric acid plants are authorized to emit excess emissions from start-up for a period of three consecutive hours provided best operational practices, in accordance with this agreement, to minimize emissions are followed. No plant shall be operated (with sulfur as fuel) out of compliance for more than three consecutive hours. Thereafter, the plant shall be shut down. the plant shall be shut down (cease burning sulfur) if, as indicated by the continuous emission monitoring system, the plant is not in compliance within three hours of startup. Restart may occur as soon as practicable following any needed repairs or adjustments, provided the corrective action is taken and properly documented.

4. Cold Start-Up Procedures.

   a. Converter.

      (1) The inlet and outlet temperature at the first two masses of catalyst shall be sufficiently high to provide immediate ignition when SO_2 enters the masses. In no event shall the inlet temperature to the first mass be less than 800°F or the outlet temperature to the first two masses be less than 700°F. These temperatures are the desired temperatures at the time the use of auxiliary fuel is terminated

      (2) The gas stream entering the converter shall contain SO_2 at a level less than normal, and sufficiently low to promote catalytic conversion to SO_3.

   b. Absorbing Towers.

      The concentration., temperature and flow of circulating acid shall be as near to normal conditions as reasonably can be achieved. In no event shall the concentration be less than 96 percent H_2SO_4.

Table 1 Air Pollutant Standards and Terms.

FACILITY ID NUMBER: 1050053

Permittee:
Farmland Hydro, L.P.

Permit No.: 1050053-019-AC
Sulfuric Acid Plant and Molten Sulfur Handling and Storage

Emission Units - Sulfuric Acid Plant, Molten Sulfur Handling/Storage

				Allowable Emissions [2]		Equivalent Emissions [3]	
E.U. ID#	Description	Pollutant ID	Fuel(s) [2]	Permit limits	lb/hr [1]	TPY	Basis
38	Sulfuric Acid Plant	SO_2	molten sulfur	3.5 lb/ton acid	401	1757	BACT
38	Sulfuric Acid plant	SAM	molten sulfur	0.15 lb/ton acid	17.2	75	NSPS
38	Sulfuric Acid plant	NOX	molten sulfur	0.12 lb/ton acid	13.8	60	Application
38	Sulfuric Acid plant	VE	molten sulfur	10 % opacity			NSPS
30-36	Molten Sulfur Handling	VE		20 % opacity			AC53-169874

ALLOWABLE OPERATING RATES

Hours of operation per year	8760
Molten Sulfur Utilization	2,530 tons per day for the site [4]
Sulfuric Acid Production	2,750 tons per day for E.U ID# 38 [4]

NOTES

(1) At a maximum sulfuric acid production rate of 2,750 TPD as 100 percent sulfuric acid.

(2) Compliance Units. This facility shall demonstrate compliance based on these standards.

(3) "Equivalent Emissions" are based on annual emissions at 8760 hrs/yr. The "Equivalent Emissions" are also listed for informational purpose and for PSD and recordkeeping tracking purposes.

[4] Ton = 2000 pounds. Any data reported as Long Tons (1000 kg) must be converted to Tons to determine compliance.

SECTION I. FACILITY INFORMATION

8. The permittee shall comply with all applicable requirements of the Department's sulfur storage and handling rule. **[Rule 62-296.411, F.A.C.]**

9. No person shall cause, suffer, allow, or permit the discharge of air pollutants which cause or contribute to an objectionable odor. **[Rule 62-296.320, F.A.C.]**

10. In order to minimize excess emissions during startup/shutdown/malfunction these emissions units shall adhere to best operational practices. The provisions of the Memorandum of Understanding issued by the Department on November 21, 1989, are hereby added to this permit as Appendix A and shall be added to the Title V permit. **[Rule 62-210.700, F.A.C., 40 CFR 60.7]**

11. A continuous emissions monitoring system (CEMS) for the measurement of sulfur dioxide emissions shall be installed, calibrated, operated and maintained in accordance with 40 CFR 60.84 (1996 version)

12. Compliance with the emission limits for SO_2, SAM, and NO_X shall be determined using the following reference methods as described in 40 CFR 60, Appendix A (1996, version), adopted by reference in Chapter 62-204, F.A.C.

Method 7E	Determination of Nitrogen Oxides from Stationary Sources.
Method 8	Determination of Sulfuric Acid Mist and Sulfur Dioxide Emissions from Stationary Sources. (for demonstrating compliance with 40 CFR 60, Subpart H)
Method 9	Visual Determination of the Opacity of Emissions from Stationary Sources.

These emissions units shall comply with all applicable requirements of Rule 62-297.310, F.A.C. General Test Requirements and 40 CFR 60.8 Performance Tests.

Testing of emissions shall be conducted with the emissions units operating at permitted capacity, which is defined as 90-100% of the maximum operating rate allowed by the permit. If it is impracticable to test at permitted capacity, then the unit may be tested at less than 90% of the maximum operating rate allowed by the permit; in this case, subsequent source operation is limited to 110% of the test load until a new test is conducted. Once the unit is so limited, then operation at higher capacities is allowed for no more than fifteen consecutive days for the purpose of additional compliance testing to regain the permitted capacity in the permit. **[Rules 62-204.800, 62-297.310, 62-297.400, 62-297.401, F.A.C., and 40 CFR 60 Appendix A and 40 CFR 60.8, Subpart A].**

13. This facility shall maintain a central file containing all measurements, records, and other data that are required to be collected pursuant to this permit. The Department shall be notified in writing at least 15 days prior to compliance testing. Written reports of the compliance tests shall be submitted to the Southwest District Office within 45 days of test completion. **[Rule 62-4.070(3), F.A.C.]**

14. An application for a Title V permit for the No. 6 sulfuric acid plant shall be submitted to the Department at least 90 days prior to the expiration date of this permit. Any request for the extension of this permit shall be submitted to the Department 60 days prior to permit expiration.

15. This facility shall maintain adequate fencing or physical barriers around the area within 450 meters of the origin of the polar coordinate system used as input in the air dispersion modeling submitted with the permit application.

SPECIFIC CONDITIONS - SULFURIC ACID PLANT AND MOLTEN SULFUR STORAGE AND HANDLING:

The following Specific Conditions apply to the following emission units:

EMISSIONS UNIT NO.	SYSTEM	EMISSIONS UNITS DESCRIPTION
003	Process	Sulfuric Acid Plant No. 3
038	Process	Sulfuric Acid Plant No. 6
030-036	Raw Material	Molten Sulfur Storage and Handling System

1. Emissions unit 038 shall comply with all applicable provisions of the 40 CFR 60, Standards of Performance for New Stationary Sources, Subpart H, Sulfuric Acid Plants. **[Rule 62-204.800(7)(b)10., F.A.C]**
2. Emissions unit 038 shall also comply with all applicable requirements of 40 CFR 60, Standards of Performance for New Stationary Sources, Subpart A, General Provisions. These include:
   - CFR 60.7, Notification and record keeping
   - CFR 60.8, Performance tests
   - CFR 60.11, Compliance with standards and maintenance requirements
   - CFR 60.12, Circumvention
   - CFR 60.13, Monitoring requirements
   - CFR 60.19, General notification and reporting requirements
3. Emissions of sulfur dioxide (SO_2), sulfuric acid mist (SAM), visible emissions (VE), and nitrogen oxides (NO_X) from the sulfuric acid plant shall not exceed the following limits: **[Rules 62-204.800(7)(b)10; 62-210.200; 62-212, F.A.C.]**

Pollutant	Pounds per Hour	Tons per Year	Limit Basis
SO_2	401.0	1757	3.5 lb/ton 100% H_2SO_4 produced (BACT)[1]
SAM	17.2	75	0.15 lb/ton 100% H_2SO_4 produced (NSPS)[1]
VE	10% opacity		NSPS
NO_X	13.8	60	0.12 lb/ton 100% H_2SO_4 produced (BACT)

1. Annual EPA Method 8 test is required to demonstrate compliance.

4. The design production capacity of the No. 6 plant shall not exceed 2,750 tons per day (TPD) of 100 percent (%) sulfuric acid. The production rate shall not exceed 2,750 TPD as 100% sulfuric acid on a 24-hour basis. **[Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]**
5. The maximum molten sulfur utilization rate for the facility shall neither exceed 2,530 TPD nor 924,000 tons per year. (Based on the maximum permitted sulfuric acid production rate of 7,650 TPD of 100% sulfuric acid for the facility) **[Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]**
6. These emissions units are allowed to operate continuously (8760 hours/year) **[Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]**
7. The existing No. 3 sulfuric acid plant (Emission Unit No. 003) shall cease operation and be permanently shut down when a new No. 6 sulfuric acid plant commences commercial operations. **[Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]**

SECTION I. FACILITY INFORMATION

GENERAL AND ADMINISTRATIVE REQUIREMENTS

1. Regulating Agencies: All documents related to applications for permits to operate, reports, tests, minor modifications and notifications shall be submitted to the Department of Environmental Protection, Southwest District Office, 3804 Coconut Palm Drive, Tampa, Florida 33619-8218 (phone number: 813/744-6100). All applications for permits to construct or modify an emissions unit(s) *subject to the Prevention of Significant Deterioration or Nonattainment (NA) review requirements* should be submitted to the Bureau of Air Regulation (BAR), Florida Department of Environmental Protection (FDEP), 2600 Blairstone Road, Tallahassee, Florida 32399-2400 (phone number 850/488-1344).

2. General Conditions: The owner and operator is subject to and shall operate under the attached General Permit Conditions G.1 through G.15 listed in *Appendix GC* of this permit. General Permit Conditions are binding and enforceable pursuant to Chapter 403 of the Florida Statutes. **[Rule 62-4.160, F.A.C.]**

3. Emission Unit(s) Common Specific Conditions: The owner and operator is subject to and shall operate under the attached Emission Unit(s) Common Specific Conditions listed in *Appendix CSC* of this permit. The Emission Unit(s) Common Specific Conditions are binding and enforceable pursuant to Chapters 62-204 through 62-297 of the Florida Administrative Code.

4. Terminology: The terms used in this permit have specific meanings as defined in the corresponding chapters of the Florida Administrative Code.

5. Forms and Application Procedures: The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. **[Rule 62-210.900, F.A.C.]**

6. Expiration: This air construction permit shall expire on October 31, 2000 **[Rule 62-210.300(1), F.A.C.]**. The permittee may, for good cause, request that this construction permit be extended. Such a request shall be submitted to the Bureau of Air Regulation prior to 60 days before the expiration of the permit. However, the permittee shall promptly notify the Department's Southwest District Office of any delays in completion of the project which would affect the startup day by more than 90 days. **[Rule 62-4.090, F.A.C]**

7. Application for Title V Permit: An application for a Title V operating permit, pursuant to Chapter 62-213, F.A.C., must be submitted to the Department's Southwest District Office. **[Chapter 62-213, F.A.C.]**

SECTION I. FACILITY INFORMATION

FACILITY DESCRIPTION

The new SAP 6 will consist of a sulfuric acid plant and associated molten sulfur storage and handling equipment. Air pollution control equipment consists of the double absorption process, and high efficiency mist eliminators on the final tower.

EMISSION UNITS

This permit addresses the following emission units:

EMISSIONS UNIT NO.	SYSTEM	EMISSIONS UNITS DESCRIPTION
003	Process	Sulfuric Acid Plant No. 3
038	Process	Sulfuric Acid Plant No. 6
030-036	Raw Material	Molten Sulfur Storage and Handling System

REGULATORY CLASSIFICATION

The facility is classified as a "Major or Title V Source" per Rule 62-210.200, F.A.C., Definitions, because emissions of at least one regulated air pollutant exceed 100 tons per year (TPY).

Sulfuric acid plants are listed as a Major Facility Category in Table 62-212.400-1, F.A.C., "Major Facility Categories." Therefore, stack and fugitive emissions of over 100 TPY of sulfur dioxide are sufficient to classify the installation as a "Major Facility" per the definitions in **Rule 62-210.200, F.A.C.,** subject to the Significant Emission Rates for sulfuric acid mist and nitrogen oxides given in Table 62-212.400-2, F.A.C. and the requirements of **Rules 62-212.400 and 410, F.A.C.,** Prevention of Significant Deterioration (PSD) and Best Available Control Technology (BACT).

The molten sulfur storage and handling equipment is subject to **Rule 62-212.600, F.A.C..** The sulfuric acid plant is also subject to 40 CFR Subpart H, New Source Performance Standards (NSPS) for Sulfuric Acid Plants, incorporated by reference in **Rule 62-204.800, F.A.C.**

PERMIT SCHEDULE:

- 05/XX/98 Notice of Intent published in ___________
- 05/19/98 Distributed Intent to Issue Permit
- 04/24/98 Application deemed complete
- 11/20/97 Received Application

RELEVANT DOCUMENTS:

The documents listed below are the basis of the permit. They are specifically related to this permit but do not supersede the conditions given in the permit. These documents are on file with the Department.

- Application received November 20, 1997
- Department's letters dated November 20 and December 18, 1997, February 11 and March 26, 1998
- Comments from the National Park Service dated January 7, 1998
- Applicant's completeness responses dated January 16, March 13, and April 24, 1998
- Department's Intent to Issue package dated May 19, 1998
- Applicant's comments dated ______ on Department's Intent package
- Department's Final Determination accompanying permit

PERMITTEE:

Farmland Hydro, L.P.
4390 County Road 640 West
Bartow, Florida 33830

File No.	1050053-019-AC
FID No.	1050053
SIC No.	2819
Permit No.	PSD-FL-243
Expires:	October 31, 2000

Authorized Representative:
C. M. Farris
Vice-President, Operations

PROJECT AND LOCATION:

Permit for the construction of a 2750 tons per day sulfur-burning, double absorption sulfuric acid plant and associated sulfur storage and handling equipment serving a phosphate fertilizer facility located at the above address in Polk County. UTM coordinates are Zone 17; 410.3 km E; 3079.7 km N.

STATEMENT OF BASIS:

This construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and Chapters 62-4, 62-204, 62-210, 62-212, 62-296 and 62-297 of the Florida Administrative Code (F.A.C.). The above named permittee is authorized to modify the facility in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department of Environmental Protection (Department).

Appendices and attachments made a part of this permit:

Table 1	Air Pollutant Standards and Terms
Appendix A	Best Operational Start-up Procedures for Sulfuric Acid Plants
Appendix BD	Best Available Control Technology Determination
Appendix CSC	Emission Unit(s) Common Specific Conditions
Appendix GC	Construction Permit General Conditions

Howard L. Rhodes, Director
Division of Air Resources
Management

Ambient Air Quality Impacts

Pollutant	Averaging Time	Major Sources Impact (ug/m^3)	Background Conc. (ug/m^3)	Total Impact (ug/m^3)	Florida AAQS (ug/m^3)	Total Impact Greater Than AAQS?
SO_2	24-hour	206	11	217	260	NO
	Annual	45	11	56	60	NO
	3-hour	560	11	571	1300	NO

6.5 Additional Impacts Analysis

6.5.1 Impact Analysis Impacts On Soils, Vegetation, And Wildlife

The maximum ground-level concentrations predicted to occur from SO_2 and NO_X emissions as a result of the proposed project, including background concentrations and all other nearby sources, will be below the associated AAQS. The AAQS are designed to protect both the public health and welfare. As such, this project is not expected to have a harmful impact on soils and vegetation in the PSD Class II area. An air quality related values (AQRV) analysis was done by the applicant for the Class I area. No significant impacts on this area are expected.

6.5.2 Impact On Visibility

A regional haze analysis was used to assess the potential for a significant increase in regional haze in the Class I CNWA due to this source's projected increase in emissions. A regional haze analysis to determine visibility impacts in the Class I area was required by the National Park Service. The results indicate that the impact of this project on visibility in the Class I area is insignificant.

6.5.3 Growth-Related Air Quality Impacts

The proposed modification will not significantly change employment, population, housing or commercial/industrial development in the area to the extent that a significant air quality impact will result.

7. CONCLUSION

Based on the foregoing technical evaluation of the application and additional information submitted by the applicant, the Department has made a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations, provided the Department's BACT determination is implemented.

Syed Arif, P.E.
Cleve Holladay, Meteorologist

6.4.5 Receptor Networks For PSD Increment And AAQS Analyses

The receptor network submitted by the applicant included a discrete receptor grid placed along the property boundaries and a polar grid out to 8 km from the facility. However, since the applicant's entire property boundary is neither fenced nor inaccessible due to physical barriers, the Department did further SO_2 AAQS and PSD increment modeling within Farmland's property boundaries to determine where fences or physical barriers, if any, should be required on the applicant's property. This modeling showed that there were predicted exceedances of the PSD increment on the applicant's property within 450 m of the origin of the receptor grid presented in the application. Farmland will maintain adequate fencing of the area where these exceedances are predicted.

6.4.5 PSD Class II Increment Analysis

The PSD increment represents the amount that new sources in an area may increase ambient ground level concentrations of a pollutant from a baseline concentration which was established in 1977 (the baseline year was 1975 for existing major sources of SO_2) for SO_2 and 1988 for NO_2. As the maximum predicted NO_2 impacts from the proposed project are less than significant, no additional modeling was required. The maximum predicted PSD Class II area SO_2 increment consumed by this project is shown below

PSD Class II Increment Analysis

Pollutant	Averaging Time	Maximum Predicted Impact (ug/m^3)	Impact Greater Than Allowable Increment?	Allowable Increment (ug/m^3)
SO_2	24-hour	56	NO	91
	Annual	0	NO	20
	3-hour	176	NO	512

6.4.6 AAQS Analysis

For pollutants subject to an AAQS review, the total impact on ambient air quality is obtained by adding a "background" concentration to the maximum modeled concentration. This "background" concentration takes into account all sources of a particular pollutant that are not explicitly modeled. As the maximum predicted NO_2 impacts from the proposed project are less than significant, no additional modeling was required. The results of the AAQS analysis for SO_2 are summarized in the table below. As shown in this table, emissions from the proposed facility are not expected to cause or significantly contribute to a violation of any AAQS.

6.4.4 Significant Impact Analysis

Initially, the applicant conducts modeling using only the proposed project's emissions changes. If this modeling shows significant impacts, further modeling is required to determine the project's impacts on the AAQS or PSD increments. Sixteen receptor rings with 10 degree intervals (10-360 degrees) were placed at distances ranging from 0.5 to 18 km from the facility, which is located in a PSD Class II area. In addition receptors were located along the facility's property boundary Thirteen discrete receptors were set in the Chassahowitzka National Wilderness Area (CNWA) which is a PSD Class I area located approximately 105 km to the northwest of the project at its closest point. For each pollutant subject to PSD and also subject to PSD increment and/or AAQS analyses, this modeling compares maximum predicted impacts due to the project with PSD significant impact levels to determine whether significant impacts due to the project are predicted in the vicinity of the facility or in the CNWA. The tables below show the results of this modeling. There were no significant impacts predicted in the CNWA Class I area. In the vicinity of the facility significant impacts were predicted for all SO_2 averaging times. Therefore, more detailed AAQS and PSD increment analyses were required in the Class II area for SO_2.

Maximum Project Air Quality Impacts for Comparison to the PSD Class II Significant Impact Levels in the Vicinity of the Facility.

Pollutant	Averaging Time	Maximum Predicted Impact (ug/m^3)	Significant Impact Level (ug/m^3)	Significant Impact?	Radius of Significant Impact (km)
SO_2	Annual	2.7	1	YES	8.0
	24-hour	69	5	YES	8.0
	3-hour	193	25	YES	8.0
NO_2	Annual	0.09	1	NO	0.0

Maximum Project Air Quality Impacts in the CNWA for Comparison to the PSD Class I Significant Impact Levels

Pollutant	Averaging Time	Maximum Predicted Impact (ug/m^3)	Significant Impact Level (ug/m^3)	Significant Impact?
SO_2	Annual	0.003	0.1	NO
	24-hour	0.10	0.2	NO
	3-hour	0.72	1.0	NO
NO_2	Annual	0	0.1	NO

The table below shows that predicted NO_2 impacts from the project are predicted to be less than the de minimus level; therefore, preconstruction ambient air quality monitoring is not required for this pollutant. Predicted SO2 impacts are greater than the de minimus level. Therefore, an SO2 background concentration of 11 ug/m3 for all averaging times was established from existing air quality data for use in the AAQS analysis required for SO_2.

Maximum Project Air Quality Impacts for Comparison to the De Minimus Ambient Levels.

Pollutant	Avg. Time	Max Predicted Impact (ug/m^3)	De Minimus Level(ug/m^3)	Impact Greater Than De Minimus?
NO_2	Annual	0.09	14	NO
SO_2	24-hour	68.7	13	YES

6.4.3 Models and Meteorological Data Used in the Air Quality Impact Analysis

The applicant and the Department used the EPA-approved Industrial Source Complex Short-Term (ISCST3) dispersion model to evaluate the pollutant emissions from the proposed project. The model determines ground-level concentrations of inert gases or small particles emitted into the atmosphere by point, area, and volume sources. The model incorporates elements for plume rise, transport by the mean wind, Gaussian dispersion, and pollutant removal mechanisms such as deposition. The ISCST3 model allows for the separation of sources, building wake downwash, and various other input and output features. A series of specific model features, recommended by the EPA, are referred to as the regulatory options. The applicant used the EPA recommended regulatory options. Direction-specific downwash parameters were used for all sources for which downwash was considered. The stacks associated with this project all satisfy the good engineering practice (GEP) stack height criteria.

Meteorological data used in the ISCST3 model consisted of a consecutive 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) stations at Tampa International Airport, Florida (surface data) and Ruskin, Florida (upper air data). The 5-year period of meteorological data was from 1987 through 1991. These NWS stations were selected for use in the study because they are the closest primary weather stations to the study area and are most representative of the project site. The surface observations included wind direction, wind speed, temperature, cloud cover, and cloud ceiling.

Since five years of data were used in ISCST3, the highest-second-high (HSH) short-term predicted concentrations were compared with the appropriate AAQS or PSD increments. For the annual averages, the highest predicted yearly average was compared with the standards. For determining the project's significant impact area in the vicinity of the facility and if there are significant impacts from the project on any PSD Class I area, both the highest short-term predicted concentrations and the highest predicted yearly averages were compared to their respective significant impact levels.

6.4 Air Quality Analysis

6.4.1 Introduction

According to the application, the proposed project will increase emissions of three pollutants in excess of PSD significant amounts: SO_2, NO_X and SAM. SO_2 and NO_X are criteria pollutants and have national and state ambient air quality standards (AAQS) and PSD increments defined for them. SAM is a non-criteria pollutant and has no AAQS or PSD increments defined for it; therefore, no air quality impact analysis was required for SAM. Instead, the NSPS requirements will establish the SAM emission limit for this project. The PSD regulations require the following air quality analyses for this project:

- A significant impact analysis for SO_2 and NO_X;
- An analysis of existing air quality for SO_2 and NO_X;
- A PSD increment analysis for SO_2 and NO_X;
- An Ambient Air Quality Standards (AAQS) analysis for SO_2 and NO_X;
- An analysis of impacts on soils, vegetation, and visibility and of growth-related air quality modeling impacts.

The analysis of existing air quality generally relies on preconstruction monitoring data collected with EPA-approved methods. The PSD increment and AAQS analyses depend on air quality dispersion modeling carried out in accordance with EPA guidelines.

Based on the required analyses, the Department has reasonable assurance that the proposed project, as described in this report and subject to the conditions of approval proposed herein, will not cause or significantly contribute to a violation of any AAQS or PSD increment. However, the following EPA-directed stack height language is included: "In approving this permit, the Department has determined that the application complies with the applicable provisions of the stack height regulations as revised by EPA on July 8, 1985 (50 FR 27892). Portions of the regulations have been remanded by a panel of the U.S. Court of Appeals for the D.C. Circuit in NRDC v. Thomas, 838 F. 2d 1224 (D.C. Cir. 1988). Consequently, this permit may be subject to modification if and when EPA revises the regulation in response to the court decision. This may result in revised emission limitations or may affect other actions taken by the source owners or operators." A discussion of the required analyses follows.

6.4.2 Analysis of Existing Air Quality and Determination of Background Concentrations

Preconstruction ambient air quality monitoring is required for all pollutants subject to PSD review unless otherwise exempted or satisfied. The monitoring requirement may be satisfied by using existing representative monitoring data, if available. An exemption to the monitoring requirement may be obtained if the maximum air quality impact resulting from the projected emissions increase, as determined by air quality modeling, is less than a pollutant-specific de minimus concentration. In addition, if EPA has not established an acceptable monitoring method for the specific pollutant, monitoring may not be required.

If preconstruction ambient monitoring is exempted, determination of background concentrations for PSD significant pollutants with established AAQS may still be necessary for use in any required AAQS analysis. These concentrations may be established from the required preconstruction ambient air quality monitoring analysis or from existing representative monitoring data. These background ambient air quality concentrations are added to pollutant impacts predicted by modeling and represent the air quality impacts of sources not included in the modeling.

6. SOURCE IMPACT ANALYSIS

6.1 Emission Limitations

The proposed project will increase annual emissions of the following PSD pollutants (Table 212.400-2, F.A.C.): SO_2, SAM, and NO_X. Per the application, the current emissions and requested allowable emissions (as revised on April 21, 1998) for the proposed project are summarized in the following table.

6.2 Emission Summary

Emissions Sulfuric Acid Plant and Sulfur Storage and Handling (total)

Pollutant	Current Emissions (tons/yr)	Future Emissions (tons/yr)	Net Increase (tons/yr)	PSD Significant Level (tons/yr)
SO_2	1227.3	1776.3	549	40
NO_X	39.2	60.2	59.2[1]	40
SAM	39.9	75.3	35.4	7

1. This includes contemporaneous emissions of 38.2 tpy from a previous project.

6.3 Control Technology Review

In the case of a sulfuric acid plant, the objective of the process and the pollution control requirements are compatible. This is to convert SO_2 to SO_3 and recover it as sulfuric acid. Prior to the 1970's most sulfuric acid was produced in a manner similar to the process previously described with the exception of the interpass tower and additional converter or pass. This was characterized by lower conversion efficiency and higher potential emissions.

Where required by environmental regulations, various control technologies were employed to further remove and recover SO_2 from single absorption plants. These typically were ammonia and caustic scrubbing processes. The addition of a second tower to the basic sulfuric acid manufacturing process virtually eliminated the need for add-on controls for control of sulfur dioxide emissions. Since the onset of the dual absorption technology, further improvements in the process have resulted in the possibility of greater conversion efficiency and pollution reduction. Therefore add-on systems which do not result in additional sulfuric acid production remain uncompetitive except where a clear by-product market exists, such as for sodium sulfites by pulp and paper plants.

The second converter and final absorption tower are beyond the economic requirements of the process and serve as the pollution control equipment. At some plants, converters and absorbers following the interpass absorber are termed as "the abatement system." The high efficiency mist eliminators together with proper plant operation serve to minimize SAM emissions. NO_X emissions are inherently low for this process and are marginally significant.

The overall conversion of SO_2 to SO_3 in the sulfuric acid process previously described in Section 3 above is over 99.7 percent. Approximately 90-95 % of acid recovery is effected in the interpass absorber with the remainder accomplished in the second absorber. The residual SO2 concentration exiting the final tower is somewhere between 200 and 400 parts per million (ppm). This reflects short-term emissions of 2 to 4 pounds of SO_2 per ton of sulfuric acid produced. Similarly, some emissions of sulfuric acid mist occur. Depending on plant conditions and mist eliminator efficiency, emissions of sulfur acid mist are on the order of 0.02 to 0.15 pounds per ton of acid produced.

The applicant proposes the replacement of the existing 2100 TPD No. 3 SAP with a new 2750 TPD No. 6 SAP. The proposed project will result in actual increases in SO_2, sulfuric acid mist (SAM), and NO_X. There will also be minimal emissions of particulate matter, reduced sulfur compounds, volatile organic compounds and SO_2 from the molten sulfur system. Emission increases of particulate matter, reduced sulfur compounds and volatile organic compounds are below their respective significant emission levels per Table 62-212.400-2, F.A.C. and do not require PSD or non-attainment new source review. However, PSD review is required for SO_2, SAM and NO_X since emissions, per the application, will increase by more than PSD significant levels.

5. RULE APPLICABILITY

The project is subject to the federal new source performance standards (NSPS) for sulfuric acid plants (40 CFR 60, Subpart H), incorporated by reference in Rule 62-204.800, F.A.C.

The proposed project is also subject to permitting, preconstruction review, emissions limits and compliance requirements under the provisions of Chapter 403, Florida Statutes, and Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.).

This facility is located in Polk County, an area designated as attainment for all criteria pollutants in accordance with Rule 62-204.360, F.A.C. The proposed project is subject to review under Rule 62-212.400, F.A.C., Prevention of Significant Deterioration (PSD), because the potential emission increases for SO2, SAM, and NOX exceed the significant emission rates given in Chapter 62-212, Table 62-212.400-2, F.A.C. PSD review requires an assessment of air quality impacts and a determination of Best Available Control Technology (BACT). New or modified sulfur storage and handling facilities require review per Rule 62-212.600, F.A.C.

The emission units affected by this permit modification shall comply with all applicable provisions of the Florida Administrative Code (including applicable portions of the Code of Federal Regulations incorporated therein) and, specifically, the following Chapters and Rules:

Chapter 62-4	Permits.
Rule 62-204.220	Ambient Air Quality Protection
Rule 62-204.240	Ambient Air Quality Standards
Rule 62-204.260	Prevention of Significant Deterioration Increments
Rule 62-204.360	Designation of Prevention of Significant Deterioration Areas
Rule 62-204.800	Federal Regulations Adopted by Reference
Rule 62-210.300	Permits Required
Rule 62-210.350	Public Notice and Comments
Rule 62-210.370	Reports
Rule 62-210.550	Stack Height Policy
Rule 62-210.650	Circumvention
Rule 62-210.700	Excess Emissions
Rule 62-210.900	Forms and Instructions
Rule 62-212.300	General Preconstruction Review Requirements
Rule 62-212.400	Prevention of Significant Deterioration
Rule 62-212.600	Sulfur Storage and Handling Facilities
Rule 62-213	Operation Permits for Major Sources of Air Pollution
Rule 62-296.320	General Pollutant Emission Limiting Standards
Rule 62-296.411	Sulfur Storage and Handling Facilities
Rule 62-297.310	General Test Requirements
Rule 62-297.401	Compliance Test Methods
Rule 62-297.520	EPA Continuous Monitor Performance Specifications

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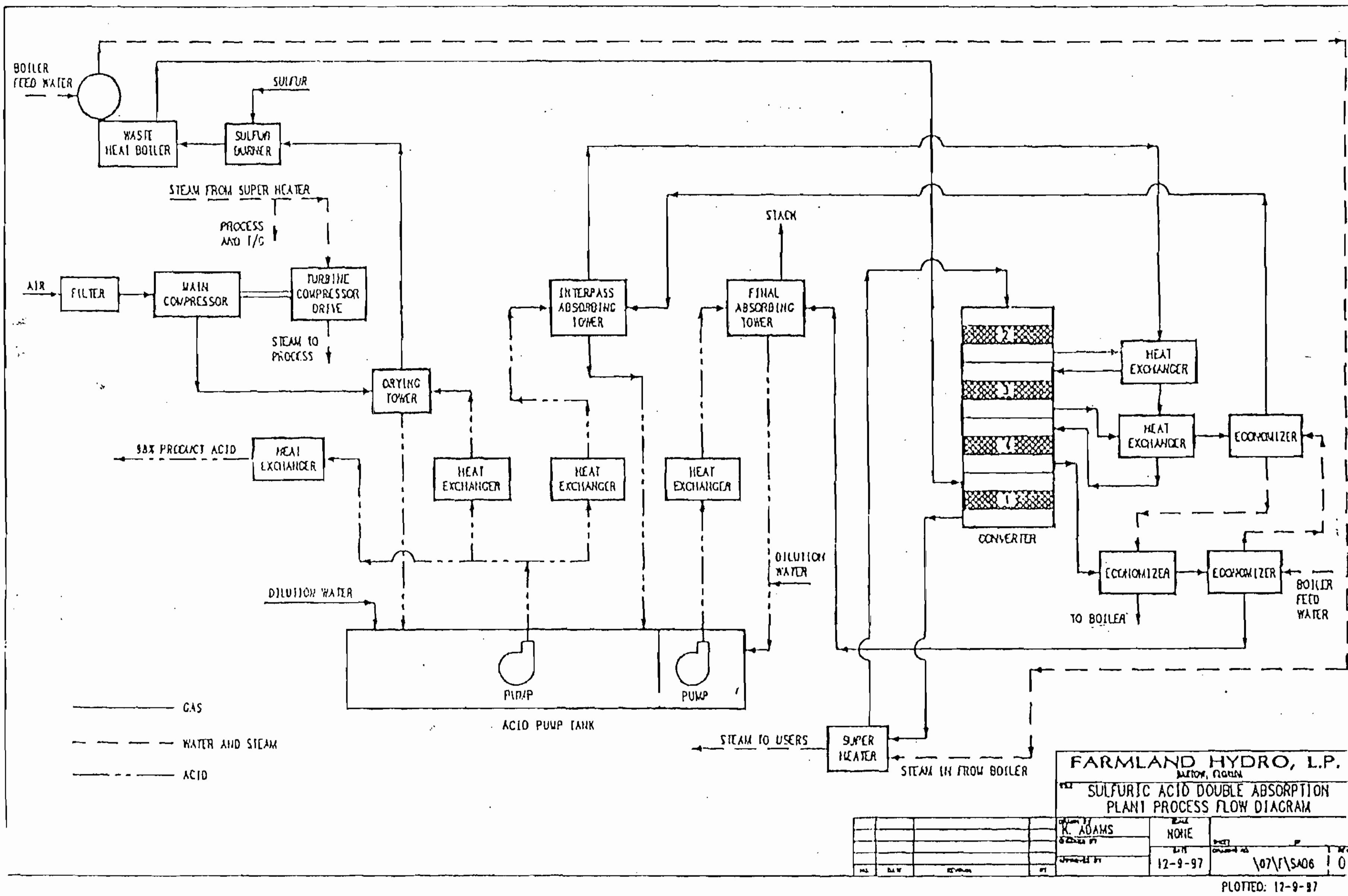
Figure 1



3. PROCESS DESCRIPTION

The plant is a sulfur-burning double absorption sulfuric acid plant. This is the most common process for producing sulfuric acid in the U.S. phosphate fertilizer industry and it continues to be improved and employed at both existing and new installations in the U.S. and throughout the world.

The process is comprised of three distinct steps. These are sulfur combustion and gas preparation; catalytic conversion of sulfur dioxide to sulfur trioxide; and absorption of sulfur trioxide into sulfuric acid. The reactions are as follows:

$S + O_2 \longrightarrow SO_2$ (sulfur burning)

$2SO_2 + O_2 \longrightarrow 2SO_3$ (in presence of vanadium-containing catalyst)

$SO_3 + H_2O \longrightarrow H_2SO_4$ (in concentrated sulfuric acid)

A great deal of heat is evolved throughout the process. Its management is an important consideration in optimizing the conversion and absorption steps as well as providing useful energy to the plant. Reaction kinetics and thermodynamics are also important factors. Following is a description of the process (refer to Figure 1):

Atmospheric air is drawn through a filter by the main compressor and then contacted with a recirculating stream of sulfuric acid in the drying tower. The dried air is blown by a steam-driven compressor into a refractory-lined burner where molten sulfur is combusted to produce sulfur dioxide (SO_2). The hot combustion gases are cooled in a waste heat boiler to recover excess heat as steam.

The gas stream is then introduced into a converter consisting of four beds (passes) packed with catalyst. In a series of steps, the SO_2 and excess oxygen from the combustion air are progressively converted to SO_3. Between the third and fourth passes, the gases containing SO_3, some unconverted SO_2, oxygen, and atmospheric nitrogen are conveyed to an "interpass tower" where the SO_3 is absorbed into a stream of concentrated sulfuric acid and reacted with excess water to further strengthen the acid. By removing most SO_3 in the interpass absorber, the equilibrium favors further conversion of the remaining SO_2 to SO_3. This is accomplished in the final pass. The resulting gas stream is conveyed to the high-efficiency "final tower" where most of the remaining SO_3 reacts with water in a 98-99 percent sulfuric acid stream.

Throughout the conversion, the temperatures are moderated by an intricate arrangement of heat exchangers so that the excess heat is removed. Mist eliminators are used to insure that sulfuric acid sprays and fine mists are contained, thereby protecting plant equipment and minimizing emissions to the atmosphere.

4. PROJECT DESCRIPTION

This permit addresses the following emissions units:

EMISSION UNIT NO.	SYSTEM	EMISSION UNIT DESCRIPTION
003	Process	Sulfuric Acid Plant No. 3
038	Process	Sulfuric Acid Plant No. 6
030-036	Raw Material	Molten Sulfur Storage and Handling System

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

1. APPLICATION INFORMATION

1.1 Applicant Name and Address

Farmland Hydro, L.P.
4390 County Road 640 West
Bartow, Florida 33830

Authorized Representative: Mr. C.M. Farris, V.P., Operations

1.2 Reviewing and Process Schedule

11-20-97:	Date of Receipt of Application
11-20-97:	Preliminary DEP Completeness Request
12-18-97:	DEP Completeness Request
01-16-98:	Farmland's response to DEP's Completeness Request of 12-18-97
02-11-98:	DEP Completeness Request
03-13-98:	Farmland's response to DEP's Completeness Request of 02-11-98
03-26-98:	DEP Completeness Request
04-24-98:	Farmland's response to DEP's Completeness Request of 03-26-98. Application complete
05-18-98:	Issue Intent

2. FACILITY INFORMATION

2.1 Facility Location

The Farmland fertilizer facility is located off County Road 640, near Bartow, Polk County. This site is approximately 105 kilometers from the Chassahowitzka National Wilderness Area, a Class I PSD Area. The UTM coordinates of this facility are Zone 17; 410.3 km E; 3079.7 km N.

2.2 Standard Industrial Classification Codes (SIC)

Major Group No.	28	Chemicals and Allied Products
Industry Group No.	2874	Phosphate Fertilizers
Industry Group No.	2819	Industrial Inorganic Chemicals (Sulfuric Acid)

2.3 Facility Category

This phosphate fertilizer facility makes sulfuric acid, phosphoric acid, super phosphoric acid, monoammonium phosphate and diammonium phosphate. Phosphoric acid is made by acidulation of phosphate rock with sulfuric acid. Waste gypsum is produced and stacked. The phosphoric acid is reacted with ammonia to make monoammonium and diammonium phosphate. The sulfuric acid is produced on-site by burning elemental sulfur, catalytically converting the resulting sulfur dioxide to sulfur trioxide, and absorbing it into a recirculating sulfuric acid solution.

The facility is classified as a major or Title V source of air pollution because emissions of at least one regulated air pollutant, such as particulate matter (PM/PM_{10}), sulfur dioxide (SO_2), nitrogen oxides (NO_X), carbon monoxide (CO), or volatile organic compounds (VOC) exceed 100 TPY.

This industry is included in the list of the 28 Major Facility Categories per Table 62-212.400-1, F.A.C. Because emissions are greater than 100 TPY for at least one criteria pollutant, the facility is also a major facility with respect to Rule 62-212.400, Prevention of Significant Deterioration (PSD). Per Table 62-212.400-2, modifications at the facility resulting in emissions increases greater than 40 TPY of NO_X or SO2 or 7 TPY of sulfuric acid mist (SAM), require review per the PSD rules and a determination of Best Available Control Technology (BACT) per Rule 62-212, F.A.C. The facility includes sulfur storage and handling for which certain analyses are required per Rule 62-212.600, F.A.C.

TECHNICAL EVALUATION

AND

PRELIMINARY DETERMINATION

FARMLAND HYDRO, L.P.

2750 Tons Per Day Sulfuric Acid Plant and
Molten Sulfur Storage & Handling
Bartow, Polk County

DEP File No. 1050053-019-AC
PSD-FL-243

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

May 19, 1998

Persons subject to regulation pursuant to any federally delegated or approved air program should be aware that Florida is specifically not authorized to issue variances or waivers from any requirements of any such federally delegated or approved program. The requirements of the program remain fully enforceable by the Administrator of the EPA and by any person under the Clean Air Act unless and until the Administrator separately approves any variance or waiver in accordance with the procedures of the federal program.

Executed in Tallahassee, Florida.

AA Linero, P.E. 5/19

for C. H. Fancy, P.E., Chief
Bureau of Air Regulation

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this INTENT TO ISSUE AIR CONSTRUCTION PERMIT (including the PUBLIC NOTICE, and DRAFT permit) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 5-19-98 to the person(s) listed:

Mr. C. M. Farris, Farmland Hydro, L.P. *
Mr. Brian Beals, EPA
Mr. John Bunyak, NPS
Mr. John Koogler, P.E., K&A
Mr. Bill Thomas, SWD
Mr. Joe King, Polk County

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

(Clerk) 5-19-98 (Date)

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative hearing in accordance with Sections 120.569 and 120.57 F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000, telephone: 850/488-9730, fax: 850/487-4938. Petitions must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. A petitioner must mail a copy of the petition to the applicant at the address indicated above, at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-5.207 of the Florida Administrative Code.

A petition must contain the following information: (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Permit File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by petitioner, if any; (e) A statement of the facts that the petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement identifying the rules or statutes that the petitioner contends require reversal or modification of the Department's action or proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wants the Department to take with respect to the action or proposed action addressed in this notice of intent.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice of intent. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

In addition to the above, a person subject to regulation has a right to apply for a variance from or waiver of the requirements of particular rules, on certain conditions, under Section 120.542 F.S. The relief provided by this state statute applies only to state rules, not statutes, and not to any federal regulatory requirements. Applying for a variance or waiver does not substitute or extend the time for filing a petition for an administrative hearing or exercising any other right that a person may have in relation to the action proposed in this notice of intent.

The application for a variance or waiver is made by filing a petition with the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000. The petition must specify the following information: (a) The name, address, and telephone number of the petitioner; (b) The name, address, and telephone number of the attorney or qualified representative of the petitioner, if any; (c) Each rule or portion of a rule from which a variance or waiver is requested; (d) The citation to the statute underlying (implemented by) the rule identified in (c) above; (e) The type of action requested; (f) The specific facts that would justify a variance or waiver for the petitioner; (g) The reason why the variance or waiver would serve the purposes of the underlying statute (implemented by the rule); and (h) A statement whether the variance or waiver is permanent or temporary and, if temporary, a statement of the dates showing the duration of the variance or waiver requested.

The Department will grant a variance or waiver when the petition demonstrates both that the application of the rule would create a substantial hardship or violate principles of fairness, as each of those terms is defined in Section 120.542(2) F.S., and that the purpose of the underlying statute will be or has been achieved by other means by the petitioner.

In the Matter of an
Application for Permit by:

Mr. C.M. Farris, Vice President, Operations
Farmland Hydro, L.P.
Post Office Box 960
Bartow, Florida 33831
/

DEP File No. 1050053-019-AC
Draft PSD Permit No. PSD-FL-243
Sulfuric Acid Plant (SAP 6)
Polk County

INTENT TO ISSUE AIR CONSTRUCTION PERMIT

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit (copy of DRAFT Permit attached) for the proposed project, as detailed in the application specified above and attached Technical Review and Preliminary determination, for the reasons stated below.

The applicant, Farmland Hydro, L.P., applied on November 18, 1997 to the Department for an air construction permit for a new sulfuric acid plant at its phosphate fertilizer facility located at 4390 County Road 640 West, Bartow, Polk County.

The Department has permitting jurisdiction under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Chapters 62-4, 62-210, and 62-212. The above actions are not exempt from permitting procedures. The Department has determined that an air construction permit, including a review for the Prevention of Significant Deterioration and a determination of Best Available Control Technology for the control of nitrogen oxides, is required for the proposed work.

The Department intends to issue this air construction permit based on the belief that reasonable assurances have been provided to indicate that operation of these emission units will not adversely impact air quality, and the emission units will comply with all appropriate provisions of Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297, F.A.C.

Pursuant to Section 403.815, F.S., and Rule 62-103.150, F.A.C., you (the applicant) are required to publish at your own expense the enclosed "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT." The notice shall be published one time only within 30 (thirty) days in the legal advertisement section of a newspaper of general circulation in the area affected. For the purpose of these rules, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. Where there is more than one newspaper of general circulation in the county, the newspaper used must be one with significant circulation in the area that may be affected by the permit. If you are uncertain that a newspaper meets these requirements, please contact the Department at the address or telephone number listed below. The applicant shall provide proof of publication to the Department's Bureau of Air Regulation, at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, Florida 32399-2400 (Telephone: 850/488-1344; Fax 850/ 922-6979) within 7 (seven) days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit pursuant to Rule 62-103.150 (6), F.A.C.

The Department will issue the FINAL Permit, in accordance with the conditions of the enclosed DRAFT Permit unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept written comments and requests for public meetings concerning the proposed DRAFT Permit issuance action for a period of 30 (thirty) days from the date of publication of "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT." Written comments (and requests for public meetings) should be provided to the Department's Bureau of Air Regulation, 2600 Blair Stone Road, Mail Station #5505, Tallahassee, Florida 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in this DRAFT Permit, the Department shall issue a Revised DRAFT Permit and require, if applicable, another Public Notice.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57 F.S. The procedures for petitioning for a hearing are set forth below. Mediation is not available for this action.

NOTICE TO BE PUBLISHED IN THE NEWSPAPER

result in a significant change in this DRAFT Permit, the Department shall issue a Revised DRAFT Permit and require, if applicable, another Public Notice.

The Department will issue FINAL Permit with the conditions of the DRAFT Permit unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57 F.S. The procedures for petitioning for a hearing are set forth below. Mediation is not available for this action.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative hearing in accordance with Sections 120.569 and 120.57 F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000, telephone: 850/488-9370, fax: 850/487-4938. Petitions must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. A petitioner must mail a copy of the petition to the applicant at the address indicated above, at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-5.207 of the Florida Administrative Code.

A petition must contain the following information: (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Permit File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by petitioner, if any; (e) A statement of the facts that the petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement identifying the rules or statutes that the petitioner contends require reversal or modification of the Department's action or proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wants the Department to take with respect to the Department's action or proposed action addressed in this notice of intent.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice of intent. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

A complete project file is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Dept. of Environmental Protection
Bureau of Air Regulation
111 S. Magnolia Drive, Suite 4
Tallahassee, Florida, 32301
Telephone: 850/488-1344
Fax: 850/922-6979

Dept. of Environmental Protection
Southwest District Office
3804 Coconut Palm Drive
Tampa, Florida 33619-8218
Telephone: 813/744-6100
Fax: 813/744-6084

Polk County Public Works Department
Natural Resources & Drainage Division
4177 Ben Durrance Road
Bartow, Florida 33830
Telephone: 941/534-7377
Fax: 941/534-7374

The complete project file includes the Draft Permit, the application, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Administrator, New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-1344, for additional information.

NOTICE TO BE PUBLISHED IN THE NEWSPAPER

PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP File No. 1050053-019-AC (PSD-FL-243)

Farmland Hydro, L.P. 2750 TPD Sulfuric Acid Plant
Polk County

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit to Farmland Hydro L.P., to construct a new 2750 tons per day (TPD) sulfuric acid plant (SAP 6) to replace the existing SAP 3 located at 4390 County Road 640 West near Bartow in Polk County. A Best Available Control Technology (BACT) determination was required for sulfur dioxide (SO_2), sulfuric acid mist (SAM), and nitrogen oxides (NO_X) pursuant to Rules 62-212.400, F.A.C., Prevention of Significant Deterioration (PSD). The applicant's name and address are: Farmland Hydro, L.P., 4390 County Road 640 West, Bartow, Florida 33830.

The new 2750 TPD SAP 6 will replace the existing 2100 TPD SAP 3 which will be permanently shut down. Control of SO_2 emissions is accomplished by the process itself which is based on the conversion of SO_2 to SO_3 and subsequent recovery as sulfuric acid product. The second absorption tower improves the efficiency of the process and also serves as the pollution control equipment. The BACT emission limit for SO_2 was determined by the Department to be 3.5 pounds per ton of sulfuric acid produced. The high efficiency mist eliminators together with proper plant operation serve to minimize sulfuric acid mist (SAM) emissions. The nitrogen oxides (NO_X) emissions will be minimized by good combustion practices.

Maximum annual SO_2 emissions will be 1757 tons per year (TPY) while SAM emissions will be 75 TPY. Annual NO_X emissions will be approximately 60 TPY.

An air quality impact analysis was conducted. Emissions from the facility will not significantly contribute to or cause a violation of any state or federal ambient air quality standards. NO_2 emissions will not have a significant impact in the PSD Class II area: therefore, no PSD Class II increment consumption for NO_2 was calculated. The maximum predicted PSD Class II increments of SO_2, consumed by all sources in the area, including this project, will be as follows:

	PSD Class II Increment Consumed ($\mu g/m^3$)	Allowable Increment ($\mu g/m^3$)	Increment Consumed (percent)
SO_2			
3-hour	176	512	34
24-hour	56	91	62
Annual	0	20	0

The project has no significant impact on the PSD Class I Chassahowitzka National Wilderness Area.

The Department will issue the FINAL Permit, in accordance with the conditions of the DRAFT Permit unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept written comments and requests for public meetings concerning the proposed DRAFT Permit issuance action for a period of 30 (thirty) days from the date of publication of this Notice. Written comments and requests for public meetings should be provided to the Department's Bureau of Air Regulation, 2600 Blair Stone Road, Mail Station #5505, Tallahassee, Florida 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received

Department of
Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

May 19, 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. C. M. Farris
Vice President-Operations
Farmland Hydro, L.P.
4390 County Road 640 West
Bartow, Florida 33830

Re: DEP File No. 1050053-019-AC (PSD-FL-243)
2750 Tons Per Day Sulfuric Acid Plant (SAP 6)

Dear Mr. Farris:

Enclosed is one copy of the Draft Air Construction Permit for the new sulfuric acid plant (SAP 6) to be located at 4390 County Road 640 West, Bartow, Polk County. The Department's Intent to Issue Air Construction Permit and the "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT" are also included.

The "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT" must be published within 30 (thirty) days of receipt of this letter. Proof of publication, i.e., newspaper affidavit, must be provided to the Department's Bureau of Air Regulation office within 7 (seven) days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit modification.

Please submit any written comments you wish to have considered concerning the Department's proposed action to Syed Arif, P.E., New Source Review Section, Mail Stop 5505, at the above letterhead address. If you have any other questions, please contact Mr. Arif at 850/921-8968

Sincerely,

A A Linero, P.E. 5/19

for C. H. Fancy, P.E., Chief,
Bureau of Air Regulation

CHF/sa

Enclosures

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

RECEIVED
JUL 15 1998
BUREAU OF
AIR REGULATION

KA 123-97-02

MEMORANDUM

TO: Cleve Holladay, FDEP

FROM: Pradeep Raval

DATE: July 13, 1998

SUBJECT: Sulfuric Acid Plant No. 6
Farmland Hydro, L.P.
Polk County, Florida

PSD-FL-243

This is a follow up to our telephone conversation today regarding the measures to be taken by Farmland to preclude public access on to the plant property, as required in Specific Condition 15 of the draft permit.

To address your specific concern, Farmland will place "No Trespassing" signs, at 200 feet interval along the road to the south of the proposed plant (in front of the main offices).

It is our understanding that this information will enable you to issue the final permit.

If you have any questions, please call me.

par.

c: C. Jenkins, Farmland

Farmland Hydro, L.P.

Charles W. Jenkins
Manager of Environmental and Safety Services

Green Bay Plant
County Road 640
Post Office Box 960
Bartow, Florida 33831
Tele: 941 533-1141
Fax: 941 533-8793

May 29, 1998

Bureau of Air Regulation
Florida Department of Environmental Protection
2600 Blair Stone Road, Mail Station #5505
Tallahassee, FL 32399-2400

RE: **Affidavit of Publication on Air Permit No. 1050053-019-AC (PSD-FL-243)**

Enclosed please find the signed and notarized Affidavit of Publication for the above referenced Air Construction Permit. Please note the date of publication was Thursday, May 28, 1998. Should you have any questions or concerns regarding this matter, call me at (941) 533-1141, extension 334.

Sincerely,

Charles W. Jenkins

Charles W. Jenkins
Manager of Environmental and Safety Services

cc Merle Farris

RECEIVED
JUN 01 1998
BUREAU OF
AIR REGULATION

CC: J. Arif, BAR
A. Linero, BAR
EPA
SWD
Polk Co.
NPS

Farmland. A Delaware Limited Partnership HYDRO

AFFIDAVIT OF PUBLICATION

THE LEDGER

Lakeland, Polk County, Florida

Case No ....

STATE OF FLORIDA)
COUNTY OF POLK)

Before the undersigned authority personally appeared Nelson Kirkland, who on oath says that he is Classified Advertising Manager of The Ledger, a daily newspaper published at Lakeland in Polk County, Florida; that the attached copy of advertisement, being a

Public Notice Of Intent

in the matter of

DEP File No. 1050053-019-AC (PSD-FL-243)

in the ....

Court, was published in said newspaper in the issues of

May 28;

1998

Affiant further says that said The Ledger is a newspaper published at Lakeland, in said Polk County, Florida, and that the said newspaper has heretofore been continuously published in said Polk County, Florida, daily, and has been entered as second class matter at the post office in Lakeland, in said Polk County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Signed ....
Nelson Kirkland
Classified Advertising Manager

By Nelson Kirkland who is
personally known to me

Sworn to and subscribed before me this 29TH

day of MAY A.D. 19 98

(Seal) Donald Ray Jenkins
Notary Public

My Commission Expires ...... DONALD RAY JENKINS MY COMMISSION # CC 586345 EXPIRES: September 18, 2000 Bonded Thru Notary Public Underwriters

Order#693274
Farmland Hydro L.P.

Attach Notice Here

PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP File No. 1050053-019-AC (PSD-FL-243)

Farmland Hydro, L.P. 2750 TPD Sulfuric Acid Plant
Polk County

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit to Farmland Hydro L.P., to construct a new 2750 tons per day (TPD) sulfuric acid plant (SAP 6) to replace the existing SAP 3 located at 4390 County Road 640 West near Bartow in Polk County. A Best Available Control Technology (BACT) determination was required for sulfur dioxide (SO_2), sulfuric acid mist (SAM), and nitrogen oxides (NO_X) pursuant to Rules 62-212.400, F.A.C., Prevention of Significant Deterioration (PSD). The applicant's name and address are: Farmland Hydro, L.P., 4390 County Road 640 West, Bartow, Florida 33830.

The new 2750 TPD SAP 6 will replace the existing 2100 TPD SAP 3 which will be permanently shut down. Control of SO_2 emissions is accomplished by the process itself which is based on the conversion of SO_2 to SO_3 and subsequent recovery as sulfuric acid product. The second absorption tower improves the efficiency of the process and also serves as the pollution control equipment. The BACT emission limit for SO_2 was determined by the Department to be 3.5 pounds per ton of sulfuric acid produced. The high efficiency mist eliminators together with proper plant operation serve to minimize sulfuric acid mist (SAM) *emissions. The nitrogen oxides (NO_X) emissions will be minimized by good combustion practices.*

Maximum annual SO_2 emissions will be 1757 tons per year (TPY) while SAM emissions will be 75 TPY. Annual NO_X emissions will be approximately 60 TPY.

An air quality impact analysis was conducted. Emissions from the facility will not significantly contribute to or cause a violation of any state or federal ambient air quality standards. NO_2 emissions will not have a significant impact in the PSD Class II area: therefore, no PSD Class II increment consumption for NO_2 was calculated. The maximum predicted PSD Class II increments of SO_2, consumed by all sources in the area, including this project, will be as follows:

	PSD Class II Increment Consumed (ug/m3)	Allowable Increment (ug/m3)	Increment Consumed (percent)
SO_2			
3-hour	176	512	34
24-hour	56	91	62
Annual	0	20	0

The project has no significant impact on the PSD Class I Chassahowitzka National Wilderness Area.

The Department will issue the FINAL Permit, in accordance with the conditions of the DRAFT Permit unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept written comments and requests for public meetings concerning the proposed DRAFT Permit issuance action for a period of 30 (thirty) days from the date of publication of this Notice. Written comments and requests for public meetings should be provided to the Department's Bureau of Air Regulation, 2600 Blair Stone Road, Mail Station #5505, Tallahassee, Florida 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in this DRAFT Permit, the Department shall issue a Revised DRAFT Permit and require, if applicable, another Public Notice.

The Department will issue FINAL Permit with the conditions of the DRAFT Permit unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57 F.S. The procedures for petitioning for a hearing are set forth below. Mediation is not available for this action.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative hearing in accordance with Sections 120.569 and 120.57 F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000, telephone: 850/488-9370, fax: 850/487-4938. Petitions must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. A petitioner must mail a copy of the petition to the applicant at the address indicated above, at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-5.207 of the Florida Administrative Code.

A petition must contain the following information: (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Permit File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by petitioner, if any; (e) A statement of the facts that the petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement identifying the rules or statutes that the petitioner contends require reversal or modification of the Department's action or proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wants the Department to take with respect to the Department's action or proposed action addressed in this notice of intent.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice of intent. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

A complete project file is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Dept. of Environmental Protection
Bureau of Air Regulation
111 S. Magnolia Drive, Suite 4
Tallahassee, Florida, 32301
Telephone: 850/488-1344
Fax: 850/922-6979

Dept. of Environmental Protection
Southwest District Office
3804 Coconut Palm Drive
Tampa, Florida 33619-8218
Telephone: 813/744-6100
Fax: 813/744-6084

Polk County Public Works Dept.
Natural Resources & Drainage
Division
4177 Ben Durrance Road
Bartow, Florida 33830
Telephone: 941/534-7377
Fax: 941/534-7374

The complete project file includes the Draft Permit, the application, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Administrator, New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-1344, for additional information.
B-562 - 5-28; 1998

B562

Memorandum Florida Department of Environmental Protection

TO: Howard L. Rhodes

THRU: Clair Fancy
Al Linero 7/14

FROM Syed Arif Syed Arif

DATE: July 14, 1998

SUBJECT: Farmland Hydro, L.P., 1050053-019-AC,
PSD-FL-243

Attached for approval and signature is a construction permit number 1050053-019-AC, PSD-FL-243 for Farmland's new 2750 tons per day sulfuric acid plant to be located near Bartow in Polk County, Florida. A Technical Evaluation and Preliminary Determination was issued, and the facility was required to do a public notice.

The new unit is a source of sulfur dioxide and sulfuric acid mist emissions. Control of SO_2 emissions is accomplished by the process itself which is based on the conversion of SO_2 to SO_3 and subsequent recovery as sulfuric acid product. The BACT emission limit for SO_2 was determined by the Department to be 3.5 pounds per ton of sulfuric acid produced on a three hour basis. This BACT limit is the most stringent in Florida for a sulfuric acid plant. The high efficiency mist eliminators together with proper plant operation serve to minimize sulfuric acid mist emissions.

The project provides reasonable assurance that all the requirements of the permit and BACT determination will be complied with. I recommend your approval and signature.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

The Department notes that Haldor-Topsoe claims its cesium line has an advantage over its non-cesium line at all typical operating temperatures. However the Haldor-Topsoe product is not an option for this project and the Department recognizes that the applicant has alternatives available to achieve emissions reflective of the Department's BACT determination.

The applicant will achieve the proposed emissions limits by improving the sulfur dioxide conversion of a traditional double absorption plant. The improvement over a traditional plant will be accomplished by an increase in the size of the converter; increase in the catalyst loading; increase in the 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. This is considered to be equivalent to BACT for sulfur dioxide. The emission limit of 3.5 pounds per ton of acid averaged over three hours is more stringent than the limit set for the Piney Point Plant where emissions are averaged over 48 hours.

Control options involving production of by-products or wastes have been rejected by Farmland. There is no indication that add-on control methods are competitive with process improvements that result in production of additional sulfuric acid. Recovery of sulfuric acid mist is an economic necessity as well as an environmental requirement. High efficiency mist eliminators are considered BACT for sulfuric acid mist.

The Department agrees with the applicant that the sulfur burning process utilized in the sulfuric acid plant inherently produces low NO_X emissions, and is considered BACT for NO_X.

COMPLIANCE METHODOLOGY:

Demonstration of compliance with the emissions limits shall be as required by Subpart H. These are EPA Reference Method 8 for SO_2 and SAM. EPA Methods 1, 2, and 3 shall be used to determine stack and flue gas properties. An initial and annual compliance test for NO_X using EPA Method 7E is required to verify the low emission rate projected in the application.

DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:

Syed Arif, P.E., Permit Engineer, New Source Review Section
Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended By:

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

Date: 7/15/98

Approved By:

for Howard L. Rhodes, Director
Division of Air Resources Management

Date: 7/15/98

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

BACT DETERMINATION PROCEDURE:

In accordance with Chapter 62-212, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

- Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.
- All scientific, engineering, and technical material and other information available to the Department.
- The emission limiting standards or BACT determination of any other state.
- The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically unfeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

BACT DETERMINATION BY DEP:

POLLUTANT	CONTROL TECHNOLOGY	EMISSION LIMIT
Sulfur Dioxide	Double Absorption	3.5 lb/ton 100% H_2SO_4
Sulfuric Acid Mist	High Efficiency Mist Eliminators	0.15 pounds per ton 100% H_2SO_4
Visibility	As Above and Process Controls	10 percent
Nitrogen Oxides	None - Low Fuel Nitrogen, Combustion Temperature	0.12 lb/ton 100% H_2SO_4 Applicant Estimate

DETERMINATION RATIONALE:

The BACT determination has been based on the established double absorption technology wherein the production process and the BACT are identical, thus eliminating the need for add-on control equipment. The applicant's BACT proposal for SO_2 is more stringent than the NSPS and previous BACT determinations.

The BACT determination for the permit issued on February 2, 1998 to Piney Point Phosphates, Manatee County serves as a basis for the evaluation of the new plant at Farmland, L.P. In the evaluation of the Piney Point plant, the Department concluded that an SO_2 emission limit of 2.4-3.2 pounds per ton of acid produced was feasible by using cesium-promoted vanadium catalyst in the final pass in place of conventional vanadium catalyst. According to Monsanto Enviro-Chem, the full service vendor, the optimum plant operating conditions for the Farmland project are such that the cesium promoted catalyst will not yield a reduction in SO_2 emissions. This is because the Monsanto cesium-promoted catalyst has an advantage over the non-cesium product only at lower temperatures.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

Sulfuric Acid Plant
Farmland Hydro, L.P.
PSD-FL-243 and 1050053-019-AC
Bartow, Polk County

BACKGROUND

The applicant, Farmland Hydro, L.P., proposes to replace the existing 2100 ton per day (TPD) No. 3 sulfuric acid plant (SAP) with a new 2750 TPD No. 6 SAP at the existing facility in Polk County.

The proposed project will result in "significant increases" with respect to Table 62-212.400-2, Florida Administrative Code (F.A.C.) of emissions of sulfur dioxide (SO_2), sulfuric acid mist (SAM), and nitrogen oxides (NO_X). The project is therefore subject to review for the Prevention of Significant Deterioration (PSD) and a determination of Best Available Control Technology (BACT) in accordance with Rule 62-212.400, F.A.C.

Descriptions of the process, project, ambient air quality effects, and rule applicability are given in the separate Technical Evaluation and Preliminary Determination issued with the Department's Intent and Public Notice package.

DATE OF RECEIPT OF A BACT APPLICATION:

The BACT application was received on November 20, 1997.

REVIEW GROUP MEMBERS:

Syed Arif, P.E.

BACT DETERMINATION REQUESTED BY THE APPLICANT:

POLLUTANT	CONTROL TECHNOLOGY	PROPOSED BACT LIMIT
Sulfur Dioxide	Double Absorption	3.5 pounds per ton 100% H_2SO_4
Sulfuric Acid Mist	Fiber Mist Eliminators	0.15 pounds per ton 100% H_2SO_4
Visibility	As Above and Process Controls	10 percent
Nitrogen Oxides	None - Low Fuel Nitrogen, Combustion Temperature	0.12 pounds per ton 100% H_2SO_4

The applicant has proposed to use the double absorption process and improved process control technology to achieve the proposed limits. These limits will be met by converting SO_2 produced into sulfur trioxide (SO_3), absorbing the SO_3 in circulating streams of sulfuric acid, and minimizing SAM formation and losses by process controls and high efficiency mist eliminators.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

G.9 In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extend it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

G.10 The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

G.11 This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

G.12 This permit or a copy thereof shall be kept at the work site of the permitted activity.

G.13 This permit also constitutes:

(a) Determination of Best Available Control Technology *(X)*
(b) Determination of Prevention of Significant Deterioration *(X)*; and
(c) Compliance with New Source Performance Standards *(X)*.

G.14 The permittee shall comply with the following:

(a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

(b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application or this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

(c) Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;
2. The person responsible for performing the sampling or measurements;
3. The dates analyses were performed;
4. The person responsible for performing the analyses;
5. The analytical techniques or methods used; and
6. The results of such analyses.

G.15 When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

APPENDIX GC

GENERAL PERMIT CONDITIONS [F.A.C. 62-4.160]

G.1 The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

G.2 This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings or exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

G.3 As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey and vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

G.4 This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

G.5 This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

G.6 The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

G.7 The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

(a) Have access to and copy and records that must be kept under the conditions of the permit;
(b) Inspect the facility, equipment, practices, or operations regulated or required under this permit, and,
(c) Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

G.8 If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

(a) A description of and cause of non-compliance; and
(b) The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

test is conducted. Once the unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purpose of additional compliance testing to regain the authority to operate at the permitted capacity. **[Rule 62-297.310(2) and (3), F.A.C.]**

SUBSECTION 6.0 REPORTS AND RECORDS

6.1 Duration: All reports and records required by this permit shall be kept for at least (5) years from the date the information was recorded. **[Rule 62-4.160(14)(b), F.A.C.]**

6.2 Emission Compliance Stack Test Reports:

(a) A *test report* indicating the results of the required compliance tests shall be filed with the Permitting Authority as soon as practical, but no later than 45 days after the last sampling run is completed. **[Rule 62-297.310(8), F.A.C.]**

b) The *test report* shall provide sufficient detail on the tested emission unit and the procedures used to allow the Department to determine if the test was properly conducted and if the test results were properly computed. At a minimum, the test report shall provide the applicable information listed in **Rule 62-297.310(8), F.A.C.**

6.3 Excess Emissions Report: If excess emissions occur, the owner or operator shall notify the Permitting Authority within (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem. In addition, the Department may request a written summary report of the incident. Pursuant to the New Source Performance Standards, excess emissions shall also be reported in accordance with 40 CFR 60.7, Subpart A. **[Rules 62-4.130 and 62-210.700(6), F.A.C.]**

6.4 Annual Operating Report for Air Pollutant Emitting Facility: Before March 1st of each year, the owner or operator shall submit to the Permitting Authority this required report [DEP Form No. 62-210.900(5)], which summarizes operations for the previous calendar year. **[Rule 62-210.370(3), F.A.C.]**

SUBSECTION 7.0 OTHER REQUIREMENTS

7.1 Waste Disposal: The owner or operator shall treat, store, and dispose of all liquid, solid, and hazardous wastes in accordance with all applicable Federal, State, and Local regulations. This air pollution permit does not preclude the permittee from securing any other types of required permits, licenses, or certifications.

SUBSECTION 5.0 TEST REQUIREMENTS

5.1 Test Performance Within 60 days after achieving the maximum production rate at which these emission units will be operated, but not later than 180 days after initial startup and annually thereafter, the owner or operator of this facility shall conduct performance test(s) pursuant to 40 CFR 60.8, Subpart A, General Provisions and 40 CFR 60, Appendix A. No other test method shall be used unless approval from the Department has been received in writing. Unless otherwise stated in the applicable emission limiting standard rule, testing of emissions shall be conducted with the emission unit(s) operating at permitted capacity pursuant to Rule 62-297.310(2), F.A.C. **[Rules 62-204.800, 62-297.310, 62-297.400, 62-297.401, F.A.C.]**

5.2 Test Procedures shall meet all applicable requirements of the Florida Administrative Code Chapter 62-297. **[Rule 62-297.310, F.A.C.]**

5.3 Test Notification: The owner or operator shall notify the Permitting Authority in writing at least *(30) days* (initial) and *15 days* (annual) prior to each scheduled compliance test to allow witnessing. The notification shall include the compliance test date, place of such test, the expected test time, the facility contact person for the test, and the person or company conducting the test. The (30) or (15) day notification requirement may be waived at the discretion of the Department. Likewise, if circumstances prevent testing during the test window specified for the emission unit, the owner or operator may request an alternate test date before the expiration of this window. **[Rule 62-297.310 and 40 CFR 60.8, F.A.C.]**

5.4 Special Compliance Tests: When the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in Rule 62-204, 62-210, 62 -212, 62-296 and 62-297, F.A.C. or in a permit issued pursuant to those rules is being violated, it may require the owner or operator of the facility to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions units and to provide a report on the results of said tests to the Permitting Authority. **[Rule 62-297.310(7)(b), F.A.C.]**

5.5 Stack Testing Facilities: The owner or operator shall install stack testing facilities in accordance with **Rule 62-297.310(6), F.A.C.**.

5.6 Exceptions and Approval of Alternate Procedures and Requirements: An Alternate Sampling Procedure (ASP) may be requested from the Bureau of Air Monitoring and Mobile Sources of the Florida Department of Environmental Protection in accordance with the procedures specified in **Rule 62-297.620, F.A.C.**

5.7 Operating Rate During Testing: Unless otherwise stated in the applicable emission limiting standard rule, testing of emissions shall be conducted with the emissions unit operation at permitted capacity. Permitted capacity is defined as 90 to 100 percent of the maximum operation rate allowed by the permit. If it is impracticable to test at permitted capacity, an emissions unit may be tested at less than the minimum permitted capacity; in this case, subsequent emissions unit operation is limited to 110 percent of the test load until a new liability for failure to comply with the conditions of this permit and the regulations. **[Rule 62-4.130, F.A.C.]**

3.3 Circumvention: The owner or operator shall not circumvent the air pollution control equipment or allow the emission of air pollutants without this equipment operating properly. **[Rules 62-210.650, F.A.C.]**

3.4 Excess Emissions Requirements **[Rule 62-210.700, F.A.C.]**

(a) Excess emissions resulting from start-up, shutdown or malfunction of these emissions units shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized, but in no case exceed two hours in any 24 hour period unless specifically authorized by the Permitting Authority office for longer duration. **[Rule 62-210.700(1), F.A.C.]**

(b) Excess emissions that are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure that may reasonably be prevented during start-up, shutdown, or malfunction shall be prohibited. **[Rule 62-210.700(4), F.A.C.]**

(c) In case of excess emissions resulting from malfunctions, the owner or operator shall notify Permitting Authority within one (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the problem; and the corrective actions being taken to prevent recurrence. **[Rule 62-210.700(6), F.A.C.]**

3.5 Operating Procedures: Operating procedures shall include good operating practices and proper training of all operators and supervisors. The good operating practices shall meet the guidelines and procedures as established by the equipment manufacturers. All operators (including supervisors) of air pollution control devices shall be properly trained in plant specific equipment. **[Rule 62-4.070(3), F.A.C.]**

SUBSECTION 4.0 MONITORING OF OPERATIONS

4.1 Determination of Process Variables

(a) The permittee shall operate and maintain equipment and/or instruments necessary to determine process variables, such as process weight input or heat input, when such data is needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.

(b) Equipment and/or instruments used to directly or indirectly determine such process variables, including devices such as belt scales, weigh hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value. **[Rule 62-297.310(5), F.A.C]**

- Landscaping or planting of vegetation.
- Use of hoods, fans, filters, and similar equipment to contain, capture and/or vent particulate matter.
- Confining abrasive blasting where possible.
- Enclosure or covering of conveyor systems.

NOTE: Facilities that cause frequent, valid complaints may be required by the Permitting Authority to take these or other reasonable precautions. In determining what constitutes reasonable precautions for a particular source, the Department shall consider the cost of the control technique or work practice, the environmental impacts of the technique or practice, and the degree of reduction of emissions expected from a particular technique or practice.

2.3 General Pollutant Emission Limiting Standards: **[Rule 62-296.320, F.A.C.]**

(a) The owner or operator shall not store, pump, handle, process, load, unload or use in any process or installation, volatile organic compounds or organic solvents without applying known and existing vapor emission control devices or systems.

(b) No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor.

NOTE: An objectionable odor is defined as any odor present in the outdoor atmosphere which by itself or in combination with other odors, is or may be harmful or injurious to human health or welfare, which unreasonably interferes with the comfortable use and enjoyment of life or property, or which creates a nuisance. [F.A.C. 62-210.200(198)]

SUBSECTION 3.0 OPERATION AND MAINTENANCE

3.1 Changes/Modifications: The owner or operator shall submit to the Permitting Authority(s), for review any changes in, or modifications to: the method of operation; process or pollution control equipment; increase in hours of operation; equipment capacities; or any change which would result in an increase in potential/actual emissions. Depending on the size and scope of the modification, it may be necessary to submit an application for, and obtain, an air construction permit prior to making the desired change. *Routine maintenance of equipment will not constitute a modification of this permit.* **[Rule 62-4.030, 62-210.300 and 62-4.070(3), F.A.C.]**

3.2 Plant Operation - Problems: If temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by fire, wind or other cause, the owner or operator shall notify the Permitting Authority as soon as possible, but at least within (1) working day, excluding weekends and holidays. The notification shall include: pertinent information as to the cause of the problem; the steps being taken to correct the problem and prevent future recurrence; and where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from any

SUBSECTION 1.0 CONSTRUCTION REQUIREMENTS

1.1 Applicable Regulations: Unless otherwise indicated in this permit, the construction and operation of the subject emission unit(s) shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of Chapter 403, F.S and Florida Administrative Code Chapters 62-4, 62-103, 62-204, 62-210, 62-212, 62-213, 62-296, 62-297; and the applicable requirements of the Code of Federal Regulations Section 40, Part 60, adopted by reference in the Florida Administrative Code regulation **[Rule 62-204.800 F.A.C.]**. Issuance of this permit does not relieve the facility owner or operator from compliance with any applicable federal, state, or local permitting requirements or regulations. **[Rule 62-210.300, F.A.C.]**

SUBSECTION 2.0 EMISSION LIMITING STANDARDS

2.1 General Particulate Emission Limiting Standards. General Visible Emissions Standard: Except for emissions units that are subject to a particulate matter or opacity limit set forth or established by rule and reflected by conditions in this permit, no person shall cause, let, permit, suffer, or allow to be discharged into the atmosphere the emissions of air pollutants from any activity, the density if which is equal to or greater than that designated as Number 1 on the Ringelmann Chart (20% opacity). **[Rule 62-296-320(4)(b)1, F.A.C.]**

2.2 Unconfined Emissions of Particulate Matter **[Rule 62-296.320(4)(c), F.A.C.]**

(a) The owner or operators shall not cause, let, permit, suffer or allow the emissions of unconfined particulate matter from any source whatsoever, including, but not limited to, vehicular movement, transportation of materials, construction, alteration, demolition or wrecking, or industrially related activities such as loading, unloading, storing or handling, without taking reasonable precautions to prevent such emission.

(b) Any permit issued to a facility with emissions of unconfined particulate matter shall specify the reasonable precautions to be taken by that facility to control the emissions of unconfined particulate matter.

(c) Reasonable precautions include the following:

- Paving and maintenance of roads, parking areas and yards.
- Application of water or chemicals to control emissions from such activities as demolition of buildings, grading roads, construction, and land clearing.
- Application of asphalt, water, oil, chemicals or other dust suppressants to unpaved roads, yards, open stock piles and similar activities.
- Removal of particulate matter from roads and other paved areas under the control of the owner or operator of the facility to prevent reentrainment, and from buildings or work areas to prevent particulate from becoming airborne.

APPENDIX A
BEST OPERATIONAL START-UP PRACTICES FOR SULFURIC ACID PLANTS

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5. Warm Restart.

   a. Converter

      The inlet and outlet temperatures of the first two catalyst masses should be sufficiently high to ensure conversion. One of the following three conditions must be met:

      (1) The first two catalyst masses inlet and outlet temperatures must be at a minimum of 700°F; or.

      (2) Two of the four inlet and outlet temperatures must be greater than or equal to 800°F; or.

      (3) The inlet temperature of the first catalyst must be greater than or equal to 600°F and the outlet temperature greater than or equal to 800°F. Also, the inlet and outlet temperatures of the second catalyst must be greater than or equal to 700°F.

      Failure to meet one of the above conditions, requires use of cold start-up procedures.

      To allow for technologies improvements or individual plant conditions, alternative conditions will be considered by the Department in appropriate cases.

   b. Absorbing Towers.

      The concentration., temperature and flow of circulating acid shall be as near to normal conditions as reasonably can be achieved. In no event shall the concentration be less than 96 percent H_2SO_4.

APPENDIX A
BEST OPERATIONAL START-UP PRACTICES FOR SULFURIC ACID PLANTS

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1. Only one sulfuric acid plant at a facility should be started up and burning sulfur at a time. There are times when it will be acceptable for more than one sulfuric acid plant to be in the start-up mode at the same time, provided the following condition is met. It is not acceptable to initiate sulfur burning at one sulfuric acid plant when another plant at the same facility is emitting SO_2 at a rate in excess of the emission limits imposed by the permit or rule, as determined by the CEMs emission rates for the immediately preceding 20 minutes.

2. A plant start-up must be at the lowest practicable operating rate, not to exceed 70 percent of the designated operating rate, until the SO_2 monitor indicates compliance. Because production rate is difficult to measure during start-up, if a more appropriate indicator (such as blower pressure, furnace temperature, gas strength, blower speed, number of sulfur guns operating, etc.) can be documented, tested and validated, the Department will accept this in lieu of directly documenting of the suitable list of surrogate parameters to demonstrate and document the reduced operating rate on a plant-by-plant basis. Documentation that the plant is conducting start-up at the reduced rate is the responsibility of the owner or operator.

3. Sulfuric acid plants are authorized to emit excess emissions from start-up for a period of three consecutive hours provided best operational practices, in accordance with this agreement, to minimize emissions are followed. No plant shall be operated (with sulfur as fuel) out of compliance for more than three consecutive hours. Thereafter, the plant shall be shut down. the plant shall be shut down (cease burning sulfur) if, as indicated by the continuous emission monitoring system, the plant is not in compliance within three hours of startup. Restart may occur as soon as practicable following any needed repairs or adjustments, provided the corrective action is taken and properly documented.

4. Cold Start-Up Procedures.

   a. Converter.

      (1) The inlet and outlet temperature at the first two masses of catalyst shall be sufficiently high to provide immediate ignition when SO_2 enters the masses. In no event shall the inlet temperature to the first mass be less than 800°F or the outlet temperature to the first two masses be less than 700°F. These temperatures are the desired temperatures at the time the use of auxiliary fuel is terminated

      (2) The gas stream entering the converter shall contain SO_2 at a level less than normal, and sufficiently low to promote catalytic conversion to SO_3.

   b. Absorbing Towers.

      The concentration., temperature and flow of circulating acid shall be as near to normal conditions as reasonably can be achieved. In no event shall the concentration be less than 96 percent H_2SO_4.

8. The permittee shall comply with all applicable requirements of the Department's sulfur storage and handling rule. **[Rule 62-296.411, F.A.C.]**

9. No person shall cause, suffer, allow, or permit the discharge of air pollutants which cause or contribute to an objectionable odor. **[Rule 62-296.320, F.A.C.]**

10. In order to minimize excess emissions during startup/shutdown/malfunction these emissions units shall adhere to best operational practices. The provisions of the Memorandum of Understanding issued by the Department on November 21, 1989, are hereby added to this permit as Appendix A and shall be added to the Title V permit. **[Rule 62-210.700, F.A.C., 40 CFR 60.7]**

11. A continuous emissions monitoring system (CEMS) for the measurement of sulfur dioxide emissions shall be installed, calibrated, operated and maintained in accordance with 40 CFR 60.84 (1996 version)

12. Compliance with the emission limits for SO_2, SAM, and NO_X shall be determined using the following reference methods as described in 40 CFR 60, Appendix A (1996, version), adopted by reference in Chapter 62-204, F.A.C.

Method 7E	Determination of Nitrogen Oxides from Stationary Sources.
Method 8	Determination of Sulfuric Acid Mist and Sulfur Dioxide Emissions from Stationary Sources. (for demonstrating compliance with 40 CFR 60, Subpart H)
Method 9	Visual Determination of the Opacity of Emissions from Stationary Sources.

These emissions units shall comply with all applicable requirements of Rule 62-297.310, F.A.C. General Test Requirements and 40 CFR 60.8 Performance Tests.

Testing of emissions shall be conducted with the emissions units operating at permitted capacity, which is defined as 90-100% of the maximum operating rate allowed by the permit. If it is impracticable to test at permitted capacity, then the unit may be tested at less than 90% of the maximum operating rate allowed by the permit; in this case, subsequent source operation is limited to 110% of the test load until a new test is conducted. Once the unit is so limited, then operation at higher capacities is allowed for no more than fifteen consecutive days for the purpose of additional compliance testing to regain the permitted capacity in the permit. **[Rules 62-204.800, 62-297.310, 62-297.400, 62-297.401, F.A.C., and 40 CFR 60 Appendix A and 40 CFR 60.8, Subpart A].**

13. This facility shall maintain a central file containing all measurements, records, and other data that are required to be collected pursuant to this permit. The Department shall be notified in writing at least 15 days prior to compliance testing. Written reports of the compliance tests shall be submitted to the Southwest District Office within 45 days of test completion. **[Rule 62-4.070(3), F.A.C.]**

14. An application for a Title V permit for the No. 6 sulfuric acid plant shall be submitted to the Department at least 90 days prior to the expiration date of this permit. Any request for the extension of this permit shall be submitted to the Department 60 days prior to permit expiration.

15. This facility shall maintain adequate fencing or physical barriers around the area within 450 meters of the origin of the polar coordinate system used as input in the air dispersion modeling submitted with the permit application.

SECTION I. FACILITY INFORMATION

SPECIFIC CONDITIONS - SULFURIC ACID PLANT AND MOLTEN SULFUR STORAGE AND HANDLING:

The following Specific Conditions apply to the following emission units:

EMISSIONS UNIT NO.	SYSTEM	EMISSIONS UNITS DESCRIPTION
003	Process	Sulfuric Acid Plant No. 3
038	Process	Sulfuric Acid Plant No. 6
030-036	Raw Material	Molten Sulfur Storage and Handling System

1. Emissions unit 038 shall comply with all applicable provisions of the 40 CFR 60, Standards of Performance for New Stationary Sources, Subpart H, Sulfuric Acid Plants. **[Rule 62-204.800(7)(b)10., F.A.C]**

2. Emissions unit 038 shall also comply with all applicable requirements of 40 CFR 60, Standards of Performance for New Stationary Sources, Subpart A, General Provisions. These include:

   - CFR 60.7, Notification and record keeping
   - CFR 60.8, Performance tests
   - CFR 60.11, Compliance with standards and maintenance requirements
   - CFR 60.12, Circumvention
   - CFR 60.13, Monitoring requirements
   - CFR 60.19, General notification and reporting requirements

3. Emissions of sulfur dioxide (SO_2), sulfuric acid mist (SAM), visible emissions (VE), and nitrogen oxides (NO_X) from the sulfuric acid plant shall not exceed the following limits: **[Rules 62-204.800(7)(b)10; 62-210.200; 62-212, F.A.C.]**

Pollutant	Pounds per Hour	Tons per Year	Limit Basis
SO_2	401.0	1757	3.5 lb/ton 100% H_2SO_4 produced (BACT)[1]
SAM	17.2	75	0.15 lb/ton 100% H_2SO_4 produced (NSPS)[1]
VE	10% opacity		NSPS
NO_X	13.8	60	0.12 lb/ton 100% H_2SO_4 produced (BACT)

[1] Annual EPA Method 8 test is required to demonstrate compliance.

4. The design production capacity of the No. 6 plant shall not exceed 2,750 tons per day (TPD) of 100 percent (%) sulfuric acid. The production rate shall not exceed 2,750 TPD as 100% sulfuric acid on a 24-hour basis. **[Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]**

5. The maximum molten sulfur utilization rate for the facility shall neither exceed 2,530 TPD nor 924,000 tons per year. (Based on the maximum permitted sulfuric acid production rate of 7,650 TPD of 100% sulfuric acid for the facility) **[Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]**

6. These emissions units are allowed to operate continuously (8760 hours/year) **[Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]**

7. The existing No. 3 sulfuric acid plant (Emission Unit No. 003) shall cease operation and be permanently shut down when a new No. 6 sulfuric acid plant commences commercial operations. **[Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]**

SECTION I. FACILITY INFORMATION

GENERAL AND ADMINISTRATIVE REQUIREMENTS

1. Regulating Agencies: All documents related to applications for permits to operate, reports, tests, minor modifications and notifications shall be submitted to the Department of Environmental Protection, Southwest District Office, 3804 Coconut Palm Drive, Tampa, Florida 33619-8218 (phone number: 813/744-6100). All applications for permits to construct or modify an emissions unit(s) *subject to the Prevention of Significant Deterioration or Nonattainment (NA) review requirements* should be submitted to the Bureau of Air Regulation (BAR), Florida Department of Environmental Protection (FDEP), 2600 Blairstone Road, Tallahassee, Florida 32399-2400 (phone number 850/488-1344).

2. General Conditions: The owner and operator is subject to and shall operate under the attached General Permit Conditions G.1 through G.15 listed in *Appendix GC* of this permit. General Permit Conditions are binding and enforceable pursuant to Chapter 403 of the Florida Statutes. **[Rule 62-4.160, F.A.C.]**

3. Emission Unit(s) Common Specific Conditions: The owner and operator is subject to and shall operate under the attached Emission Unit(s) Common Specific Conditions listed in *Appendix CSC* of this permit. The Emission Unit(s) Common Specific Conditions are binding and enforceable pursuant to Chapters 62-204 through 62-297 of the Florida Administrative Code.

4. Terminology: The terms used in this permit have specific meanings as defined in the corresponding chapters of the Florida Administrative Code.

5. Forms and Application Procedures: The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. **[Rule 62-210.900, F.A.C.]**

6. Expiration: This air construction permit shall expire on October 31, 2000 **[Rule 62-210.300(1), F.A.C.]**. The permittee may, for good cause, request that this construction permit be extended. Such a request shall be submitted to the Bureau of Air Regulation prior to 60 days before the expiration of the permit. However, the permittee shall promptly notify the Department's Southwest District Office of any delays in completion of the project which would affect the startup day by more than 90 days. **[Rule 62-4.090, F.A.C]**

7. Application for Title V Permit: An application for a Title V operating permit, pursuant to Chapter 62-213, F.A.C., must be submitted to the Department's Southwest District Office. **[Chapter 62-213, F.A.C.]**

SECTION I. FACILITY INFORMATION

FACILITY DESCRIPTION

The new SAP 6 will consist of a sulfuric acid plant and associated molten sulfur storage and handling equipment. Air pollution control equipment consists of the double absorption process, and high efficiency mist eliminators on the final tower.

EMISSION UNITS

This permit addresses the following emission units:

EMISSIONS UNIT NO.	SYSTEM	EMISSIONS UNITS DESCRIPTION
003	Process	Sulfuric Acid Plant No. 3
038	Process	Sulfuric Acid Plant No. 6
030-036	Raw Material	Molten Sulfur Storage and Handling System

REGULATORY CLASSIFICATION

The facility is classified as a "Major or Title V Source" per Rule 62-210.200, F.A.C., Definitions, because emissions of at least one regulated air pollutant exceed 100 tons per year (TPY).

Sulfuric acid plants are listed as a Major Facility Category in Table 62-212.400-1, F.A.C., "Major Facility Categories." Therefore, stack and fugitive emissions of over 100 TPY of sulfur dioxide are sufficient to classify the installation as a "Major Facility" per the definitions in **Rule 62-210.200, F.A.C.,** subject to the Significant Emission Rates for sulfuric acid mist and nitrogen oxides given in Table 62-212.400-2, F.A.C. and the requirements of **Rules 62-212.400 and 410, F.A.C.**, Prevention of Significant Deterioration (PSD) and Best Available Control Technology (BACT).

The molten sulfur storage and handling equipment is subject to **Rule 62-212.600, F.A.C..** The sulfuric acid plant is also subject to 40 CFR Subpart H, New Source Performance Standards (NSPS) for Sulfuric Acid Plants, incorporated by reference in **Rule 62-204.800, F.A.C.**

PERMIT SCHEDULE:

05/28/98	Notice of Intent published in Lakeland Ledger
05/19/98	Distributed Intent to Issue Permit
04/24/98	Application deemed complete
11/20/97	Received Application

RELEVANT DOCUMENTS:

The documents listed below are the basis of the permit. They are specifically related to this permit but do not supersede the conditions given in the permit. These documents are on file with the Department.

- Application received November 20, 1997
- Department's letters dated November 20 and December 18, 1997, February 11 and March 26, 1998
- Comments from the National Park Service dated January 7, 1998
- Applicant's completeness responses dated January 16, March 13, and April 24, 1998
- Department's Intent to Issue package dated May 19, 1998
- Applicant's plans for limiting public access dated July 7, 1998
- Department's Final Determination accompanying permit dated July 14, 1998

Department of
Environmental Protection

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

PERMITTEE:

Farmland Hydro, L.P.
4390 County Road 640 West
Bartow, Florida 33830

File No.	1050053-019-AC
FID No.	1050053
SIC No.	2819
Permit No.	PSD-FL-243
Expires:	October 31, 2000

Authorized Representative:
C. M. Farris
Vice-President, Operations

PROJECT AND LOCATION:

Permit for the construction of a 2750 tons per day sulfur-burning, double absorption sulfuric acid plant and associated sulfur storage and handling equipment serving a phosphate fertilizer facility located at the above address in Polk County. UTM coordinates are Zone 17; 410.3 km E; 3079.7 km N.

STATEMENT OF BASIS:

This construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and Chapters 62-4, 62-204, 62-210, 62-212, 62-296 and 62-297 of the Florida Administrative Code (F.A.C.). The above named permittee is authorized to modify the facility in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department of Environmental Protection (Department).

Appendices and attachments made a part of this permit:

Appendix A	Best Operational Start-up Procedures for Sulfuric Acid Plants
Appendix BD	Best Available Control Technology Determination
Appendix CSC	Emission Unit(s) Common Specific Conditions
Appendix GC	Construction Permit General Conditions

for Howard L. Rhodes, Director
Division of Air Resources
Management

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

KA 123-97-02

MEMORANDUM

TO: Cleve Holladay, FDEP

FROM: Pradeep Raval

DATE: July 13, 1998

SUBJECT: Sulfuric Acid Plant No. 6
Farmland Hydro, L.P.
Polk County, Florida

This is a follow up to our telephone conversation today regarding the measures to be taken by Farmland to preclude public access on to the plant property, as required in Specific Condition 15 of the draft permit.

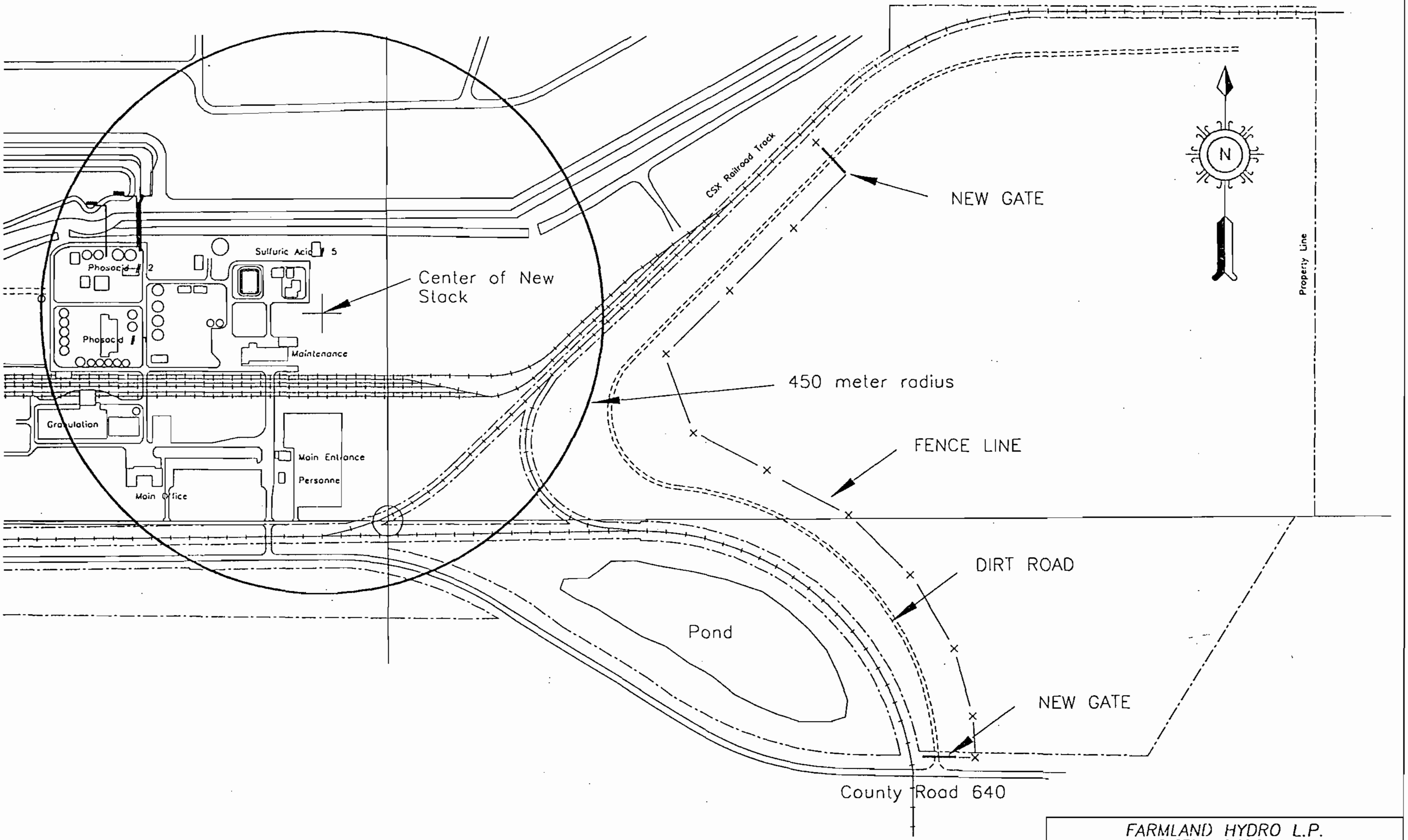
To address your specific concern, Farmland will place "No Trespassing" signs, at 200 feet interval along the road to the south of the proposed plant (in front of the main offices).

It is our understanding that this information will enable you to issue the final permit.

If you have any questions, please call me.

par.

c: C. Jenkins, Farmland



FARMLAND HYDRO L.P.
BARTOW, FLORIDA

FARMLAND HYDRO IMMEDIATE PROPERTY

CHANGE

DRAWN BY cwj
CHECKED BY
APPROVED BY
SCALE NONE
DATE 7/7/98
SHEET 2 OF 2
DRAWING NO. c:\acadlt\sadna6.dwg

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

RECEIVED
JUL 10 1998
BUREAU OF
AIR REGULATION

KA 123-97-02

MEMORANDUM

TO: Cleve Holladay, FDEP

FROM: Pradeep Raval

DATE: July 7, 1998

SUBJECT: Sulfuric Acid Plant No. 6
Farmland Hydro, L.P.
Polk County, Florida

This is a follow up to our telephone conversation regarding the physical barriers proposed by Farmland to preclude public access on to the plant property, as required in Specific Condition 15 of the draft permit.

As previously discussed, the public access is presently adequately precluded from the north, south and west of the proposed No. 6 Sulfuric Acid Plant. However, additional physical barriers will be required to the east of the proposed plant (see attached drawing). Farmland proposes new gates with the fencing marked on the plot plan. This measure is expected to adequately preclude public access, from the east, to the area of concern to you.

It is anticipated that this information will complement the information you already have on the physical barriers at the site to provide the reasonable assurance in order to issue the final permit.

If you have any questions, please call me.

par.

c: C. Jenkins, Farmland

FINAL DETERMINATION

Farmland Hydro, L.P.

Permit No. 1050053-019-AC, PSD-FL-243

2750 Tons Per Day Sulfuric Acid Plant

An Intent to Issue an air construction permit to Farmland Hydro, L.P., to construct a new 2750 tons per day sulfuric acid plant in Polk County, was distributed on May 19, 1998. The Notice of Intent was published in the Lakeland Ledger on May 28, 1998. Copies of the draft construction permit were available for public inspection at the Department offices in Tampa and Tallahassee.

No comments were submitted by the National Park Service, the U.S. Environmental Protection Agency or the public. No comments were received from the applicant other than the attached follow up correspondence regarding the physical barriers Farmland proposes for complying with Specific Condition 15. Farmland's implementation of its proposal will adequately comply with this condition.

The final action of the Department is to issue the permit as proposed.

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 <u>not</u> 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.

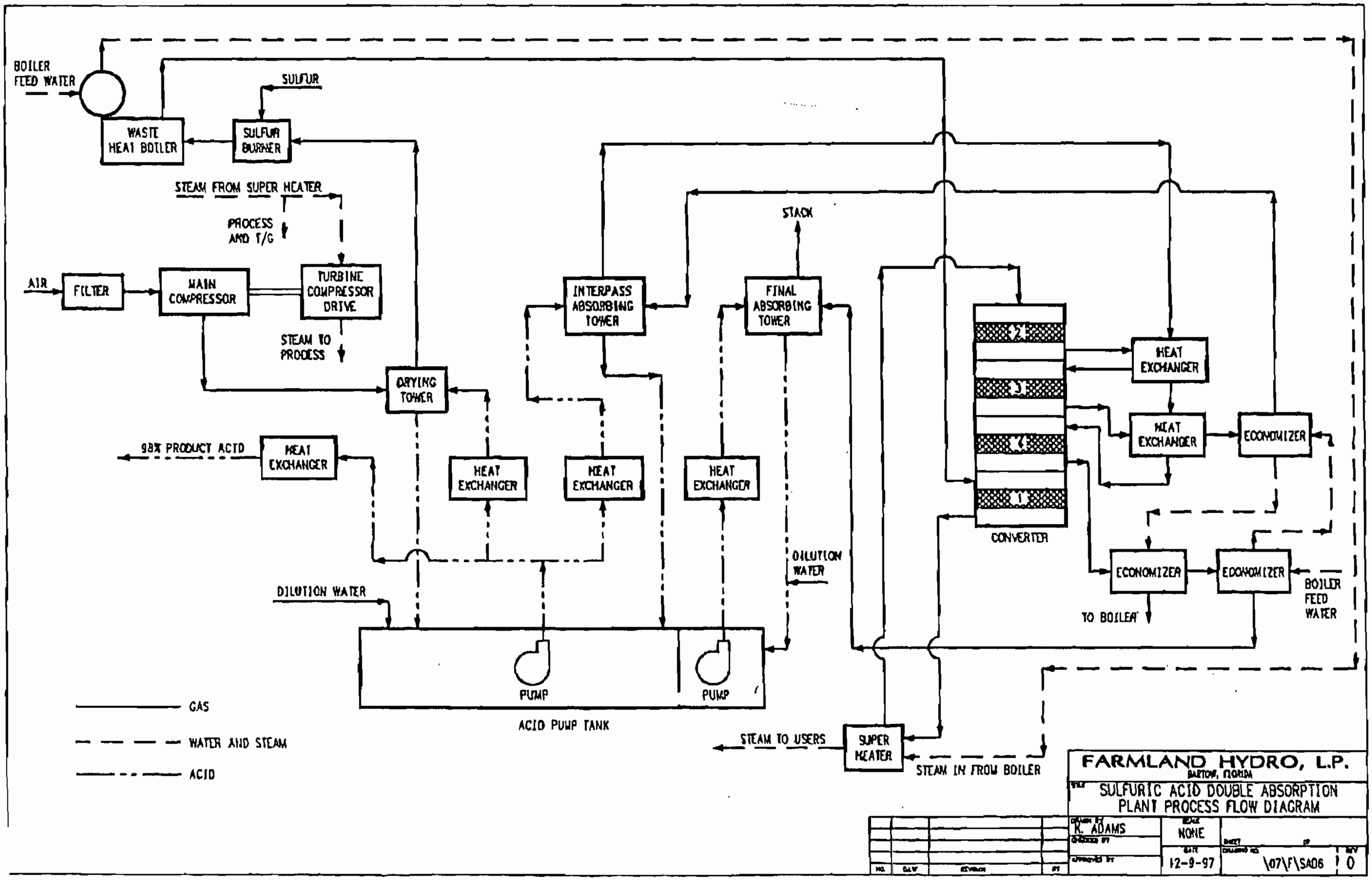
c: Charles Jenkins, Farmland Hydro, L.P.

cc: S. arif, BAR
SWD
EPA

Polk Co.

ATTACHMENT 1

PROCESS FLOW DIAGRAM



FARMLAND HYDRO, L.P.
BARTOW, FLORIDA

TITLE SULFURIC ACID DOUBLE ABSORPTION PLANT PROCESS FLOW DIAGRAM

NO.	DATE	REVISION	BY

DRAWN BY K. ADAMS
CHECKED BY
APPROVED BY
SCALE NONE
DATE 12-9-97
SHEET OF
DRAWING NO. \07\F\SA06
REV 0

PLOTTED: 12-9-97

ATTACHMENT 2

EMISSIONS, PRODUCTION AND TURNAROUND INFORMATION

FIGURE 1
Sulfuric Acid Plant # 3

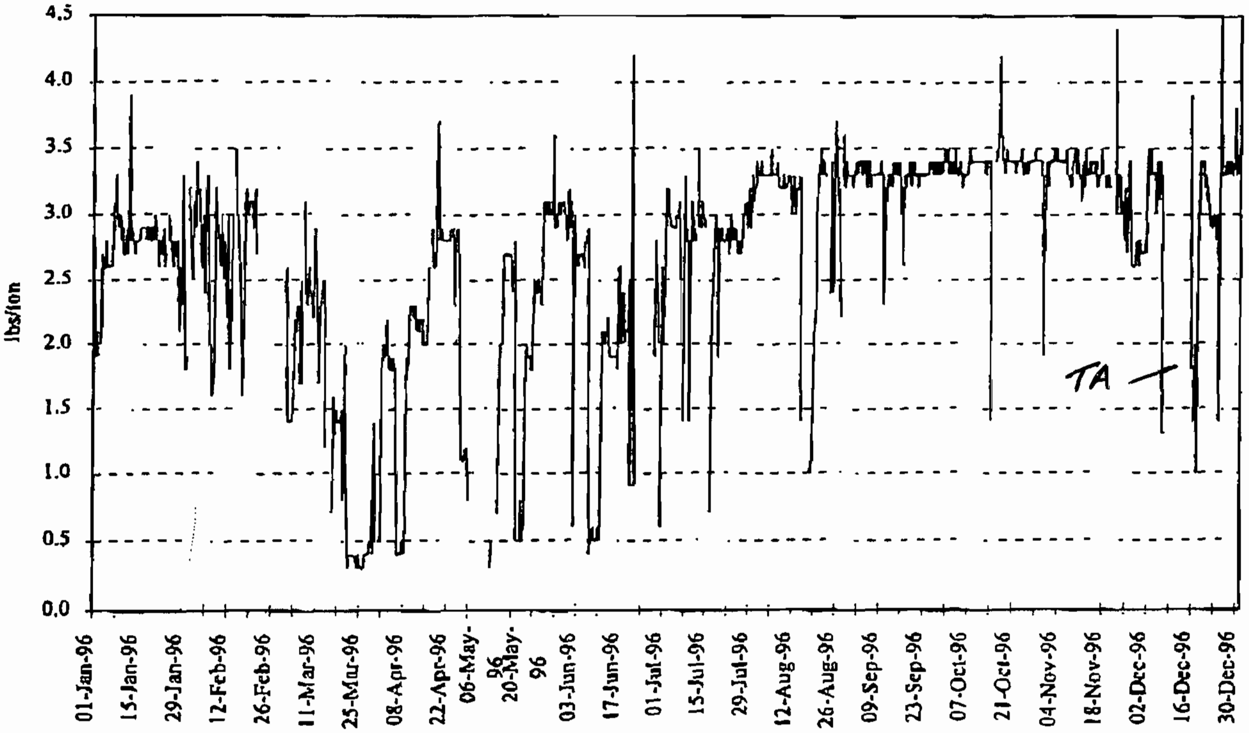


FIGURE 2
Sulfuric Acid Plant # 4

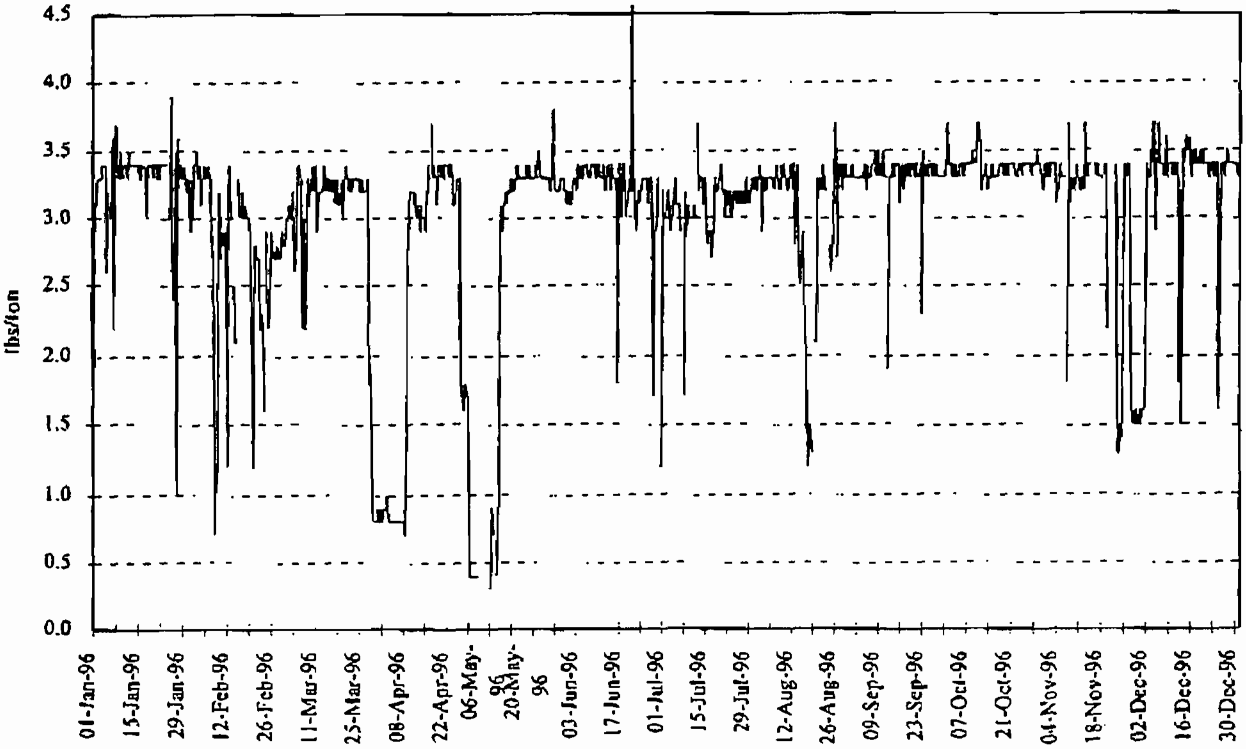


FIGURE 3
Sulfuric Acid Plant # 3

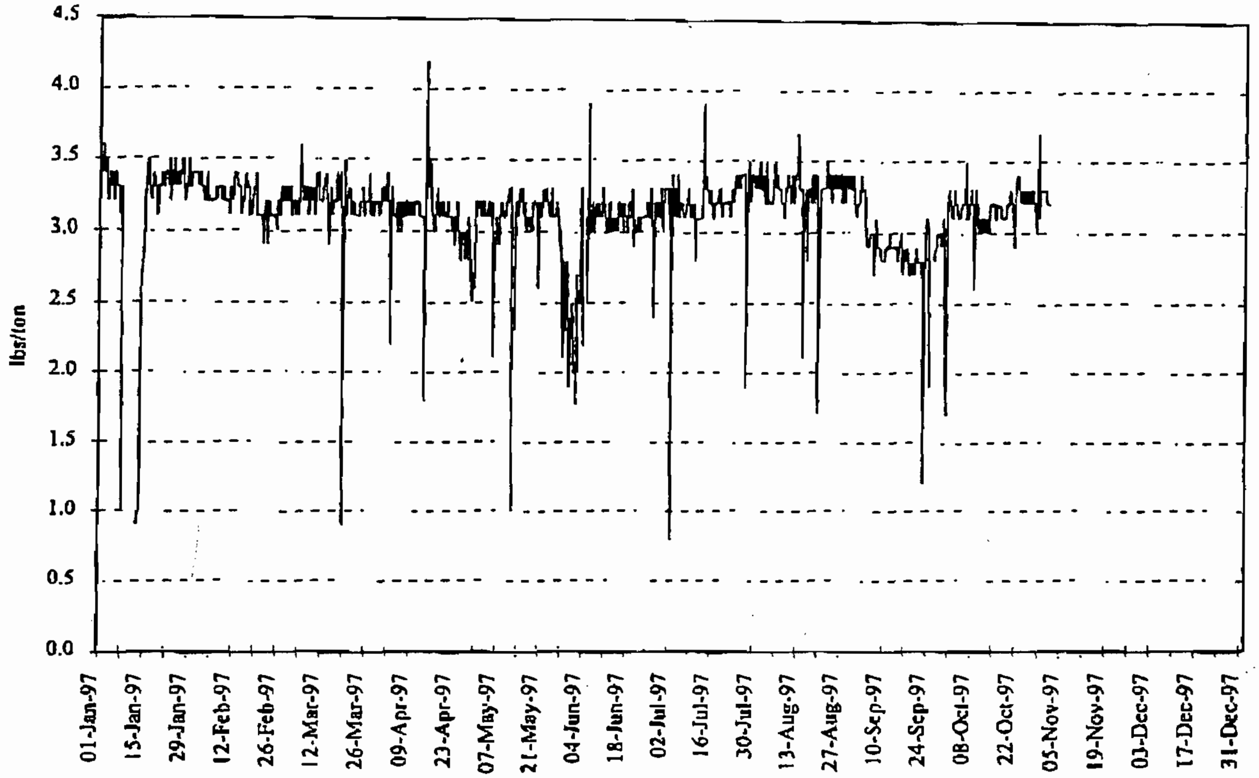


FIGURE 4
Sulfuric Acid Plant # 4

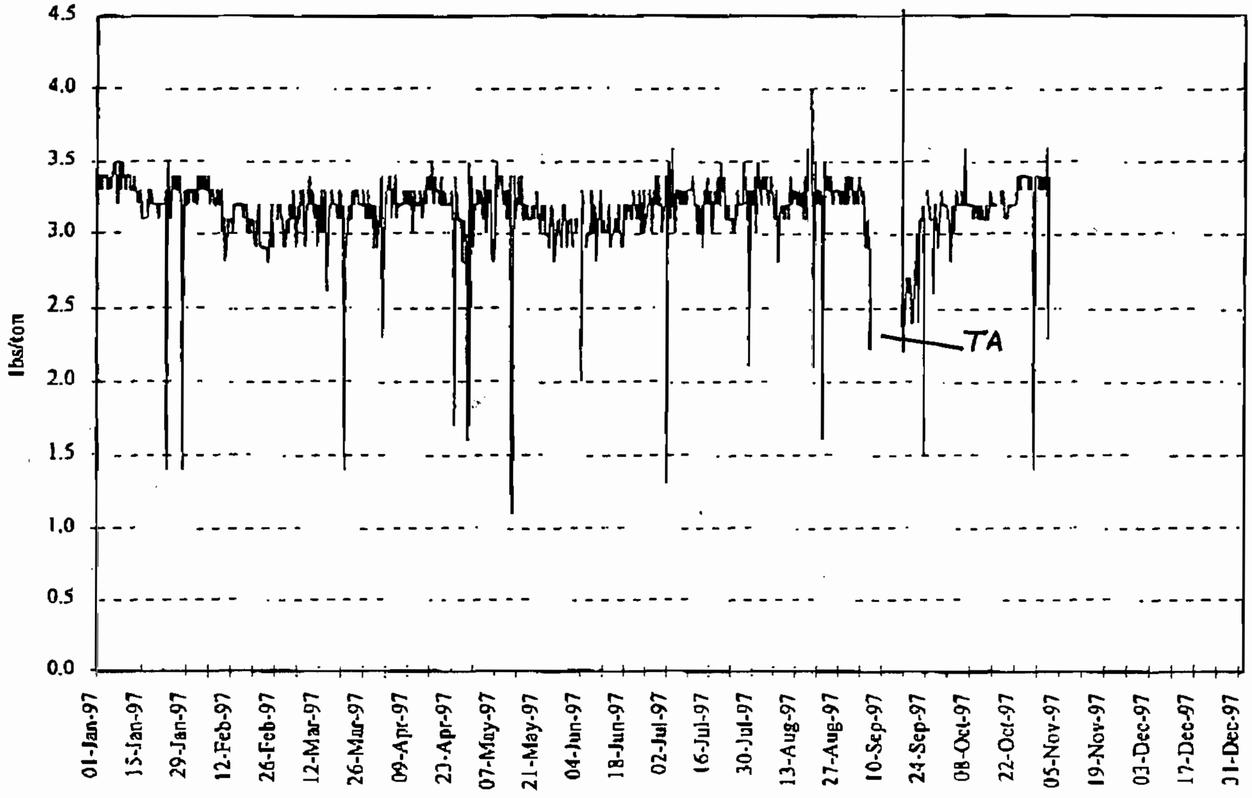


FIGURE 5
Sulfuric Acid Plant # 3
Four day averaged and adjusted production

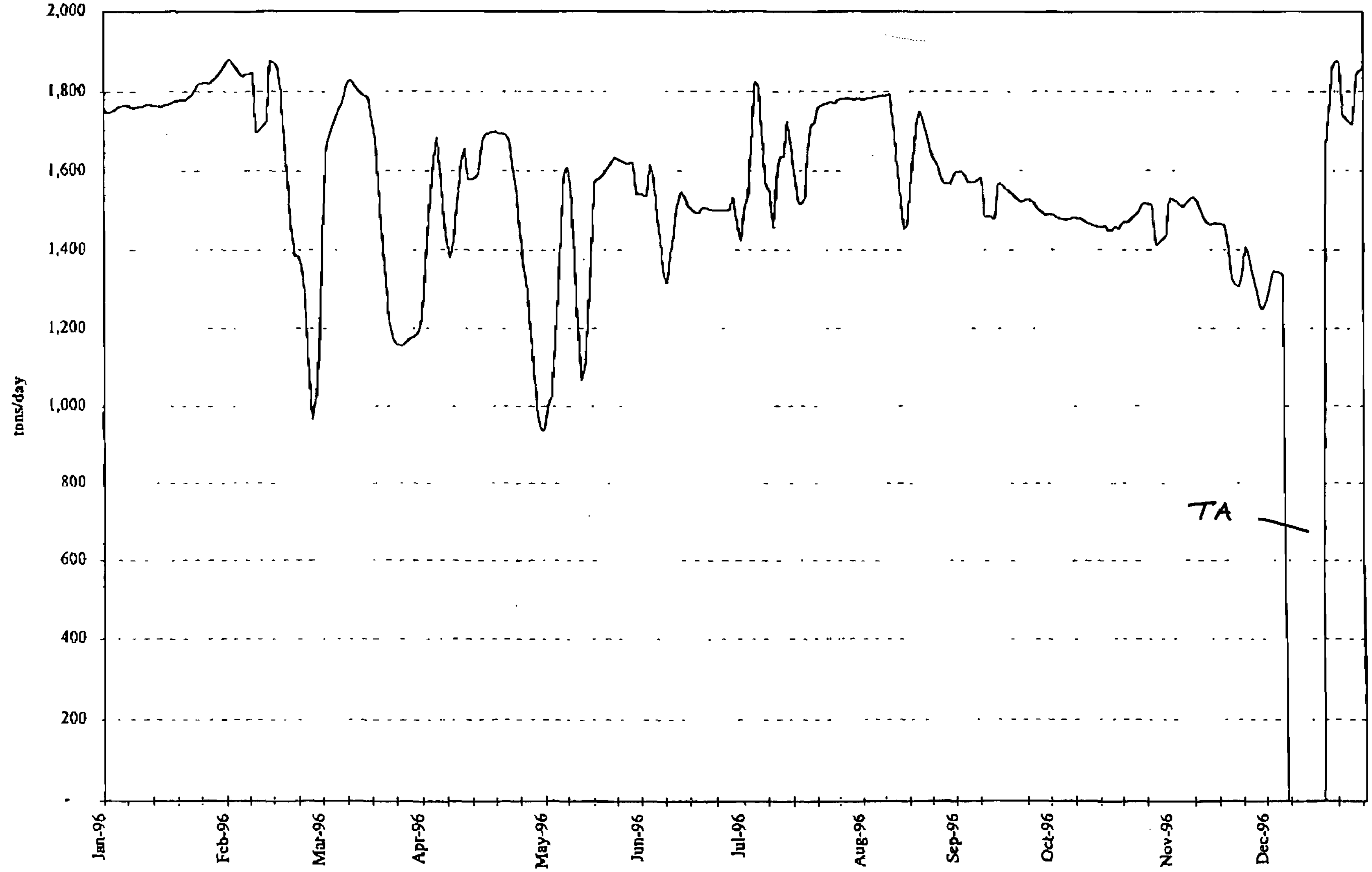


FIGURE 6
Sulfuric Acid Plant # 4
Four day averaged and adjusted production

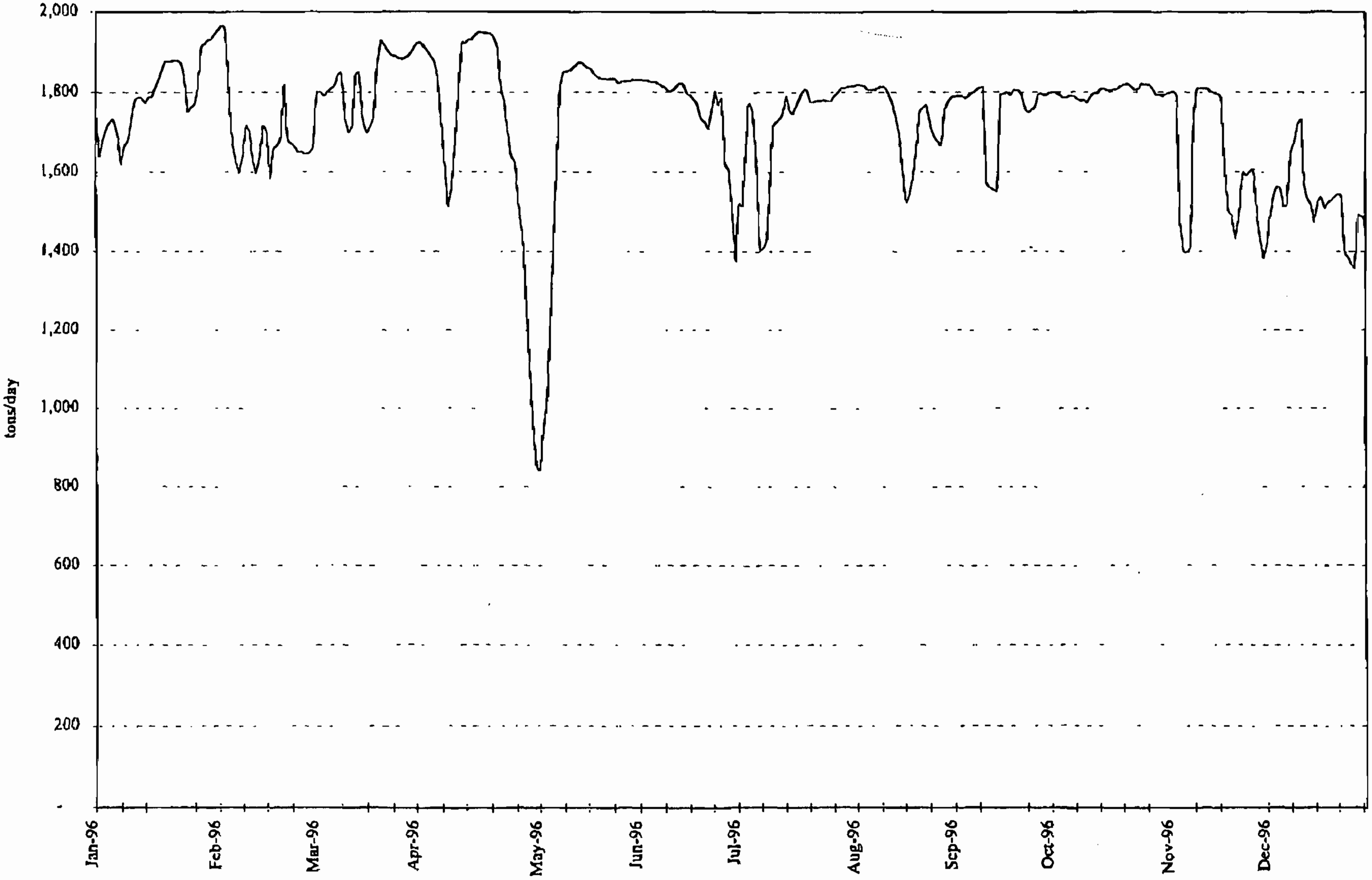


FIGURE 7

Sulfuric Acid Plant # 3

Four day averaged and adjusted production

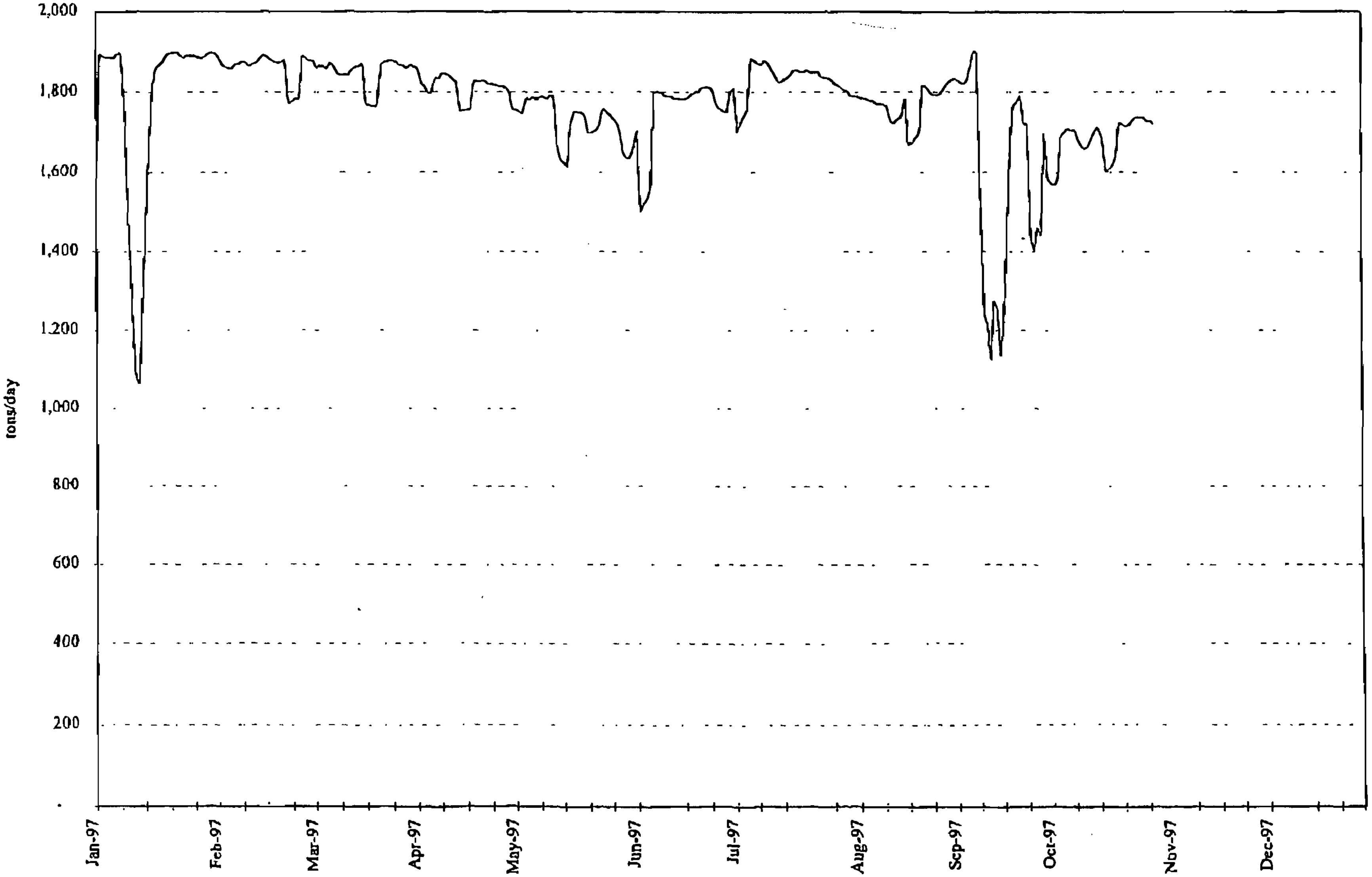


FIGURE 8
Sulfuric Acid Plant # 4
Four day averaged and adjusted production

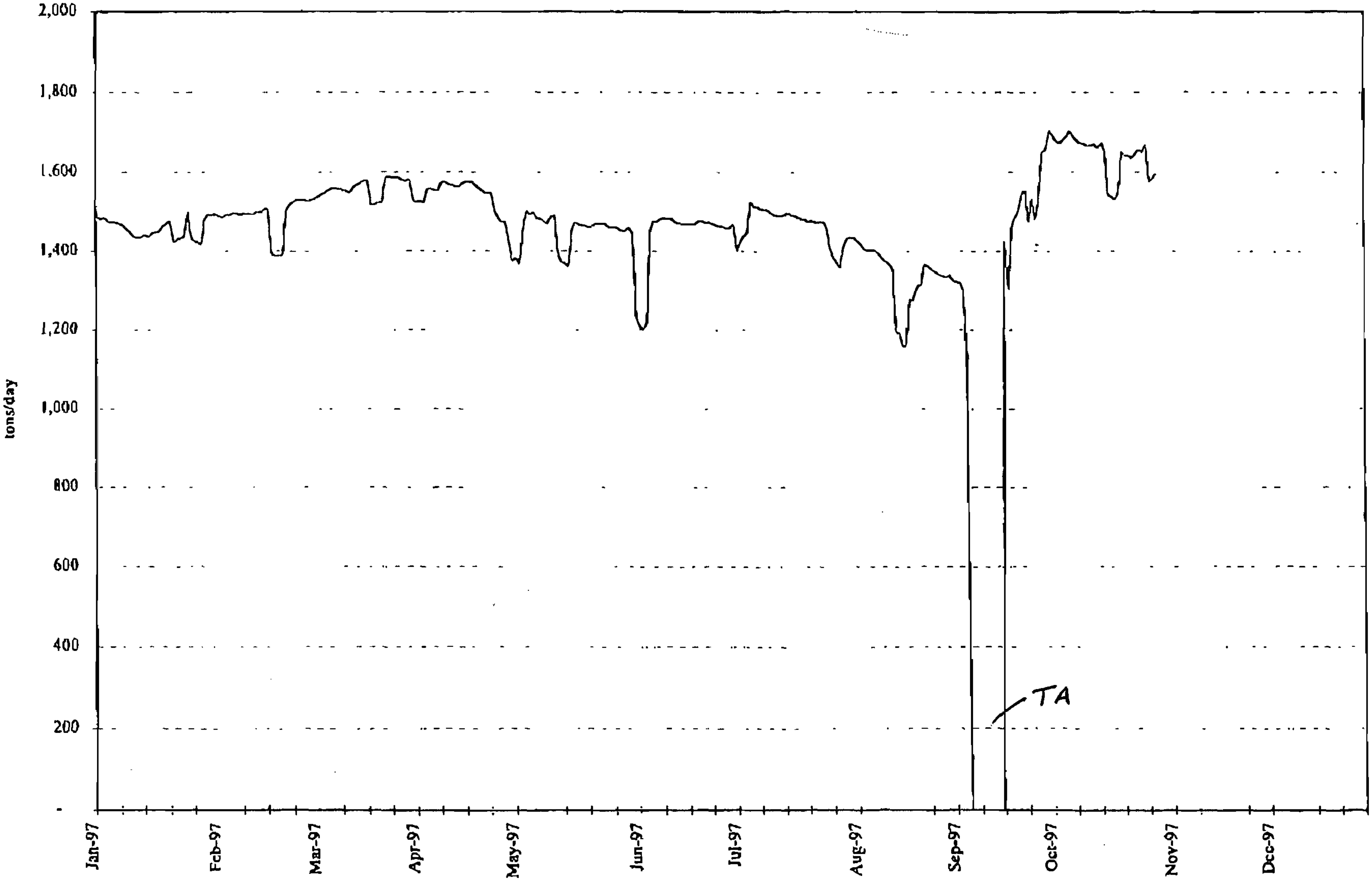


FIGURE 9

Sulfuric Acid Plant # 5 Emissions of SO2

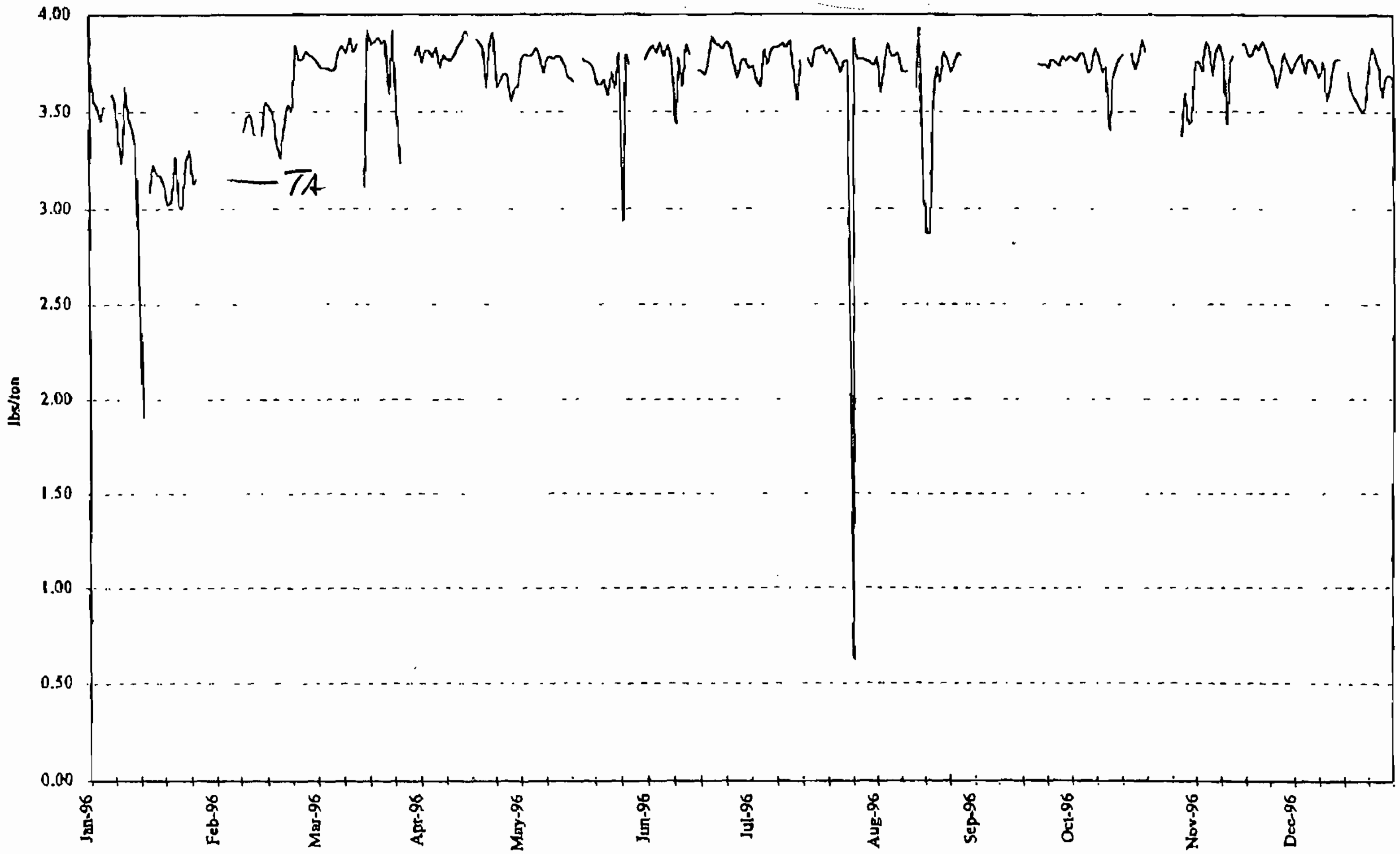


FIGURE 10
Sulfuric Acid Plant # 5 Emissions of SO2

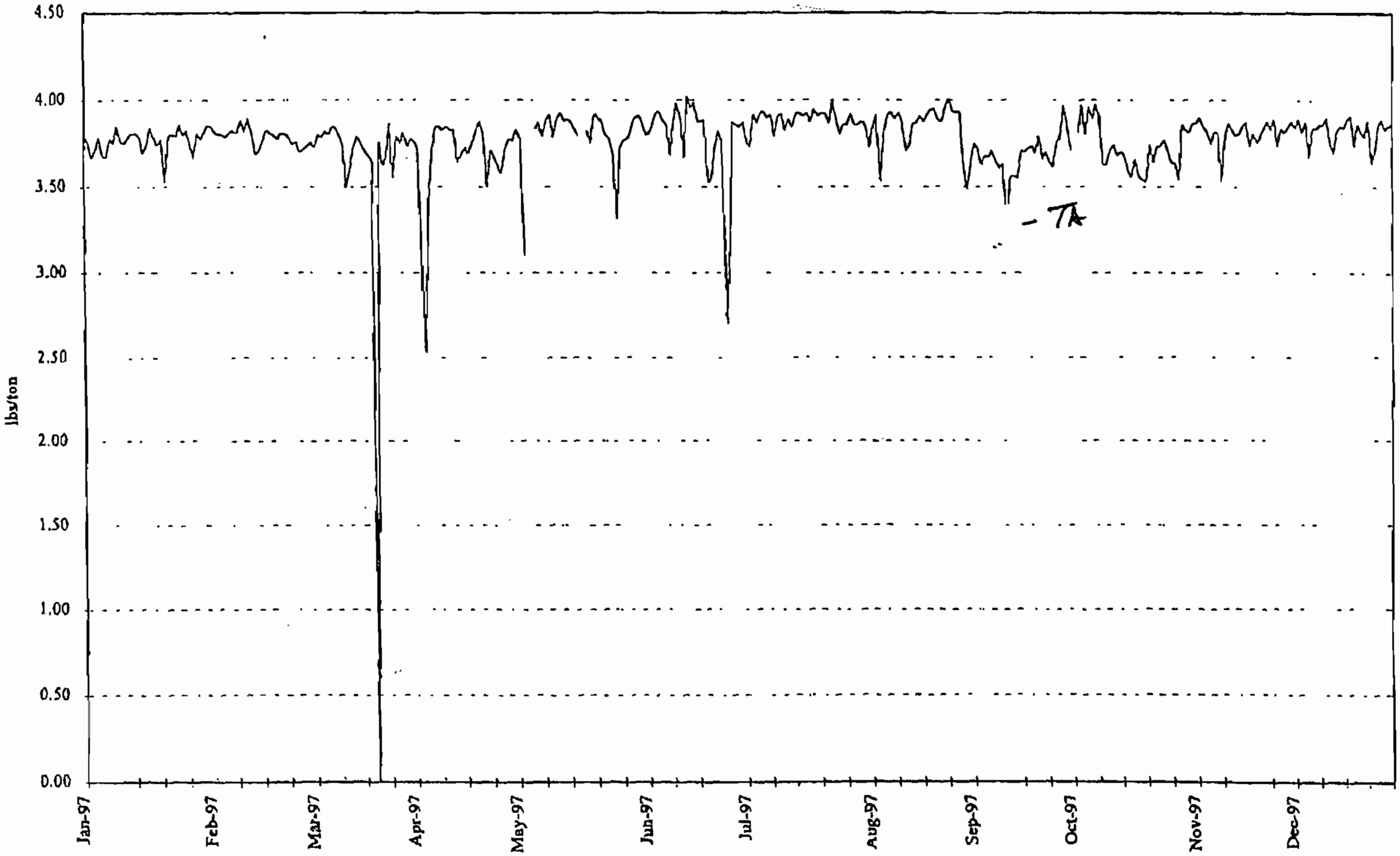


FIGURE 11

Sulfuric Acid Plant # 5

Four day averaged and adjusted production

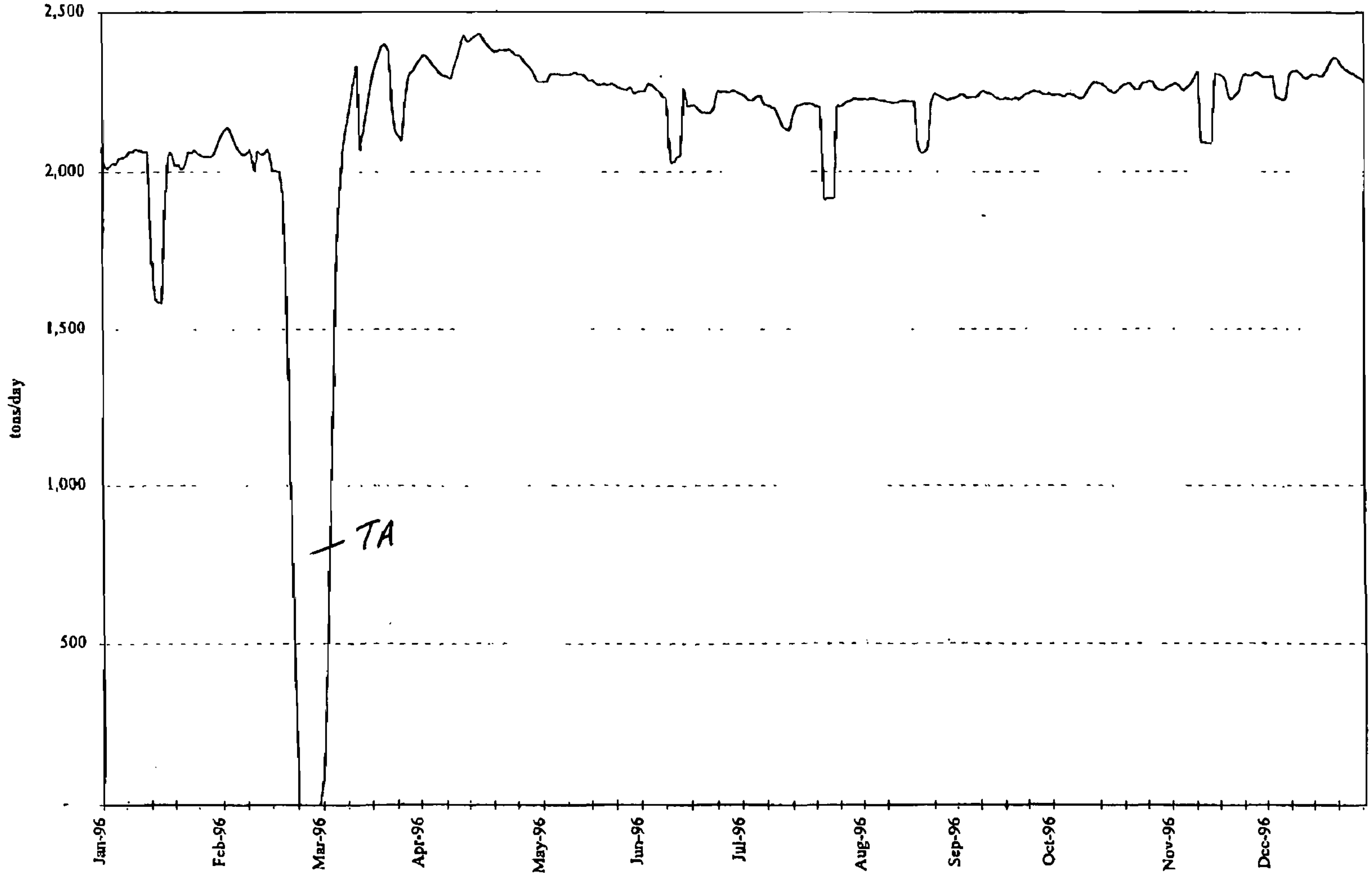
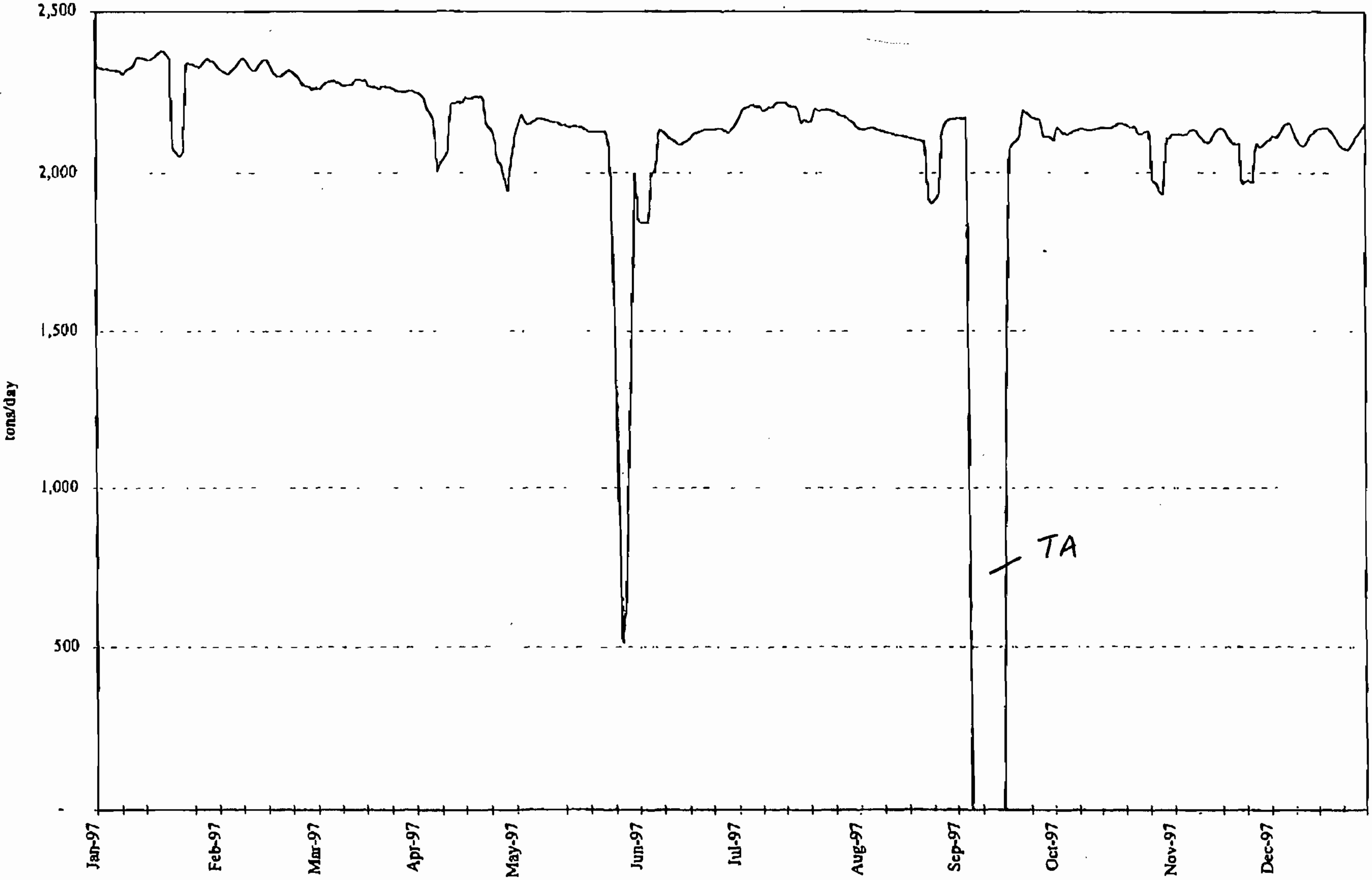


FIGURE 12

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).

<u>For 3.0 lb/ton:</u>

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:

<u>Difference in Direct Costs</u>:

Operating Labor = None

Maintenance & = $ 5.3 million x 0.03
Materials = $ 159,000

Energy - Fan = $ 1758 /day x 365 days/yr
= $ 642,000

Waste Disposal = None

Total DC = $ 801,000

<u>Difference in Indirect Costs</u>:

Overhead = $ 159,000 x 0.6
= $ 95,000

Admin. Charges, = $ 5.3 million x 0.04
Tax, Insurance = $ 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

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

Difference in Indirect Costs:

Overhead = $ 72,000 x 0.6
= $ 43,000

Admin. Charges, = $ 2.4 million x 0.04
Tax, Insurance = $ 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.

MARCH 3, 1849

IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

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

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Sincerely yours,

H 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

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POLLUTANT	EMISSIONS INCREASE (TPY)
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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.

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>
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Sulfuric Acid Mist (SAM): Farmland proposes to control SAM emissions from the acid plant by using fiber mist eliminators to a level below 0.15 lb SAM/ton of 100 percent acid produced. This level is also the NSPS level EPA set for SAM emissions from new or modified sulfuric acid plants. While we believe that the use of high efficiency mist eliminators represents BACT to minimize SAM emissions from this sulfuric acid plant, we are not sure what kind of mist eliminators have been proposed by Farmland. On page 47 of the application, it is stated that the mist eliminators will remove 99% of the SAM; however, according to Monsanto Enviro-Chem, a true high efficiency mist eliminator can achieve 99.5% removal of submicron particles.

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The feasibility of lower acid mist limits is further supported by a look at tests conducted at Mississippi Phosphate Corporation (Figure 2). An inspection of the data clearly shows the effect of the difference in the two types of mist eliminators used there. Plant 2 uses a Brink type ES (Energy Saver) mist eliminator marketed by the Enviro-Chem Systems division of Monsanto. Plant 3 uses type HE (High Efficiency) mist eliminators from the same manufacturer. Even at its worst, the high efficiency mist eliminator can achieve 0.08 lb SAM/ton. Therefore, we recommend that BACT represent a limit of not more than 0.08 lb SAM/ton.

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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,

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

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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.

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	0.118
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	0.161
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	0.084
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	0.008
48		6	0.014
49		7	0.016
50		8	0.008
51		9	0.008
52		10	0.008
53	16	1	0.494
54		2	0.301
55		3	0.417
56		4	0.541
57		5	0.358
58		6	0.609
59		7	0.419
60		8	0.201

Count = 60
Average = 0.108
Median = 0.045
Mode = 0.014
S.D. = 0.141
95% CI = 0.036 +/- 0.108

Emission Factor @ 95% 0.073 <EF< 0.144

FIG. 1.--SULFURIC ACID MIST

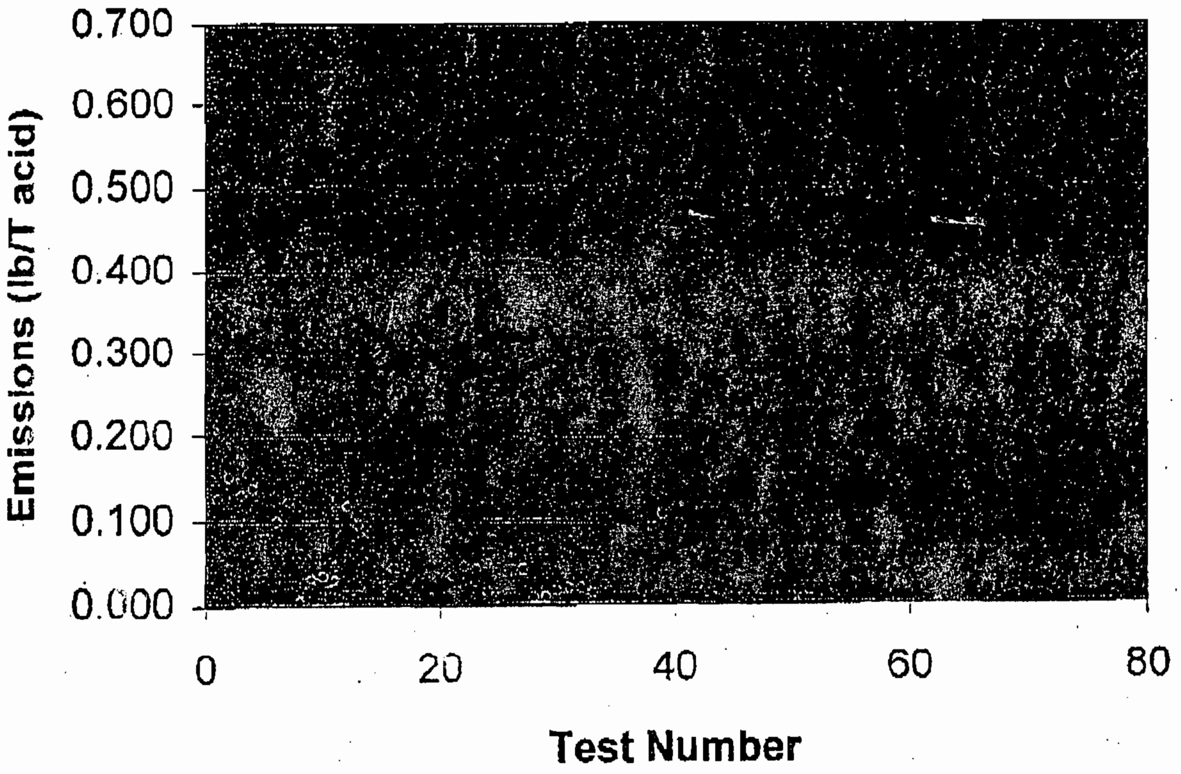


Table 1.b.

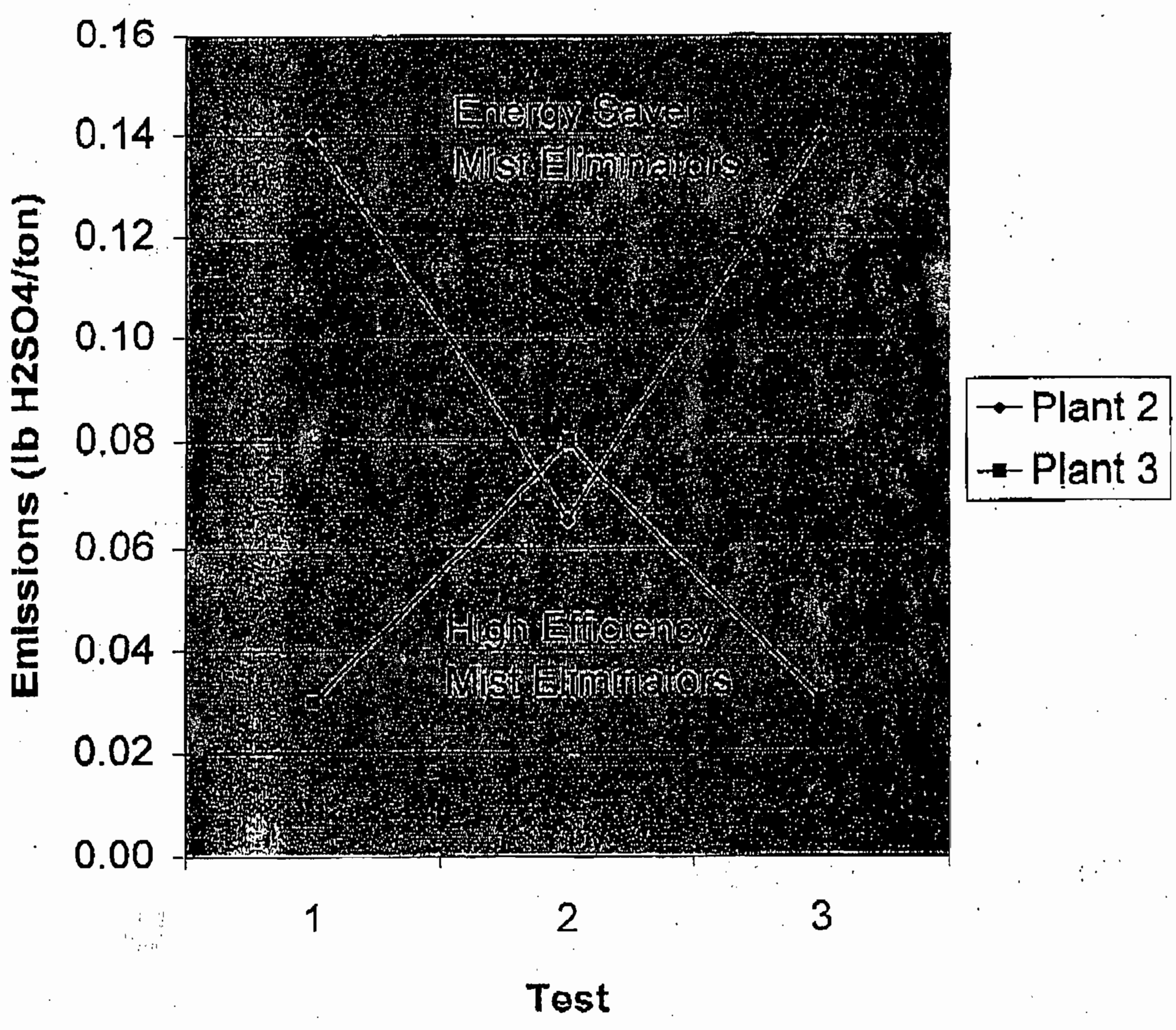
H2SO4 Test Results **Minus Outliers**

	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	0.093
39		7	0.107
40		8	0.023
41		9	0.032
42		10	0.022
43	15	1	0.014
44		2	0.014
45		3	0.018
46		4	0.013
47		5	0.008
48		6	0.014
49		7	0.016
50		8	0.008
51		9	0.008
62		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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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,

Douglas Neeley

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.

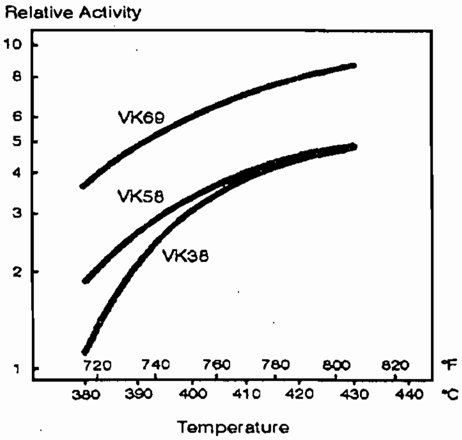
Shape

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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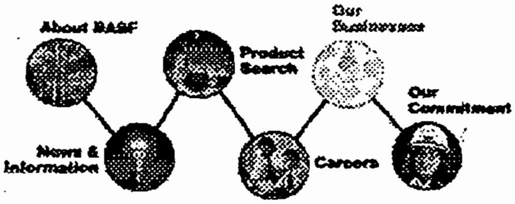

BASF

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
Bartow, 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 Jean Hicks

PS Form **3811**, December 1994

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Street & Number Farmland Hydro
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Postage	$
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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

1050053-019-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

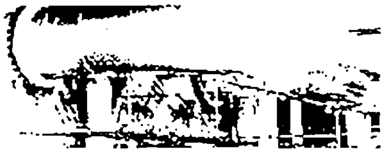
A. A. Linero, P.E. Administrator
New Source Review Section

AAL/sa

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

[illegible]
CALGON CARBON ANNOUNCES
[illegible]

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

US Postal Service

Receipt for Certified Mail

No Insurance Coverage Provided.

Do not use for International Mail *(See reverse)*

Sent to Charles Jenkins

Street & Number Farmland Hydro

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 11-21-97

1050053-019-AC

PSD-Fl-243

PS Form **3800**, April 1995

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

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.

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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.

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[illegible]
CALGON CARBON ANNOUNCES
[illegible]

Calgon Carbon Announces

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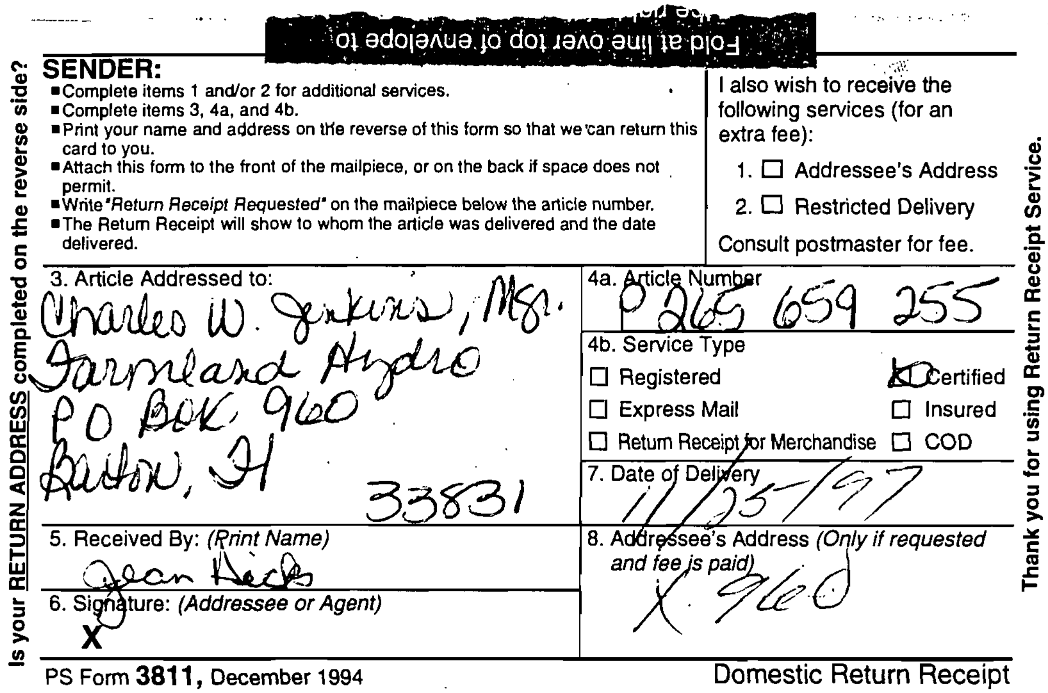
Previous news



Fold at line over top of envelope to

Is your RETURN ADDRESS completed on the reverse side?

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

Consult postmaster for fee.

3. Article Addressed to:
Charles W. Jenkins, Mgr.
Farmland Hydro
P O Box 960
Bartow, Fl
33831

4a. Article Number P 265 659 255

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

7. Date of Delivery 11/25/97

5. Received By: *(Print Name)* Jean Hicks

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

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

PS Form **3811**, December 1994

Domestic Return Receipt

Thank you for using Return Receipt Service.

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

RECEIVED
NOV 20 1997
BUREAU OF
AIR REGULATION

RECEIVED
NOV 20 1997
BUREAU OF
AIR REGULATION

Farmland Hydro, L.P.

Charles W. Jenkins
Manager, Environmental/Safety Services

Green Bay Plant
County Road 640
Post Office Box 960
Bartow, Florida 33831
Tele: 813 533-1141
Fax: 813 533-8793

RECEIVED
NOV 20 1997
BUREAU OF
AIR REGULATION

November 14, 1997

A. A. Linero, P.E.
Administrator
New Source Review Section
Bureau of Air Regulation
Florida Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399

RE: POLK COUNTY GREEN BAY COMPLEX
SULFURIC ACID PRODUCTION REALLOCATION
PERMIT I.D. NO. 1050053-018-AC, PSD-FL-225

1050053-019-AC
PSD-FL-243

Dear Mr. Linero:

Enclosed you will find our check in the amount of $7,250.00 per your letter of October 16, 1997, which is also enclosed for your convenience. We have sent to you $250.00 already, so this equals the $7,000.00 referred to in Koogler and Associates' cover letter, which is attached.

Also enclosed you will find eight (8) copies of the permit application along with a disk from Koogler and Associates.

If you have any questions or concerns, please do not hesitate to call John Koogler (352-377-5822) or me (941-533-1141, ext. 334).

Very truly yours,

Charles W. Jenkins

Charles W. Jenkins
Manager, Environmental/Safety Services

CWJ:jp\280-97
enclosures

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Department of
Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

October 16, 1997

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

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

RE: Polk County-AP, Green Bay Complex
Sulfuric Acid Production Reallocation
Permit I.D. No. 1050053-018-AC, PSD-FL-225

Dear Mr. Jenkins:

The Bureau of Air Regulation received your request for a minor modification of the above-referenced permit and has determined that a PSD permit application is required. An additional processing fee of $7250 pursuant to Rule 62-4.050(4)(r)5, F.A.C., must be submitted along with the PSD application.

If you have any questions, please call John Reynolds at (904)488-1344.

Sincerely,

10/16

A. A. Linero, P.E.
Administrator
New Source Review Section
Bureau of Air Regulation

AAL/kt

cc: John Reynolds, BAR
John Bunyak, NPS
Brian Beals, EPA
Bill Thomas, SWD
Roy Harwood, Polk Co.

make out to:
Florida Dept. of Environmental Prot.
Bureau of Air Regulations,
2600 Blairstone Rd,
Tallahassee, FL 32399

VENDOR NO.
101890

VENDOR NAME
FLORIDA DEPT OF ENVIRONMENTAL

Farmland Hydro, L.P.
Post Office Box 960 Bartow, Florida 33831

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0000003958

FHL
NBCDA
FHAP

CODE	CHECK NO.
IO	0000003958
DATE	PAGE
11/14/1997	1 of 1

FARMLAND HYDRO, L.P. ACCOUNTS PAYABLE CHECK DETAIL

B.A.	DATE	INVOICE NO.	DOCUMENT NO.	GROSS	DISCOUNT	NET
FHL	11/10/1997	111097	100005098	7,250.00		7,250.00
Return to Joan						
		Total		$7,250.00		$7,250.00

DETACH VOUCHER BEFORE DEPOSITING

Farmland.

Farmland Hydro, L.P.
Post Office Box 960 Bartow, Florida 33831

HYDRO

NationsBank, N.A. (South)
Atlanta, Dekalb County, Georgia
64-1278/611

NO. 0000003958

DATE	CHECK NO.
11/14/1997	0000003958

AMOUNT VOID AFTER 180 DAYS

AMOUNT
*****$7,250.00

PAY EXACTLY *********7,250 DOLLARS AND 00 CENTS

TO THE ORDER OF

FLORIDA DEPT OF ENVIRONMENTAL
PROTECTION
BUREAU OF AIR REGULATIONS
TWIN TOWERS OFFICE BLDG
2600 BLAIRSTONE RD
TALLAHASSEE FL 32399-2400

FARMLAND HYDRO, L.P. ACCOUNTS PAYABLE

[redacted] [redacted] [redacted]

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

KA 123-97-02

November 12, 1997

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NOV 20 1997
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.
Green Bay Complex
PSD Permit Application
Sulfuric Acid Plant Replacement

1050053-019-AC
PSD-FL-243

Dear Mr. Linero:

Farmland Hydro, L.P. is submitting this PSD permit application for the replacement of the existing 2100 tons per day (TPD) No. 3 Sulfuric Acid Plant with a new 2750 TPD sulfuric acid plant at the existing facility in Polk County, Florida.

Enclosed are eight (8) copies of the permit application, along with a check in the amount of $7500 (PSD application review fee). A disk, containing the modeling output of the air impact analysis associated with the proposed project, is also 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: J. Arif
EPA
NPS

Polk Co
SWD
C. Holladay, BAR

RECEIVED
NOV 20 1997
BUREAU OF
AIR REGULATION

Department of
Environmental Protection

DIVISION OF AIR RESOURCES MANAGEMENT

APPLICATION FOR AIR PERMIT - LONG FORM

See Instructions for Form No. 62-210.900(1)

I. APPLICATION INFORMATION

This section of the Application for Air Permit form identifies the facility and provides general information on the scope and purpose of this application. This section also includes information on the owner or authorized representative of the facility (or the responsible official in the case of a Title V source) and the necessary statements for the applicant and professional engineer, where required, to sign and date for formal submittal of the Application for Air Permit to the Department. If the application form is submitted to the Department using ELSA, this section of the Application for Air Permit must also be submitted in hard-copy.

Identification of Facility Addressed in This Application

Enter the name of the corporation, business, governmental entity, or individual that has ownership or control of the facility; the facility site name, if any; and the facility's physical location. If known, also enter the facility identification number.

1. Facility Owner/Company Name: **Farmland Hydro, L.P.**

2. Site Name: **Green Bay Plant**

3. Facility Identification Number: **1050053** [ ] Unknown

4. Facility Location:
Street Address or Other Locator: **4390 County Road 640 West**
City: **Bartow** County: **Polk** Zip Code: **33830**

5. Relocatable Facility?
[ ] Yes [X] No

6. Existing Permitted Facility?
[X] Yes [ ] No

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	November 20, 1997
2. Permit Number:	1050053-019-AC
3. PSD Number (if applicable):	PSD-FI-243
4. Siting Number (if applicable):	

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official:
   C. M. Farris, Vice President, Operations

2. Owner/Authorized Representative or Responsible Official Mailing Address:

   Organization/Firm: **Farmland Hydro, L.P.**
   Street Address: **P.O. Box 960**
   City: **Bartow** State: **FL** Zip Code: **33831**

3. Owner/Authorized Representative or Responsible Official Telephone Numbers:
   Telephone: **(941) 533-1141** Fax: **(941) 533 - 8793**

4. Owner/Authorized Representative or Responsible Official Statement:

   I, the undersigned, am the owner or authorized representative of the non-Title V source addressed in this Application for Air Permit or the responsible official, as defined in Rule 62-210.200, F.A.C., of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.*

   CMFarris
   Signature

   Nov. 13, 1997
   Date

* Attach letter of authorization if not currently on file.

Scope of Application

This Application for Air Permit addresses the following emissions unit(s) at the facility. An Emissions Unit Information Section (a Section III of the form) must be included for each emissions unit listed.

Emissions Unit ID	Description of Emissions Unit	Permit Type
030 + 031 + 032 + 033 + 034 + 036	MOLTEN SULFUR SYSTEM	AC1A
No Corresponding I.D.	SULFURIC ACID PLANT #6	AC1A

Purpose of Application and Category

Check one (except as otherwise indicated):

Category I: All Air Operation Permit Applications Subject to Processing Under Chapter 62-213, F.A.C.

This Application for Air Permit is submitted to obtain:

[ ] Initial air operation permit under Chapter 62-213, F.A.C., for an existing facility which is classified as a Title V source.

[ ] Initial air operation permit under Chapter 62-213, F.A.C., for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.

Current construction permit number: ______________________________

[ ] Air operation permit renewal under Chapter 62-213, F.A.C., for a Title V source.

Operation permit to be renewed: ______________________________

[ ] Air operation permit revision for a Title V source to address one or more newly constructed or modified emissions units addressed in this application.

Current construction permit number: ______________________________

Operation permit to be revised: ______________________________

[ ] Air operation permit revision or administrative correction for a Title V source to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application. Also check Category III.

Operation permit to be revised/corrected: ______________________________

[ ] Air operation permit revision for a Title V source for reasons other than construction or modification of an emissions unit. Give reason for the revision; e.g., to comply with a new applicable requirement or to request approval of an "Early Reductions" proposal.

Operation permit to be revised: ______________________________

Reason for revision: ______________________________

____

Category II: All Air Operation Permit Applications Subject to Processing Under Rule 62-210.300(2)(b), F.A.C.

This Application for Air Permit is submitted to obtain:

[ ] Initial air operation permit under Rule 62-210.300(2)(b), F.A.C., for an existing facility seeking classification as a synthetic non-Title V source.

Current operation/construction permit number(s): ____________________

[ ] Renewal air operation permit under Rule 62-210.300(2)(b), F.A.C., for a synthetic non-Title V source.

Operation permit to be renewed: ____________________

[ ] Air operation permit revision for a synthetic non-Title V source. Give reason for revision; e.g., to address one or more newly constructed or modified emissions units.

Operation permit to be revised: ____________________

Reason for revision: ____________________

____

Category III: All Air Construction Permit Applications for All Facilities and Emissions Units

This Application for Air Permit is submitted to obtain:

[X] Air construction permit to construct or modify one or more emissions units within a facility (including any facility classified as a Title V source).

Current operation permit number(s), if any: NA

[ ] Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.

Current operation permit number(s): ____________________

[ ] Air construction permit for one or more existing, but unpermitted, emissions units.

Application Processing Fee

Check one:

[X] Attached - Amount: $ 7500.00 [ ] Not Applicable.

Construction/Modification Information

1. Description of Proposed Project or Alterations: **The proposed project consists of replacing the existing 2100 ton per day Sulfuric Acid Plant No. 3 with a new more efficient 2750 tpd Sulfuric Acid Plant No. 6.**
2. Projected or Actual Date of Commencement of Construction: **April 10, 1998**
3. Projected Date of Completion of Construction: **April 10, 2000**

Professional Engineer Certification

1. Professional Engineer Name: : **John B. Koogler, Ph.D., P.E.** Registration Number: **12925**
2. Professional Engineer Mailing Address: Organization/Firm: **Koogler & Associates** Street Address: **4014 NW 13th Street** City: **Gainesville** State: **FL** Zip Code: **32609**
3. Professional Engineer Telephone Numbers: Telephone: **(352) 377 - 5822** Fax: **(352) 377 - 7158**

4. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

If the purpose of this application is to obtain a Title V source air operation permit (check here [ ] if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.

If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [X] if so), I further certify that the engineering features of each such emissions unit described in this application have been ~~designed~~ or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [ ] if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Signature, (seal)

Date 11/12/97

*Attach any exception to certification statement.

Application Contact

1. Name and Title of Application Contact:

Pradeep Raval

2. Application Contact Mailing Address:

Organization/Firm: **Koogler & Associates**
Street Address: **4014 NW 13th Street**
City: **Gainesville** State: **FL** Zip Code: **32609**

3. Application Contact Telephone Numbers:
Telephone: (**352**) **377** - **5822** Fax: (**352**) **377** - **7158**

Application Comment

This application is submitted in the format suggested by FDEP. Additional information will be submitted , as necessary, during the permitting process.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates:
Zone: **17** East (km): **410.3** North (km): **3079.7**

2. Facility Latitude/Longitude:
Latitude (DD/MM/SS): Longitude (DD/MM/SS):

3. Governmental Facility Code:	4. Facility Status Code: **A**	5. Facility Major Group SIC Code: **28**	6. Facility SIC(s): **2874**

7. Facility Comment (limit to 500 characters):

Phosphate Fertilizer Plant

Facility Contact

1. Name and Title of Facility Contact:
Charles Jenkins, Manager of Env. & Safety Services

2. Facility Contact Mailing Address:
Organization/Firm: **Farmland Hydro, L.P., Green Bay Plant**
Street Address: **P.O. Box 960**
City: **Bartow** State: **FL** Zip Code: **33831**

3. Facility Contact Telephone Numbers:
Telephone: **(941) 533-1141, ext. 334** Fax: **(941) 533 - 8793**

Facility Regulatory Classifications

1. Small Business Stationary Source?
[ ] Yes [X] No [ ] Unknown

2. Title V Source?
[X] Yes [ ] No

3. Synthetic Non-Title V Source?
[ ] Yes [X] No

4. Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)?
[X] Yes [ ] No

5. Synthetic Minor Source of Pollutants Other than HAPs?
[ ] Yes [X] No

6. Major Source of Hazardous Air Pollutants (HAPs)?
[ ] Yes [X] No

7. Synthetic Minor Source of HAPs?
[ ] Yes [X] No

8. One or More Emissions Units Subject to NSPS?
[X] Yes [ ] No

9. One or More Emission Units Subject to NESHAP?
[X] Yes [ ] No

10. Title V Source by EPA Designation?
[ ] Yes [X] No

11. Facility Regulatory Classifications Comment (limit to 200 characters):

B. FACILITY REGULATIONS

Rule Applicability Analysis (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

NA

List of Applicable Regulations (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

FDEP CORE LIST	
FS 120, 403	
FAC 62-4, 204, 210, 212, 213, 214, 252, 256, 257, 281, 296, 297	
40 CFR 52, 55, 60, 61, 63, 82.	

C. FACILITY POLLUTANTS

Facility Pollutant Information

1. Pollutant Emitted	2. Pollutant Classification
PM/PM10	**A**
SO2	**A**
NOX	**A**
SAM	**A**
FL	**B**
CO	**B**
VOC	**B**

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Detail Information: Pollutant ______ of ______

1. Pollutant Emitted: **NA**
2. Requested Emissions Cap: (lb/hour) (tons/year)
3. Basis for Emissions Cap Code:
4. Facility Pollutant Comment (limit to 400 characters):

Facility Pollutant Detail Information: Pollutant ______ of ______

1. Pollutant Emitted: **NA**
2. Requested Emissions Cap: (lb/hour) (tons/year)
3. Basis for Emissions Cap Code:
4. Facility Pollutant Comment (limit to 400 characters):

E. FACILITY SUPPLEMENTAL INFORMATION

Supplemental Requirements for All Applications

1. Area Map Showing Facility Location:
[X] Attached, Document ID: **Report** [ ] Not Applicable [ ] Waiver Requested

2. Facility Plot Plan:
[X] Attached, Document ID: **Report** [ ] Not Applicable [ ] Waiver Requested

3. Process Flow Diagram(s):
[X] Attached, Document ID: **Report** [ ] Not Applicable [ ] Waiver Requested

4. Precautions to Prevent Emissions of Unconfined Particulate Matter:
[ ] Attached, Document ID:_______ [X] Not Applicable [ ] Waiver Requested

5. Fugitive Emissions Identification:
[ ] Attached, Document ID:_______ [ ] Not Applicable [X] Waiver Requested

6. Supplemental Information for Construction Permit Application:
[X] Attached, Document ID: **Report** [ ] Not Applicable

Additional Supplemental Requirements for Category I Applications Only

7. List of Proposed Exempt Activities:
[ ] Attached, Document ID:_________ [X] Not Applicable

8. List of Equipment/Activities Regulated under Title VI:

[ ] Attached, Document ID:________

[ ] Equipment/Activities On site but Not Required to be Individually Listed

[X] Not Applicable

9. Alternative Methods of Operation:
[ ] Attached, Document ID:________ [X] Not Applicable

10. Alternative Modes of Operation (Emissions Trading):
[ ] Attached, Document ID:________ [X] Not Applicable

11. Identification of Additional Applicable Requirements:
[ ] Attached, Document ID:________ [X] Not Applicable

12. Compliance Assurance Monitoring Plan:
[ ] Attached, Document ID:________ [X] Not Applicable

13. Risk Management Plan Verification:

[ ] Plan Submitted to Implementing Agency - Verification Attached, Document ID:________

[ ] Plan to be Submitted to Implementing Agency by Required Date

[X] Not Applicable

14. Compliance Report and Plan:
[ ] Attached, Document ID:_______ [X] Not Applicable

15. Compliance Certification (Hard-copy Required):
[ ] Attached, Document ID:_______ [X] Not Applicable

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through L as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application. Some of the subsections comprising the Emissions Unit Information Section of the form are intended for regulated emissions units only. Others are intended for both regulated and unregulated emissions units. Each subsection is appropriately marked.

A. TYPE OF EMISSIONS UNIT
(Regulated and Unregulated Emissions Units)

Type of Emissions Unit Addressed in This Section

1. Regulated or Unregulated Emissions Unit? Check one:

[X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

2. Single Process, Group of Processes, or Fugitive Only? Check one:

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[X] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

B. GENERAL EMISSIONS UNIT INFORMATION
(Regulated and Unregulated Emissions Units)

Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section (limit to 60 characters):
MOLTEN SULFUR SYSTEM

2. Emissions Unit Identification Number: **030** [ ] No Corresponding ID [ ] Unknown

3. Emissions Unit Status Code: **A**	4. Acid Rain Unit? [ ] Yes [X] No	5. Emissions Unit Major Group SIC Code: **28**

6. Emissions Unit Comment (limit to 500 characters): **TANKS / PITS**

INCLUDES ITEMS 030, 031, 032, 033, 034, 036. WILL ALSO INCLUDE NEW TANK UPON COMPLETION OF CONSTRUCTION.

Emissions Unit Control Equipment

A.

1. Description (limit to 200 characters): **NA**

2. Control Device or Method Code: **NA**

Emissions Unit Information Section (__1__of__2_)

B.

1. Description (limit to 200 characters):
2. Control Device or Method Code:

C.

1. Description (limit to 200 characters):
2. Control Device or Method Code:

Emissions Unit Information Section (1 of 2)

C. EMISSIONS UNIT DETAIL INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Details

1. Initial Startup Date: **NA**		
2. Long-term Reserve Shutdown Date: **NA**		
3. Package Unit: **NA** Manufacturer:	Model Number:	
4. Generator Nameplate Rating: **NA**	MW	
5. Incinerator Information: **NA** Dwell Temperature: Dwell Time: Incinerator Afterburner Temperature:		 °F seconds °F

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate: **NA**		mmBtu/hr
2. Maximum Incineration Rate: **NA**	lb/hr	tons/day
3. Maximum Process or Throughput Rate: **2800 TPD Throughput Rate**		
4. Maximum Production Rate: **NA**		
5. Operating Capacity Comment (limit to 200 characters):		

Emissions Unit Operating Schedule

Requested Maximum Operating Schedule:		
	24 hours/day	**7** days/week
	52 weeks/year	**8760** hours/year

D. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

Rule Applicability Analysis (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

N/A

List of Applicable Regulations (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

SEE PAGE 12.	

E. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram:

2. Emission Point Type Code:
[ ] 1 [ ] 2 [X] 3 [ ] 4

3. Descriptions of Emissions Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point):

TANK 1 - 6000 TON
TANK 2 - 2900 TON
TANK 3 - 2900 TON
TRUCK PIT - 72 TON
RAIL/TRUCK PIT -91 TON
SUPPLY PIT - 28 TON
TANK - 7700 TON

4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **NA**

5. Discharge Type Code:
[ ] D [ ] F [ ] H [ ] P
[ ] R [ ] V [X] W

6. Stack Height: **40** feet

7. Exit Diameter: **2.0** feet

8. Exit Temperature: **120** °F

9. Actual Volumetric Flow Rate: **18** acfm

10. Percent Water Vapor : **NA** %

11. Maximum Dry Standard Flow Rate: **NA** dscfm

12. Nonstack Emission Point Height: **NA** feet

13. Emission Point UTM Coordinates:
Zone: East (km): North (km):

14. Emission Point Comment (limit to 200 characters):

F. SEGMENT (PROCESS/FUEL) INFORMATION
(Regulated and Unregulated Emissions Units)

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Chemical Manufacturing - Inorganic Chemicals - General Processes Storage/Transfer**

2. Source Classification Code (SCC): **3-01-070-02**

3. SCC Units: **Tons Product**

4. Maximum Hourly Rate: **580**

5. Maximum Annual Rate: **924,000**

6. Estimated Annual Activity Factor: **NA**

7. Maximum Percent Sulfur: **100**

8. Maximum Percent Ash: **NA**

9. Million Btu per SCC Unit: **NA**

10. Segment Comment (limit to 200 characters):

Molten sulfur throughput increase to 924,000 tpy. No change in maximum hourly rates.

G. EMISSIONS UNIT POLLUTANTS
(Regulated and Unregulated Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM10	**000**	**000**	**NS**
PM	**000**	**000**	**NS**
VOC	**000**	**000**	**NS**
TRS	**000**	**000**	**NS**
SO2	**000**	**000**	**NS**

Emissions Unit Information Section (1 of 2)

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: **NA**

2. Total Percent Efficiency of Control: %

3. Potential Emissions: lb/hour tons/year

4. Synthetically Limited?
[ ] Yes [ ] No

5. Range of Estimated Fugitive/Other Emissions:
[ ] 1 [ ] 2 [ ] 3 _______ to _______ tons/year

6. Emission Factor:
Reference:

7. Emissions Method Code:
[ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

8. Calculation of Emissions (limit to 600 characters):

9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):

Allowable Emissions (Pollutant identified on front of page)

A.

1. Basis for Allowable Emissions Code:**NA**
2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:
4. Equivalent Allowable Emissions: lb/hour Tons/year
5. Method of Compliance (limit to 60 characters):
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):

B.

1. Basis for Allowable Emissions Code:
2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:
4. Equivalent Allowable Emissions: lb/hr tons/year
5. Method of Compliance (limit to 60 characters):
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):

I. VISIBLE EMISSIONS INFORMATION
(Regulated Emissions Units Only)

Visible Emissions Limitation: Visible Emissions Limitation ___1___ of ___1___

1. Visible Emissions Subtype: **VE**
2. Basis for Allowable Opacity: [X] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: **20%** Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour
4. Method of Compliance: **EPA METHOD 9**
5. Visible Emissions Comment (limit to 200 characters): **VE at Each Vent on the Sulfur Storage Tank**

Visible Emissions Limitation: Visible Emissions Limitation ______ of ______

1. Visible Emissions Subtype:
2. Basis for Allowable Opacity: [ ] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour
4. Method of Compliance:
5. Visible Emissions Comment (limit to 200 characters):

J. CONTINUOUS MONITOR INFORMATION
(Regulated Emissions Units Only)

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number:	Serial Number:
5. Installation Date:	
6. Performance Specification Test Date:	
7. Continuous Monitor Comment (limit to 200 characters):	

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number:	Serial Number:
5. Installation Date:	
6. Performance Specification Test Date:	
7. Continuous Monitor Comment (limit to 200 characters):	

K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION

(Regulated and Unregulated Emissions Units)

PSD Increment Consumption Determination

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

If the emissions unit addressed in this section emits particulate matter or sulfur dioxide, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for particulate matter or sulfur dioxide. Check the first statement, if any, that applies and skip remaining statements.

[ ] The emissions unit is undergoing PSD review as part of this application, or has undergone PSD review previously, for particulate matter or sulfur dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after January 6, 1975. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after January 6, 1975, but before December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

[NA] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

2. Increment Consuming for Nitrogen Dioxide?

If the emissions unit addressed in this section emits nitrogen oxides, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for nitrogen dioxide. Check first statement, if any, that applies and skip remaining statements.

[ ] The emissions unit addressed in this section is undergoing PSD review as part of this application, or has undergone PSD review previously, for nitrogen dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after February 8, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after February 8, 1988, but before March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[NA] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

3. Increment Consuming/Expanding Code:

PM	[ ] C	[ ] E	[ ] Unknown
SO2	[ ] C	[ ] E	[ ] Unknown
NO2	[ ] C	[ ] E	[ ] Unknown

4. Baseline Emissions:

PM	lb/hour	tons/year
SO2	lb/hour	tons/year
NO2		tons/year

5. PSD Comment (limit to 200 characters):

L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)

Supplemental Requirements for All Applications

1. Process Flow Diagram [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested
2. Fuel Analysis or Specification [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested
3. Detailed Description of Control Equipment [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested
4. Description of Stack Sampling Facilities [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested
5. Compliance Test Report [ ] Attached, Document ID:________ [ ] Previously submitted, Date:_______________ [X] Not Applicable
6. Procedures for Startup and Shutdown [ ] Attached, Document ID:________ [X] Not Applicable
7. Operation and Maintenance Plan [ ] Attached, Document ID:________ [X] Not Applicable
8. Supplemental Information for Construction Permit Application [ ] Attached, Document ID:________ [X] Not Applicable
9. Other Information Required by Rule or Statute [ ] Attached, Document ID:________ [X] Not Applicable

Additional Supplemental Requirements for Category I Applications Only

10. Alternative Methods of Operation
[ ] Attached, Document ID:_______ [X] Not Applicable

11. Alternative Modes of Operation (Emissions Trading)
[ ] Attached, Document ID:________ [X] Not Applicable

12. Identification of Additional Applicable Requirements
[ ] Attached, Document ID:______ [X] Not Applicable

13. Compliance Assurance Monitoring Plan
[ ] Attached, Document ID:______ [X] Not Applicable

14. Acid Rain Application (Hard-copy Required)

[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
Attached, Document ID:________

[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
Attached, Document ID:________

[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
Attached, Document ID:________

[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
Attached, Document ID:________

[X] Not Applicable

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through L as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application. Some of the subsections comprising the Emissions Unit Information Section of the form are intended for regulated emissions units only. Others are intended for both regulated and unregulated emissions units. Each subsection is appropriately marked.

A. TYPE OF EMISSIONS UNIT
(Regulated and Unregulated Emissions Units)

Type of Emissions Unit Addressed in This Section

1. Regulated or Unregulated Emissions Unit? Check one:

[**X**] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

2. Single Process, Group of Processes, or Fugitive Only? Check one:

[**X**] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

B. GENERAL EMISSIONS UNIT INFORMATION
(Regulated and Unregulated Emissions Units)

Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

Sulfuric Acid Plant No. 6

2. Emissions Unit Identification Number: [X] No Corresponding ID [ ] Unknown

3. Emissions Unit Status Code: **C**	4. Acid Rain Unit? [ ] Yes [X] No	5. Emissions Unit Major Group SIC Code: **28**

6. Emissions Unit Comment (limit to 500 characters):

Proposed new plant to replace existing No. 3 sulfuric acid plant.

Emissions Unit Control Equipment

A.

1. Description (limit to 200 characters): **Double Absorption**

2. Control Device or Method Code: **044**

B.

1. Description (limit to 200 characters): **Mist Eliminators**

2. Control Device or Method Code: **014**

C.

1. Description (limit to 200 characters):

2. Control Device or Method Code:

C. EMISSIONS UNIT DETAIL INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Details

1. Initial Startup Date: **NA**

2. Long-term Reserve Shutdown Date: **NA**

3. Package Unit: **NA**
   Manufacturer: Model Number:

4. Generator Nameplate Rating: **NA** MW

5. Incinerator Information: **NA**
   Dwell Temperature: °F
   Dwell Time: seconds
   Incinerator Afterburner Temperature: °F

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate: **NA** mmBtu/hr

2. Maximum Incineration Rate: **NA** lb/hr tons/day

3. Maximum Process or Throughput Rate: **NA**

4. Maximum Production Rate: **2750 TPD 100% H2SO4**

5. Operating Capacity Comment (limit to 200 characters):

Emissions Unit Operating Schedule

Requested Maximum Operating Schedule:

24 hours/day **7** days/week

52 weeks/year **8760** hours/year

D. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

Rule Applicability Analysis (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

N/A

Emissions Unit Information Section (2 of 2)

List of Applicable Regulations (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

See Page 12.	

E. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram:
Sulfuric Acid Plant No. 6

2. Emission Point Type Code:
[**X**] 1 [ ] 2 [ ] 3 [ ] 4

3. Descriptions of Emissions Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): **NA**

4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:

NA

5. Discharge Type Code:
[ ] D [ ] F [ ] H [ ] P
[ ] R [**X**] V [ ] W

6. Stack Height: **150** feet

7. Exit Diameter: **9** feet

8. Exit Temperature: **180** °F

9. Actual Volumetric Flow Rate: **133,000** acfm

10. Percent Water Vapor : **NA** %

11. Maximum Dry Standard Flow Rate: **NA** dscfm

12. Nonstack Emission Point Height: **NA** feet

13. Emission Point UTM Coordinates:
Zone: East (km): North (km):

14. Emission Point Comment (limit to 200 characters):

F. SEGMENT (PROCESS/FUEL) INFORMATION
(Regulated and Unregulated Emissions Units)

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Sulfuric Acid Production**	
2. Source Classification Code (SCC): **3-01-023-04**	
3. SCC Units: **Tons 100% H2SO4**	
4. Maximum Hourly Rate: **114.6**	5. Maximum Annual Rate: **1,003,750**
6. Estimated Annual Activity Factor: **NA**	
7. Maximum Percent Sulfur: **NA**	8. Maximum Percent Ash: **NA**
9. Million Btu per SCC Unit: **NA**	
10. Segment Comment (limit to 200 characters): **Hourly rate is based on 2,750 TPD of 100%H2SO4.**	

G. EMISSIONS UNIT POLLUTANTS
(Regulated and Unregulated Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
SO2	**044**	**044**	**EL**
SAM	**044**	**014**	**EL**
NOx	**000**	**000**	**EL**

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: **SO2**

2. Total Percent Efficiency of Control: **99.7 %**

3. Potential Emissions: **458.3** lb/hour **2007.5** tons/year

4. Synthetically Limited?
[ ] Yes [**X**] No

5. Range of Estimated Fugitive/Other Emissions:
[ ] 1 [ ] 2 [ ] 3 _______ to _______ tons/year

6. Emission Factor: **4.0 LB/TON ACID**
Reference: **Permit**

7. Emissions Method Code:
[X] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

8. Calculation of Emissions (limit to 600 characters):

SO2 = 4.0 LB/TON X 2750 TPD / 24 HRS/DAY = 458.3 LB/HR
X 8760 HRS/YR X TON/2000 LBS = 2007.5 TPY

9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):

Emissions Unit Information Section (2 of 2)

Allowable Emissions (Pollutant identified on front of page)

A.

1. Basis for Allowable Emissions Code: **Rule**
2. Future Effective Date of Allowable Emissions: **NA**
3. Requested Allowable Emissions and Units: **4.0 lb / Ton Produced**
4. Equivalent Allowable Emissions: **458.3** lb/hour **2007.5** Tons/year
5. Method of Compliance (limit to 60 characters): **EPA METHOD 8**
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **40 CFR 60, SUBPART H**

B.

1. Basis for Allowable Emissions Code:
2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:
4. Equivalent Allowable Emissions: lb/hr tons/year
5. Method of Compliance (limit to 60 characters):
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: **SAM**

2. Total Percent Efficiency of Control: **99** %

3. Potential Emissions: **17.2** lb/hour **75.3** tons/year

4. Synthetically Limited?
[ ] Yes [**X**] No

5. Range of Estimated Fugitive/Other Emissions:
[ ] 1 [ ] 2 [ ] 3 _______ to _______ tons/year

6. Emission Factor: **0.15 LB/TON ACID**
Reference: **Permit**

7. Emissions Method Code:
[X] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

8. Calculation of Emissions (limit to 600 characters):

SAM = 0.15 LB/TON X 2750 TPD / 24 HRS/DAY = 17.2 LB/HR
X 8760 HRS/YR X TON/2000 LBS = 75.3 TPY

9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):

Emissions Unit Information Section (2 of 2)

Allowable Emissions (Pollutant identified on front of page)

A.

1. Basis for Allowable Emissions Code:**Rule**
2. Future Effective Date of Allowable Emissions:**NA**
3. Requested Allowable Emissions and Units: **0.15 lb /Ton Produced**
4. Equivalent Allowable Emissions: **17.2** lb/hour **75.3** Tons/year
5. Method of Compliance (limit to 60 characters): **EPA METHOD 8**
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **40 CFR 60, SUBPART H**

B.

1. Basis for Allowable Emissions Code:
2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:
4. Equivalent Allowable Emissions: lb/hr tons/year
5. Method of Compliance (limit to 60 characters):
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: **NOX**

2. Total Percent Efficiency of Control: %

3. Potential Emissions: **13.8** lb/hour **60.2** tons/year

4. Synthetically Limited?
[ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions:
[ ] 1 [ ] 2 [ ] 3 _______ to _______ tons/year

6. Emission Factor: **0.12 LB/TON ACID**
Reference: **Similar Permit**

7. Emissions Method Code:
[X] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

8. Calculation of Emissions (limit to 600 characters):

NOX = 0.12 LB/TON X 2750 TPD / 24 HRS/DAY = 13.8 LB/HR
X 8760 HRS/YR X TON/2000 LBS = 60.2 TPY

9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):

Allowable Emissions (Pollutant identified on front of page)

A.

1. Basis for Allowable Emissions Code: **Rule**
2. Future Effective Date of Allowable Emissions: **NA**
3. Requested Allowable Emissions and Units: **0.12 lb /Ton Produced**
4. Equivalent Allowable Emissions: **13.8** lb/hour **60.2** Tons/year
5. Method of Compliance (limit to 60 characters): **EPA METHOD 7E**
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **BACT**

B.

1. Basis for Allowable Emissions Code:
2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:
4. Equivalent Allowable Emissions: lb/hr tons/year
5. Method of Compliance (limit to 60 characters):
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):

I. VISIBLE EMISSIONS INFORMATION
(Regulated Emissions Units Only)

Visible Emissions Limitation: Visible Emissions Limitation __1__of__1__

1. Visible Emissions Subtype: **VE10**
2. Basis for Allowable Opacity: [X] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: 10% Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour
4. Method of Compliance: **EPA METHOD 9**
5. Visible Emissions Comment (limit to 200 characters): **40 CFR 60, SUBPART H**

Visible Emissions Limitation: Visible Emissions Limitation ______ of ______

1. Visible Emissions Subtype:
2. Basis for Allowable Opacity: [ ] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour
4. Method of Compliance:
5. Visible Emissions Comment (limit to 200 characters):

J. CONTINUOUS MONITOR INFORMATION
(Regulated Emissions Units Only)

Continuous Monitoring System: Continuous Monitor 1 of 1

1. Parameter Code: **EM**	2. Pollutant(s): **SO2**
3. CMS Requirement:	[**X**] Rule [ ] Other
4. Monitor Information: **To Be Decided** Manufacturer: Model Number:	Serial Number:
5. Installation Date:	
6. Performance Specification Test Date:	
7. Continuous Monitor Comment (limit to 200 characters): **40 CFR 60, SUBPART H**	

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number:	Serial Number:
5. Installation Date:	
6. Performance Specification Test Date:	
7. Continuous Monitor Comment (limit to 200 characters):	

K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION
(Regulated and Unregulated Emissions Units)

PSD Increment Consumption Determination

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

If the emissions unit addressed in this section emits particulate matter or sulfur dioxide, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for particulate matter or sulfur dioxide. Check the first statement, if any, that applies and skip remaining statements.

[**X**] The emissions unit is undergoing PSD review as part of this application, or has undergone PSD review previously, for particulate matter or sulfur dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after January 6, 1975. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after January 6, 1975, but before December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

2. Increment Consuming for Nitrogen Dioxide?

If the emissions unit addressed in this section emits nitrogen oxides, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for nitrogen dioxide. Check first statement, if any, that applies and skip remaining statements.

[X] The emissions unit addressed in this section is undergoing PSD review as part of this application, or has undergone PSD review previously, for nitrogen dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after February 8, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after February 8, 1988, but before March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

3. Increment Consuming/Expanding Code:

PM	[ ] C	[ ] E	[ ] Unknown
SO2	[ ] C	[ ] E	[ ] Unknown
NO2	[ ] C	[ ] E	[ ] Unknown

4. Baseline Emissions:

PM	lb/hour	tons/year
SO2	lb/hour	tons/year
NO2		tons/year

5. PSD Comment (limit to 200 characters):

L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)

Supplemental Requirements for All Applications

1. Process Flow Diagram
   [X] Attached, Document ID: **Report** [ ] Not Applicable [ ] Waiver Requested

2. Fuel Analysis or Specification
   [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested

3. Detailed Description of Control Equipment
   [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested

Will be submitted when obtained from manufacturer.

4. Description of Stack Sampling Facilities
   [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested

Will be submitted when obtained from manufacturer.

5. Compliance Test Report
   [ ] Attached, Document ID:________

   [ ] Previously submitted, Date:______________

   [X] Not Applicable

6. Procedures for Startup and Shutdown
   [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested

7. Operation and Maintenance Plan
   [ ] Attached, Document ID:________ [X] Not Applicable

8. Supplemental Information for Construction Permit Application
   [X] Attached, Document ID: **Report** [ ] Not Applicable

9. Other Information Required by Rule or Statute
   [X] Attached, Document ID: **Report** [ ] Not Applicable

Emissions Unit Information Section (_2_ of _2_)

Additional Supplemental Requirements for Category I Applications Only

10. Alternative Methods of Operation
[ ] Attached, Document ID:________ [X] Not Applicable

11. Alternative Modes of Operation (Emissions Trading)
[ ] Attached, Document ID:________ [X] Not Applicable

12. Identification of Additional Applicable Requirements
[ ] Attached, Document ID:________ [X] Not Applicable

13. Compliance Assurance Monitoring Plan
[ ] Attached, Document ID:________ [X] Not Applicable

14. Acid Rain Application (Hard-copy Required)

[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
Attached, Document ID:________

[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
Attached, Document ID:________

[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
Attached, Document ID:________

[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
Attached, Document ID:________

[X] Not Applicable

A REPORT IN SUPPORT OF PSD PERMIT APPLICATION

PREPARED FOR:

FARMLAND HYDRO, L.P.
GREEN BAY COMPLEX
POLK COUNTY, FLORIDA

NOVEMBER 1997

PREPARED BY:

KOOGLER & ASSOCIATES
4014 N.W. 13TH STREET
GAINESVILLE, FLORIDA 32609
(352) 377-5822

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 SYNOPSIS OF APPLICATION

1.1 APPLICANT

Farmland Hydro, L.P.
Green Bay Complex
P.O. Box 960
Bartow, FL 33831

1.2 FACILITY LOCATION

Farmland Hydro, L.P. (Farmland), Green Bay Complex, consists of a phosphate chemical fertilizer manufacturing facility approximately six miles southwest of Bartow, Florida, on County Road 640 in Polk County. The UTM coordinates of Farmland's sulfuric acid manufacturing complex are Zone 17, 410.3 km east and 3079.7 km north.

1.3 PROJECT SUMMARY

Farmland proposes to replace the existing 2100 tons per day (tpd) Sulfuric Acid Plant No. 3 (SAP3) with a new, more efficient SAP6 with a production rate of 2,750 tpd. This will increase the facility capacity from 7000 to 7650 tpd, or less than 10 percent. Please refer to Table 3-1 for proposed production rates. Thus, there will be a less than 10 percent increase in the molten sulfur throughput rates. No other plant at the facility will be affected by the change in sulfuric acid production rates.

The proposed project will result in a significant net increase (in accordance with Rule 62-212, Florida Administrative Code (FAC), in the emission rates of sulfur dioxide (SO_2), sulfuric acid mist (SAM), and nitrogen oxides (NOx).

Farmland is submitting this report in support of the application to the Florida Department of Environmental Protection (FDEP) for the construction of the new SAP6 and the shutdown of existing SAP3 at the Green Bay facility. This report, includes a description of the existing facility and the proposed project, a review of Best Available Control Technology, an ambient air quality analysis and an evaluation of the impact of the proposed project on soils, vegetation, visibility, and the Class I area.

2.0 FACILITY DESCRIPTION

The Farmland fertilizer manufacturing facility is located near Bartow in Polk County, Florida. The site location and area location maps are presented in Figures 2-1 and 2-2, respectively.

2.1 EXISTING FACILITY

The existing fertilizer complex processes wet phosphate rock into several different fertilizer products. This is accomplished by reacting the phosphate rock with sulfuric acid to produce phosphoric acid and then converting the phosphoric acid to fertilizer products. The chemical complex includes sulfuric acid plants, phosphoric acid plants, super phosphoric acid plant, monoammonium phosphate (MAP) and diammonium phosphate (DAP) plants, and storage, handling, grinding and shipping facilities for phosphate rock, ammonia, sulfur, and fertilizer products. Figure 2-3, Plot Plan, shows the location of the existing plants.

2.1.1 Sulfuric Acid Plants

There are three existing sulfuric acid plants. All three sulfuric acid plants utilize the double absorption process. Molten sulfur is fired into a furnace producing sulfur dioxide. Multiple beds of catalyst convert the sulfur dioxide to sulfur trioxide. Dual absorption towers use sulfuric acid to absorb the sulfur trioxide forming a concentrated acid (product). A significant amount of process waste heat is recovered by heat exchangers. There is also a turbogenerator which converts excess steam into electrical power.

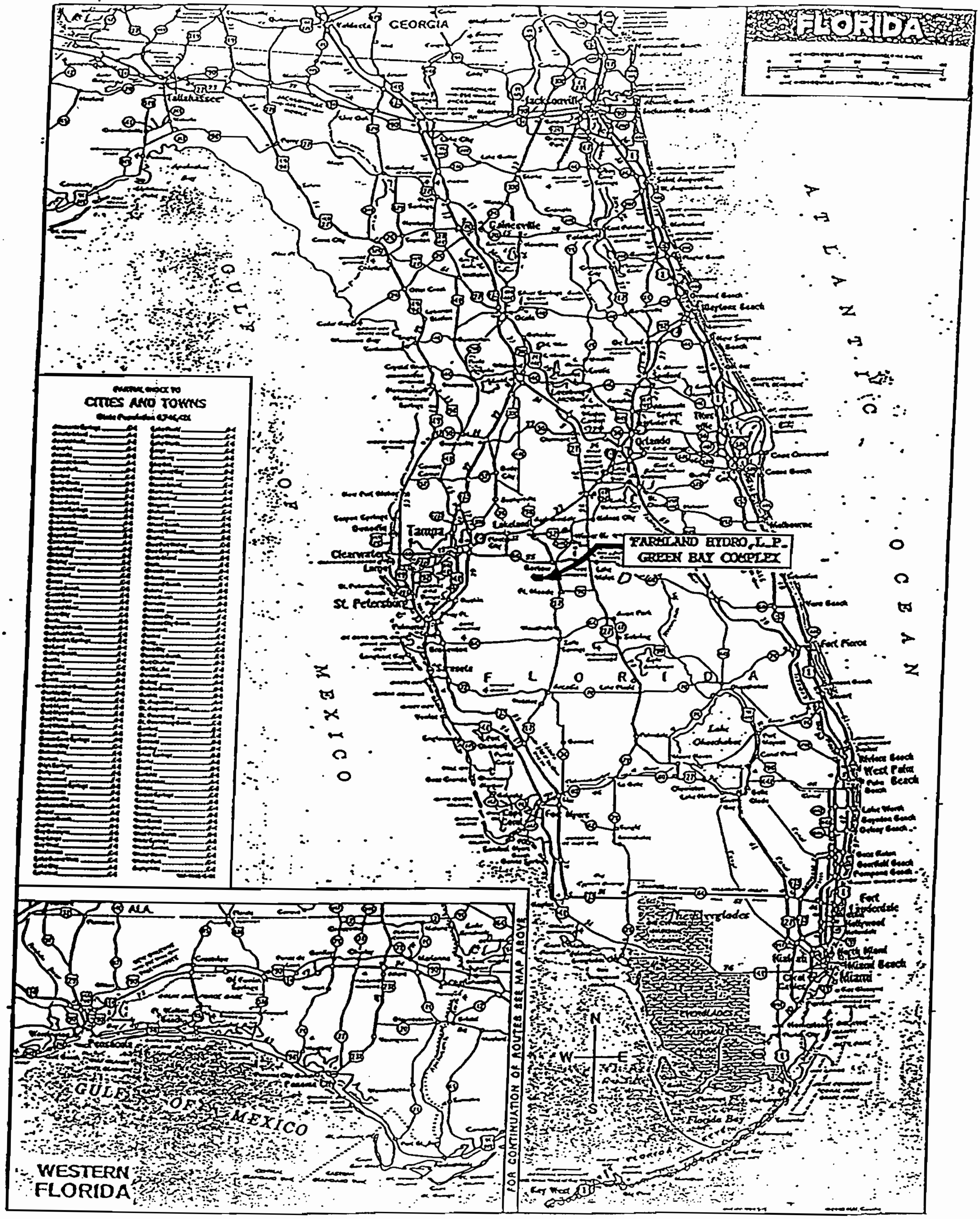
The emissions of SO2 are controlled by the dual absorption towers. The emissions of SAM are controlled by mist eliminators. NOx is emitted from the sulfur combustion process.

The existing sulfuric acid plants, subject to federal New Source Performance Standards as set forth in 40 CFR 60, Subpart H, are presently permitted under AC 53-265755, extended by Title V provisions.

FIGURE 2-1 **BEST AVAILABLE COPY**

SITE LOCATION MAP

FARMLAND HYDRO, L.P.



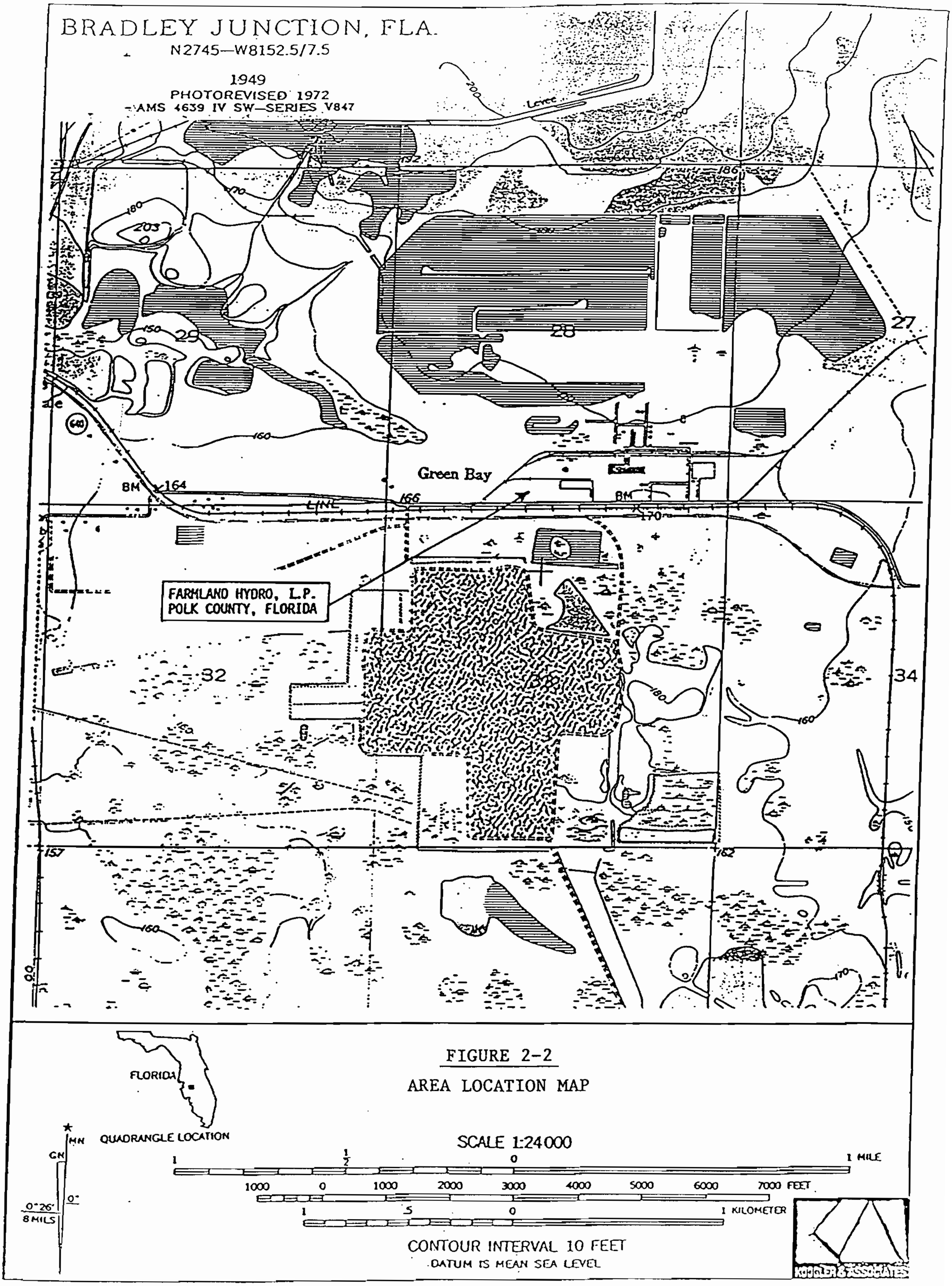


FIGURE 2-2

AREA LOCATION MAP

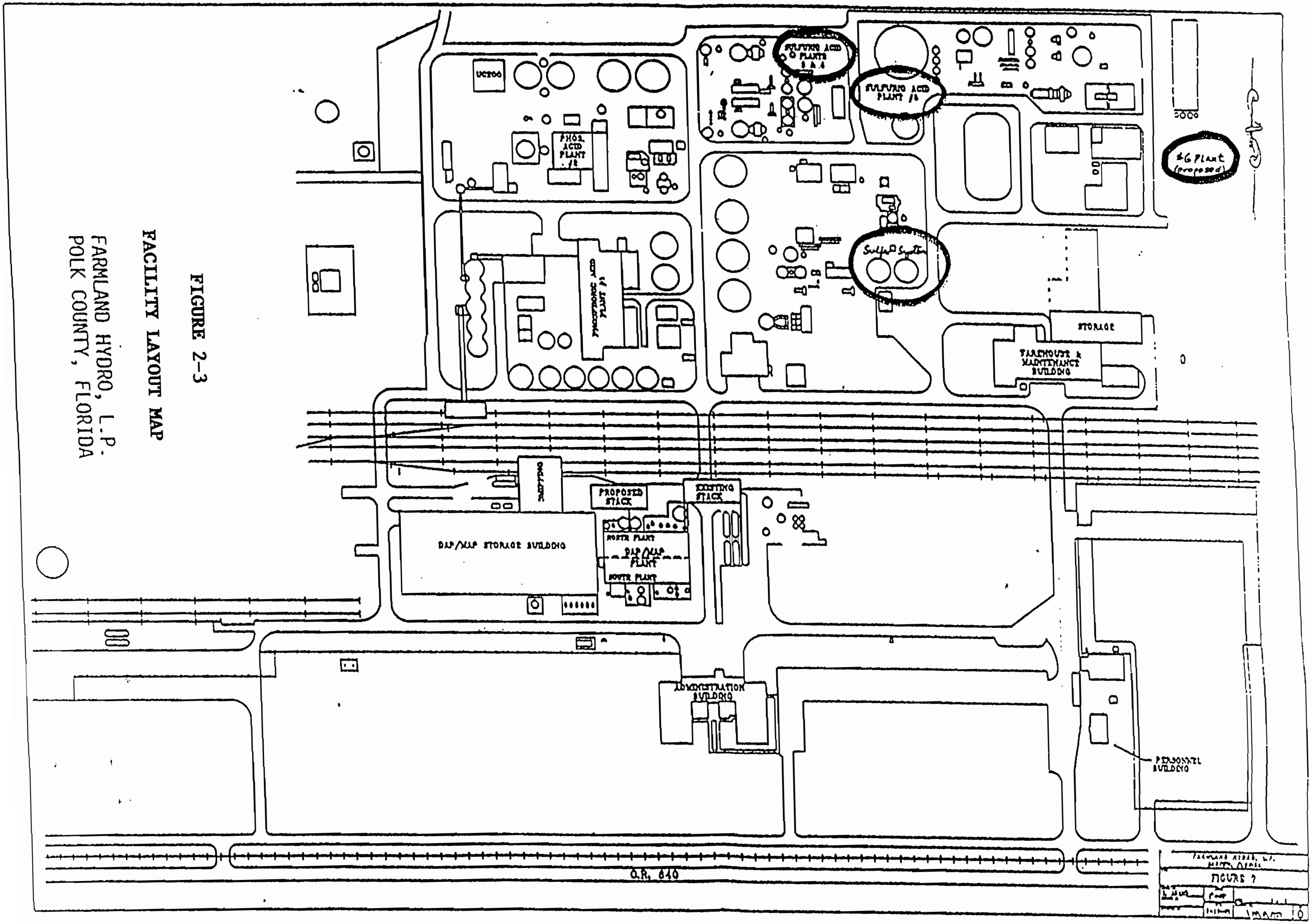


FIGURE 2-3
FACILITY LAYOUT MAP
FARMLAND HYDRO, L.P.
POLK COUNTY, FLORIDA

3.0 PROPOSED PROJECT

3.1 PROJECT DESCRIPTION

Farmland proposes to replace the existing 2100 tpd SAP3 with a new more efficient SAP6 capable of producing 2,750 tpd 100% sulfuric acid. This corresponds to a change in the facility capacity from 7000 to 7650 tpd, or less than 10 percent.

The new SAP6 will be a sulfur burning, double absorption plant similar to the existing SAP5. The new plant will be constructed close to the existing plants. SAP3 will be permanently shutdown and dismantled after SAP6 is operational.

The molten sulfur system throughput rate will increase by less than 10 percent and there will be installation of new piping to connect the existing molten sulfur system to the new SAP6 plant. No other plant at the facility will be affected by the proposed project.

The emission limits for the new sulfuric acid plant will be in accordance with the Federal NSPS and Rule 62-296, Florida Administrative Code (FAC); i.e., the SO2 and SAM emission limits will be 4.0 pounds per ton and 0.15 pounds per ton of 100 percent sulfuric acid, respectively. The emissions of NOx will be estimated based on an emission factor used in recent permitting of similar sources.

A process flow diagram, for the new sulfuric acid plant, is presented in Figure 3-1.

The net emission changes as a result of the proposed project are summarized in Table 3-2. The information presented in Table 3-2 shows there will be a significant net increase in the annual emissions of SO2, SAM and NOx, as defined in Rule 62-212, FAC.

3.2 RULE REVIEW

The following are the state and federal air regulatory requirements that apply to new or modified sources subject to a Prevention of Significant Deterioration (PSD) review.

In accordance with EPA and state of Florida PSD review requirements, all major new or modified sources of air pollutants regulated under the Clean Air Act (CAA) are subject to preconstruction review. Florida's State

Implementation Plan (SIP), approved by the EPA, authorizes the Florida Department of Environmental Protection (FDEP) to manage the air pollution program in Florida.

The PSD review determines whether or not significant air quality deterioration will result from a new or modified facility. Federal PSD regulations are contained in 40CFR52.21, Prevention of Significant Deterioration of Air Quality. The state of Florida has adopted PSD regulations which are essentially identical to the federal regulations and are contained in Chapter 62-212 of the Florida Administration Code (FAC). All new major sources and major modifications to existing sources are subject to control technology review, source impact analysis, air quality analysis and additional impact analyses for each pollutant subject to a PSD review. A facility must also comply with the Good Engineering Practice (GEP) stack height rule.

A major facility is defined in the PSD rules as any one of the 28 specific source categories (see Table 3-3) which has the potential to emit 100 tons per year (tpy) or more, or any other stationary facility which has the potential to emit 250 tpy or more, of any pollutant regulated under the CAA. A major modification is defined in the PSD rules as a change at an existing major facility which increases the actual emissions by greater than significant amounts (see Table 3-4).

3.2.1 Ambient Air Quality Standards

The EPA and the state of Florida have developed/adopted ambient air quality standards, AAQS (see Table 3-5). Primary AAQS protect the public health while the secondary AAQS protect the public welfare from adverse effects of air pollution. Areas of the country have been designated as attainment or nonattainment for specific pollutants. Areas not meeting the AAQS for a given pollutant are designated as nonattainment areas for that pollutant. Any new source or expansion of existing sources in or near these nonattainment areas are usually subject to more stringent air permitting requirements. Projects proposed in attainment areas are subject to air permit requirements which would ensure continued attainment status.

3.2.2 PSD Increments

In promulgating the 1977 CAA Amendments, Congress quantified concentration increases above an air quality baseline concentration levels for sulfur dioxide (SO_2) and particulate matter (PM/TSP) which would constitute significant deterioration. The size of the allowable increment depends on the classification of the area in which the source would be located or have an impact. Class I areas include specific national parks, wilderness areas and memorial parks. Class II areas are all areas not designated as Class I areas and Class III areas are industrial areas in which greater deterioration than Class II areas would be allowed. There are no designated Class III areas in Florida.

In 1988, EPA promulgated PSD regulations for nitrogen oxides (NOx) and PSD increments for nitrogen dioxide (NO_2) concentrations. FDEP adopted the NO_2 increments in July 1990 (see Table 3-6 for PSD increments).

In the PSD regulations, as amended August 7, 1980, baseline concentration is defined as the ambient concentration level for a given pollutant which exists in the baseline area at the time of the applicable baseline date and includes the actual emissions representative of facilities in existence on the applicable baseline date, and the allowable emissions of major stationary facilities which commenced construction before January 6, 1975, but were not in operation by the applicable baseline date.

The emissions not included in the baseline concentration and, therefore, affecting PSD increment consumption are the actual emissions from any major stationary facility on which construction commenced after January 6, 1975, for SO_2 and PM (TSP) and February 8, 1988, for NO_2, and the actual emission increases and decreases at any stationary facility occurring after the baseline date.

3.2.3 Control Technology Evaluation

The PSD control technology review requires that all applicable federal and state emission limiting standards be met and that Best Available Control Technology (BACT) be applied to the source. The BACT requirements are applicable to all regulated pollutants subject to a PSD review.

BACT is defined in Chapter 62-212, FAC as an emission limitation, including a visible emission standard, based on the maximum degree of reduction of each pollutant emitted which the Department, on a case-by-case basis, taking into account energy, environmental, and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques (including fuel cleaning or treatment or innovative fuel combustion techniques) for control of such pollutant. If the Department determines that technological or economic limitations on the application of measurement methodology to a particular part of a source or facility would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard or combination thereof, may be prescribed instead, to satisfy the requirement for the application of BACT. Such standard shall, to the degree possible, set forth the emissions reductions achievable by implementation of such design, equipment, work practice or operation. Each BACT determination shall include applicable test methods or shall provide for determining compliance with the standard(s) by means which achieve equivalent results.

The reason for evaluating the BACT is to minimize as much as possible the consumption of PSD increments and to allow future growth without significantly degrading air quality. The BACT review also analyzes if the most current control systems are incorporated in the design of a proposed facility. The BACT, as a minimum, has to comply with the applicable New Source Performance Standard for the source. The BACT analysis requires the evaluation of the available air pollution control methods including a cost-benefit analysis of the alternatives. The cost-benefit analysis includes consideration of materials, energy, and economic penalties associated with the control systems, as well as environmental benefits derived from the alternatives.

EPA determined that the bottom-up approach (starting at NSPS and working up to BACT) was not providing the level of BACT originally intended. As a result, in December 1987, EPA strongly suggested changes in the implementation of the PSD program including the "top-down" approach to BACT. The top-down approach requires an applicant to start with the most stringent control alternative, often Lowest Achievable Emission Rate (LAER), and justify its rejection or acceptance as BACT. Rejection of control alternatives may be based on technical or economical infeasibility, physical differences, locational differences, and environmental or energy impact differences when comparing a proposed project with a project previously subject to that BACT.

3.2.4 Air Quality Monitoring

An application for a PSD permit requires an analysis of ambient air quality in the area affected by the proposed facility or major modification. For a new major facility, the affected pollutants are those that the facility would potentially emit in significant amounts. For a major modification, the pollutants are those for which the net emissions increase exceeds the significant emission rate.

Ambient air monitoring for a period of up to one year, but no less than four months, is required. Existing ambient air data for a location in the vicinity of the proposed project is acceptable if the data meet FDEP quality assurance requirements. If not, additional data would need to be gathered. There are guidelines available for designing a PSD air monitoring network in EPA's "Ambient Monitoring Guidelines for Prevention of Significant Deterioration."

FDEP may exempt a proposed major stationary facility or major modification from the monitoring requirements with respect to a particular pollutant if the emissions increase of the pollutant from the facility or modification would cause air quality impacts less than the de minimis levels (see Table 3-4).

3.2.5 Ambient Impact Analysis

A source impact analysis is required for a proposed major source subject to PSD for each pollutant for which the increase in emissions exceeds the significant emission rate. Specific atmospheric dispersion models are required in performing the impact analysis. The analysis should demonstrate the project's compliance with AAQS and allowable PSD increments. The impact analysis for criteria pollutants may be limited to only the new or modified source if the net increase in impacts due to the new or modified source is below significant impact levels.

Typically, a five-year period is used for the evaluation of the highest, second-highest short-term concentrations for comparison to AAQS or PSD increments. The term "highest, second-highest" refers to the highest of the second-highest concentrations at all receptors. The second-highest concentration is considered because short-term AAQS specify that the standard should not be exceeded at any location more than once a year. If less than five years of meteorological data are used in the modeling analysis, the highest concentration at each receptor is normally used.

3.2.6 Additional Impact Analysis

The PSD rules also require analyses of the impairment to visibility and the impact on soils and vegetation that would occur as a result of the project. A visibility impairment analysis must be conducted for PSD Class I areas. Impacts due to commercial, residential, industrial, and other growth associated with the source must be addressed. For Class I areas, an Air Quality Related Values Analysis is required by the National Park Service.

3.2.7 Good Engineering Practice Stack Height

In accordance with Rule 62-210.550, FAC, the degree of emission limitation required for control of any pollutant should not be affected by a stack height that exceeds GEP, or any other dispersion technique. GEP stack height is defined as the greater of:

1. 65 meters (m), or
2. A height established by applying the formula:
   $Hg = H + 1.5 L$
   where:
   Hg - GEP stack height,
   H - Height of the structure or nearby structure, and
   L - Lesser dimension, height or projected width of nearby structure(s)
3. A height demonstrated by a model or field study.

The GEP stack height regulations require that the stack height used in modeling for determining compliance with AAQS and PSD increments not exceed the GEP stack height. The actual stack height may be higher or lower.

3.3 RULE APPLICABILITY

The construction of a new sulfuric acid plant and redistribution of facility-wide allowable sulfuric acid production at Farmland are classified as a major modification to a major source subject to both state and federal regulations as set forth in Rule 62-212, FAC. The facility is located in an area classified as attainment for each of the regulated air pollutants in accordance with Rule 62-275, FAC. The proposed project will result in significant increases in the emissions of SO2, SAM and NOx, as defined in Rule 62-212, FAC; and, will therefore be subject to PSD preconstruction review requirements (see Table 3-2). This will include a determination of Best Available Control Technology, an air quality review, Good Engineering Practice stack height analysis and an evaluation of impacts on soils, vegetation and visibility.

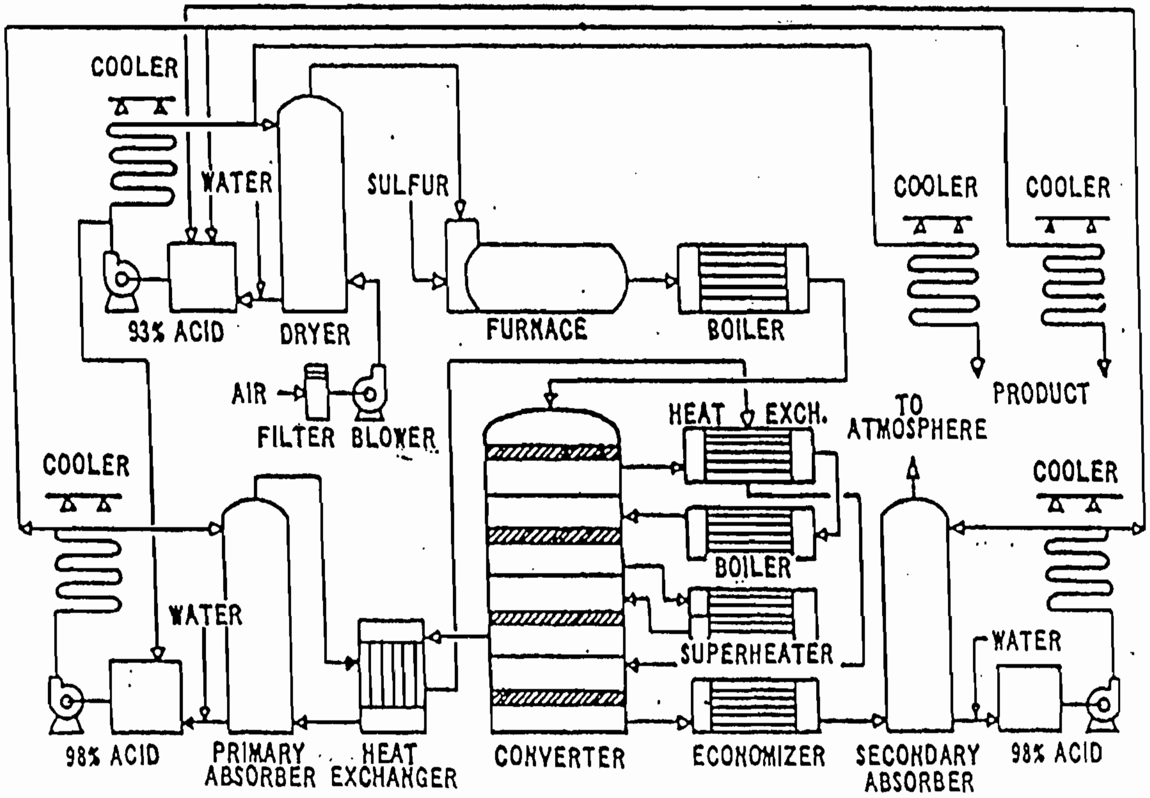


FIGURE 3-1

TYPICAL SULFURIC ACID
DOUBLE ABSORPTION PLANT
PROCESS FLOW DIAGRAM

$S + O_2 \rightarrow SO_2$ (BURNER)

$SO_2 + \frac{1}{2} O_2 \rightleftharpoons SO_3$ (CONVERTER)

$SO_3 + H_2O \rightarrow H_2SO_4$ (ABSORBER)

KOOGLER & ASSOCIATES

TABLE 3-1
SUMMARY OF EMISSION RATES

FARMLAND HYDRO, L.P.
POLK COUNTY, FLORIDA

	EMISSIONS					
	PERMITTED		ACTUALS		PROPOSED	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Sulfuric Acid Plant No. 3 (Existing)						
Sulfur Dioxide	350.0	1533.0	276.1	1209.4	0	0
Acid Mist	13.1	57.5	9.1	39.9	0	0
Nitrogen Oxides	NA	NA	8.5	37.2	0	0
Annual Operating Hours	8760		8760		0	
Production Rate	2100		NA		0	
Sulfuric Acid Plant No. 6 (New)						
Sulfur Dioxide	NA	NA	NA	NA	458.3	2007.5
Acid Mist	NA	NA	NA	NA	17.2	75.3
Nitrogen Oxides	NA	NA	NA	NA	13.8	60.2
Annual Operating Hours	NA		NA		8760	
Production Rate	NA		NA		2750	
Sulfur System Estimates (Existing)						
Sulfur Dioxide	NA	17.9	NA	NA	NA	19.7
Acid Mist	NA	NA	NA	NA	NA	NA
Nitrogen Oxides	NA	NA	NA	NA	NA	NA
Particulates	NA	9.7	NA	NA	NA	10.7
Reduced Sulfur Cpds.	NA	11.9	NA	NA	NA	13.1
Hydrocarbons	NA	17.7	NA	NA	NA	19.5
Annual Operating Hours	8760		8760		8760	
Throughput Rate (tpy)	840,000		840,000		924,000	

NOTE: (1) See Appendix for calculations of emission rates.

TABLE 3-2
NET EMISSIONS INCREASES(1)

FARMLAND HYDRO, L.P.
POLK COUNTY, FLORIDA

Pollutant	Net Emissions Increase (TPY)	Significant Increase (TPY)	PSD Review
Acid Mist	35.4	7	YES
Nitrogen Oxides	59.7 (2)	40	YES
Particulate Matter	3.0	25	NO
Reduced Sulfur Cpds.	3.6	10	NO
Sulfur Dioxide	799.9	40	YES
Volatile Organic Cpds.	5.5	40	NO

NOTES:

(1) Calculations are presented in the Appendix.
(2) This includes the contemporaneous emissions increase associated with the previous PSD review to operate the facility at 7000 tpd 100% sulfuric acid.

TABLE 3-3
MAJOR FACILITY CATEGORIES

FARMLAND HYDRO, L.P.
POLK COUNTY, FLORIDA

Fossil fuel fired steam electric plants of more than 250 MMBTU/hr heat input
Coal cleaning plants (with thermal dryers)
Kraft pulp mills
Portland cement plants
Primary zinc smelters
Iron and steel mill plants
Primary aluminum ore reduction plants
Primary copper smelters
Municipal incinerators capable of charging more than 250 tons of refuse per day
Hydrofluoric acid plants
Sulfuric acid plants
Nitric acid plants
Petroleum refineries
Lime plants
Phosphate rock processing plants
Coke oven batteries
Sulfur recovery plants
Carbon black plants (furnace process)
Primary lead smelters
Fuel conversion plants
Sintering plants
Secondary metal production plants
Chemical process plants
Fossil fuel boilers (or combinations thereof) totaling more than 250 million BTU/hr heat input
Petroleum storage and transfer units with total storage capacity exceeding 300,000 barrels
Taconite ore processing plants
Glass fiber processing plants
Charcoal production plants

TABLE 3-4
REGULATED AIR POLLUTANTS - SIGNIFICANT EMISSION RATES

FARMLAND HYDRO, L.P.
POLK COUNTY, FLORIDA

Pollutant	Significant Emission Rate tons/yr	De Minimis Ambient Impacts $\mu g/m^3$
CO	100	575 (8-hour)
NOx	40	14 (NO_2, Annual)
SO_2	40	13 (24-hour)
Ozone	40 (VOC)	-
PM	25	10 (24-hour)
PM10	15	10 (24-hour)
TRS (including H2S)	10	0.2 (1-hour)
H_2SO_4 mist	7	-
Fluorides	3	0.25 (24-hour)
Vinyl Chloride	1	15 (24-hour)
	pounds/yr	
Lead	1200	0.1 (Quarterly avg)
Mercury	200	0.25 (24-hour)
Asbestos	14	-
Beryllium	0.8	0.001 (24-hour)

TABLE 3-5
AMBIENT AIR QUALITY STANDARDS

FARMLAND HYDRO, L.P.
POLK COUNTY, FLORIDA

			USEPA (National)			
	FDEP (State)		Primary		Secondary	
Pollutant	$\mu g/m^3$	PPM	$\mu g/m^3$	PPM	$\mu g/m^3$	PPM
SO_2, 3-hour	1,300	0.5	-	-	1300	0.5
24-hour	260	0.1	365	0.14	-	-
Annual	60	0.02	80	0.03	-	-
PM10, 24-hour	150	-	150	-	150	-
Annual	50	-	50	-	50	-
CO, 1-hour	40,000	35	40,000	35	-	-
8-hour	10,000	9	10,000	9	-	-
Ozone, 1-hour	235	0.12	235	0.12	235	0.12
NO_2, Annual	100	0.053	100	-	100	-
Lead, Quarterly	1.5	-	1.5	-	1.5	-

TABLE 3-6
PSD INCREMENTS

FARMLAND HYDRO, L.P.
POLK COUNTY, FLORIDA

	Allowable PSD Increments (State/National)		
Pollutant	Class I $\mu g/m^3$	Class II $\mu g/m^3$	Class III $\mu g/m^3$
TSP, Annual	5	19	37
24-hour	10	37	75
SO_2, Annual	2	20	40
24-hour	5	91	182
3-hour	25	512	700
NO_2, Annual	2.5	25	50

4.0 BEST AVAILABLE CONTROL TECHNOLOGY

Best Available Control Technology (BACT) is required to control air pollutants emitted from newly constructed major sources or from modification to the major emitting facilities if the modification results in significant increase in the emission rate of regulated pollutants (see Table 3-4 for significant emission levels).

The emission rate increases proposed by Farmland have been summarized in Table 3-2. The SO2, SAM and NOx emissions increase from the proposed project will represent a significant increase.

The SO2, SAM and NOx are present in the tail gas from all contact process sulfuric acid plants. In a typical plant with a single absorption system, the SO2 in the tail gas is approximately 30 pounds per ton of acid produced and the SAM is approximately 4 pounds per ton of acid produced. In a typical plant with a double absorption system, the SO2 in the tail gas is approximately 4 pounds per ton of acid produced and the SAM is approximately 0.15 pounds per ton of acid produced. The NOx emissions that are present in the tail gas are formed in the sulfur burners as a result of the fixation of atmospheric nitrogen. Recent measurements have indicated that the NOx in the tail gas from a sulfuric acid plant can be around 0.12 pound per ton of acid produced.

4.1 EMISSION STANDARDS FOR SULFURIC ACID PLANTS

Federal New Source Performance Standards (NSPS) for sulfuric acid plants became effective on August 17, 1971. These standards are codified in 40 CFR 60, Subpart H and require SO2 emissions to be limited to no more than 4.0 pounds per ton of 100 percent acid produced and require that SAM emissions be limited to no more than 0.15 pounds per ton of 100 percent acid produced. Additionally, the standards limit the opacity of the emissions from new or modified sulfuric acid plants to less than 10 percent. There are no applicable emission standards for NOx from sulfuric acid plants.

EPA's most recent review of the New Source Performance Standards for sulfuric acid plants in 1985 (EPA-450/3-85-012), concluded that because of variations in SO2 emissions as a function of catalyst age:

> "... the level of SO_2 emissions as specified in the current NSPS (should) not be changed ...."

Regarding the NSPS for SAM, EPA concluded:

> "Making the acid mist standard more stringent is not believed to be practical at this time because of the need to provide a margin of safety due to in-plant operating fluctuations, which introduce variable quantities of moisture into the sulfuric acid production line."

There has been no change in EPA philosophy related to sulfuric acid plants since the 1985 review.

A review of BACT/LAER determinations published in the EPA Clearinghouse indicates that no new control alternatives have been applied to the double absorption sulfuric acid plants as of 1997 that would result in a consistent reduction in S02 emission below 4.0 pounds per ton of acid nor would result in a consistent reduction of SAM emissions below 0.15 pounds per ton of acid. No control technologies for NOx are discussed in either the NSPS review or in BACT/LAER determinations as there is typically no control of NOx from the double absorption sulfuric acid plants.

Farmland is proposing the double absorption process, as BACT, for the new SAP6.

4.2 CONTROL TECHNOLOGIES

The control of S02 and SAM emissions from sulfuric acid plants can be achieved by various processes. The process of choice for S02 control has been double absorption and the process of choice for controlling SAM emission has been one of the various types of fiber mist eliminators. These processes have been selected based on cost, product recovery, the formation of no undesirable by-products and the fact that neither introduces operating processes that are foreign to plant personnel.

In EPA's review of NSPS for sulfuric acid plants in March 1985 (EPA-450/3-85-012), 46 sulfuric acid plants built between 1971 and 1985 were reviewed. Of these 46 plants, 40 used the double absorption process for S02 control with the remaining six using some type of acid gas scrubbing. All 46 plants used the high efficiency mist eliminators for acid mist control. The control of NOx in sulfuric acid plants has not been addressed to date because the low concentration of NOx in the tail gases of sulfuric acid plants (10-20 parts per million) does not lend itself to cost effective controls.

Also in the EPA review, several potential control technologies that had been used to control S02 and SAM emissions from sulfuric acid plants were addressed. The alternatives included the double absorption process, ammonia scrubbing, sodium sulfite-bisulfite scrubbing, and molecular sieves for S02 control and filter type mist eliminators and electrostatic precipitators for SAM control. A review of the EPA BACT/LAER Clearinghouse information indicated that no other control alternatives have been considered for sulfuric acid plants. No control alternatives were addressed for NOx control in either the 1985 EPA NSPS review or in the BACT/LAER Clearinghouse.

4.2.1 Sulfur Dioxide Control

The control alternatives for S02 have been summarized based upon information compiled by EPA in the 1985 NSPS review for sulfuric acid plants and information recently submitted to FDEP by companies with similar sulfuric acid plants during review of production increase requests (refer to PSD-FL-225, 229, 235 and 238).

4.2.1.1 Double Absorption Process

The double absorption process has become the S02 control system of choice within the sulfuric acid industry since the promulgation of NSPS in 1971. Of the 46 new sulfuric acid plants constructed between 1971 and 1985, 40 employed this process for S02 control. The process offers the following advantages over other S02 control technologies:

1. 99.7 percent of the sulfur is converted to sulfuric acid compared with about 97.7 percent conversion with a single absorption plant;

2. there are no by-products produced;

3. there are no new operating processes that plant personnel must become familiar with;

4. the process permits higher inlet S02 concentrations resulting in a reduction in equipment size;

5. there is no reduction in overall plant operating time or efficiency; and

6. there is no increase in manpower requirements.

The double absorption plant is capable of operating at a SO2 emission rate of 4.0 pounds per ton of acid or less as required by New Source Performance Standards (NSPS). However, in an effort to optimize plant performance, most plants in the fertilizer industry tend to run at SO2 emission levels close to the permitted rate.

It should be noted that when EPA adopted the NSPS for sulfuric acid plants in 1971, it was recognized that double absorption plants could operate with a SO2 emission rate in the range of 2-4 pounds per ton of acid. The SO2 emission limit, however, was set at 4.0 pounds per ton of acid to account for small fluctuations that invariably occur in operating plants.

Since the adoption of the NSPS, there have been design and operating changes in sulfur burning sulfuric acid plants as well as changes and improvements in catalyst technology. Changes have occurred in the composition of the vanadium/sodium/potassium catalyst and in the physical shape of the catalyst; from a pellet to a ring-type structure resulting in higher activity and lower pressure drop. These changes have allowed sulfur burning sulfuric acid plants to operate much more efficiently and still operate in compliance with the NSPS limit for SO2 of 4.0 pounds per ton of acid.

As in 1971, plants can still operate with SO2 emissions somewhat below 4.0 pounds per ton of acid but slight fluctuations do occur which result in SO2 emissions that approach the NSPS limit. It was the intent of EPA when the NSPS limits were adopted in 1971 and reviewed in 1985 that the SO2 emission limit should be set with a margin of safety that will allow for these slight fluctuations in plant emissions.

Typically, the time between turnarounds in double absorption sulfur burning sulfuric acid plants in Florida is in the range of 18-24 months. Suggestions have been made that if the time between turnarounds is reduced, the activity of the catalyst will be upgraded more frequently resulting in lower SO2 emissions. While catalyst activity may be improved as a result of screening and partial replacement, the plant production rate will also be increased. The effect of increasing the frequency of sulfuric acid plant turnaround from once every 18 months to once every nine months is not expected to substantially reduce SO2 emissions since the plant will be operating at an overall higher production rate and thus emitting more SO2.

Based on information in FDEP files on a similar plant, the cost of SO2 control using this approach is well above BACT cost guidelines. Therefore, more frequent catalyst changes/turnarounds are rejected as BACT.

4.2.1.2 Ammonia Scrubbing

Five sulfuric acid plants constructed between 1971 and 1985 use ammonia scrubbing for S02 control. None of these plants were double absorption plants. The process can be effective for reducing S02 emissions to below 4.0 pounds per ton and also for controlling sulfuric acid mist emissions. The major disadvantages of ammonia scrubbing are:

1. a waste by-product is produced;

2. the scrubbing system is a high maintenance item and requires additional manpower for operation; and

3. no sulfuric acid production increase benefits are achieved with the scrubbing system.

4. the environmental liabilities of introducing a toxic air pollutant release point at another location in the plant.

Ammonia scrubbing uses anhydrous ammonia and water in a scrubbing system to convert S02 to ammonium sulfite/bisulfite and eventually to ammonium sulfate. The ammonium sulfate can be crystallized and sold as a market commodity, it can be blended in a MAP/DAP plant or it can be disposed of as a waste. One plant that operates ammonia scrubbers on sulfuric acid plants had an ammonium sulfate crystallizer but abandoned it because of the volatility of the market. Blending with MAP or DAP is viable only if the additional sulfate (from ammonium sulfate) does not adversely affect the grade of the MAP/DAP product. At Farmland, the additional sulfate cannot be added to the granular fertilizer as the grade of the fertilizer has to be maintained to be competitive in the market.

Due to the cost, reduced plant reliability from the scrubber system, and the environmental liability associated with the waste disposal and accidental release provisions of the Clean Air Act, ammonia scrubbing is rejected as BACT.

4.2.1.3 Other Scrubbing Technologies

Between 1971 and 1985, two sulfuric acid plants were constructed employing sodium sulfite-bisulfite scrubbing to control SO2 emissions. One of the plants was subsequently converted to ammonia scrubbing and the second plant has never been used. As a result, sodium sulfite-bisulfite scrubbing is not considered a demonstrated SO2 control alternative.

Other scrubbing liquors that have a potential for reducing SO2 emissions include caustic, sodium carbonate, calcium oxide and hydrogen peroxide. Without going through a detailed cost analysis to evaluate these scrubbing technologies, it can be stated that the capital investment cost and many of the direct and indirect annual costs are expected to be very similar to the costs incurred with ammonia scrubbing. Because of higher chemical costs and/or waste disposal costs, these other technologies are expected to be more costly than ammonia scrubbing. For this reason, these technologies are rejected as BACT.

4.2.1.4 Molecular Sieves

A molecular sieve was installed at one sulfuric acid plant in Florida for SO2 control. The system was effective for controlling SO2; however, extensive operating problems were experienced as the molecular sieve also absorbed NOx. The molecular sieve regeneration process resulted in the formation of nitric acid within the sulfuric acid plant. The nitric acid/sulfuric acid mixture resulted in severe corrosion problems which caused the molecular sieve system to be abandoned. As a result, molecular sieves are not considered a viable alternative for SO2 control in sulfuric acid plants.

4.2.1.5 Catalyst Selection

Changes in catalyst composition and shape have occurred since the promulgation of the NSPS for sulfuric acid plants. The results of this improvement were to extend the time between plant turnarounds to 18-24 months.

A change in catalyst composition, beyond changes in the vanadium content of the catalyst, has been the reintroduction of the “cesium catalyst”. The cesium catalyst is a 6-8 percent vanadium catalyst with a portion of the potassium promoter replaced by cesium. The introduction of cesium reduces the activation temperature of the catalyst by approximately 20°F (from about 770°F to 750°F). At temperatures above approximately 770°F, the performance of the cesium catalyst and the conventional catalyst are about the same.

The advantage of the cesium catalyst is that it allows the startup of a sulfuric acid plant at a lower entrance gas temperature. The disadvantage of the shift to a lower temperature is the reduction in the reaction rate which slows the approach to equilibrium. The reduction in reaction rate therefore could offset the more favorable conversion resulting in no appreciable overall improvement in plant conversion efficiency. Another disadvantage of the cesium catalyst is that the cesium catalyst cost is 2.5-3.0 times the cost of conventional catalyst and not a demonstrated technology for sulfur burning double absorption plants. For these reasons, the use of cesium catalyst in place of the traditional catalyst, is rejected as BACT.

4.2.2 Sulfuric Acid Mist Control

Control alternatives that were reviewed by EPA in the 1985 New Source Performance Standards review are summarized in the following sections.

4.2.2.1 Fiber Mist Eliminators

The 46 new sulfuric acid plants constructed between 1971 and 1985, all used the fiber-type mist eliminators for SAM control. Operations demonstrated that these types of mist eliminators can control SAM emissions to 0.15 pounds per ton of sulfuric acid.

The mist eliminators are the control of choice for SAM within the sulfuric acid industry because they require very little operation and maintenance attention and because of the small space requirement associated with these devices. The disadvantage of this type of mist eliminator is that the pressure drop across the elements varies from five to 15 inches of water; resulting in an increase in operating utility costs.

4.2.2.2 Electrostatic Precipitators

Electrostatic precipitators (ESPs) have the potential for controlling SAM emissions from sulfuric acid plants; however, there is no demonstrated application of ESPs. The disadvantages associated with ESPs and hence, the reason they have not been used, include the initial cost, size requirements, operating and maintenance requirements and the potential for corrosion.

4.2.3 Nitrogen Oxides Control

There are no demonstrated control technologies to reduce the nitrogen oxides that are present in the tail gas from sulfuric acid plants. No control alternatives were addressed for nitrogen oxides control in either the 1985 EPA NSPS review or in the BACT/LAER Clearinghouse. As the NOx concentration level in the exit gas stream from a sulfur burning double absorption sulfuric acid plant is low, there are no effective add on control technologies.

4.3 BACT CONCLUSION

Considering the above BACT analysis, Farmland proposes the use of the double absorption system for SO2 control with no restrictions on operating practices or on catalyst type. For SAM control, Farmland proposes the use of fiber mist eliminators and for NOx emissions, no control is proposed.

5.0 AIR QUALITY REVIEW

The air quality review required of a PSD construction permit application potentially requires both air quality modeling and air quality monitoring. The air quality monitoring is required when the impact of air pollutant emission increases and decreases associated with a proposed project exceed the de minimis impact levels (see Table 3-4) or in cases where an applicant wishes to define existing ambient air quality by monitoring rather than by air quality modeling. The air quality modeling is required to provide assurance that the increases and decreases in air pollutant emissions associated with the project, combined with all other applicable air pollutant emission rate increases and decreases associated with new sources affecting the project area, will not cause or contribute to an exceedance of the applicable ambient air quality standards.

The air quality review for the proposed project included SO2, SAM and NOx emission increases associated with the sulfuric acid plant. The molten sulfur system was not included as no change in hourly rates are requested.

5.1 AIR QUALITY MODELING

5.1.1 Significant Impact Analysis

The emission rates used for air quality modeling purposes for Significant Impact Analysis (SIA) represent the proposed net increase in the emission rate associated with the construction of SAP6 and the shutdown of SAP3. Table 5-1 contains modeling input parameters used in the ambient air quality impacts analysis.

The impact analysis of the net increase in emissions was conducted using the Industrial Source Complex-Short Term air quality model, Version 96113 (ISC-ST3), in accordance with guidelines established by EPA and published in the document, Guideline for Air Quality Modeling. The meteorological data used with the model were for Tampa, Florida and represented the period 1987-1991.

The emissions from sulfuric acid plants 3 and 6 were modeled in the SIA. The SAP3 emission rates were represented as a negative input while the SAP6 emission rates were represented as a positive inputs to the model.

The SIA modeling included discrete receptors at the facility property boundary and additional receptors established by the polar grid system extending to 18 kilometers from the plant. The discrete receptors were placed along the property boundary at 100 meter intervals. Sixteen sets of receptor rings were placed at distances ranging from about 500 to 18,000 meters from the plant with receptors placed at 10 degree intervals from 10° to 360° on each receptor ring, with the exclusion of receptors within Farmland's property boundary. The downwind receptor distances were selected in order to provide a higher concentration of receptors closer to the source where the maximum impacts were expected. Receptor locations are shown in Figure 5-1.

The results of the SIA modeling, summarized in Table 5-2, demonstrate that the predicted ambient air quality impact of the SO2 emission increases from the proposed project for the Class II area are greater than significant for the 3-hour, 24-hour and annual periods; and, less than significant at the Class I area. The SIA modeling also demonstrated that the predicted SO2 impacts from the proposed project are significant upto a distance of about 8 kilometers. Consequently, additional modeling was required to determine compliance with the ambient air quality standards and allowable Class II area PSD increments.

The SIA modeling also demonstrated that the maximum predicted NOx impacts from the proposed project will not be significant.

No ambient air quality standards, PSD increments or significant impact levels have been established for SAM. FDEP's current permitting guideline for air toxics requires temporary facilities to evaluate short-term impacts for comparison with Air Reference Concentrations (ARC) listed in Version 3 of the Air Toxics List. However, permanent facilities have to evaluate annual impacts to compare with the ARCs. As there is no annual ARC for sulfuric acid mist, no comparisons are required.

It should be noted that the maximum sulfuric acid mist impacts from the proposed project are predicted to occur at locations which are both remote and far from the population centers (based on the results of the modeling for sulfur dioxide emissions). Also, the sulfuric acid mist will be controlled by the Best Available Control Technology. As a result, the sulfuric acid mist emissions are not expected to be of concern.

5.1.2 Class II Area AAQS and PSD Increment Analysis

The Ambient Air Quality Standards (AAQS) Analysis and the PSD Increment (PSD) Analysis were conducted to determine the combined ambient air impact of the proposed project and other nearby SO2 emitting sources. The significant facilities to be included in the analysis were determined based on the "20 D Rule" using the facility emission inventory most recently utilized by FDEP, with recent updates provided by FDEP staff.

A list of the significant facilities near the proposed project is presented in Table 5-3. The corresponding sources at the significant facilities which contribute to the ambient air concentration and the PSD increment consumption/expansion in the Class II area are presented in Tables 5-4 and 5-5, respectively. Although the ISC model is not recommended for modeling sources beyond 50 kilometers, some of the borderline sources were included to be conservative.

The results of the AAQS and PSD increment analysis indicate that the maximum predicted 3-hour, 24-hour and annual period impacts for the AAQS and Class II area PSD increment are within the standards, as shown in Table 5-6.

Figure 5.1
Modeling Receptor Network For Class 2 and FAAQS Significant Impact Analysis

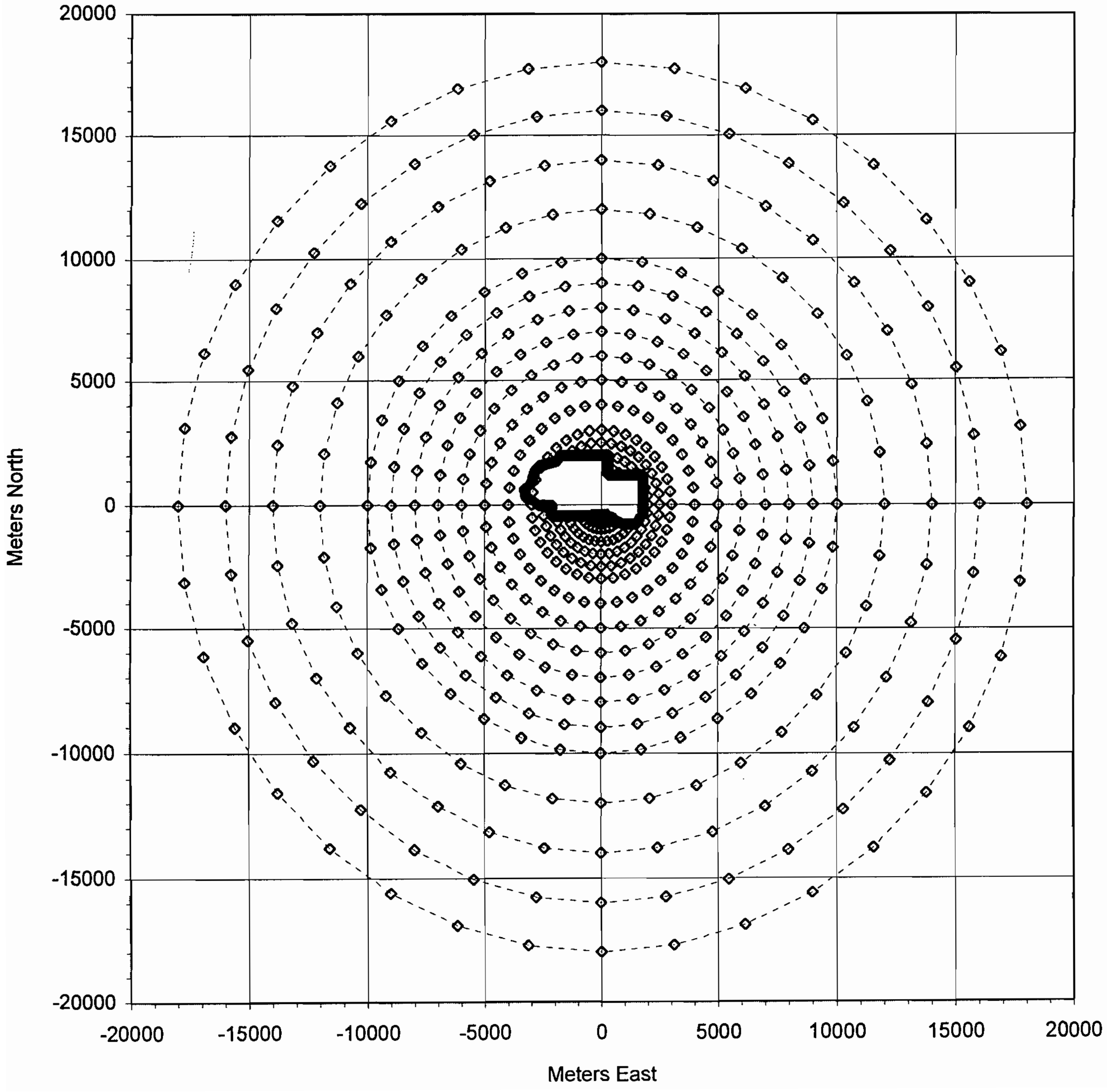


TABLE 5-1

AIR QUALITY MODELING PARAMETERS

FARMLAND HYDRO, L.P.
POLK COUNTY, FLORIDA

	Stack		Stack Gas		Emission Rates	
Emission Unit	Ht (m)	Dia (m)	Vel (mps)	Temp (°K)	SO2 (g/s)	NOx (g/s)
Existing						
SAP3	30.48	2.29	12.02	355	44.1	1.32
Proposed						
SAP6	45.72	2.74	10.60	355	57.8	1.74

NOTES:
1. Building downwash effects, from the EPA approved BPIP program, were included in the modeling.

TABLE 5-2

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 5-3
Significant Sulfur Dioxide Emitting Facilities (20 D Table)
Farmland Hydro, L.P.
Green Bay, Florida

SO2 "20 D" SOURCE INVENTORY FOR FARMLAND HYDRO PLANT			Source Location	410.330	3079.655
	UTM Coordinates (km)		SO2	Distance	20-D Emission
SOURCE DESCRIPTION	EAST	NORTH	TPY	(Km)	(TPY)
AUBURNDALE	420.800	3103.300	221	26	517
BORDEN DRYER	414.500	3109.000	-184	30	593
BORDEN DRYER	394.800	3069.600	-225	19	370
BREWSTER/IMPERIAL	404.800	3069.500	-670	12	231
CARGILL/GARDINIER	363.400	3082.400	5870	47	940
CARGILL/GARDINIER MINE	415.300	3063.300	612	17	342
CARGILL/SEMINOLE/W.R. GRACE	409.770	3086.990	5007	7	147
CF BARTOW	408.500	3082.500	5145	3	68
CF PLANT CITY	388.000	3116.000	9048	43	853
CITRUS WORLD	441.000	3087.300	1604	32	632
CLM CHLORIDE METALS	361.800	3088.300	731	49	986
CONSOLIDATED MINERALS	393.800	3096.300	943	23	469
COUCH CONST-ZEPHYRHILLS	390.300	3129.400	123	54	1073
DOLIME	404.813	3069.548	-355	12	230
ESTECH/SWIFT	411.500	3074.200	-4856	6	112
FARMLAND	410.330	3079.655	5208	0	0
FPC INTERSESSION CITY	446.300	3126.000	8168	59	1173
FPC OSCEOLA	446.300	3126.000	4380	59	1173
FPC POLK	414.400	3073.910	1720	7	141
FPL MANATEE	367.200	3054.100	83410	50	1003
GEN. PORT. CEMENT	358.000	3090.600	-4602	53	1069
GULF COAST RECYCLING	364.000	3093.500	1711	48	967
HARDEE	404.800	3057.400	9657	23	459
HILLS. CO. RESOURCE RECOVERY	368.200	3092.700	744	44	882
IMC - AGRICO /NICHOLS/CONSERVE	398.400	3084.200	1978	13	255
IMC-AGRICO/NEW WALES	396.600	3078.900	11416	14	275
IMC-AGRICO/NORALYN	414.700	3080.300	504	4	88
IMC-AGRICO/PIERCE	404.100	3078.950	-1646	6	125
IMC-AGRICO/SO. PIERCE	407.500	3071.300	4676	9	176
LAKELAND LARSEN	409.300	3102.800	4944	23	463
LAKELAND MCINTOSH	409.200	3106.200	30563	27	531
MOBIL BIG-4	394.850	3069.770	87	18	367
MOBIL NICHOLS	398.300	3084.300	971	13	258
MOBILE ELECTROPHOS	405.600	3079.400	-3337	5	95
MULBERRY COGENERATION	413.600	3080.600	466	3	68
MULBERRY PROSPHATES/ROYSTER	406.700	3085.200	1280	7	133
NITRAM	363.100	3089.000	108	48	963
PANDA KATHLEEN	398.700	3101.400	25	25	493
RIDGE COGENERATION	416.700	3100.400	480	22	434
SECI HARDEE	404.900	3057.400	223	23	458
SULFUR TERMINALS	358.000	3090.000	104	53	1067
TAMPA GENERAL HOSP	356.400	3091.000	59	55	1102
TAMPA MCKAY BAY RRF	360.000	3091.000	744	52	1032
TECO BIG BEND	361.900	3075.000	372294	49	973
TECO GANNON	360.000	3087.500	127495	51	1019
TECO HOOKERS POINT	358.000	3091.000	13535	54	1071
TECO POLK POWER	402.488	3066.914	4031	15	299
THATCHER GLASS	361.800	3088.300	177	49	986
USS AGRI-CHEM BARTOW	413.200	3086.300	-1580	7	145
USSAC FT MEADE	416.120	3068.620	3217	12	249

NOTE: Facilities with negative emissions represent shutdown facilities.

Table 5-4

AAQS SO2 Source Inventory
Farmland Hydro, L.P. - Green Bay, Florida

	Inventory	NAAQS	UTM Coordinates (km)		Stack Centered Coordinat		Emissions	Height	Temperature	Velocity	Dimeter
SOURCE DESCRIPTION	Designation	Designation	EAST	NORTH	EAST	NORTH	(g/s)	(m)	(°K)	(m/s)	(m)
CARGILL/GARDINIER NaSiF MFG (U41)	NAAQS	CARG1	363.4	3082.4	-46930	2745	0.16	12.2	333.1	13.37	2.8
CARGILL/GARDINIER DAP (U55)	NAAQS	CARG2	363.4	3082.4	-46930	2745	0.96	40.5	320	16.09	2.13
CARGILL/GARDINIER GTSP (UAA)	NAAQS	CARG3	363.4	3082.4	-46930	2745	1.9	38.4	328	11.56	2.44
CARGILL/GARDINIER MINE ROCK DRYER	NAAQS	CARG4	415.3	3063.3	4970	-16355	17.6	19.2	290	7	2.9
CARGILL/GARDINIER SAP #7 (U04)	NAAQS	CARG5	363.4	3082.4	-46930	2745	46.2	45.6	340	12.64	2.29
CARGILL/GARDINIER SAP #8 (U05)	NAAQS	CARG6	363.4	3082.4	-46930	2745	52.5	45.6	339	13.93	2.44
CARGILL/GARDINIER SAP #9 (INCR9 OF8/9	BOTH	CARG7	363.4	3082.4	-46930	2745	67.2	45.6	350	12.66	2.74
CARGILL/SEMINOLE/W.R. GRACE DAP 4 - Ba	NAAQS	CARG8	409.8	3087.0	-560	7335	0.3	40.2	316	26.2	2.1
CARGILL/SEMINOLE/W.R. GRACE SAP 4, 5	BOTH	CARG9	409.8	3087.0	-560	7335	143.64	60.96	347	34	1.52
CF BARTOW DAP 1-3	NAAQS	CFB1	408.5	3082.5	-1830	2845	7.93	36.4	339	16.11	2.13
CF BARTOW DAP 1-3	BOTH	CFB2	408.5	3082.5	-1830	2845	3.97	36.4	339	16.11	2.13
CF BARTOW H2SO4 5 (2400 TPD)	BOTH	CFB3	408.5	3082.5	-1830	2845	50.4	63.41	361	10.88	2.13
CF BARTOW H2SO4 6 (2400 TPD)	BOTH	CFB4	408.5	3082.5	-1830	2845	50.4	63.41	370	7.28	2.13
CF BARTOW H2SO4 7 (2000 TPD)	BOTH	CFB5	408.5	3082.5	-1830	2845	42	67.1	351	9.8	2.4
CF PLANT CITY (U22)	NAAQS	CFP1	388.0	3116.0	-22330	36345	0.12	2.44	373	0.33	0.61
CF PLANT CITY (U22)	NAAQS	CFP2	388.0	3116.0	-22330	36345	0.11	2.4	373.1	1.63	0.27
CF PLANT CITY (U23-24)	NAAQS	CFP3	388.0	3116.0	-22330	36345	0.17	3.7	373.1	1.65	0.09
CF PLANT CITY DAP A (U10)	NAAQS	CFP4	388.0	3116.0	-22330	36345	3	28.7	326	7.9	3
CF PLANT CITY DAP X (U16)	NAAQS	CFP5	388.0	3116.0	-22330	36345	13.2	54.9	325	9.8	2.8
CF PLANT CITY DAP Z (U11)	NAAQS	CFP6	388.0	3116.0	-22330	36345	13.2	54.9	331	13.1	2.8
CF PLANT CITY GTSP X (U12)	NAAQS	CFP7	388.0	3116.0	-22330	36345	13.2	54.9	314	7.9	2.8
CF PLANT CITY H2SO4 A&B (U02&03)	BOTH	CFP8	388.0	3116.0	-22330	36345	88.2	33.5	316	19.5	1.52
CF PLANT CITY PROPOSED C & D (U07-08)	BOTH	CFP9	388.0	3116.0	-22330	36345	109.2	60.35	353	17.77	2.44
CF PLANT CITY Y-GTSP (U17)	NAAQS	CFP10	388.0	3116.0	-22330	36345	11.33	54.9	333.1	13.37	2.8
CF PLANT CITY Zephyrhills (U01)	NAAQS	CFP11	388.0	3116.0	-22330	36345	19.98	7.62	560.8	17.74	1.07
CITRUS WORLD DRYER 1	NAAQS	CITRUS1	441.0	3087.3	30670	7645	11.8	22.9	323	10.7	1
CITRUS WORLD DRYER 2	NAAQS	CITRUS2	441.0	3087.3	30670	7645	23.74	22.9	325	12.2	0.8
CITRUS WORLD DRYER 3	NAAQS	CITRUS3	441.0	3087.3	30670	7645	23.74	24.4	313	21.9	0.8
CONSOLIDATED MINERALS	NAAQS	CONSOL1	393.8	3096.3	-16530	16645	0.12	6.1	605.2	20.21	0.37
CONSOLIDATED MINERALS FLUID BED REACTOR	NAAQS	CONSOL2	393.8	3096.3	-16530	16645	11.57	46.33	299.7	12.14	1.77
CONSOLIDATED MINERALS KILNS 3, 4 & 5	NAAQS	CONSOL3	393.8	3096.3	-16530	16645	15.43	46.33	298	13.17	1.77
FARMLAND	NAAQS	FARM1	410.3	3079.7	0	0	2.33	28.96	605.2	3.58	1.68
FARMLAND SULFUR SYSTEM (EXISTING)	NAAQS	FARM2	410.3	3079.7	0	0	0.39	12.19	366.3	2.67	0.61
FARMLAND SULFUR SYSTEM (PROPOSED)	NAAQS	FARM3	410.3	3079.7	0	0	0.16	12.19	366.3	2.67	0.61
FPC BARTOW PEAKING 1-4	NAAQS	FPC1	342.4	3082.6	-67930	2945	192.89	13.7	772	22.3	5.3
FPC BARTOW PIPELINE HEATER (U04)	NAAQS	FPC2	342.4	3082.6	-67930	2945	1.8	9.1	541	5.2	0.9
FPC BARTOW UNIT 1 & 2 (U01&02)	NAAQS	FPC3	342.4	3082.6	-67930	2945	896.8	91.4	429	36.3	2.7
FPC BARTOW UNIT 3 (U03)	NAAQS	FPC4	342.4	3082.6	-67930	2945	710.54	91.4	408	34.4	3.4

Table 5-4
Continued
AAQS SO2 Source Inventory
Farmland Hydro, L.P. - Green Bay, Florida

SOURCE DESCRIPTION	Inventory Designation	NAAQS Designation	UTM Coordinates (km)		Stack Centered Coordinat		Emissions (g/s)	Height (m)	Temperature (°K)	Velocity (m/s)	Dimeter (m)
			EAST	NORTH	EAST	NORTH					
FPC BAYBORO PEAKING 1-4	NAAQS	FPC5	338.8	3071.3	-71530	-8355	197.8	12.2	755	6.4	7
FPC INT. CITY PROP TURBINES/7EA @ 20°F	BOTH	FPC6	446.3	3126.0	35970	46345	124.4	15.24	819.8	56.21	4.21
FPC INT. CITY PROP TURBINES/7FA @20°F	BOTH	FPC7	446.3	3126.0	35970	46345	110.4	15.24	880.8	32.07	7.04
FPC OSCEOLA PEAKING 1-6	NAAQS	FPC8	446.3	3126.0	35970	46345	273.06	7.9	703.7	18.06	4.24
FPC OSCEOLA PEAKING 11-12	BOTH	FPC9	446.3	3126.0	35970	46345	102.56	15.2	895.9	0.03	7.04
FPC OSCEOLA PEAKING 7-10	BOTH	FPC10	446.3	3126.0	35970	46345	111.88	15.2	834.8	0.05	4.21
FPC POLK	BOTH	FPC11	414.4	3073.9	4070	-5745	24.7	34.4	400	40.5	4.1
FPL MANATEE UNIT 1 & 2 (U01&02)	NAAQS	FPL1	367.2	3054.1	-43130	-25555	2397.8	152.1	426	17.1	8
GULF COAST LEAD	NAAQS	GULF1	364.0	3093.5	-46330	13845	0.75	8.84	309.1	20.85	0.34
GULF COAST LEAD (U01)	NAAQS	GULF2	364.0	3093.5	-46330	13845	48.45	29.57	344.1	37.59	0.61
HARDEE	BOTH	HARDEE1	404.8	3057.4	-5530	-22255	277.6	22.9	389	23.9	4.88
IMC-AGRICO /NICHOLS/CONSERVE (2500 TP	BOTH	IMC1	398.4	3084.2	-11930	4545	52.5	45.7	352	12	2.3
IMC-AGRICO /NICHOLS/CONSERVE DAP DRYE	NAAQS	IMC2	398.4	3084.2	-11930	4545	1.01	24.4	333	23.1	1.07
IMC-AGRICO /NICHOLS/CONSERVE DRYER	NAAQS	IMC3	398.4	3084.2	-11930	4545	3.34	24.69	327.4	3.77	2.29
IMC-AGRICO/NEW WALES AFI PLANT	BOTH	IMC4	396.6	3078.9	-13730	-755	0.2	52.4	322	13.1	2.4
IMC-AGRICO/NEW WALES DAP	BOTH	IMC5	396.6	3078.9	-13730	-755	5.54	36.6	319.1	20.15	1.83
IMC-AGRICO/NEW WALES DAP 1	NAAQS	IMC6	396.7	3079.4	-13630	-255	3.7	40.5	314	14.9	2.1
IMC-AGRICO/NEW WALES GTSP	NAAQS	IMC7	396.7	3079.4	-13630	-255	9.2	40.5	316	20.4	1.8
IMC-AGRICO/NEW WALES MULTIPHOS	BOTH	IMC8	396.6	3078.9	-13730	-755	4.8	52.4	314	15.8	1.4
IMC-AGRICO/NEW WALES SAP #1, 2, 3 (3	BOTH	IMC9	396.6	3078.9	-13730	-755	182.85	61	350	15.31	2.6
IMC-AGRICO/NEW WALES SAP #4, 5 (2 AT	BOTH	IMC10	396.6	3078.9	-13730	-755	121.9	60.7	350	15.31	2.6
IMC-AGRICO/NORALYN	NAAQS	IMC11	414.7	3080.3	4370	645	1.2	23.2	394	17.1	2
IMC-AGRICO/NORALYN	NAAQS	IMC12	414.7	3080.3	4370	645	13.3	18.3	341	8.5	2.8
IMC-AGRICO/SO. PIERCE DAP PLANT	BOTH	IMC13	407.5	3071.3	-2830	-8325	4.41	38.1	328	14.6	3.1
IMC-AGRICO/SO. PIERCE GTSP PLANT	NAAQS	IMC14	407.5	3071.3	-2830	-8355	16.6	42.7	305	10.4	2.7
IMC-AGRICO/SO. PIERCE H2SO4 (2 @ 2700	BOTH	IMC15	407.5	3071.3	-2830	-8355	113.4	44.18	350	13.29	2.74
LAKELAND LARSEN	NAAQS	LAKE1	409.3	3102.8	-1030	23145	0.2	9.75	699.7	171.38	1.52
LAKELAND LARSEN 4	NAAQS	LAKE2	409.3	3102.8	-1030	23145	93.37	50.29	433	5.64	3.05
LAKELAND LARSEN 5	NAAQS	LAKE3	409.3	3102.8	-1030	23145	0.4	50.29	444.1	6.47	3.05
LAKELAND LARSEN 6	NAAQS	LAKE4	409.3	3102.8	-1030	23145	0.35	50.29	444.1	6.47	3.05
LAKELAND LARSEN 7	NAAQS	LAKE5	409.3	3102.8	-1030	23145	18.71	50.29	444.1	6.86	3.05
LAKELAND LARSEN CT	BOTH	LAKE6	409.3	3102.8	-1030	23145	29.11	30.48	783.2	28.22	5.79
LAKELAND MCINTOSH	NAAQS	LAKE7	409.2	3106.2	-1130	26545	8.32	10.97	791.3	0.39	2.8
LAKELAND MCINTOSH	NAAQS	LAKE8	409.2	3106.2	-1130	26545	2.94	6.1	652.4	23.54	0.79
LAKELAND MCINTOSH 1	NAAQS	LAKE9	409.3	3106.2	-1030	26545	341.56	45.72	419.1	23.96	2.74
LAKELAND MCINTOSH 2	NAAQS	LAKE10	409.2	3106.2	-1130	26545	25.68	47.55	402.4	21.29	3.17
LAKELAND MCINTOSH 3	BOTH	LAKE11	409.2	3106.2	-1130	26545	500.1	76.2	350	19.7	4.88
MOBIL NICHOLS DRYER 1	NAAQS	MOBIL1	398.3	3084.3	-12030	4645	12.73	25.9	342	14.1	2.29

Table 5-4
Concluded
AAQS SO2 Source Inventory
Farmland Hydro, L.P. - Green Bay, Florida

	Inventory	NAAQS	UTM Coordinates (km)		Stack Centered Coordinate		Emissions	Height	Temperature	Velocity	Dimeter
SOURCE DESCRIPTION	Designation	Designation	EAST	NORTH	EAST	NORTH	(g/s)	(m)	(ºK)	(m/s)	(m)
MOBIL NICHOLS DRYER 2	NAAQS	MOBIL2	398.3	3084.3	-12030	4645	12.73	25.9	342	14.1	2.29
MOBIL NICHOLS DRYER 4	BOTH	MOBIL3	398.3	3084.3	-12030	4645	2.44	25.9	339	16.05	2.29
MULBERRY COGENERATION CT	BOTH	MULB1	413.6	3080.6	3270	945	13.4	38.1	377	9.31	1.98
MULBERRY PROSPHATES/ROYSTER (1700 TPD	BOTH	MULB2	406.7	3085.2	-3630	5545	35.7	61	360	12.2	2.13
MULBERRY PROSPHATES/ROYSTER DAP	NAAQS	MULB3	406.7	3085.2	-3630	5545	9.3	31.1	316	7.9	2.7
RIDGE COGENERATION	BOTH	RIDGE1	416.7	3100.4	6370	20745	13.8	99.1	350	14.54	3.05
TECO BIG BEND TURBINE 1 (U07)	NAAQS	TECO1	361.9	3075.0	-48430	-4655	11.3	10.7	816	136.2	1.5
TECO BIG BEND TURBINE 2&3 (U05&06)	NAAQS	TECO2	361.9	3075.0	-48430	-4655	79.12	22.86	770.8	18.74	4.27
TECO BIG BEND UNIT 1 (U01)	NAAQS	TECO3	361.9	3075.0	-48430	-4655	3309	149.35	404.7	13.74	7.32
TECO BIG BEND UNIT 2 (U02)	NAAQS	TECO4	361.9	3075.0	-48430	-4655	3275.32	149.35	404.7	13.02	7.32
TECO BIG BEND UNIT 3 (U03)	NAAQS	TECO5	361.9	3075.0	-48430	-4655	3372.92	149.35	410.2	14.47	7.32
TECO BIG BEND UNIT 4 (U04)	BOTH	TECO6	361.9	3075.0	-48430	-4655	654.7	149.4	342.2	19.81	7.32
TECO GANNON 1 & 2 (U01&02)	NAAQS	TECO7	360.0	3087.5	-50330	7845	760.86	93.27	420.8	30.85	3.05
TECO GANNON 3 (U03)	NAAQS	TECO8	360.0	3087.5	-50330	7845	483.96	93.27	419.7	38.64	3.23
TECO GANNON 4 (U04)	NAAQS	TECO9	360.0	3087.5	-50330	7845	567.71	93.27	426.9	22.97	3.05
TECO GANNON 5 (U05)	NAAQS	TECO10	360.0	3087.5	-50330	7845	691.28	93.27	423.6	23.18	4.45
TECO GANNON 6 (U06)	NAAQS	TECO11	360.0	3087.5	-50330	7845	1149.41	93.27	433	24.74	5.36
TECO GANNON TURBINE (U07)	NAAQS	TECO12	360.0	3087.5	-50330	7845	11.9	10.67	816.3	136.61	1.52
TECO HOOKERS POINT 1 & 2 (U01&02)	NAAQS	TECO13	358.0	3091.0	-52330	11345	82.6	85.3	419	6.1	3.4
TECO HOOKERS POINT 3 & 4 (U03&04)	NAAQS	TECO14	358.0	3091.0	-52330	11345	114	85.3	434	7.9	3.7
TECO HOOKERS POINT 5 (U05)	NAAQS	TECO15	358.0	3091.0	-52330	11345	84.6	85.3	448	11	3.4
TECO HOOKERS POINT 6 (U06)	NAAQS	TECO16	358.0	3091.0	-52330	11345	107.9	85.3	434	22.3	2.9
TECO POLK POWER	BOTH	TECO17	402.5	3067.0	-7842	-12701	5.42	22.86	812	27.43	5.49
TECO POLK POWER	BOTH	TECO18	402.5	3067.4	-7880	-12305	49.68	45.72	400	16.76	5.79
TECO POLK POWER	BOTH	TECO19	402.3	3067.5	-8002	-12183	8.2	60.7	1033	10.7	1.4
TECO POLK POWER	BOTH	TECO20	402.4	3067.3	-7910	-12335	0.3	6.1	533	13.1	0.91
TECO POLK POWER	BOTH	TECO21	402.0	3067.6	-8314	-12015	0.016	22.9	1000	20	1.2
TECO POLK POWER	BOTH	TECO22	402.3	3067.3	-8032	-12358	1.27	60.7	1033	9.1	1.1
TECO POLK POWER 4 CC	BOTH	TECO23	402.5	3067.2	-7880	-12439	17.6	45.72	389	16.15	4.42
TECO POLK POWER 5 CT	BOTH	TECO24	402.5	3066.9	-7842	-12741	33.4	22.86	785	31.39	5.49
USSAC FT MEADE H2SO4 1 & 2 (2200 TPD)	BOTH	USSAC1	416.1	3068.6	5790	-11035	92.48	53.4	355	10	2.59

Table 5-5

PSD Class 2 SO2 Source Inventory
Farmland Hydro, L.P. - Green Bay, Florida

	INVENTORY	Modeling	UTM Coordinates (km)		Stack Centered Coordinate		Emissions	Height	Temperature	Velocity	Dimeter
SOURCE DESCRIPTION	Designation	Designation	EAST	NORTH	EAST	NORTH	(g/s)	(m)	(ºK)	(m/s)	(m)
BREWSTER/IMPERIAL DRYER	PSD	BREW1	404.8	3069.5	-5530	-10155	-19.26	27.44	339	15.25	2.29
CARGILL/GARDINIER DRYER	PSD	CARG1	363.4	3082.4	-46930	2745	-28.89	20.73	310	13.12	1.07
CARGILL/GARDINIER SAP #4, 5, 6	PSD	CARG2	363.4	3082.4	-46930	2745	-187.7	22.6	363	7	1.52
CARGILL/GARDINIER SAP #7	PSD	CARG3	363.4	3082.4	-46930	2745	-26.25	45.6	340	12.64	2.29
CARGILL/GARDINIER SAP #8	PSD	CARG4	363.4	3082.4	-46930	2745	-41.16	45.6	339	13.93	2.44
CARGILL/GARDINIER SAP #9	PSD	CARG5	363.4	3082.4	-46930	2745	-54.6	45.6	350	10.3	2.74
CARGILL/GARDINIER SAP #9 (INCR IN9 OF8/9 U06)	BOTH	CARG6	363.4	3082.4	-46930	2745	67.2	45.6	350	12.66	2.74
CARGILL/SEMINOLE/W.R. GRACE DRYER	PSD	CARG7	409.77	3086.99	-560	7335	-39.66	15.24	327	17.32	2.04
CARGILL/SEMINOLE/W.R. GRACE SAP #1 & #2	PSD	CARG8	409.77	3086.99	-560	7335	-216	45.72	352	16.5	1.37
CARGILL/SEMINOLE/W.R. GRACE SAP #3	PSD	CARG9	409.77	3086.99	-560	7335	-52.5	45.72	311	16.7	1.52
CARGILL/SEMINOLE/W.R. GRACE SAP 4, 5 & 6	PSD	CARG10	409.77	3086.99	-560	7335	-121.07	60.96	347	25.1	1.52
CARGILL/SEMINOLE/W.R. GRACE SAP 4, 5 & 6	BOTH	CARG11	409.77	3086.99	-560	7335	143.64	60.96	347	34	1.52
CF BARTOW DAP 1-3	BOTH	CFB1	408.5	3082.5	-1830	2845	3.97	36.4	339	16.11	2.13
CF BARTOW H2SO4 1 (400 TPD)	PSD	CFB2	408.5	3082.5	-1830	2845	-60.9	30.49	350	12.2	1.37
CF BARTOW H2SO4 2 (500 TPD)	PSD	CFB3	408.5	3082.5	-1830	2845	-110.25	30.49	350	10.37	1.68
CF BARTOW H2SO4 3 (600 TPD)	PSD	CFB4	408.5	3082.5	-1830	2845	-107.1	30.49	364	4.27	2.74
CF BARTOW H2SO4 4 (900 TPD)	PSD	CFB5	408.5	3082.5	-1830	2845	-174.83	30.49	358	7.93	2.13
CF BARTOW H2SO4 5 (2400 TPD)	BOTH	CFB6	408.5	3082.5	-1830	2845	50.4	63.41	361	10.88	2.13
CF BARTOW H2SO4 5 (900 TPD)	PSD	CFB7	408.5	3082.5	-1830	2845	-226.8	63.41	358	10.67	2.13
CF BARTOW H2SO4 6 (2400 TPD)	BOTH	CFB8	408.5	3082.5	-1830	2845	50.4	63.41	370	7.28	2.13
CF BARTOW H2SO4 6 (900 TPD)	PSD	CFB9	408.5	3082.5	-1830	2845	-170.1	63.41	359	10.37	2.13
CF BARTOW H2SO4 7 (2000 TPD)	BOTH	CFB10	408.5	3082.5	-1830	2845	42	67.1	351	9.8	2.4
CF PLANT CITY BASELINE A & B	PSD	CFP1	388	3116	-22330	36345	-105	23.8	316	18.8	1.52
CF PLANT CITY BASELINE C & D	PSD	CFP2	388	3116	-22330	36345	-100.8	60.35	353	16.4	2.44
CF PLANT CITY H2SO4 A&B (U02&03)	BOTH	CFP3	388	3116	-22330	36345	88.2	33.5	316	19.5	1.52
CF PLANT CITY PROPOSED C & D (U07-08)	BOTH	CFP4	388	3116	-22330	36345	109.2	60.35	353	17.77	2.44
DOLIME BOILER	PSD	DOLIME1	404.813	3069.548	-5517	-10107	-4.52	27.43	494.1	7.25	0.61
DOLIME DRYER	PSD	DOLIME2	404.813	3069.548	-5517	-10107	-5.68	27.43	333	20.67	1.52
ESTECH/SWIFT DRYER	PSD	ESTE1	411.5	3074.2	1170	-5455	-23.94	18.29	339	8.47	2.95
ESTECH/SWIFT DRYER	PSD	ESTE2	411.5	3074.2	1170	-5455	-22.8	18.75	340	5.06	2.95
ESTECH/SWIFT SAP (610 TPD & 29 LB/Ton)	PSD	ESTE3	411.5	3074.2	1170	-5455	-92.87	30.79	358	3.9	2.13
FARMLAND 1, 2 H2SO4	PSD	FARM1	410.33	3079.655	0	0	-83.98	30.48	311	20.18	1.37
FPC INT. CITY PROP TURBINES/7EA AT 20 DEG F	BOTH	FPC1	446.3	3126	35970	46345	124.4	15.24	819.8	56.21	4.21
FPC INT. CITY PROP TURBINES/7FA AT 20 DEG F	BOTH	FPC2	446.3	3126	35970	46345	110.4	15.24	880.8	32.07	7.04
FPC OSCEOLA PEAKING 11-12	BOTH	FPC3	446.3	3126	35970	46345	102.56	15.2	895.9	0.03	7.04
FPC OSCEOLA PEAKING 7-10	BOTH	FPC4	446.3	3126	35970	46345	111.88	15.2	834.8	0.05	4.21
FPC POLK	BOTH	FPC5	414.4	3073.91	4070	-5745	24.7	34.4	400	40.5	4.1
GEN. PORT. CEMENT KILN 4	PSD	GENPORT1	358	3090.6	-52330	10945	-62.99	35.97	505.2	17.61	2.74

Table 5-5
Continued
PSD Class 2 SO2 Source Inventory
Farmland Hydro, L.P. - Green Bay, Florida

	INVENTORY	Modeling	UTM Coordinates (km)		Stack Centered Coordinate		Emissions	Height	Temperature	Velocity	Dimeter
SOURCE DESCRIPTION	Designation	Designation	EAST	NORTH	EAST	NORTH	(g/s)	(m)	(°K)	(m/s)	(m)
GEN. PORT. CEMENT KILN 5	PSD	GENPORT2	358	3090.6	-52330	10945	-69.3	45.42	494.1	5.8	3.81
HARDEE	BOTH	HARDEE1	404.8	3057.4	-5530	-22255	277.6	22.9	389	23.9	4.88
IMC-Agrico/Nichols/Conserve (2@ 1300TPD & 4lb/To	PSD	IMC1	398.4	3084.2	-11930	4545	-54.6	30.5	308	18.9	1.8
IMC-Agrico/Nichols/Conserve (2000TPD @ 4LB/Ton)	PSD	IMC2	398.4	3084.2	-11930	4545	-42	45.7	352	10.3	2.3
IMC-Agrico/Nichols/Conserve (2500TPD @ 4LB/Ton)	BOTH	IMC3	398.4	3084.2	-11930	4545	52.5	45.7	352	12	2.3
IMC-Agrico/Nichols/Conserve ROCK DRYER	PSD	IMC4	398.4	3084.2	-11930	4545	-3.88	24.4	339	12.9	1.52
IMC-Agrico/NEW WALES AFI PLANT	BOTH	IMC5	396.6	3078.9	-13730	-755	0.2	52.4	322	13.1	2.4
IMC-Agrico/NEW WALES DAP	BOTH	IMC6	396.6	3078.9	-13730	-755	5.54	36.6	319.1	20.15	1.83
IMC-Agrico/NEW WALES MULTIPHOS	BOTH	IMC7	396.6	3078.9	-13730	-755	4.8	52.4	314	15.8	1.4
IMC-Agrico/NEW WALES ROCK DRYER	PSD	IMC8	396.6	3078.9	-13730	-755	-34.27	21	347	18.6	2.13
IMC-Agrico/NEW WALES SAP #1, 2, 3 (3 AT 2900 TP	BOTH	IMC9	396.6	3078.9	-13730	-755	182.85	61	350	15.31	2.6
IMC-Agrico/NEW WALES SAP #1, 2, 3 BASELINE	PSD	IMC10	396.6	3078.9	-13730	-755	-146	61	350	14.28	2.6
IMC-Agrico/NEW WALES SAP #4, 5 (2 AT 2900 TPD)	BOTH	IMC11	396.6	3078.9	-13730	-755	121.9	60.7	350	15.31	2.6
IMC-Agrico/PIERCE DRYERS 1, 2	PSD	IMC12	404.1	3078.95	-6230	-705	-24.32	24.38	339	12.94	1.52
IMC-Agrico/PIERCE DRYERS 3, 4	PSD	IMC13	404.1	3078.95	-6230	-705	-23	24.38	339	18.82	2.43
IMC-Agrico/SO. PIERCE DAP PLANT	BOTH	IMC14	407.5	3071.33	-2830	-8325	4.41	38.1	328	14.6	3.1
IMC-Agrico/SO. PIERCE H2SO4 (2 @ 2700 TPD)	BOTH	IMC15	407.5	3071.3	-2830	-8355	113.4	44.18	350	13.29	2.74
IMC-Agrico/SO. PIERCE H2SO4 (2 @1800 TPD)	PSD	IMC16	407.5	3071.3	-2830	-8355	-75.6	45.73	350	26.4	1.6
LAKELAND LARSEN CT	BOTH	LAKE1	409.3	3102.8	-1030	23145	29.11	30.48	783.2	28.22	5.79
LAKELAND MCINTOSH 3	BOTH	LAKE2	409.2	3106.2	-1130	26545	500.1	76.2	350	19.7	4.88
MOBIL Nichols 75 HP BOILER	PSD	MOBIL1	398.3	3084.3	-12030	4645	-0.87	4	522	1.8	0.8
MOBIL Nichols CALCINER	PSD	MOBIL2	398.3	3084.3	-12030	4645	-13.89	28.4	340	19.24	1.09
MOBIL Nichols DRYER 4	BOTH	MOBIL3	398.3	3084.3	-12030	4645	2.44	25.9	339	16.05	2.29
MOBILE Electrophos 400HP BOILER	PSD	MOBILE1	405.6	3079.4	-4730	-255	-6.53	7.32	464	3.23	0.91
MOBILE Electrophos 600HP BOILER	PSD	MOBILE2	405.6	3079.4	-4730	-255	-10.05	6.1	464	7.71	0.91
MOBILE Electrophos CALCINER	PSD	MOBILE3	405.6	3079.4	-4730	-255	-7.11	25.61	306	6.97	2.13
MOBILE Electrophos COKE DRYER	PSD	MOBILE4	405.6	3079.4	-4730	-255	-3.17	18.29	322	22.87	0.7
MOBILE Electrophos Furnace (31.25TPH Rock@ 0.3%S)	PSD	MOBILE5	405.6	3079.4	-4730	-255	-47.25	29.27	314	8.52	2.13
MOBILE Electrophos ROCK DRYER	PSD	MOBILE6	405.6	3079.4	-4730	-255	-21.81	18.29	350	6.79	1.83
MULBERRY COGENERATION CT	BOTH	MULB1	413.6	3080.6	3270	945	13.4	38.1	377	9.31	1.98
Mulbeerry Phosphates/Royster (1003TPD @29 LB/Ton)	PSD	MULB2	406.7	3085.2	-3630	5545	-152.71	51	356	9.9	2.13
Mulberry Phosphates/Royster (1700TPD @4 LB/Ton)	BOTH	MULB3	406.7	3085.2	-3630	5545	35.7	61	360	12.2	2.13
RIDGE COGENERATION	BOTH	RIDGE1	416.7	3100.4	6370	20745	13.8	99.1	350	14.54	3.05
TECO BIG BEND UNIT 3 (24-HR)	PSD	TECO1	361.9	3075	-48430	-4655	-1218	149.4	418	14.33	7.32
TECO BIG BEND UNIT 4 (U04)	BOTH	TECO2	361.9	3075	-48430	-4655	654.7	149.4	342.2	19.81	7.32
TECO BIG BEND UNITS 1&2 (24-HR)	PSD	TECO3	361.9	3075	-48430	-4655	-2436	149.4	422	28.65	7.32
TECO POLK POWER	BOTH	TECO4	402.42	3067.32	-7910	-12335	0.3	6.1	533	13.1	0.91
TECO POLK POWER	BOTH	TECO5	402.298	3067.297	-8032	-12358	1.27	60.7	1033	9.1	1.1

Table 5-5
Concluded
PSD Class 2 SO2 Source Inventory
Farmland Hydro, L.P. - Green Bay, Florida

SOURCE DESCRIPTION	INVENTORY Designation	Modeling Designation	UTM Coordinates (km)		Stack Centered Coordinates		Emissions	Height	Temperature	Velocity	Dimeter
			EAST	NORTH	EAST	NORTH	(g/s)	(m)	(°K)	(m/s)	(m)
TECO POLK POWER	BOTH	TECO6	402.328	3067.472	-8002	-12183	8.2	60.7	1033	10.7	1.4
TECO POLK POWER	BOTH	TECO7	402.45	3067.35	-7880	-12305	49.68	45.72	400	16.76	5.79
TECO POLK POWER	BOTH	TECO8	402.488	3066.954	-7842	-12701	5.42	22.86	812	27.43	5.49
TECO POLK POWER	BOTH	TECO9	402.016	3067.64	-8314	-12015	0.016	22.9	1000	20	1.2
TECO POLK POWER 4 CC	BOTH	TECO10	402.45	3067.216	-7880	-12439	17.6	45.72	389	16.15	4.42
TECO POLK POWER 5 CT	BOTH	TECO11	402.488	3066.914	-7842	-12741	33.4	22.86	785	31.39	5.49
USS AGRI-CHEM BARTOW DRYER	PSD	USSAG1	413.2	3086.3	2870	6645	-3.41	15.8	332	10.01	1.83
USS AGRI-CHEM BARTOW SAP (800 TPD & 10 LB/Ton)	PSD	USSAG2	413.2	3086.3	2870	6645	-42	28.96	305	7.5	2.12
USSAC FT MEADE GTSP	PSD	USSAC1	416	3069	5670	-10655	-18.27	28.35	330	17.6	1.52
USSAC FT MEADE H2SO4 (1500 TPD @ 10 LB/Ton)	PSD	USSAC2	416.21	3068.74	5880	-10915	-78.8	29	314	6.77	3.02
USSAC FT MEADE H2SO4 1 & 2 (2200 TPD)	BOTH	USSAC3	416.12	3068.62	5790	-11035	92.48	53.4	355	10	2.59

TABLE 5-6
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 ANNUAL(1)	PSD 3-HOUR(2)	PSD 24-HOUR(2)	AAQS ANNUAL(1)	AAQS 3-HOUR(2)	AAQS 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.

6.0 GOOD ENGINEERING PRACTICE STACK HEIGHT

The criteria for good engineering practice stack height in Rule 62-210, FAC, states that the height of a stack should not exceed the greater of 65 meters (213) feet or the height of nearby structures plus the lesser of 1.5 times the height or cross-wind width of the nearby structure. This stack height policy is designed to prevent achieving ambient air quality goals solely through the use of excessive stack heights and air dispersion.

Based on this policy, the limiting height for sources addressed in this application is 213 feet. The Farmland sulfuric acid plant stacks are all less than 213 feet in height above-grade. This satisfies the good engineering practice (GEP) stack height criteria.

7.0 IMPACTS ON SOILS, VEGETATION AND VISIBILITY

7.1 IMPACT ON SOILS AND VEGETATION

The U. S. Environmental Protection Agency was directed by Congress to develop primary and secondary ambient air quality standards. The primary standards were to protect human health and the secondary standards were to:

> "... protect the public welfare from any known or anticipated adverse effects of a pollutant."

The public welfare was to include soils, vegetation and visibility.

As a basis for promulgating the air quality standards, EPA undertook studies related to the effects of all major air pollutants and published criteria documents summarizing the results of the studies. The studies included in the criteria documents were related to both acute and chronic effects of air pollutants. Based on the results of these studies, the criteria documents recommended air pollutant concentration limits for various periods of time that would protect against both chronic and acute effects of air pollutants with a reasonable margin of safety.

The air quality modeling that has been conducted as a requirement for the PSD application demonstrates that the levels of SO2 expected in the vicinity of the proposed project are below the ambient air quality standards. As a result, it is reasonable to conclude that there will be no adverse effect to the soils, vegetation or visibility of the area.

The Farmland plant property and the surrounding areas are comprised of mining lands (phosphate), flatwoods, marshes, and sloughs. The soils of the area are primarily sandy and are typically low in both clay and silt content. These characteristics and the semi-tropic climatic factors of high temperature and rainfall are the natural factors which determine the terrestrial communities of the region.

The land in the vicinity of the Farmland plant supports various plant communities. Much of the natural vegetation on the site and the surrounding areas has been altered due to mining and industrial use; primarily the phosphate fertilizer industry. As a result of mining and industrial activity, there is very little undisturbed land in existence in the vicinity of the plant. As a result, no adverse impacts from the proposed project are expected on the soils and vegetation in the vicinity of the facility.

7.2 GROWTH RELATED IMPACTS

The proposed modification will require no increase in personnel to operate the facility. Also, the increase in sulfuric acid production may cause a slight increase in delivery truck tanker traffic but will have a negligible impact on traffic in the area as compared with traffic levels that presently exist. Therefore, no additional growth impacts are expected as a result of the proposed project.

7.3 VISIBILITY IMPACTS

The proposed project will result in an increase in air emissions and therefore has the potential for adverse impacts on visibility.

A screening approach suggested by EPA (Workbook for Plume Visual Impact Screening and Analysis, 1988) and computerized in a model referred to as VISCREEN was used for the analysis. The emissions of acid mist and nitrogen oxides were input to the model. In the case of sulfur dioxide however, EPA has noted in discussions on visibility models that the sulfates formation resulting from sulfur dioxide emissions becomes a factor beyond 200 kilometers and so the sulfur dioxide emissions were not included in the analysis. The VISCREEN - Level 1 modeling results, presented in Table 7-1, indicate that there will be no adverse visibility impacts from the proposed project.

7.4 IMPACTS ON AIR QUALITY RELATED VALUES FOR CLASS I AREA

The analysis addressed in this section addresses the review of the impact of increased emissions on air quality related values associated with the Chassahowitzka Wildlife Refuge, a Class I area located in excess of 100 kilometers northwest of the Farmland plant.

7.4.1 Impact on Vegetation

The response of vegetation to air pollutants is influenced by the concentration of the pollutant, the duration of the exposure and the frequency of the exposure. The pattern of exposure expected from a single facility is that of a few episodes of relatively high concentrations interdispersed with long periods of no exposure or extremely low concentrations. This is the pattern of exposure that would be expected from SO2, NOx and SAM emissions from the proposed project impacting the Class I area.

Vegetation responds to a dose of an air pollutant with a dose being defined as the product of the concentration of the pollutant and the duration of the exposure. The impact of the S02 emissions on Chassahowitzka regional vegetation was assessed by comparing pollutant doses that have been projected with air quality modeling to threshold doses reported in the literature.

S02 damage to vegetation can be grouped into two general categories: acute and chronic. Acute damage is caused by short-term exposure to relatively high concentrations of S02. This damage is usually characterized by a yellowing of leaf tips with a sharp, well defined separation between the damaged and healthy areas of a leaf. In pine trees, injury usually first occurs at the base of the youngest needles (the newest tissue on the plant).

Damaged plants typically show decreased growth and yield. These effects vary widely between species but studies have shown a rough correlation between the loss and yield and the exposure dose. These studies showed approximately a 10 percent yield loss for each 10-fold increase in S02 dose beyond 260 micrograms per cubic meter-hour.

Susceptibility to acute damage varies widely with plant species and also with the time of exposure. For example, alfalfa can tolerate 3250 micrograms per cubic meter for one hour (3250 micrograms per cubic meter-hour dose), but only 1850 micrograms per cubic meter for two hours (3700 micrograms per cubic meter-hour dose). Table 7-3 shows the sulfur dioxide concentration/time thresholds for several plant species common to Florida.

The vegetation in the Chassahowitzka area is characterized by flatwoods, brackish-water, marine and halothytic terrestrial species. Predominant tree species are slash pine, laurel oak, sweet gum and palm. Other plants in the area include needlegrass rush, seashore saltgrass, marsh hay and red mangrove.

A study of the tolerance of native Florida species to S02 (Woltz and Howe, 1981) demonstrated that cypress, slash pine, live oak and mangrove exposed to 1300 micrograms per cubic meter of S02 for 8-hours were not visibly damaged. This is consistent with the results reported in Table 7-3. Another study (McLaughlin and Lee, 1974) demonstrated that approximately 20 percent of a broad range of plants ranging from sensitive to tolerant were visibly injured when exposed to a S02 concentration of 920 micrograms per cubic meter for a 3-hour period.

Acute injury results from a plants inability to quickly convert absorbed SO2 into the sulfate ion; an essential nutrient to plants. Chronic injury, on the other hand, results from a build-up of sulfate in tissue to the point where it becomes toxic. This sulfate build-up occurs over a relatively long period of time. Symptoms include a reduction in chlorophyll production resulting in decreased photosynthesis and yellow or reddish areas on leaves in a mottled pattern. In pines, sulfate injury is typically shown first at tips of older needles (the oldest tissue in the needle).

Chronic injury can result from SO2 exposures that are much lower than is required for acute injury. Unfortunately, there is a lack of quantitative experimental data for long term effects of SO2 exposure. The lowest average concentration for which chronic injury has been shown is 80 micrograms per cubic meter. The Environmental Protection Agency has therefore established an ambient air quality standard of 80 micrograms per cubic meter, annual average. The Florida Department of Environmental Protection adopted a more conservative standard of 60 micrograms per cubic meter, annual average. Although the predicted maximum impacts exceed the Class I PSD increments, the SO2 impacts from the proposed project are expected to be well below the ambient air quality standards (see Table 5-6).

The maximum expected concentrations of acid mist in the Chassahowitzka area resulting from the increased emissions from Farmland will be less than four percent of the expected sulfur dioxide impacts. Furthermore, it would be expected that by the time acid mist droplets have traveled over 100 kilometers from Farmland to the Chassahowitzka area, the droplets may react with particles in the atmosphere to produce a sulfate salt.

Salt deposition concentrations in coastal areas are in the range of 25-300 pounds per acre per year and may be as high as 4000 pounds per acre per year on exposed shorelines. Sulfates can account for 5 - 6 percent of the total salt; resulting in a deposition rate in the range of 1-200 pounds per acre per year.

One study (Mulchi Armbruster, 1975) demonstrated leaf damage in reduced yields in corn and soybeans with a salt deposition of 169 - 339 pounds per acre per year. Another study (Curtis, 1975) reported that broad leaf plants absorbed greater amounts of salt than do pines, probably due to leaf shape. It has been found that deciduous trees begin to exhibit adverse effects to salt exposure concentrations in the range of 100 micrograms per cubic meter (DeVine, 1975). The same study reported no observed injury to plants with long-term exposures to salt spray of 40 micrograms per cubic meter.

The sulfate concentrations resulting from acid mist emissions from Farmland are well below concentrations which have been reported to produce vegetation damage.

Given that the maximum predicted Class I area NOx impacts are less than significant, no adverse impact to the Class I area vegetation are expected from the NOx emissions from the proposed project.

7.4.2 Impact on Soils

The major soil classification in the Chassahowitzka area is Weeki Wachee-Durbin muck. This is an euic, hyderthermic typic sufihemist that is characterized by high levels of sulfur and organic matter. This soil is flooded daily with the advent of high tide and the pH ranges between 6.1 and 7.8. The upper level of this soil may contain as much as four percent sulfur (USDA, 1991).

Based upon the expected SO2 and sulfate concentrations in the Chassahowitzka area resulting from the increased emissions from the Farmland plant, it is not expected that there will be any adverse impact on the native soils. A recent study (1994), coordinated by the National Park Service, supports this position.

Given that the maximum predicted Class I area NOx impacts are less than significant, no adverse impact to the Class I area soils are expected from the NOx emissions from the proposed project.

7.4.3 Impacts on Wildlife

As the predicted SO2 and NOx levels are below those known to affect vegetation, the proposed project is not expected to have any adverse impact on the wildlife in the Chassahowitzka area.

7.4.4. Visibility Impairment Analysis

Visibility impairment analysis was performed to determine potential impact of the proposed project in the Chassahowitzka area. The VISCREEN - Level 1 modeling results, presented in Table 7-1, and the regional haze analysis, presented in Table 7-2, indicate that no adverse visibility impacts are expected as a result of the proposed project.

TABLE 7-1

Visual Effects Screening Analysis for
Farmland Hydro, L.P.
Class I Area: Chassahowitzka

```
 User-selected Screening Scenario Results
 Input Emissions for SAP6 - SAP3

    Particulates       .53  G  /S (acid mist)
    NOx (as NO2)       .42  G  /S
    Primary NO2        .00  G  /S
    Soot               .00  G  /S
    Primary SO4        .00  G  /S

Default Particle Characteristics Assumed
Transport Scenario Specifications:

     Background Ozone:                     .04 ppm
     Background Visual Range:            65.00 km
     Source-Observer Distance:          105.00 km
     Min. Source-Class I Distance:      105.00 km
     Max. Source-Class I Distance:      125.00 km
     Plume-Source-Observer Angle:        11.25 degrees
     Stability:   6
     Wind Speed:   1.00 m/s

                             R E S U L T S
________________________________________________

Asterisks (*) indicate plume impacts that exceed screening criteria

          Maximum Visual Impacts INSIDE  Class I Area
           Screening Criteria ARE NOT Exceeded
                                           Delta E      Contrast
                                         ===========  ============
 Backgrnd Theta Azi Distance Alpha Crit   Plume   Crit  Plume
 ======== ===== === ======== ===== ====   =====   ====  =====
  SKY      10.  84.   105.0   84.  2.00    .021    .05   .000
  SKY     140.  84.   105.0   84.  2.00    .004    .05  -.000
  TERRAIN  10.  84.   105.0   84.  2.00    .010    .05   .000
  TERRAIN 140.  84.   105.0   84.  2.00    .002    .05   .000

          Maximum Visual Impacts OUTSIDE Class I Area
           Screening Criteria ARE NOT Exceeded
                                           Delta E      Contrast
                                         ===========  ============
 Backgrnd Theta Azi Distance Alpha Crit   Plume   Crit  Plume
 ======== ===== === ======== ===== ====   =====   ====  =====
  SKY      10.  30.    79.6  139.  2.00    .026    .05   .000
  SKY     140.  30.    79.6  139.  2.00    .005    .05  -.000
  TERRAIN  10.  50.    91.7  119.  2.00    .013    .05   .000
  TERRAIN 140.  50.    91.7  119.  2.00    .003    .05   .000
```

Table 7-2

Regional Haze Analysis For
Farmland Hydro L.P. - Green Bay, Florida
CLASS I CHASSAHOWITZKA N.W.R.

(1) SO2 (µg/m^3)	(2) Background Visibility (km)	(3) Ambient b(ext)a	(4) Acid Mist Impact H2SO4 (µg/m^3)	(5) SO4 (µg/m^3)	(6) (NH4)SO2 (µg/m^3)	(7) Transport Time (hrs)	(8) Conversion
0.0930	65	0.0602	0.00342	0.1395	0.1965	12.96	**34.8%**
(9) AT 34.8% (NH4)SO2 CONVERSION (µg/m^3)	(10) Relative Humidity FACTOR @ 83%	(11) PM-10 (µg/m^3)	(12) Source b(ext)s (NH4)SO2	(13) Source b(ext)s PM10	(14) **Total** Source b(ext)s	(15) Deciview	Is Deciview Greater than 1
0.0684	4.2	0.0000	0.00086	0.00000	**0.00086**	0.1423	NO

(1) Maximum 24-hour SO2 Impact at Class I Receptor (Table 5-2).
(2) Measured Background Visibility Range as recomended by FWS
(3) Ambient b(ext)a = 3.912/Background Visibility
(4) Acid Mist Impact = 0.15/4 * SO2 Impact * 96/98.
(5) SO4 = SO2 Impact * 1.5
(6) 100 % (NH4)SO2 Impact = 1.375 * (SO4 + Acid Mist)
(7) Transport Time (hours) = Maximum Distance / Average daily wind speed - From 1996 Modeling.
(8) Conversion = Transport Time * 0.03 (% / hour) - From 1996 Modeling.
(9) (NH4)SO2 Conversion = % Conversion * (NH4)SO2)
(10) Relative Humidity Factor From Meteorology and Figure B-1 IWAQM
(11) Maximum 24-hour PM10 Impact at Class I Receptor. (None)
(12) Source b(ext)s (NH4)SO4 = 0.003 * Relative Humidity Factor * (NH4)SO4
(13) Source b(ext)s PM10 = 0.003 * Relative Humidity Factor (1) * PM10
(14) Total Source b(ext)s = b(ext)s (NH4)SO4 + b(ext)s PM10
(15) Deciview = 10 * LN [1 + (Total b(ext)s / b(ext)a)]

TABLE 7-3

SENSITIVITY OF VEGETATION TO SULFUR DIOXIDE

CONCENTRATION - TIME EXPOSURES TO SULFUR DIOXIDE RESULTING IN DAMAGE TO SEVERAL SPECIES COMMON TO FLORIDA

Sensitive Plants

Poplar
Lombardy Poplar
Black Willow
Elm
American Elm
Southern pines
Red Oak
Black Oak
Sumac
Radish
Cucumber
Squash
Bean
Pea
Soybean
Cotton
Eggplant
Celery
Cabbage
Broccoli
Spinach
Wheat
Begonia
Zinnia
Rubber plant
Bluegrass
Ryegrass

Intermediate Plants

Basswood
Red Oxier Dogwood
Maples
Red Maple
Elm
Pine
White Oak
Pin Oak
Yellow Poplar
Sweetgum
Locust
Eastern Cottonwood
Saltgrass
Cucumber
Tobacco
Potato
Virginia creeper
Rose
Hibiscus
Gladiolus
Honeysuckle
Wisteria
Chrysanthemum

Tolerant Plants

Juniper
Ginkgo
Dogwood
Oak
Live Oak
Pine
Sumac
Cantaloupe
Corn
Lily
Gardenia
Citrus
Celery

(Continued)

TABLE 7-3 (CONTINUED)

Exposure Time, Hours	Concentration Needed to Produce Injury ($\mu g/m^3$)		
	Sensitive	Intermediate	Tolerant
0.5	2,620 - 10,480	9,170 - 31,440	>26,200
1.0	1,310 - 7,860	6,550 - 26,200	>20,960
2.0	655 - 5,240	3,930 - 19,650	>15,720
4.0	262 - 2,620	1,310 - 13,100	>10,480
8.0	131 - 1,310	524 - 6,550	> 5,240

8.0 CONCLUSION

It can be concluded from the information in this report that the proposed construction of SAP6 and the shutdown of SAP3, as described in this report, will not cause or significantly contribute to an exceedance of any air quality standard, PSD increment, or any other provision of Chapter 62, FAC.

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APPENDIX A - EMISSION RATE CALCULATIONS

APPENDIX A - EMISSION RATE CALCULATIONS

1.0 PERMITTED SAP3 EMISSION RATES

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

ACID MIST = 13.1 lbs/hr
(SAM) 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 SAP3 EMISSION RATE CALCULATIONS

Sulfuric acid plant emissions were estimated using December 29, 1996 compliance test results and 8,760 as the representative annual hours of operation. Sulfur system emissions assumed to be same as above.

SO2 = 276.1 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 1209.4 TPY

SAM = 9.1 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 39.9 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 = 1791 tpd x 1 day/24 hrs x 0.12 lb/ton
= 9.0 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 39.2 TPY

3.0 PROPOSED SAP6 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 H2SO4 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)				
	No.3 (Actuals)	No.6 (Proposed)	SULFUR SYSTEM (Net)	CONTEMPORANEOUS	NET
SO2	1209.4	2007.5	1.8	0	799.9
SAM	39.9	75.3	0	0	35.4
NOx	39.2	60.2	0	38.7	59.7
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

APPENDIX B - MODELING OUTPUT ON DISK

THE FOLLOWING SIA FILES ARE PROVIDED:

```
F2ASI87  OUT        201,211 11-08-97    SO2 CLASS 2 AND FAAQS SIA FOR 1987
F2ASI88  OUT        201,211 11-08-97    SO2 CLASS 2 AND FAAQS SIA FOR 1988
F2ASI89  OUT        201,211 11-08-97    SO2 CLASS 2 AND FAAQS SIA FOR 1989
F2ASI90  OUT        201,211 11-08-97    SO2 CLASS 2 AND FAAQS SIA FOR 1990
F2ASI91  OUT        201,211 11-08-97    SO2 CLASS 2 AND FAAQS SIA FOR 1991

C2NX87   OUT        114,765 11-09-97    NOX CLASS 2 AND FAAQS SIA FOR 1987
C2NX88   OUT        114,765 11-09-97    NOX CLASS 2 AND FAAQS SIA FOR 1988
C2NX89   OUT        114,765 11-09-97    NOX CLASS 2 AND FAAQS SIA FOR 1989
C2NX90   OUT        114,765 11-09-97    NOX CLASS 2 AND FAAQS SIA FOR 1990
C2NX91   OUT        114,765 11-09-97    NOX CLASS 2 AND FAAQS SIA FOR 1991
```

NO SIGNIFICANCE WAS FOUND FOR NOX AT THE PSD CLASS 1 AREA

PSD CLASS 2 AND FAAQS INVENTORIES WERE COMPILED AND APPLIED TO THE RECEPTOR GROUPS THAT DEMONSTRATED SIGNIFICANCE. FOR THE FIVE YEARS MODELED, EACH AVERAGING PERIOD DEMONSTRATED MAXIMUM SIGNIFICANCE AT DIFFERENT RECEPTOR DISTANCES;

3-HOUR & 24-HOUR	8 KILOMETERS
ANNUAL	DISCRETE RECEPTORS

IN THE INCREMENT ANALYSIS FOR THE 3-HOUR AND 24-HOUR AVERAGING PERIOD, ALL DISCRETE RECEPTORS MENTIONED ABOVE WERE USED WITH POLAR RECEPTOR RINGS @ 3000 4000 5000 6000 7000 AND 8000 METERS.

```
FP-2487  OUT        264,685 11-12-97   PSD CLASS 2 FOR 1987
FP-2488  OUT        264,685 11-12-97   PSD CLASS 2 FOR 1988
FP-2489  OUT        264,685 11-12-97   PSD CLASS 2 FOR 1989
FP-2490  OUT        264,685 11-12-97   PSD CLASS 2 FOR 1990
FP-2491  OUT        264,685 11-12-97   PSD CLASS 2 FOR 1991

FQ-2487  OUT        271,663 11-08-97   FAAQS FOR 1987
FQ-2488  OUT        271,663 11-09-97   FAAQS FOR 1988
FQ-2489  OUT        271,663 11-09-97   FAAQS FOR 1989
FQ-2490  OUT        271,663 11-09-97   FAAQS FOR 1990
FQ-2491  OUT        271,663 11-09-97   FAAQS FOR 1991
```

IN THE INCREMENT ANALYSIS FOR THE ANNUAL AVERAGING PERIOD, ONLY THE DISCRETE RECEPTORS MENTIONED ABOVE WERE REQUIRED.

```
FP-AN87  OUT        146,093 11-12-97 PSD CLASS 2 1987
FP-AN88  OUT        146,093 11-12-97 PSD CLASS 2 1988
FP-AN89  OUT        146,091 11-12-97 PSD CLASS 2 1989
FP-AN90  OUT        146,091 11-12-97 PSD CLASS 2 1990
FP-AN91  OUT        146,091 11-12-97 PSD CLASS 2 1991

FQ-AN87  OUT        153,161 11-09-97 FAAQS FOR 1987
FQ-AN88  OUT        153,161 11-09-97 FAAQS FOR 1988
FQ-AN89  OUT        153,161 11-09-97 FAAQS FOR 1989
FQ-AN90  OUT        153,161 11-09-97 FAAQS FOR 1990
FQ-AN91  OUT        153,161 11-09-97 FAAQS 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.

NOVEMBER 12, 1997
MARK KOLETZKE, P.E.
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APPENDIX C - TECHNICAL PAPERS

Comparison of Sulfuric Acid Plant Catalysts

by

Leonard J. Friedman

Acid Engineering & Consulting, Inc.
Lakeland, Florida

Comparison of Sulfuric Acid Plant Catalysts

By

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Lakeland, Florida

Introduction

The contact process for the production of sulfuric acid is based on the oxidation of sulfur dioxide to sulfur trioxide in the presence of a vanadium catalyst. From its beginnings in 1831 when Phillips of Bristol, England patented the oxidation of SO2 to SO3 over a platinum catalyst, to the modern plants of today using high activity, low pressure drop, ribbed rings of vanadium catalyst, the contact process and the catalyst it is based on have undergone significant (but subtle) changes, with the vast majority of developments in the last thirty years.

This paper will review the basic principals of the catalytic sulfuric acid process, and using a summary of operating data compare the three catalysts normally used in North America in the areas of conversion efficiency, activity, ignition temperature, loss in activity over time and screening losses. The paper will also review the advantages and problems with extensive plant converter testing using gas chromatography, Reich or other test methods.

Background

Before 1900, essentially all sulfuric acid was produced by the "Chamber" process, where nitrogen oxides were used to catalyze the oxidation of sulfur dioxide to sulfur trioxide. Plant size was small, unusually less than 50 STPD, and product acid strength limited to 65% to 75% sulfuric acid. The development of the chemical (dye) industry and the need for gun powder in the late 1800's necessitated a process to produce high strength sulfuric acid and Oleum. Early work (1870's - 1910) based on platinum as a solid catalyst, usually as platinum impregnated asbestos gauze, was the first technical and economic application of the "Contact" process. The high cost of platinum and its susceptibility to poisoning by many materials (notably arsenic present in the roaster gas streams of the day), led to the development of vanadium pentoxide based catalysts using alkali metal prompters on a porous silica carrier in the early 1900's (BASF patent of 1913). This is essentially the vanadium based catalyst used today. The following table shows the transition from the Chamber to Contact process:

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 FAAQS, PSD CLASS 2 AREAS
- SIA FOR PSD CLASS I AREA CHASSAHOWITZKA NWR, AND
- ANALYSIS FOR FAAQS AND PSD CLASS 2 AREAS
- BUILDING DOWNWASH PROFILE INPUT PROGRAM (BPIP) FILES.

SO2 ASI ANALYSIS OF CHASSAHOWITZKA NWR PSD CLASS I AREA:

F1ASI	EXE	49,975	11-11-97

SO2 ASI ANALYSIS OF CLASS 2 AREA:

F2ASI	EXE	166,006	11-11-97

NOX ASI ANALYSIS OF CLASS 1 AND CLASS 2 AREAS:

FNX	EXE	107,622	11-11-97

ANALYSIS OF PSD CLASS 2 AND FAAQS AREA:

C2-INV	EXE	283,756	11-12-97	PSD CLASS 2 AREA
FQ-INV	EXE	295,046	11-11-97	FAAQS AREA

AND:

BPIP-DW	EXE	20,828	11-11-97	BUILDING DOWNWASH CALCULATIONS

TO UNARCHIVE THESE FILES COPY THEM TO A HARD DISK DRIVE AND TYPE THE FILE NAME. FOR EXAMPLE TO UNARCHIVE THE SO2 ASI CLASS 2 ISCST3 OUTPUT FILES, TYPE "ASI-C2" 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;

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

F1ASI87	OUT	50,072	11-08-97	SO2 CLASS 1 SIA FOR 1987
F1ASI88	OUT	50,087	11-08-97	SO2 CLASS 1 SIA FOR 1988
F1ASI89	OUT	49,997	11-08-97	SO2 CLASS 1 SIA FOR 1989
F1ASI90	OUT	49,997	11-08-97	SO2 CLASS 1 SIA FOR 1990
F1ASI91	OUT	50,087	11-08-97	SO2 CLASS 1 SIA FOR 1991

C1NX87	OUT	33,380	11-09-97	NOX CLASS 1 SIA FOR 1987
C1NX88	OUT	33,395	11-09-97	NOX CLASS 1 SIA FOR 1988
C1NX89	OUT	33,305	11-09-97	NOX CLASS 1 SIA FOR 1989
C1NX90	OUT	33,305	11-09-97	NOX CLASS 1 SIA FOR 1990
C1NX91	OUT	33,395	11-09-97	NOX CLASS 1 SIA FOR 1991

POLAR RECEPTORS ARE CENTERED AT UTMS X=410,330 METERS EAST Y=3074,655 METERS NORTH ON SULFURIC ACID PLANT NUMBER 5

Transition to the Contact Process

	1910	1930	1950	1960	1980
Contact Process %	20	27	75	85	100
Chamber Process %	80	73	25	15	0

Vanadium Catalyst

Vanadium catalyst usually contains 6% - 9% vanadium pentoxide with alkali metal promoters. The promoters are potassium sulfate with an atomic ratio of potassium to vanadium of 2 - 4 and a small amount of sodium sulfate to adjust (lower) the eutectic melt temperature of the mixture. The active components are supported on a highly porous silica base (diatomaceous earth).

In 1948 Topsoe & Nielsen demonstrated catalyst at operating temperatures exists as a melt within the pores of the silica support. The melt consists of vanadium sulfur complexes dissolved in pyrosulfates. In other words, the oxidation of sulfur dioxide to sulfur trioxide is a homogeneous reaction in the liquid film covering the surfaces of the support and not the heterogeneous reaction it would appear to be. The activity of the catalyst is from active species of vanadium pentoxide (V2O5), with the mechanism involving changes in the valence of vanadium.

The reaction rate is the result of many factors, including; the solubility of SO2, SO3 and oxygen in the melt, mass transfer limitations, the concentration of the active catalyst components and their solubility's in the melt, the porosity and pore size distribution of the silica support, as well as other less obvious factors (manufacturing process, etc.). The effect and interaction of each variable is not completely defined, so changes leading to improvements are more by trial and error than science. The difference between conversion predicted by rate equations and conversion actually obtained is accounted for by adding a so called "catalyst effectiveness factor" or fudge factor to the rate equation. The reaction rate can be described by the following relationship:

$$r = k\,[p(SO2)^{l}\,p(O2)^{m}\,p(SO3)^{-n}]\ K\ \text{act}\ \ K\ \text{eff}$$

r = reaction rate - g mole SO2/g catalyst, sec
k = rate constant - function on catalyst properties
$p()^{x}$ = partial pressure of components
K act = adjustment factor for catalyst activity
K eff = adjustment factor for system unknowns

The acknowledgment of the reaction taking place in the liquid melt leads to an understanding of catalyst ignition temperature as the temperature at which the melt first forms. The decrease in activity at low temperature is explained by the precipitation of some of the vanadium compounds reducing the concentration of the vanadium in the melt. The loss in catalyst activity at high temperature is attributed to the melt exceeding the capacity of the catalyst pores, with the liquid melt forming large inactive globules. The "old wives tale" of catalyst having a memory - once operated at high temperature, it must always be operated at high temperature - is explained by the loss in activity from melt components flowing out of the catalyst.

Sulfur dioxide to sulfur trioxide equilibrium is determined by the following equation:

$$Kp = \frac{p(SO3)}{p(SO2)\ p(O2)^{.5}}$$

A typical equilibrium curve showing operating lines for a four bed single or double absorption system is shown in Figure 1. The figure shows the change in the equilibrium curve resulting from the removal of SO3 in the interstage absorber (upper equilibrium line), and the reason the double absorption process increases conversion of SO2 to SO3 from 98.5% to 99.7%.

A review of the equilibrium equation indicates increasing pressure will increase equilibrium conversion. Figure 2 shows the effect of increasing pressure. In the example shown, increasing pressure from 1.3 bar (3.8 psi) to 10 bar (127 psi) will increase equilibrium conversion in a first catalyst stage from 63% to 75%. In the late 1960's, I did extensive work developing and evaluating a pressure process for sulfuric acid production - looking at single absorption at pressure versus double absorption. The conclusion of that work indicated double absorption could not be avoided at reasonable pressures to meet 99.7% conversion, eliminating the pressure process from economic consideration. In the mid 1970's, Krebs built a plant at PCUK in France based on the pressure process. The plant was a double absorption unit operating at 70 psi. Analysis indicated capital cost savings compared to the conventional double absorption route to be small (< 10%), with the plant experiencing extremely high corrosion and low energy efficiency.

Another route to increased conversion is to increase the oxygen concentration in the converter gas by using enriched air or pure oxygen. Analysis indicates improved conversion efficiency, but not enough to eliminate double absorption. A process using pure oxygen was evaluated in the late 1960's as an alternate to double absorption. The system was not economically sound due to the continuing cost of oxygen. No plants based on pure oxygen have been built. A number of spent acid regeneration plants use enriched air to overcome capacity limitations in the gas cleaning sections of the plant, and oxygen use to enrich the gas in the contact section is being used in a few places. The cost is a balance of the need for additional capacity versus the continuing cost of oxygen.

Catalyst Shape and Composition

In the 1960's and early 1970's catalyst was in the form of pellets, usually 1/4" and 5/32" diameter by 0.3" to 0.6" long (6 mm & 4 mm diameter by 8 mm - 15 mm long). The catalyst normally contained 6% to 8% V2O5, and was sold in North America by many vendors:

Stauffer
Cyanamid
BASF
Catalyst & Chemicals

Allied
Monsanto
Topsoe
Imperial Smelting

In the mid to late 1970's lower pressure drop through the catalyst bed was achieved by the use of a larger diameter pellet, 8 mm in diameter or 5/16" rather than 6 mm diameter.. This size pellet was heavily promoted by Monsanto as 516 catalyst. At about the same time Topsoe introduced the ring shape catalyst to the North American market. Topsoe claimed significantly lower pressure drop and greater dust holding capacity. Initial installations used ring catalyst to top off the pellets in the first catalyst bed. Data showed lower initial pressure drop, and lower rate of pressure drop build-up (greater dust holding capacity). Complete first beds of ring catalyst showed acceptable activity and conversion while maintaining the low pressure drop and pressure drop build-up. Ring catalyst allowed an increase in operating time between turnarounds from 12 months to 18 - 24 months. It took a number of years for ring catalyst to be accepted and used in the entire converter. Now the three principal catalyst suppliers to North America (Topsoe, BASF, Monsanto) all offer ring shaped catalyst - with pellet and 516 catalyst essentially obsolete. The most recent change in catalyst shape has been the ribbed ring, offered by Topsoe as "Daisy" and BASF as "Star" rings, providing about 20% lower pressure drop than the normal 10 mm rings.

In addition to catalyst shape changes, in the last twenty years catalyst composition changes have provided improved performance permitting 99.7% conversion in a double absorption plant with increasing SO2 gas strengths (9.5% - 10% in the 1970's to 11.5% - 11.75% today). A catalyst with 6% - 8% V2O5 is used in the first and second beds of the converter to attain resistance to activity loss at high temperature and maintain high temperature strength (reduced screening loss). The lower vanadium content - lower activity is offset by the higher average operating temperature of the upper beds, resulting in a high reaction rate and acceptable catalyst loading and approach to equilibrium. A catalyst with 7% to 9% V2O5 is used in the third and fourth catalyst beds to provide higher activity, lower ignition temperature and high reaction rate at the lower average operating temperature. The higher vanadium, lower bed catalyst has 10% to 20% greater activity than the 6% - 8% V2O5 upper bed catalyst.

The most recent catalyst development (re-invention of a 1948 discovery) is the so called "Cesium Catalyst". Cesium catalyst is really a 6% - 8% V2O5 catalyst with the formulation adjusted by substituting cesium for a portion of the potassium promoter. The use of cesium doubles the activity of the catalyst in the low temperature region, permitting continuous operation at bed inlet temperatures in the 720 F - 730 F region. The high cost of cesium promoted catalyst (about 2.5 times standard catalyst) limits its use to special applications.

The various catalyst shapes are shown in Figures 3 and 4. The following tables compare catalyst size and composition.

Shape

		Pellet	Pellet	Ring	Ribbed Ring
Diameter	mm	6	8	10	12
Length	mm	8	12 - 15	9 - 14	10
Pressure Drop	"H2O	1.0	0.9 - 0.95	0.5	0.4

Composition

	V2O5 Content	**Comments**
Upper Bed Catalyst	6% to 8%	High Temperature Operation Hardness & Temperature Resistance
Lower Bed Catalyst	7% to 9%	Low Temperature Operation High Activity - Softer Catalyst
Cesium Catalyst	6% to 8%	High Activity at Low Temperature (720 F) Can be Sticky at High Temperature

Catalyst Operation Analysis

Over the last ten years Acid Engineering & Consulting, Inc. has been involved with the operation of over one-hundred sulfuric acid plants around the world. In many cases data collected included information on various catalysts, including conversion efficiency, ignition temperature, loss in activity, screening loss, pressure drop and pressure drop build-up. A statistical analysis was performed on the data and the resulting observations are presented below. The analysis was made for the three main North America catalyst suppliers, Topsoe, BASF, and Monsanto, identified and supplier "A", "B", and "C". Note: If the analysis is on target, acid plant operators should be able to connect the supplier with their performance data.

Conversion Efficiency - The data suggests little significant difference in overall conversion efficiency between the three suppliers. Conversion efficiency analysis was complicated by many operating plants with more than one manufacturers catalyst in the converter, and many with two or three suppliers catalyst in a particular bed. Although there was some statistical difference, one could not use the conversion efficiency difference to tell which catalyst was in a particular converter.

Loss in Activity - The reduction in activity of a particular catalyst over time was determined by a review of catalyst suppliers activity test results and operating data showing changes in bed inlet and exit temperatures and conversions over time. The results were based on plants operating with high converter inlet SO2 concentrations resulting in bed 1 exit temperatures of 1140 F to 1160 F. The table below summarizes the activity loss over an 18 month to 24 month period for ring catalyst.

Loss in Activity (18 - 24 Months)

	Supplier "A"	Supplier "B"	Supplier "C"
Bed 1	20% - 35%	9% - 12%	9% - 13%
Bed 2	8% - 12%	5% - 8%	5% - 8%
Bed 3	< 5%	< 5%	< 5%
Bed 4	< 5%	< 5%	< 5%

The data indicates supplier "A" upper bed catalyst looses activity at a significantly higher rate than the others, about 2 to 3 times the activity loss between turnarounds. This would suggest a formulation problem resulting in the melt solution leaving the pores of the catalyst when operating at high temperature. The data is consistent over many years, eliminating the possibility of a bad batch or run of catalyst causing the results. In fact, for many years this supplier recommended limiting first bed exit temperature to less than 1125 F.

Screening Loss - Data for screening loss was based on ring catalyst, vacuum screened per suppliers instructions, usually by the same two commercial catalyst screening companies. The wide variation in the data for a particular supplier is attributed to operating time at high temperature, screening rate and the amount of broken pieces returned to the converter.

Screening Loss (% of Bed)

	Supplier "A"	Supplier "B"	Supplier "C"
Bed 1	25% - 40%	10% - 15%	11% - 16%
Bed 2	20% - 30%	9% - 15%	10% - 15%
Bed 3	15% - 20%	8% - 14%	8% - 14%
Bed 4	12% - 17%	8% - 12%	8% - 12%

The data is consistent, indicating a problem with supplier "A" catalyst, especially in the high temperature area, suggesting a formulation problem (high screening loss and loss in activity). The data is from many plants over a number of years with more data points for beds 1 and 2, and limited data for beds 3 and 4.

Pressure Drop Build-up - Data for sulfur burning plants was analyzed to determine differences in the rate of pressure drop build-up over an 18 month operating period between turnarounds. The analysis was complicated by unknown variations in the ash content of the sulfur and the amount of broken pieces returned to the converter after screening. After some adjustment for bed area, gas velocity, etc., the data indicated no significant difference in the rate of pressure drop build-up between the three catalysts.

Comparison Summary

Overall the catalyst comparison indicates supplier "A" has a problem with its upper bed ring catalyst when operated at high gas strength - high temperature (exit temperatures above 1130 F), resulting in excessive loss of activity over time and screening losses two to three times the others. In fact, the high screening loss and subsequent make-up with fresh catalyst obscures the activity loss problem, so overall plant conversion efficiency is maintained. Based on the analysis, supplier "B" and "C" catalyst are close in all aspects studied, with supplier "A" upper bed catalyst of lower overall performance.

Cesium Promoted Catalyst

Cesium promoted catalyst is offered by the three North American suppliers. The high cost, about 2.5 - 3 times conventional catalyst, has limited use to special situations. Cesium catalyst is rarely used in sulfur burning plants, but has found some advantages in spent acid regeneration and metallurgical plants. The catalyst has been used as a top layer of the first catalyst bed to provide operation at 720 F - 730 F, reducing gas heat exchanger requirements, while allowing restart of the plant when the catalyst bed is at 600 F.

Early installations of cesium promoted catalyst experienced severe pressure drop build-up. Pressure drop in some plants increased 30" to 60" H2O in a few months. Investigation indicated the plants experiencing the problem were operating at first bed inlet temperature of 780 F to 820 F, while plants without problems operated at 720 F to 740 F. The operating data indicates the cesium catalyst becomes very sticky at elevated temperatures. Recently, Topsoe has reformulated their cesium catalyst so it can be operated at low or high temperature without the pressure drop build-up problem. The other suppliers are expected to produce an adjusted formulation in the near future.

Converter Testing

Traditionally catalyst performance evaluations are made by reviewing bed inlet temperatures and temperature rise, inlet SO2 gas strength and overall conversion efficiency. Changes in these operating variables, although small from day to day, are good indicators of catalyst bed performance over time. Recently, one catalyst supplier has offered portable gas chromatograph testing of converter systems. The tests provide the composition of gas into and out of each catalyst bed. Comparing actual bed conversion with calculated conversion and equilibrium would be a superior way of determining catalyst activity - performance.

Acid Engineering & Consulting, Inc. has reviewed the results of a number of gas chromatograph tests of converter systems. In most cases, the test data was consistent with evaluations based on traditional methods, and was a useful tool in determining catalyst activity - replacement requirements for an upcoming turnaround. In a number of cases, the test results were obviously incorrect and the interpretation of the results flawed and self-serving. Objectivity comes into question when the one doing the testing is selling catalyst or testing his own catalyst to show how good it is, or how bad a competitors is. In one case, the test data indicated 7% to 8% conversion of SO2 to SO3 in the sulfur furnace - well above equilibrium. This was coupled with extremely low conversion in the first catalyst bed, indicating low catalyst activity and the need for additional replacement catalyst. In another case, a spent acid regeneration plant was experiencing conversion efficiency problems (very low first bed temperature rise) after a major plant modification. The catalyst in the first bed was changed, but the same problem persisted. Gas chromatograph tests (purchased with the replacement bed of catalyst) were run at various O2/SO2 ratios (0.72 to 0.92) and SO2 gas strengths (9.4% - 10.7%). Note: Most sulfur burning plants operate at O2/SO2 ratios of 0.75 to 0.77 and SO2 gas strengths of 11.5% - 11.75%. The test results are summarized below:

Plant Test Data

	Run 1	Run 2	Run 3
O2/SO2 Ratio	0.72	0.86	0.92
Overall Conversion	90.8%	94.2%	95.4%
Bed 1 Catalyst Activity	104%	83%	82%

Note: Catalyst activity dropped 22% between test runs 1 and 3. This was reported as "catalyst activities are in the normal range".

The conclusion presented by the testing company - catalyst supplier was the plant design at 0.75 O2/SO2 ratio and 97% conversion in a single absorption plant was not possible with the catalyst type, volume and O2/SO2 ratio. However, the catalyst supplier - testing company would be happy to study ways to achieve plant conversion and capacity, although they stated "there are no clear cut, low cost ways to do this". Note: Acid Engineering & Consulting, Inc. adjusted plant operating conditions and in four hours the plant was able to meet design capacity at an O2/SO2 ratio of 0.75 with conversion exceeding 98%. In this case, knowledge and experience was able to do what blind or self-serving testing could not do - get the plant operating at or above design without additional catalyst or costly modifications.

Conclusion

This work was intended to provide an understanding of sulfuric acid plant catalysts and to present a comparison of the three catalysts used in North America. Data from many plants over a number of years was reviewed, adjusted and evaluated to obtain comparative catalyst performance. The data indicated suppliers "B" and "C" catalyst to be about equal in each of the areas examined, with supplier "A" catalyst of lower performance (activity loss over time and high screening loss).

If some have a better understanding of sulfuric acid plant converter operation and catalysts, and supplier "A" is encouraged to improve their catalyst, the time and effort spent on this work will have been justified.

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Figure 1

Converter Equilibrium

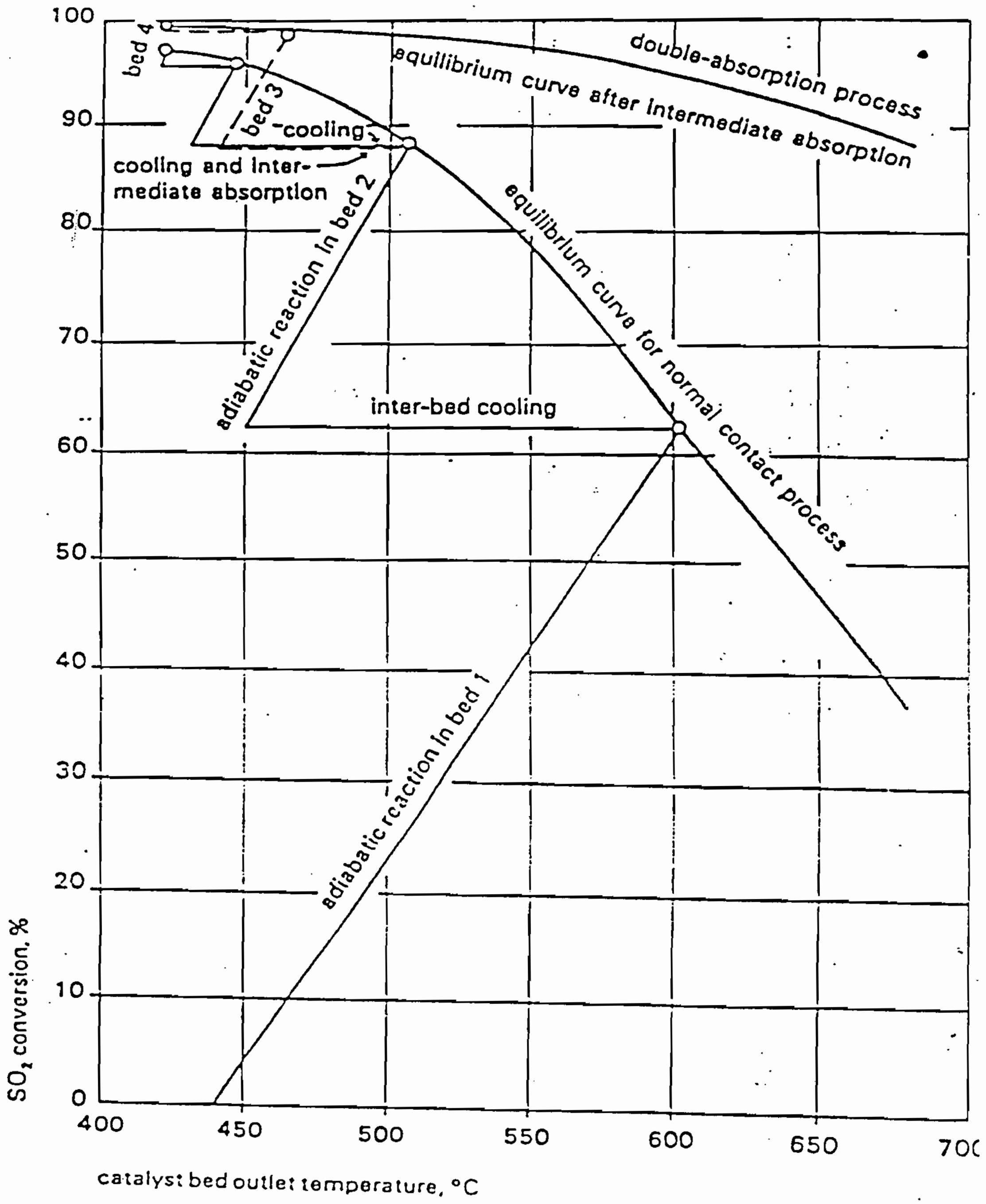

Figure 2

Pressure Effect on Equilibrium

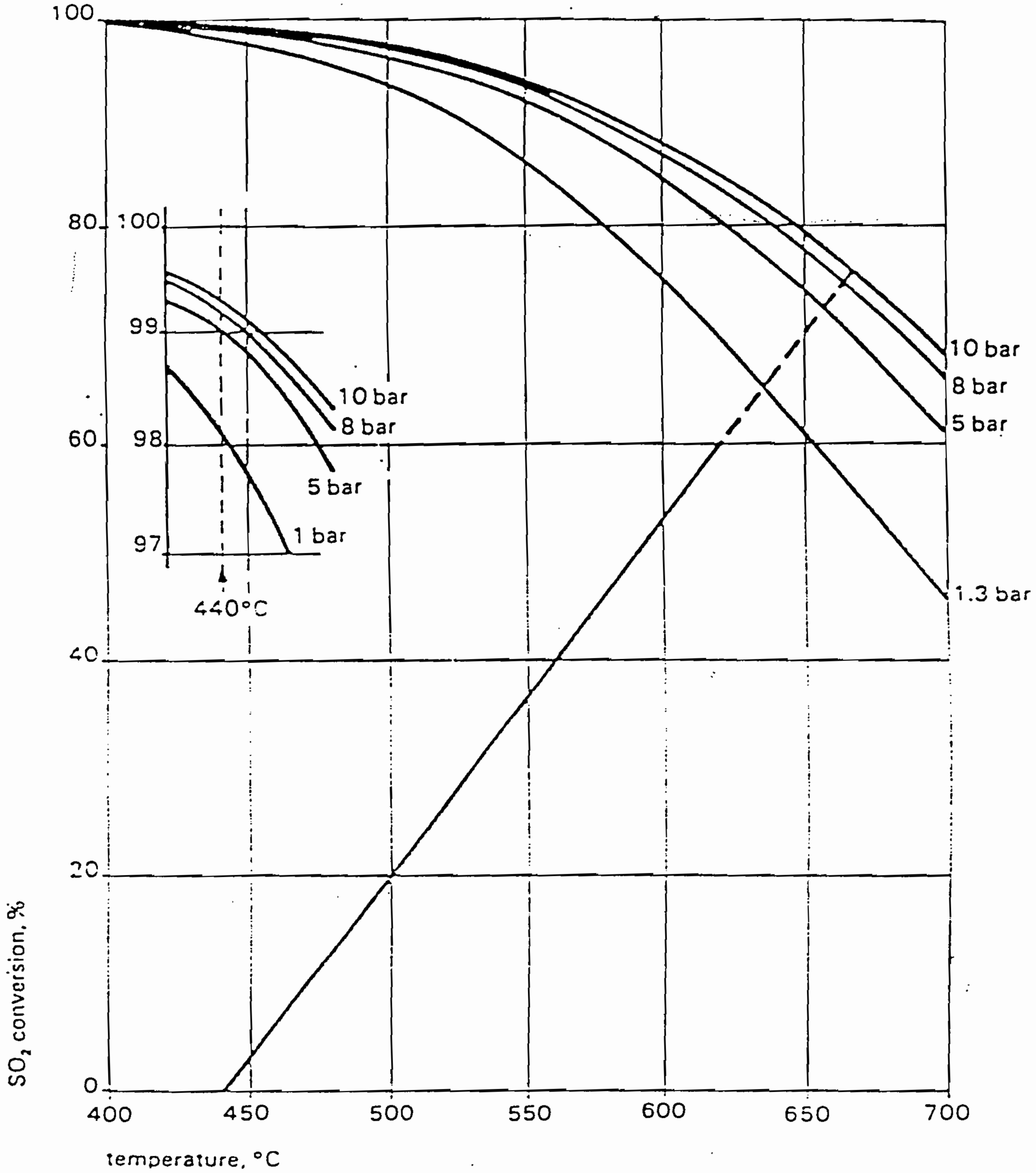

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Figure 3

Catalyst Shapes & Sizes

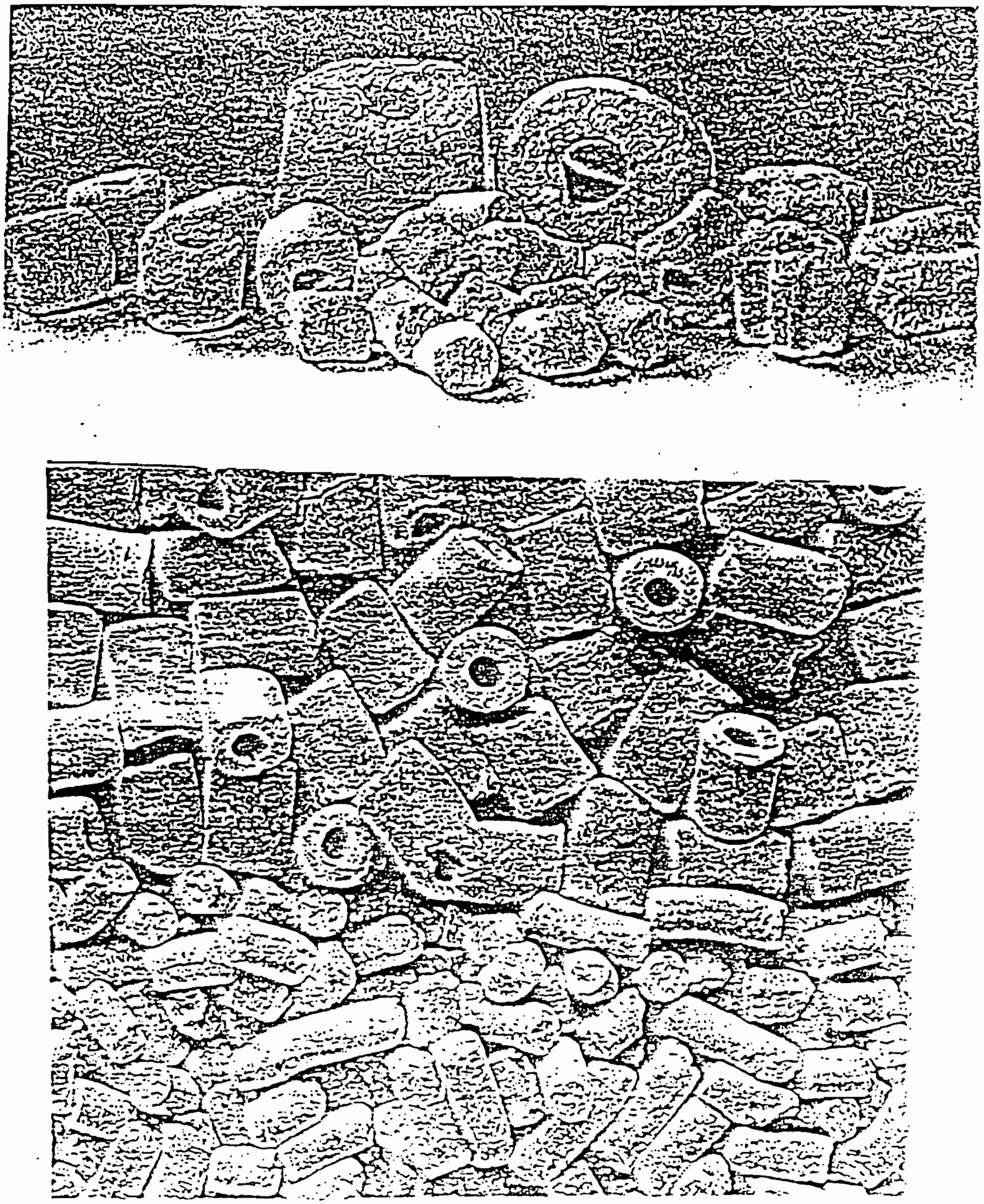
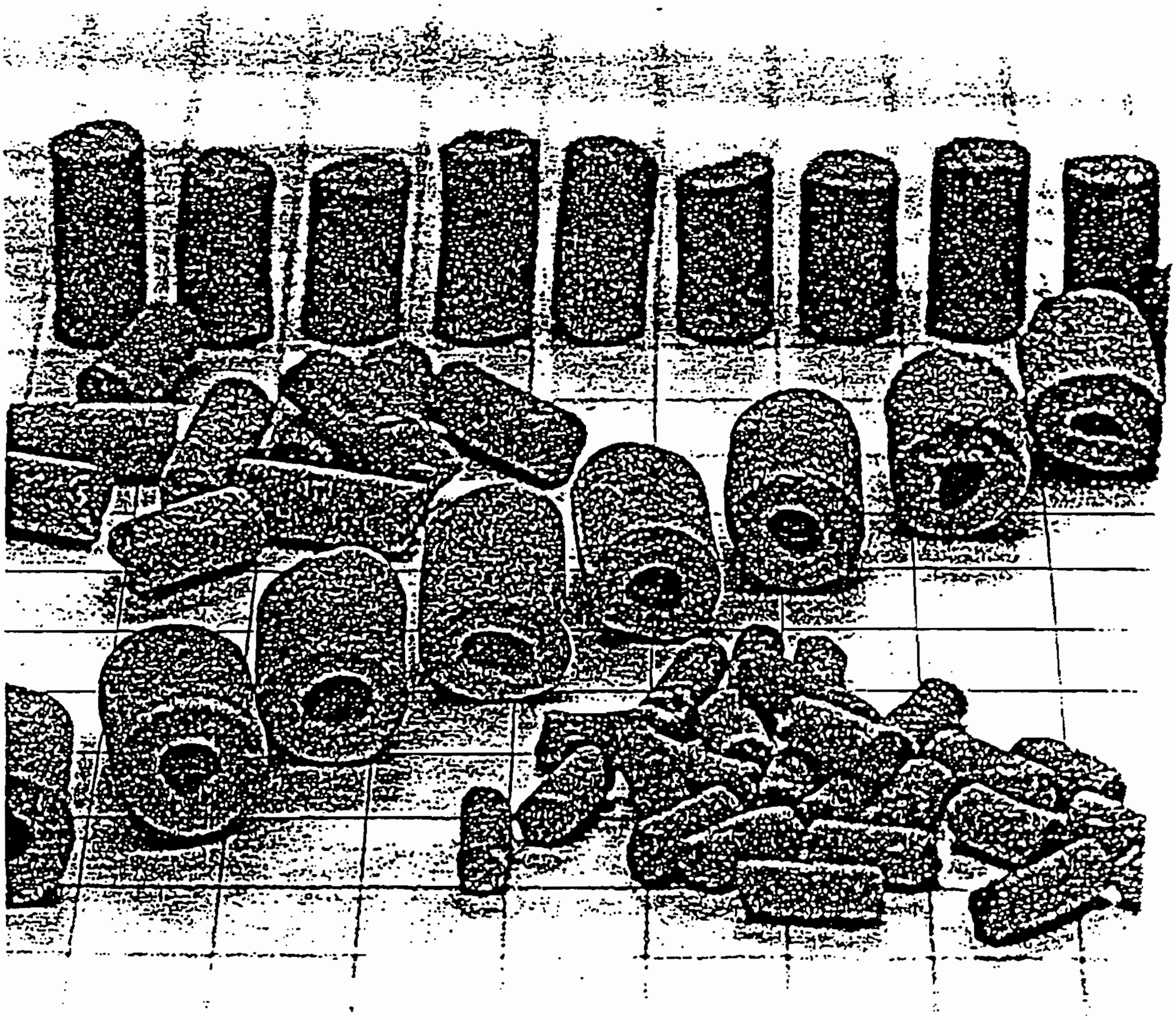


Figure 4

Catalyst Shapes & Sizes



SO_2 EMISSIONS REDUCTIONS IN SULFURIC ACID PLANTS

by

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ABSTRACT

The current trend in the sulfuric acid industry is to reduce the emission of sulfur dioxide (SO_2) to the atmosphere while maintaining or increasing acid production. Utilizing Monsanto cesium-modified catalysts, a number of sulfuric acid producers have effectively reduced their SO_2 emissions in both single absorption and double absorption cases. This paper will present the realized possibilities for the reduction in emissions using Monsanto Cesium Catalyst and the optimization of plant operations utilizing the Monsanto Portable Gas Analysis System (PeGASyS). The portable gas analyzer has served as an invaluable tool to optimize plant operations and demonstrate the advantages of the cesium catalyst in reducing emissions. The utilization of both the Monsanto Cesium Catalyst and the Portable Gas Analysis System in many plant applications will set the new standard for sulfuric converter performance.

INTRODUCTION

The trends in sulfuric acid plant design have changed dramatically over the last several decades. The demand for operations with minimal SO_2 emissions has required the development of the double absorption contact process for SO_2 oxidation which is capable of generating greater than 99.7 % conversion of the sulfur dioxide fed to the plant. Pollution reduction commitments by many major corporations as well as government regulatory requirements are responsible for the continuing trend to develop new and cost effective technologies to further reduce the SO_2 emission levels from sulfuric acid plants.

There are still a large number of sulfuric acid plants in the world which operate in the single absorption mode with SO_2 conversion levels near 98 %. Although these plants are operating within authorized conversion limits, many companies are striving to reduce the SO_2 emissions as much as is technically and economically feasible. Until recently, the technologies to accomplish this goal were limited. Plant operations were "optimized" using crude chemical techniques and often inaccurate temperature measurements, resulting in less than ideal performance in the plants. Over the years, conventional sulfuric acid catalyst improvements have enhanced the plant performance significantly, but further advances were limited by thermodynamic and kinetic barriers.

This paper presents the results of implementing two new technologies in the sulfuric acid industry. Monsanto Enviro-Chem has developed a low temperature cesium-promoted catalyst which eases some of the aforementioned limitations and improves the overall conversion in both single and double absorption plants, resulting in significantly less SO_2 emissions to the stack. A discussion of some case histories of cesium (Cs) catalyst installations and the potential applications of the technology are presented. The second technology developed by Monsanto Enviro-Chem is the Portable Gas Analysis System (PeGASyS) which is used to measure and optimize sulfuric acid plant converter/heat exchanger performance. Using this state-of-the-art instrumentation, plant problems are quickly and easily identified and resolved. Catalyst performance can be quickly determined and optimum operation conditions can be determined based on the catalyst quality and desired conversion results. Examples of the applications of the PeGASyS technology are presented in this paper. When utilized together, the cesium catalyst technology and the PeGASyS system can generate the optimum performance from any sulfuric acid plant and lead to lower SO_2 emissions.

CATALYST DEVELOPMENT AND APPLICATIONS

In the contact sulfuric acid process, there is often an interest in lowering the inlet temperatures to the various adiabatic catalyst beds in order to provide more favorable equilibrium conditions. The addition of cesium (Cs) to the conventional alkali-vanadium sulfuric acid catalyst has long been known to enhance the low temperature properties of the catalyst (1). The cesium salt promoter stabilizes the vanadium +5 oxidation state at temperatures below 420°C (790°F) and keeps the vanadium species solubilized in the melt and available for reaction. In the conventional K-V catalyst, vanadium compounds precipitate out of the molten salt at lower temperatures, causing loss of catalyst activity (2,3). The stabilizing effects of the cesium appear at relatively low Cs concentrations. A qualitative display of this effect is shown in Figure 1. At high temperatures (> 430°C/806°F), the activity of the conventional catalyst and the cesium-promoted catalysts are fairly similar. However, near 410°C (770°F), the reaction rate of the conventional catalyst drops off dramatically due to the precipitation of vanadium compounds (curve breakpoint # 1). As the temperature is further lowered (moving to the right on the graph), the cesium-promoted catalyst maintains a higher reaction rate until the temperature drops well below 400°C (750°F) when its activity finally begins to decline due to vanadium salt precipitation (curve breakpoint # 2). Although the reaction rate of the cesium-promoted catalyst drops off at relatively low temperatures, it is still sufficiently high to generate good conversion at acceptable catalyst loadings. Over the last several years, Monsanto Enviro-Chem has utilized its strong base in cesium catalyst studies (4-7) to develop an optimized and affordable cesium promoted catalyst (Cs-120 and Cs-110). These products contain the optimum levels of alkali metal salts (potassium and cesium) to provide excellent ***low*** and ***high*** temperature performance in the converter. Following extensive lab development and field testing, the products were commercialized in 1989 and have been installed in over 20 sulfuric acid plants worldwide.

There are many applications for the cesium-promoted catalyst in sulfuric acid plants. The smaller 9.5 mm (3/8 in.) Cs-110 rings can be loaded into the lower beds and allow for lower bed inlet temperatures and higher overall conversion. Figure 2 shows a graphical display of the advantage of using the Cs-110 catalyst in the 4th pass of a single absorption plant. The lower inlet temperature with Cs-110 catalyst opens a larger thermodynamic "window" which permits greater overall conversion. This higher level of conversion is not possible with the conventional catalyst at the lower inlet temperature as the catalyst loadings would have to be extremely high, creating excessive pressure drop. A similar scenario can be devised for the lower beds of double absorption plants, resulting in lower stack emissions.

Another cesium-promoted catalyst application involves installing a 33-50 % cap of Cs-120 rings in the first pass of a sulfuric acid plant. This catalyst configuration will dramatically lower the required inlet temperature for good conversion in this bed. Figure 3 shows that the conversion versus bed depth profile for a capped Cs-120 bed with an inlet temperature of 380°C (715°F). A full bed of conventional catalyst will produce very little conversion with this low inlet temperature at any reasonable catalyst loading. A full first bed of Cs-120 rings is not required in this application as the outlet temperature from the cesium catalyst portion of the bed is high enough to ignite the remaining conventional catalyst layer. The lower first pass inlet temperature is advantageous for plants with very high inlet SO_2 strength. In this case, the lower inlet temperature will lead to a lower outlet temperature, therefore extending the life of the first pass exit posts and grids. Furthermore, the overall conversion in the first pass will also be increased over that possible with conventional catalyst. The use of the Cs-120 rings in Pass 1 will also reduce or eliminate the need for startup gas pre-heating in spent acid and metallurgical plants following short shutdowns.

The cesium-promoted catalyst can also be utilized in situations where heat exchanger deficiencies (undersized or plugged) limit the inlet temperatures to lower passes. The Cs-110 rings can effectively operate at the reduced temperatures and hence maintain the needed conversion in the lower beds. Also, the Cs-120 first pass caps and the full beds of Cs-110 in the lower passes can greatly reduce the time required to startup the sulfuric acid plant. The cesium catalyst beds will ignite at much lower temperatures than conventional catalyst beds and hence require less pre-heating. Also, due to the high activity at low temperatures, the cesium catalyst beds help to minimize the stack SO_2 emissions during plant startup operations. Examples of many of these cesium catalyst applications are presented in subsequent sections.

Cs-110/Cs-120 CATALYST APPLICATIONS

The applications of the Cs-110 and Cs-120 catalysts in reducing SO_2 emissions will be presented as a series of case histories. Although the applications vary from plant to plant, the common threads in each case are lower stack emissions and improved operating versatility. The following are five examples of Monsanto cesium promoted catalyst performance: (Note: STPD = Short Tons acid produced Per Day)

Case 1: *Single Absorption Spent Acid Plant*

Pre-Cs Data:

(1) Conventional catalyst in Pass 4.
(2) Pass 4 operating at 430°C (806°F) inlet temperature.
(3) Conversion at 98.0 % with 9 % SO_2 feed gas.
(4) Stack SO_2 emissions were over 25 lbs./STPD.

Post-Cs Information:

(1) Installed full bed of Cs-110 ring in Pass 4.
(2) Pass 4 inlet temperature optimized at 410°C (770°F).
(3) Conversion measured at 98.5 % with 9 % SO_2 fed.
(4) Stack SO_2 emissions at 19 lbs./STPD (24 % reduction).

Case 2: *Single Absorption Sulfur Burning Plant*

Pre-Cs Data:

(1) Aging, conventional catalyst in all beds.
(2) Pass 4 operating at 427°C (800°F) inlet temperature.
(3) Conversion at 97.5 % with 8 % SO_2 feed gas.
(4) Stack SO_2 emissions at 33 lbs./STPD.

Post-Cs Information:

(1) Screened all beds; full fourth pass of Cs-110.
(2) Pass 4 operating at 395-405°C (743-760°F).
(3) Conversion measured at 98.4 % with 8 % SO_2 fed.
(4) Stack SO_2 emissions at 21 lbs./STPD (36 % reduction).

Case 3: *Single Absorption Sulfur Burning Plant*

Pre-Cs Data:

(1) Used conventional catalyst in all five passes.
(2) Pass 5 operating near 430°C (806°F) inlet temp.
(3) Conversion at 98 % (air dilution plant).
(4) Stack SO_2 emissions at 26 lbs./STPD.

Post-Cs Information:

(1) Fresh catalyst in all beds; Cs-110 in Passes 4 and 5.
(2) Passes 4 and 5 operating at 410°C (770°F) inlet temp.
(3) Conversion reaches *99.1* % with 8 % SO_2 fed.
(4) Stack SO_2 emissions at 12 lbs./STPD (*50 % reduction)*.

Case 4: *Double Absorption Spent Acid Plant*

Pre-Cs Data:

(1) Standard catalyst in all beds; 12 % SO_2 gas strength.
(2) Pass 1 at 405°C (760°F); Pass 3 at 400°C (750°F).
(3) Heat exchanger pluggage limited Pass 3 inlet temp.
(4) Pre-heater required, especially after short shutdowns.
(5) Rate reduced to stay with SO_2 stack requirements.

Post-Cs Information:

(1) Cs-120 cap in Pass 1; full 3rd bed of Cs-110 rings.
(2) Pass 1 inlet at 360°C (680°F); outlet at 600°C (1110°F).
(3) Pass 3 operating well at 400°C (750°F).
(4) Need for pre-heater virtually eliminated.
(5) Rate dramatically increased with low SO_2 emissions.

Case 5: *Double Absorption Spent Acid Plant*

Pre-Cs Data:

(1) Used conventional catalyst in all beds; 7 % SO_2 fed.
(2) Pass 3 inlet at 410°C (770°F); heat exchange limits.
(3) Pass 4 inlet at 390°C (735°F) due to low 3rd pass temp.
(4) Emissions high (especially at startup);rate limited.

Post-Cs Information:

(1) Installed full bed of Cs-110 rings in Pass 3.
(2) Pass 3 operating very well at 410°C (770°F) inlet.
(3) Pass 4 operating very well at 425°C (800°F) inlet.
(4) Very low startup emissions; production rate increased; no gas pre-heating required after short shutdown.

Several other applications for the cesium promoted catalyst are under consideration. Scenarios have been developed for increasing the acid production rates for double absorption plants and yet maintaining the same permitted hourly SO_2 emissions. Using Cs-110 rings in the bottom pass of double absorption plants, it is possible to reduce the lbs. SO_2 per ton of acid and hence allowing for greater production at the same SO_2 ppm level in the stack.

In order to take advantage of the benefits of the cesium-promoted Cs-120 and Cs-110 catalysts, there are some considerations that need to be evaluated prior to installation. Firstly, the heat exchange capacity in the plant must be evaluated in order to insure the feasibility of reaching the lower inlet temperatures required for the cesium catalyst beds. Secondly, there may be a greater tendency for pressure drop buildup in first passes equipped with cesium catalyst caps if the incoming gas stream is very dust-laden or contains acid mist. The highly active cesium-promoted catalyst has a more mobile molten salt than that of the conventional catalyst, which has a slightly greater tendency for accumulating incoming converter dust. The larger Cs-120 rings (12.5 mm, 1/2 in.) were developed to minimize the potential pressure drop buildup and yet maintain the required performance. The low temperature benefits of the Cs-120 rings in the first pass must be weighed against the slight possibility of higher pressure drop. Cs-110 applications in all other passes have been in operation for over two years without any indication of pressure drop buildup and/or loss of activity.

Overall, the use of the cesium-promoted catalyst in sulfuric acid converters has contributed to the significant reduction in SO_2 emissions and improved operability of the acid plants.

PORTABLE GAS ANALYSIS SYSTEM *(PeGASyS)*

The Monsanto Enviro-Chem Portable Gas Analysis System was developed several years ago to provide sulfuric acid producers with the means to fully characterize their plant operations. The PeGASyS system consists of a highly specialized gas sampling system and the state-of-the-art gas analyzer. Figure 4 shows a photograph of a portion of the gas analyzer system, including the specially design gas syringe. The analyzer is generally set up near a control room or laboratory and occupies a desk-sized space. A gas sample is taken from a slip stream of gas at the converter, heat exchanger, or absorbing tower pressure tap (or any available sampling port). The gas sample is then injected into the analyzer (state-of-the-art gas chromatograph) which accurately determines the SO_2 and O_2 levels. The PeGASyS method for characterizing the sulfuric acid plant operations is much more reliable and accurate than the standard wet chemical Reich test method. A typical sulfur burning plant can be completely analyzed in only a few hours with the PeGASyS system.

The results obtained with the PeGASyS system consist of an analysis report of the SO_2 and O_2 levels in each sample and a conversion calculation for each specific converter sample based on the inlet gas to the first bed. Figure 5 shows a typical Converter Performance Summary for a sulfur burning double absorption plant. The custom PeGASyS software also calculates gas flow rates based on the given production rates. Utilizing the PeGASyS data, the converter performance can be effectively simulated using the Monsanto Enviro-Chem proprietary modeling software. This information can then be used to optimize the plant operations, adjusting bed inlet temperatures, upgrading catalyst charges to maximize conversion and minimize SO_2 emissions.

Another important application of the PeGASyS system is in gas-gas heat exchanger leak detection. The exchanger must have shell side and tube side gas streams which contain different SO_2 levelsin order for the analysis to be effective. Figure 6 shows the typical output for a heat exchanger analysis. Often, leaking heat exchangers contribute to high SO_2 emissions by bleeding high SO_2 gas directly to the stack or flooding lower pass catalyst beds with SO_2-rich gas. Once the leaking exchanger is identified, it can be repaired, leading to a direct reduction in the stack emissions.

The following are case histories of typical applications of the PeGASyS service to reducing stack emissions:

Case 1: *Spent Acid Double Absorption Plant*

Issue: SO_2 emissions higher than expected.

Result: PeGASyS analysis indicated that the aging first pass was operating at a reduced efficiency. Replacement of the first pass resulted in significant reduction in stack emissions.

Case 2: *Sulfur Burning Double Absorption Plant*

Issue: SO_2 emissions were approaching permitted limit.

Result: PeGASyS analysis indicated a severe leak in the cold heat exchanger. Following exchanger repair, SO_2 emissions decreased from 3.9 lbs./STPD to 2.0 lbs./STPD.

Case 3: *Sulfur Burning Single Absorption Plant*

Issue: Emissions extremely high; poor conversion.

Result: PeGASyS analysis determined that Passes 2 and 3 were performing very poorly. It was determined that low bed inlet temperatures were responsible. Raising the temperatures led to a dramatic reduction in SO_2 emissions. The results also indicated that a 4th pass Cs-110 application was justified. With a full 4th pass of Cs-110 rings, this plant now has extremely low SO_2 emissions.

Case 4: *Spent Acid Double Absorption Plant*

Issue: SO_2 emissions approaching allowed limit.

Result: PeGASyS analysis of the cold heat exchanger identified a minute leak which was allowing some first pass feed gas to bypass directly to the final tower. This leak added over 200 ppm SO_2 to the stack. Repairs to this exchanger resolved the problem.

As can be seen from these examples, the Portable Gas Analysis System is an extremely effective tool for optimizing sulfuric plant operations and reducing stack SO_2 emissions. In a number of cases, the PeGASyS results have led to the installation of Monsanto cesium-promoted catalyst which resulted in the best overall conversion and the lowest level of sulfur dioxide escaping to the atmosphere.

CONCLUSIONS

The effectiveness of the Monsanto Enviro-Chem cesium-promoted catalysts (Cs-120 and Cs-110 rings) in improving sulfur dioxide conversion and reducing stack emissions has been demonstrated in a number of applications. The cesium catalyst can be applied in a variety of situations which can reduce emissions as well as enhance the versatility of the plant operations. In many situations, the catalyst can be used to reduce the impact of heat exchanger limitations. Cesium catalyst effectiveness in both single absorption and double absorption plants has been demonstrated and novel applications are still under development.

The Monsanto Enviro-Chem Portable Gas Analysis System (PeGASyS) has effectively been used in a variety of plants to optimize converter performance and identify problem areas. The results of the gas analyses are often used to identify the most effective applications of the Monsanto Cesium Catalyst in order to minimize SO_2 emissions and maximize converter performance. The use of these products and services allows for not only a positive impact on the environment but also improved performance and profitability for the sulfuric acid producer.

ACKNOWLEDGMENTS

The authors would like to acknowledge and thank David A. Berkel of Monsanto Enviro-Chem Systems, Inc. for developing the Portable Gas Analysis System and refining the unit into an extremely effective tool for our sulfuric acid customers.

The authors would like to acknowledge the St. Louis R&D Team and the Manufacturing Team in Martinez, CA for their work on the cesium-promoted catalyst development.

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Figure 1

SO_2 OXIDATION RATE VERSUS TEMPERATURE

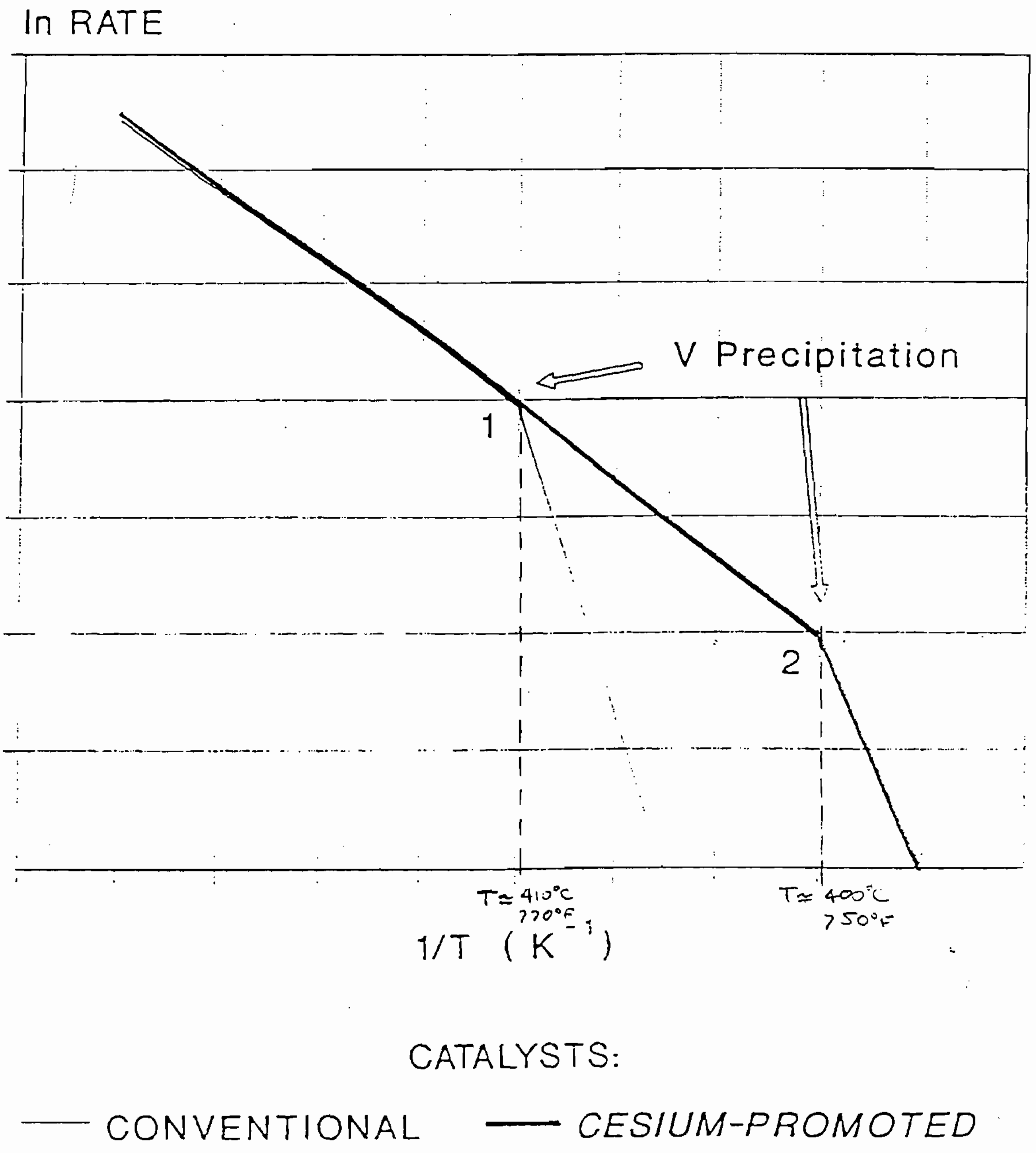
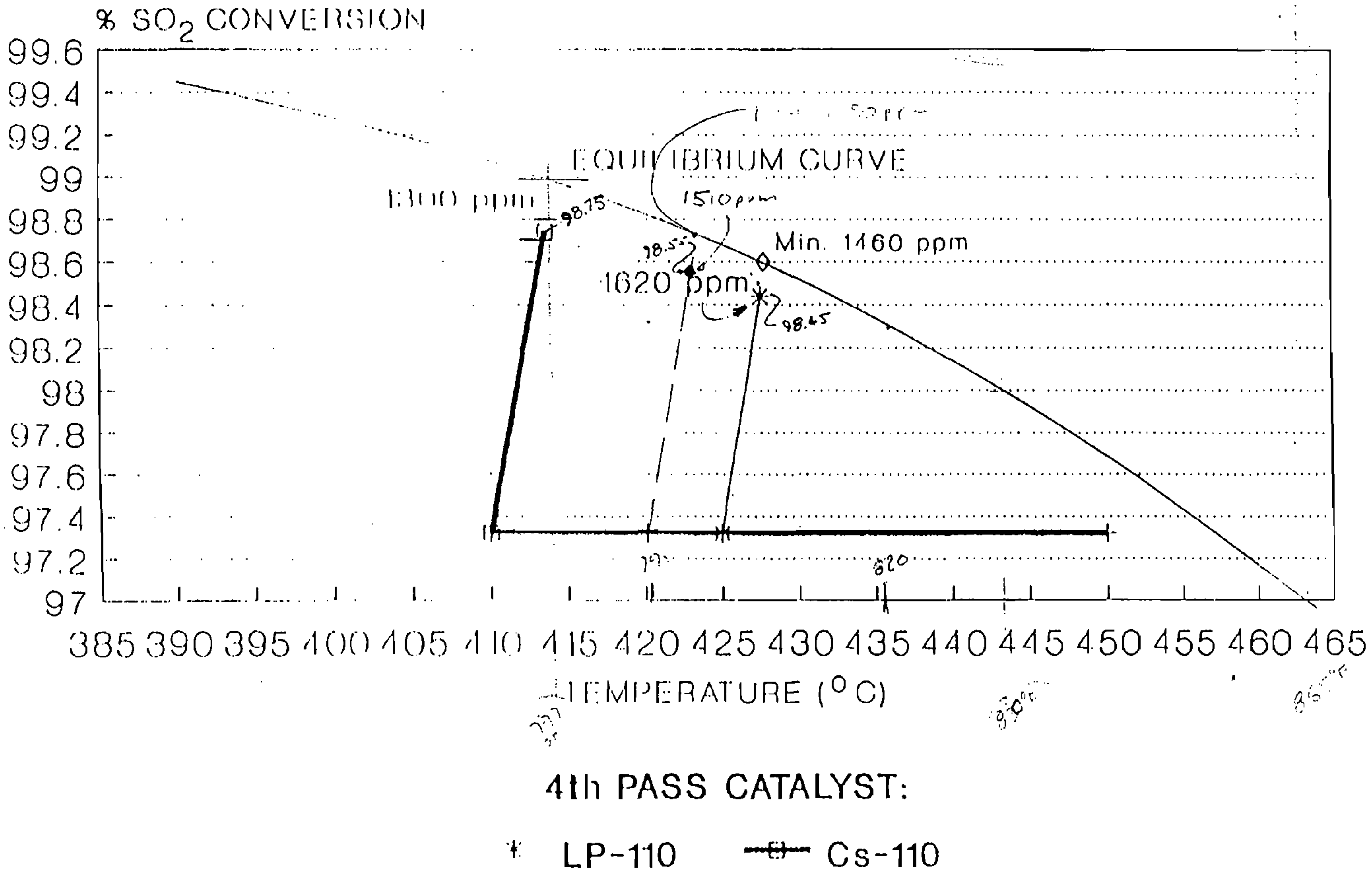


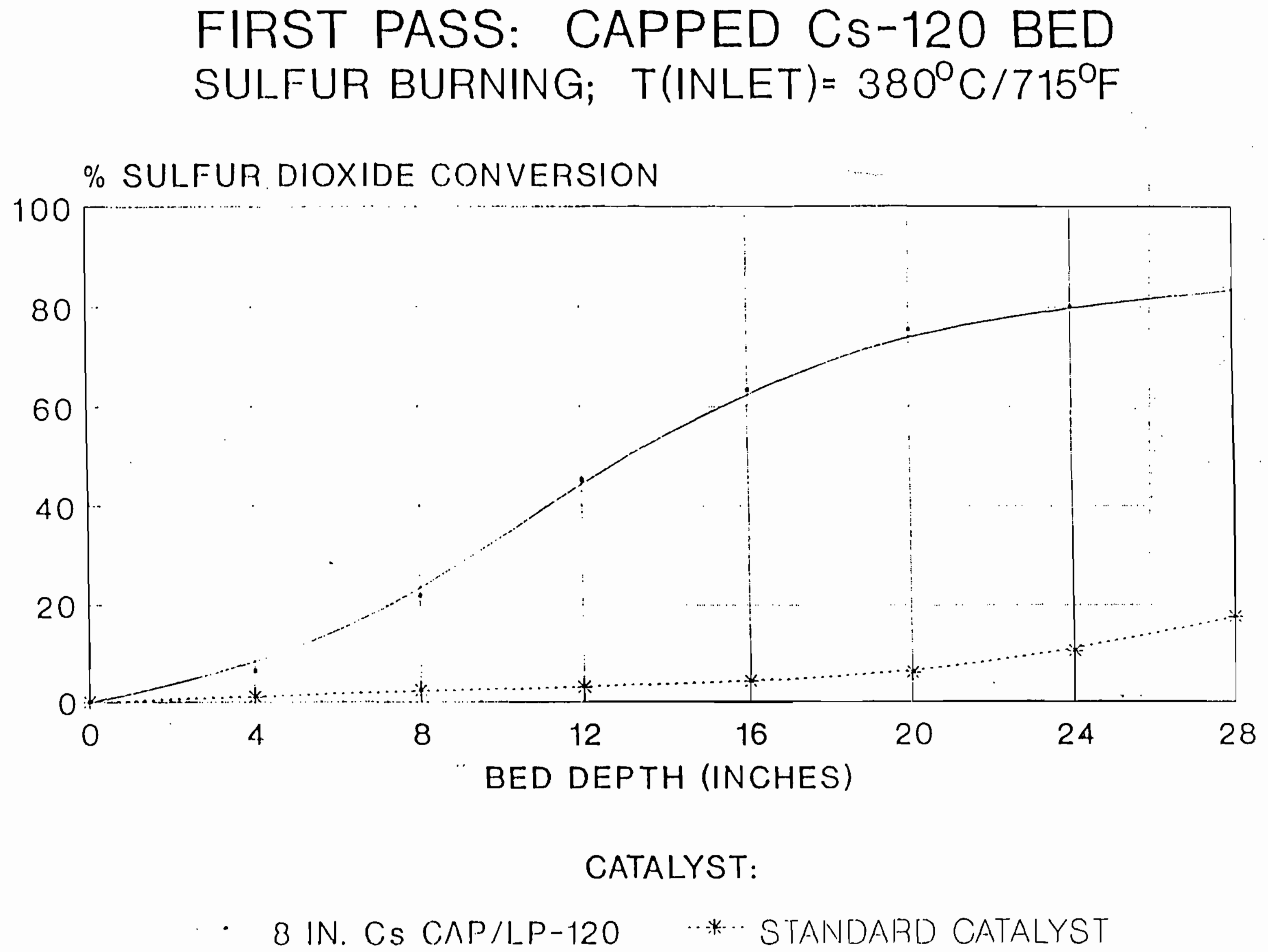
Figure 2 **BEST AVAILABLE COPY**

SINGLE ABSORPTION: Cs ADVANTAGE



FEED GAS = 9 % SO$_2$, 11.9 % O$_2$
410°C = 770°F; 425°C = 797°F

Figure 3

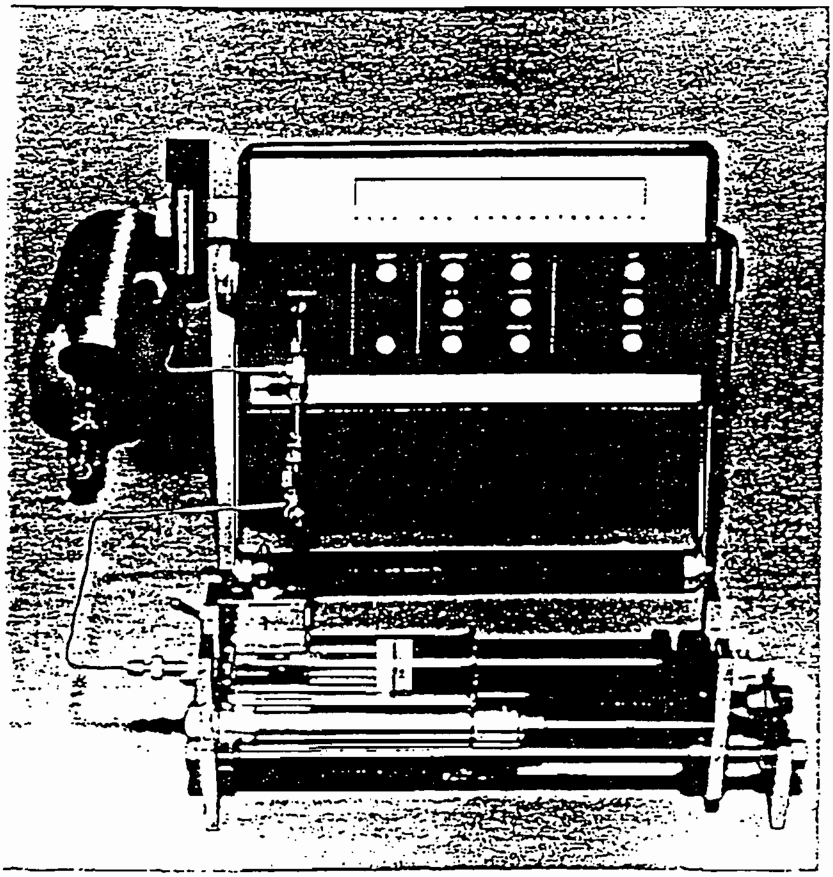


8 IN. Cs-120 CAP ON LP-120 RINGS

Figure 4

PeGASyS

Portable Gas Analysis System



Monsanto Enviro-Chem Systems, Inc.

Figure 5

MONSANTO ENVIRO-CHEM SYSTEMS, INC.

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                        CONVERTER PERFORMANCE SUMMARY

          CUSTOMER NAME:     EXAMPLE 3      DATA FILE: XXX003.SAM

          PLANT LOCATION:    U. S. A.

          PLANT NUMBER:   3

          PLANT TYPE:    SULFUR BURNER       DOUBLE ABSORPTION


SAMPLE        SAMPLE                  DATE / TIME
  NO.    IDENTIFICATION                OF SAMPLE            % SO2        % O2        % CONV.
-------------------------------------------------------------------------------------------

  5   SULFUR BURNER OUTLET          4-1-91     1600        11.209       9.506        1.563
  4   FIRST PASS OUTLET             4-1-91     1600         5.135       6.998       59.394
  3   SECOND PASS OUTLET            4-1-91     1600         2.088       5.638       84.269
  2   THIRD PASS OUTLET             4-1-91     1600         0.911       5.144       93.257
  1   FOURTH PASS OUTLET            4-1-91     1600         0.035       4.771       99.744

                              SULFUR BURNER GAS            11.366       9.580


SAMPLE NO.        SAMPLING POINT
-----------------------------------------------------

    1             OUTLET OF FINAL TOWER ABOVE MIST ELIM.
    2             PASS 4 INLET AT CONVERTER TAP
    3             PASS 3 INLET AT CONVERTER TAP
    4             PASS 2 INLET AT CONVERTER TAP
    5             PASS 1 INLET AT CONVERTER TAP


X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X
X                                                        X                             X
X                              KG/HR.        LBS./HR.    X         CATALYST BED        X
X                            ----------------------     X         TEMPERATURES        X
X  SULFUR FEED RATE           26054.80      57441.31     X         ------------        X
X  SO2 EMISSIONS                133.04        293.30     X L/STPD  BED     °F    °C    X
X                                                        X ------  ---     -     -     X
X  LBS.SO2/TON =    3.35     KG SO2/TON =    1.67        X         1 IN   779   415    X
X                                                        X  31.5   1 OUT 1130   610    X
X                              NM3/HR         SCFM       X          RISE  351   195    X
X                            ----------------------     X         2 IN   824   440    X
X  AIR TO SULFUR BURNER      160139.22      94243.89     X  33.0   2 OUT  986   531    X
X  CONVERTER INLET GAS       160139.22      94243.89     X          RISE  164    91    X
X  CONVERTER OUTLET GAS      132907.50      78217.69     X         3 IN   831   444    X
X  DILUTION AIR                   0.00          0.00     X  38.5   3 OUT  891   477    X
X  TOTAL GAS TO PLANT        160139.22      94243.89     X          RISE   60    33    X
X                                                        X         4 IN   795   424    X
X  PRODUCTION RATE = 2100.00 SHORT TONS PER DAY          X  50.5   4 OUT  844   451    X
X                                                        X          RISE   49    27    X
X                                                        X         5 IN                X
X                                                        X         5 OUT               X
X  NOTE: ALL GAS VOLUMES ARE BASED ON                    X          RISE               X
X        DRY, SO3-FREE GAS.                              X                             X
X                                                        X       TOTAL R  624   346    X
X                                                        X                             X
X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X
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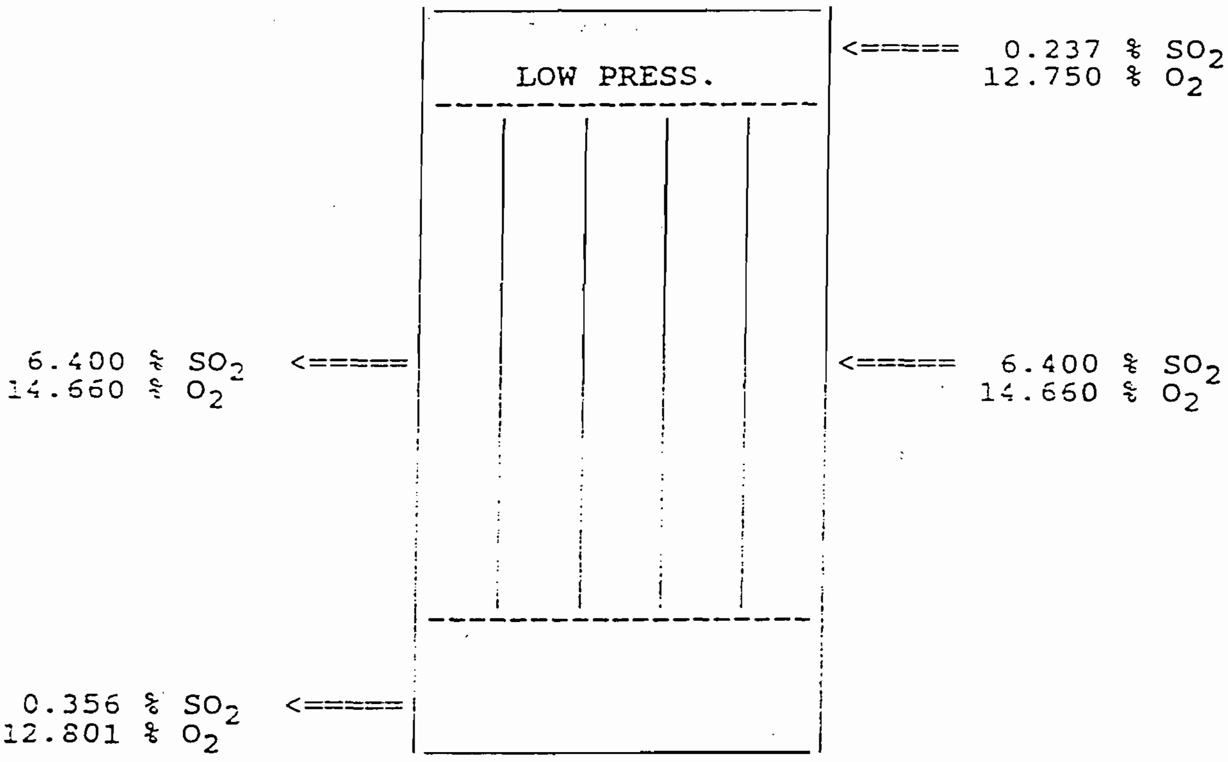
Figure 6

MONSANTO ENVIRO-CHEM SYSTEMS, INC.

HEAT EXCHANGER EVALUATION

DATE / TIME: 4-1-91 / 1500 FILE: INTHEX.HEX
CUSTOMER: EXAMPLE
PLANT LOCATION: U. S. A.
PLANT NUMBER: 1
PLANT TYPE: METALLURGICAL; SINGLE ABSORPTION
HEAT EXCHANGER: INTERMEDIATE HEX



2.0 % OF SHELL SIDE GAS IS LEAKING INTO TUBE SIDE

TUBE SIDE INLET GAS WAS SAMPLED AT:
INLET TO INTERMEDIATE HEX

TUBE SIDE OUTLET GAS WAS SAMPLED AT:
PASS 4 INLET AT CONVERTER

APPENDIX D - CURRENT SAP3 PERMIT

Department of
Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

PERMITTEE:
Farmland Hydro, L.P.
County Road 640 West
Bartow, Florida 33830

Permit Number: AC 53-265755
PSD-FL-225
Expiration Date: Dec. 31, 1996
County: Polk
UTM Coordinates: 17-410.3 km E
17-3079.7 km N
Project: Sulfuric Acid Plant Production Increase

This permit is issued under the provisions of Chapter 403, Florida Statutes; Chapters 62-210, 212, 272, 296 and 297, Florida Administrative Code (F.A.C.); and, Chapter 62-4, F.A.C. The above named permittee is hereby authorized to perform the work or operate the emission unit/source shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department of Environmental Protection (Department) and specifically described as follows:

For the increase in production rate of the Nos. 3, 4 and 5 sulfuric acid plants from a total of 5,640 tons of sulfuric acid product/day to 7,000 tons/day. No major physical changes are required for this modification. The sources are located at the permittee's facility in Bartow, Polk County, Florida.

The modification shall be in accordance with the permit application, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

<u>Attachments are listed below</u>:

1. Application received February 21, 1995
2. Department's letter dated March 22, 1995
3. USDOI's letter dated March 29, 1995
4. Koogler & Assoc. letter dated May 10, 1995
5. Memorandum of Understanding Regarding Best Operational Start-up Practices for Sulfuric Acid Plants, 1989

GENERAL CONDITIONS:

arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

11. This permit is transferable only upon Department approval in accordance with Rules 62-4.120 and 62-30.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit or a copy thereof shall be kept at the work site of the permitted activity.

13. This permit also constitutes:

(x) Determination of Best Available Control Technology (BACT)
(x) Determination of Prevention of Significant Deterioration (PSD)
(x) Compliance with New Source Performance Standards (NSPS)

14. The permittee shall comply with the following:

a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application

GENERAL CONDITIONS:

for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the dates analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and,
- the results of such analyses.

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

SPECIFIC CONDITIONS:

1. Unless otherwise indicated, the subject modification shall be in accordance with the capacities and specifications stated in the application.

2. The maximum production rates for the Nos. 3 and 4 sulfuric acid plants shall be 2,100 tons/day each while that for the No. 5 sulfuric acid plant shall be 2,800 tons/day, based on 100% sulfuric acid (H_2SO_4). [Rule 62-212.200(56), F.A.C.]

3. The Nos. 3, 4 and 5 sulfuric acid plants may operate on a full-time basis (8,760 hours per year). [Rule 62-212.200(56), F.A.C.]

4. Emissions of sulfur dioxide (SO_2), sulfuric acid mist (SAM) and visible emissions (VE) from the Nos. 3, 4 and 5 sulfuric acid plants shall not exceed the following limits [Rule 62-212.410, F.A.C.]:

	SO_2		SAM		VE
Plant	lb/hr	TPY	lb/hr	TPY	%
3	350	1,533	13.1	57.5	10
4	350	1,533	13.1	57.5	10
5	467	2,044	17.5	76.7	10

SPECIFIC CONDITIONS:

5. Before this permit expires, performance testing of emissions from each unit shall be conducted with the emission unit operating at permitted capacity. Permitted capacity is defined as 90-100% of the maximum operating rate allowed by the permit. If it is impracticable to test at permitted capacity, then emission units may be tested at less than 90% of the maximum operating rate allowed by the permit. In this case, subsequent emission unit operation is limited to 110% of the test load until a new test is conducted. Once the emission unit is so limited, then operation at higher capacities (with prior notification provided to the Department) is allowed for no more than 15 consecutive days for the purpose of additional compliance testing to regain the permitted capacity in the permit. [Rule 62-297.340(1)(a), F.A.C.]

6. Performance testing shall be conducted and compliance determined using the test methods and procedures set forth in 40 CFR 60.85(a) through (c). Pursuant to Rule 62-297.340(1)(i), the Department's Southwest District office shall be notified in writing at least 15 days prior to performance testing. Pursuant to Rule 62-297.570(1) and (2), written reports of the test results shall be submitted to that office within 45 days of test completion.

7. A continuous monitoring system for the measurement of sulfur dioxide emissions shall be installed, calibrated, operated and maintained as described in 40 CFR 60.84(a) through (e). [Rule 62-296.800, F.A.C.; 40 CFR 60.84]

8. Objectionable odors associated with air emissions shall be prohibited. [Rule 62-296.320(2), F.A.C.]

9. Pursuant to Rule 62-210.700(1), F.A.C., excess emissions from the sulfuric acid plants resulting from startup, shutdown, malfunction, or load change shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed three hours in any 24-hour period unless specifically authorized by the Department for a longer duration. Best operational start-up practices shall be followed as described in the attached Memorandum of Understanding signed in 1989.

10. Stack sampling facilities shall be provided by the permittee in accordance with Rule 62-297.345, F.A.C.

SPECIFIC CONDITIONS:

11. The permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the Department's Bureau of Air Regulation prior to 60 days before the expiration of the permit. [Rule 62-4.090, F.A.C.].

12. An application for an operation permit must be submitted to the Department's Southwest District office at least 90 days prior to the expiration date of this construction permit or within 45 days after completion of compliance testing, whichever occurs first. The operation permit application shall include a set of conditions acceptable to the Department for startup/shutdown of the permittee's sulfuric acid plant. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit. [Rules 62-4.055 and 62-4.220, F.A.C.].

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Howard L Rhodes

Howard L. Rhodes, P.E.
Director
Division of Air Resources
Management

Best Available Control Technology (BACT) Determination
Farmland Hydro, L.P.
Polk County
Permit Number AC 53-265755
PSD-FL-225

The applicant proposes to increase the total production of the No. 3, 4 and 5 Sulfuric Acid Plants (SAP) from 5,640 tons per day (TPD) to 7,000 TPD at the applicant's phosphate fertilizer manufacturing facility on County Road 640 West in Polk County, Florida. The proposed project will result in a significant increase in emissions of sulfur dioxide (SO_2) and sulfuric acid mist. The project is therefore subject to Prevention of Significant Deterioration (PSD) review in accordance with Rule 62-212.400, Florida Administrative Code (F.A.C.). The BACT determination is part of the PSD review requirements in accordance with Rule 62-212.410, F.A.C.

Date Application Received: February 21, 1995

Date Application Complete: May 11, 1995

BACT Determination Proposed by Applicant:

Control Technology: Double Absorption/Fiber Mist Eliminators

Emission Limits: SO_2: 4 lbs/ton of 100% H_2SO_4 produced
Acid Mist: 0.15 lb/ton of 100% H_2SO_4 produced
Visible Emissions: 10% opacity

BACT Determination Procedure:

In accordance with Chapter 62-212, F.A.C., this determination is based on the maximum degree of reduction of each pollutant emitted which the Department, on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that in making the BACT determination the Department shall give consideration to:

(a) Any Environmental Protection Agency determination of Best Available Control Technology pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources) or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants).

(b) All scientific, engineering, and technical material and other information available to the Department.

(c) The emission limiting standards or BACT determinations of any other state.

(d) The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine for the emission source in question the most stringent control available for a similar or identical source or source category. If it is shown that this level of control is technically or economically infeasible for the source in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

<u>BACT Determined by the Department</u>: Same as proposed by applicant

<u>BACT Determination Rationale</u>

The Department's BACT determination is the same as that proposed by the applicant. This is consistent with determinations completed by other states and the Standards of Performance for Sulfuric Acid Plants, 40 CFR 60 Subpart H, (double absorption process). The process itself is the control technology for SO_2. For this reason, more stringent limits have not been required. The emission limits reflect a conversion efficiency of around 99.4% of SO_2 to H_2SO_4. High efficiency mist eliminators are considered BACT for sulfuric acid mist. BACT/LAER Clearinghouse information indicates that double absorption technology and the use of high efficiency mist eliminators are representative of BACT using the top-down approach.

<u>Conclusion</u>

The emission limits are equivalent to those in other BACT determinations and are in compliance with all air pollution regulations. It is concluded that the emission limits established herein represent BACT.

<u>BACT Analysis Details Available From</u>:

John Reynolds, Permit Engineer
New Source Review Section
Bureau of Air Regulation
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended by:

CH Fancy
C. H. Fancy, P.E., Chief
Bureau of Air Regulation

9/20, 1995
Date

Approved by:

Howard L Rhodes
Howard L. Rhodes, P.E., Director
Division of Air Resources Management

9/22/95, 1995
Date

Z 333 618 081

US Postal Service

Receipt for Certified Mail

No Insurance Coverage Provided.
Do not use for International Mail *(See reverse)*

Sent to: C M Farris
Street & Number: Farmland Hydro
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
1050053-023-AC 3-9-99
PSD-F1-243a

PS Form **3800**, April 1995

[redacted]

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- Print your name and address on the reverse of this form so that we can return this card to you.
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I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Mr. C M Farris, VP
Farmland Hydro, LP
P O Box 960
Bartow, Fl 33831

4a. Article Number
Z 333 618 081

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

7. Date of Delivery
3-12-99

5. Received By: *(Print Name)*

6. Signature: *(Addressee or Agent)*
X Denise Bunney

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

Is your R... JRN ADDRESS com... ...se side?

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PS Form **3811,** December 1994 102595-97-B-0179 Domestic Return Receipt

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF FINAL PERMIT

In the Matter of an
Application for Permit

Mr. C.M. Farris
Farmland Hydro, L.P.
Post Office Box 960
Bartow, Florida 33831

DEP File No. 1050053-019-AC
PSD-FL-243

Enclosed is the FINAL Permit Number PSD-FL-243 for the constructionof a new 2750 tons per day sulfuric acid plant (SAP 6) at the Farmland Hydro, L.P., Green Bay Facility, Polk County. This permit is issued pursuant to Chapter 403, Florida Statutes and in accorance with Rule 62-212.400., F.A.C. - Prevention of Significant Deterioration(PSD).

Any party to this order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, F.S., by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department of Environmental Protection in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000, and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 (thirty) days from the date this Notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

C.H. Fancy, P.E., Chief
Bureau of Air Regulation

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF FINAL PERMIT (including the FINAL permit) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 7-15-98 to the person(s) listed:

Mr. C.M. Farris, Farmland *
Mr. Brian Beals, EPA
Mr. John Bunyak, NPS
Mr. Bill Thomas, DEP

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52(7), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Keri Tober 7-15-98
(Clerk) (Date)

BEST AVAILABLE COPY

Is your RETURN ADDRESS completed on the reverse side?

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.
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I also wish to receive th following services (for an extra fee):

1. ☐ Addressee's Addr
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:

C.M. Farris
Farmland Hydro, LP
P O Box 960
Bartow, Fl 33831

4a. Article Number
P 265 659 389

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

7. Date of Delivery
7-20-98

5. Received By: *(Print Name)*
Jean Hicks

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

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

Thank you for

PS Form 3811, December 1994 102595-97-B-0179 **Domestic Return Receipt**

P 265 659 389

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail *(See reverse)*

Sent to CM Farris	
Street & Number Farmland Hydro	
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 7-15-98 1050053-019-AC PSO-FI-243	

PS Form **3800**, April 1995

AFFIDAVIT OF PUBLICATION

THE LEDGER

Lakeland, Polk County, Florida

Case No ....

STATE OF FLORIDA)
COUNTY OF POLK)

Before the undersigned authority personally appeared Nelson Kirkland, who on oath says that he is Classified Advertising Manager of The Ledger, a daily newspaper published at Lakeland in Polk County, Florida; that the attached copy of advertisement, being a

Public Notice Of Intent

in the matter of ....

DEP File No. 1050053-019-AC (PSD-FL-243)

in the ....

Court, was published in said newspaper in the issues of ....

May 28;

1998

Affiant further says that said The Ledger is a newspaper published at Lakeland, in said Polk County, Florida, and that the said newspaper has heretofore been continuously published in said Polk County, Florida, daily, and has been entered as second class matter at the post office in Lakeland, in said Polk County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Signed ....
Nelson Kirkland
Classified Advertising Manager

By Nelson Kirkland who is
personally known to me

Sworn to and subscribed before me this 29TH

day of MAy A.D. 19 98

(Seal) Donald Ray Jenkins
Notary Public

DONALD RAY JENKINS
MY COMMISSION # CC 586345
EXPIRES: September 18, 2000
Bonded Thru Notary Public Underwriters

My Commission Expires ....

Order#693274
Farmland Hydro L.P.

Attach Notice Here

PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP File No. 1050053-019-AC (PSD-FL-243)

Farmland Hydro, L.P. 2750 TPD Sulfuric Acid Plant
Polk County

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit to Farmland Hydro L.P., to construct a new 2750 tons per day (TPD) sulfuric acid plant (SAP 6) to replace the existing SAP 3 located at 4390 County Road 640 West near Bartow in Polk County. A Best Available Control Technology (BACT) determination was required for sulfur dioxide (SO_2), sulfuric acid mist (SAM), and nitrogen oxides (NO_X) pursuant to Rules 62-212.400, F.A.C., Prevention of Significant Deterioration (PSD). The applicant's name and address are: Farmland Hydro, L.P., 4390 County Road 640 West, Bartow, Florida 33830.

The new 2750 TPD SAP 6 will replace the existing 2100 TPD SAP 3 which will be permanently shut down. Control of SO_2 emissions is accomplished by the process itself which is based on the conversion of SO_2 to SO_3 and subsequent recovery as sulfuric acid product. The second absorption tower improves the efficiency of the process and also serves as the pollution control equipment. The BACT emission limit for SO_2 was determined by the Department to be 3.5 pounds per ton of sulfuric acid produced. The high efficiency mist eliminators together with proper plant operation serve to minimize sulfuric acid mist (SAM) emissions. The nitrogen oxides (NO_X) emissions will be minimized by good combustion practices.

Maximum annual SO_2 emissions will be 1757 tons per year (TPY) while SAM emissions will be 75 TPY. Annual NO_X emissions will be approximately 60 TPY.

An air quality impact analysis was conducted. Emissions from the facility will not significantly contribute to or cause a violation of any state or federal ambient air quality standards. NO_2 emissions will not have a significant impact in the PSD Class II area; therefore, no PSD Class II increment consumption for NO_2 was calculated. The maximum predicted PSD Class II increments of SO_2, consumed by all sources in the area, including this project, will be as follows:

	PSD Class II Increment Consumed (ug/m3)	Allowable Increment (ug/m3)	Increment Consumed (percent)
SO_2			
3-hour	176	512	34
24-hour	56	91	62
Annual	0	20	0

The project has no significant impact on the PSD Class I Chassahowitzka National Wilderness Area.

The Department will issue the FINAL Permit, in accordance with the conditions of the DRAFT Permit unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept written comments and requests for public meetings concerning the proposed DRAFT Permit issuance action for a period of 30 (thirty) days from the date of publication of this Notice. Written comments and requests for public meetings should be provided to the Department's Bureau of Air Regulation, 2600 Blair Stone Road, Mail Station #5505, Tallahassee, Florida 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in this DRAFT Permit, the Department shall issue a Revised DRAFT Permit and require, if applicable, another Public Notice.

The Department will issue FINAL Permit with the conditions of the DRAFT Permit unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57 F.S. The procedures for petitioning for a hearing are set forth below. Mediation is not available for this action.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative hearing in accordance with Sections 120.569 and 120.57 F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000, telephone: 850/488-9370, fax: 850/487-4938. Petitions must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. A petitioner must mail a copy of the petition to the applicant at the address indicated above, at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-5.207 of the Florida Administrative Code.

A petition must contain the following information: (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Permit File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by petitioner, if any; (e) A statement of the facts that the petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement identifying the rules or statutes that the petitioner contends require reversal or modification of the Department's action or proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wants the Department to take with respect to the Department's action or proposed action addressed in this notice of intent.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice of intent. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

A complete project file is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Dept. of Environmental Protection
Bureau of Air Regulation
111 S. Magnolia Drive, Suite 4
Tallahassee, Florida, 32301
Telephone: 850/488-1344
Fax: 850/922-6979

Dept. of Environmental Protection
Southwest District Office
3804 Coconut Palm Drive
Tampa, Florida 33619-8218
Telephone: 813/744-6100
Fax: 813/744-6084

Polk County Public Works Dept.
Natural Resources & Drainage Division
4177 Ben Durrance Road
Bartow, Florida 33830
Telephone: 941/534-7377
Fax: 941/534-7374

The complete project file includes the Draft Permit, the application, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Administrator, New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-1344, for additional information.
B-562 - 5-28; 1998

B562

Memorandum

Florida Department of
Environmental Protection

TO: Clair Fancy, Chief, BAR aal for CHF 5/19

THRU: Al Linero, P.E. Administrator, NSRS A A Linero 5/19

FROM: Syed Arif, P.E. Syed Arif 5/14/98

DATE: May 14, 1998

SUBJECT: Farmland Hydro, L.P.
Green Bay Sulfuric Acid Plant No. 6
DEP File No. 1050053-019-AC; PSD-FL-243

Attached is the Public Notice package for the construction of a new 2750 tons per day (TPD) sulfuric acid plant. The new plant will replace the existing 2100 TPD No. 3 plant which will be permanently shut down. Control of sulfur dioxide (SO_2) emissions is accomplished by the process itself which is based on the conversion SO_2 to SO_3 and subsequent recovery as sulfuric acid product. The second absorption tower improves the efficiency of the process and also serves as the pollution control equipment The high efficiency mist eliminators together with proper plant operation serves to minimize sulfuric acid mist emissions. The nitrogen oxides emissions will be minimized by good combustion practices.

The BACT for SO_2 was determined to be 3.5 lb/ton on a three hour basis. This is the most stringent BACT determination for any sulfuric acid plant in Florida. The BACT for sulfuric acid mist emissions will still be 0.15 lb/ton which is consistent with other BACT in the state.

I recommend your approval and signature.

SA

Attachments

your RETURN ADDRESS completed on the reverse side?

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

Consult postmaster for fee.

3. Article Addressed to:

Mr. C.M. Farris, VP-operations
Farmland Hydro, LP
4390 County Rd-640 West
Bartow, Fl
33830

4a. Article Number
P 265 659 350

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

7. Date of Delivery
5/24/98

5. Received By: (*Print Name*)
Jean Hicks

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

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

PS

n Receipt

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Receipt for Certified Mail

No Insurance Coverage Provided.
Do not use for International Mail (*See reverse*)

Sent to C M Farris	
Street & Number Farmland Hydro	
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 5-19-98 1050053-019-AC PSO-Fl-243	

PS Form **3800**, April 1995

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DEPARTMENT OF ENVIRONMENTAL PROTECTION
FLORIDA

Department of
Environmental Prote

Lawton Chiles
Governor

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

P 265 659 323
NO Green Card
US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail *(See reverse)*

Sent to Charles Jenkins	
Street & Number Farmland Hydro	
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 1050053-019-AC 3/~~26~~27/98 PSD-F1-243 #6	

PS Form **3800**, April 1995

March 26, 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:

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 (^{o}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 ^{o}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^{o}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^{o}C

"Protect, Conserve and Manage Florida's Environment and Natural Resources"

Printed on recycled paper.

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,

3/26

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

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]

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Env. & Safety Services
Farmland Hydro
P O BOX 960
Bartow, Fl
33831

4a. Article Number
P265 659 291

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PSD-Fl-243

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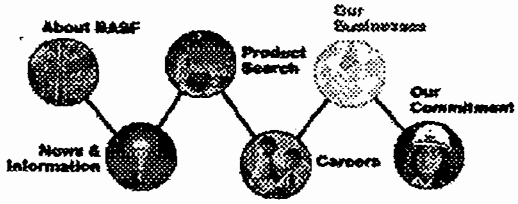

BASF

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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Farmland Hydro, LP
PO Box 960
Bartow, Fl
33831

4a. Article Number
P 265 659 269

4b. Service Type
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7. Date of Delivery
12/23/97

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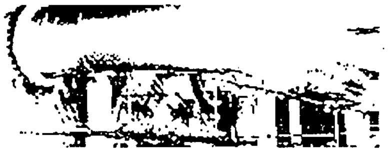
Calgon Carbon Announces



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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CALGON CARBON ANNOUNCES
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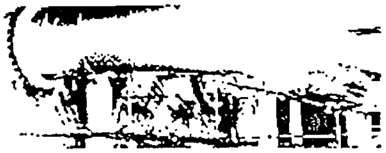
Calgon Carbon Announces



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Bartow, Fl 33831

4a. Article Number P 265 659 255

4b. Service Type
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7. Date of Delivery 11/25/97

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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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