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

KA 230-97-01

January 22, 1997

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

Subject: Mulberry Phosphates, Inc.
Sulfuric Acid Plant
Increase in Annual Hours of Operation

Dear Mr. Linero:

Enclosed are six (6) copies of a construction permit application for an increase in the annual hours of operation of the existing sulfuric acid plant at the Mulberry Phosphates' facility located in Polk County, Florida. Also enclosed is a check in the amount of $7500 (application processing fee).

If you have any questions, please call me.

Very truly yours,

KOOGLER & ASSOCIATES

Pradeep Raval

par
encl.

c: Ivan Nance, Mulberry Phosphates

cc: C. Holladay EPA
G. Reynolds NPS
SWD

P.O. Drawer 797
Mulberry, Florida 33860

MULBERRY PHOSPHATES INC.

(941) 425-1176
FAX (941) 425-5446

CERTIFIED/RETURN RECEIPT
NO. P 430 369 134

28 January 1997

RECEIVED
JAN 31 1997
BUREAU OF
AIR REGULATION

Mr. A. A. Linero
Florida Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-3400

Re: Mulberry Phosphates, Inc.;
PDEP Permit No. A053-198769

Dear Sir:

Please find accompanying this transmittal letter a construction permit application and a check in the amount of $7,500.00.

If further information is needed, please contact our offices.

Very truly yours,

Ivan Nance
Corporate Environmental Manager

/rmm

Enclosures

1050048-002-AC
PSD-FL-238

ULBERRY PHOSPHATES, INC.
eneral Disbursements
O. Box 797 Mulberry, FL 33860

FLORIDA DEPARTMENT OF

INVOICE	INV DATE	DUE DATE	INV AMOUNT	DISCOUNT	NET AMOUNT
014619	01/27/97	01/27/97	7,500.00	.00	7,500.00

REMITTANCE ADVICE CHECK NO. 0137508 7,500.00 7,500.00

DETACH BEFORE DEPOSITING

MULBERRY PHOSPHATES, INC.
General Disbursements
P.O. Box 797 Mulberry, FL 33860

ACCOUNTS PAYABLE CHECK

No 137508

DATE 01/27/97

CHECK NUMBER 0137508

63-600/631
8

PAY EXACTLY
SEVEN THOUSAND FIVE HUNDRED AND NO/100

AMOUNT
$7,500.00

Barnett Bank
039-008
6990 S. Florida Ave.
Lakeland, Florida 33813

Pay to the order of

FLORIDA DEPARTMENT OF
ENVIROMENTAL PROTECTION
2600 BLAIR STONE ROAD
TALLAHASSEE FL 32399-2400

Nela J Kennight
AUTHORIZED SIGNATURE

⑈137508⑈ ⑆063106006⑆ 1391106143⑈

Department of
Environmental Protection

DIVISION OF AIR RESOURCES MANAGEMENT

APPLICATION FOR AIR PERMIT - LONG FORM

RECEIVED
JAN 31 1997
BUREAU OF
AIR REGULATION

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: **Mulberry Phosphates, Inc.**	
2. Site Name: **Mulberry**	
3. Facility Identification Number: **1050048** [ ] Unknown	
4. Facility Location: Street Address or Other Locator: **SR 60, 1 Mile E. of Mulberry** City: **Mulberry** County: **Polk** Zip Code: **33860**	
5. Relocatable Facility? [ ] Yes [X] No	6. Existing Permitted Facility? [X] Yes [ ] No

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	January 31, 1997
2. Permit Number:	1050048-002-AC
3. PSD Number (if applicable):	PSD-FL-238
4. Siting Number (if applicable):	

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official:
   Robert Stewart, Vice President, Operations & Administration

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

   Organization/Firm: **Mulberry Phosphates, Inc.**
   Street Address: **SR 60, 1 Mile E. of Mulberry, P.O. Drawer 797**
   City: **Mulberry** State: **FL** Zip Code: **33860**

3. Owner/Authorized Representative or Responsible Official Telephone Numbers:
   Telephone: **(941) 425-1176** Fax: **(941) 425-5446**

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.*

Signature

1/29/97

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
002	**Sulfuric Acid Plant**	

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: _____

[X] 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: **Title V permit application**

[ ] 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: **AO53-198769**

[ ] 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 [ ] Not Applicable.

Construction/Modification Information

1. Description of Proposed Project or Alterations:

Mulberry Phosphates, Inc. requests an increase in annual hours of operation of existing Sulfuric Acid Plant from 8,400 hours per year to continuous operation (8,760 hrs/yr). An increase in annual hours of operation to allow continuous operation corresponds to a net annual production increase for the site of 25,500 tons of 100% H_2SO_4.

2. Projected or Actual Date of Commencement of Construction:
April 1, 1997

3. Projected Date of Completion of Construction:
January 1, 1998

Professional Engineer Certification

1. Professional Engineer Name: : **Steven C. Cullen, P.E.**
Registration Number: **45188**

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

1/21/97

Date

(seal)

* Attach any exception to certification statement.

Application Contact

1. Name and Title of Application Contact:

Steven C. Cullen-Project Engineer

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. Only information pertaining to the modification is presented herein.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates: Zone: **17** East (km): **406.8** North (km): **3085.1**			
2. Facility Latitude/Longitude: **See Field 5** Latitude (DD/MM/SS): Longitude (DD/MM/SS):			
3. Governmental Facility Code: **0**	4. Facility Status Code: **A**	5. Facility Major Group SIC Code: **28**	6. Facility SIC(s): **2874**
7. Facility Comment (limit to 500 characters):			

Facility Contact

1. Name and Title of Facility Contact: **Ivan Nance**
2. Facility Contact Mailing Address: Organization/Firm: **Mulberry Phosphates, Inc.** Street Address: **SR 60, 1 Mile E. of Mulberry, P.O. Drawer 797** City: **Mulberry** State: **FL** Zip Code: **33860**
3. Facility Contact Telephone Numbers: Telephone: **(941) 425-1176** Fax: **(941) 425-5446**

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? [ ] Yes [X] 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.)

N/A

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

See Attached Report.	

C. FACILITY POLLUTANTS

Facility Pollutant Information

1. Pollutant Emitted	2. Pollutant Classification
PM/PM10	**A**
SO2	**A**
NOX	**A**
SAM	**B**
FL	**B**
CO	**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:		
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: _____ [X] Not Applicable [ ] Waiver Requested
6. Supplemental Information for Construction Permit Application: [X] Attached, Document ID: **Report** [ ] Not Applicable

Additional Supplemental Requirements for Category I Applications Only **N/A**

7. List of Proposed Exempt Activities: [ ] Attached, Document ID:_____ [ ] 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 [ ] Not Applicable
9. Alternative Methods of Operation: [ ] Attached, Document ID:_____ [ ] Not Applicable
10. Alternative Modes of Operation (Emissions Trading): [ ] Attached, Document ID:_____ [ ] Not Applicable

11. Identification of Additional Applicable Requirements: [ ] Attached, Document ID:_____ [ ] Not Applicable
12. Compliance Assurance Monitoring Plan: [ ] Attached, Document ID:_____ [ ] 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 [ ] Not Applicable
14. Compliance Report and Plan: [ ] Attached, Document ID:_____ [ ] Not Applicable
15. Compliance Certification (Hard-copy Required): [ ] Attached, Document ID:_____ [ ] 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**		
2. Emissions Unit Identification Number: **002** [ ] 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):		

Emissions Unit Control Equipment

A.

1. Description (limit to 200 characters): **Double Contact/Absorption**
2. Control Device or Method Code: **044**

Emissions Unit Information Section 1 of 1 (Sulfuric Acid Plant)

B.

1. Description (limit to 200 characters):
Demister
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: **N/A**		
2. Long-term Reserve Shutdown Date: **N/A**		
3. Package Unit: **N/A** Manufacturer:	Model Number:	
4. Generator Nameplate Rating: **N/A**	MW	
5. Incinerator Information: **N/A** Dwell Temperature: Dwell Time: Incinerator Afterburner Temperature:		°F seconds °F

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate: **N/A**		mmBtu/hr
2. Maximum Incineration Rate: **N/A**	lb/hr	tons/day
3. Maximum Process or Throughput Rate:		
4. Maximum Production Rate: **1700 tpd 100% H2SO4**		
5. Operating Capacity Comment (limit to 200 characters): **Mulberry Phosphates, Inc. requests an increase in annual hours of operation from 8,400 hours per year to continuous operation (8,760 hrs/yr).**		

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 1 of 1 (Sulfuric Acid Plant)

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

See Attached Report.	

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: **Point 02**	
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): **N/A**	
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **N/A**	
5. Discharge Type Code: [ ] D [ ] F [ ] H [ ] P [ ] R [**X**] V [ ] W	
6. Stack Height:	**200** feet
7. Exit Diameter:	**7** feet
8. Exit Temperature:	**158** °F

Emissions Unit Information Section 1 of 1 (Sulfuric Acid Plant)

9. Actual Volumetric Flow Rate:	**82,000** 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: **NA** 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% H_2SO_4**	
4. Maximum Hourly Rate: **70.8**	5. Maximum Annual Rate: **620,500**
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): **Plant rate at 1700 TPD**	

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**	**000**	**EL**
SAM	**044**	**014**	**EL**
NOX	**000**	**000**	**NS**

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: **283.3** lb/hour **1241** tons/year

4. Synthetically Limited?
   [ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions: **N/A**
   [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year

6. Emission Factor: **4 lb/ton 100% H2SO4**
   Reference: **Permit**

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

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

SO2 = 1700 tpd/24 hrs x 4 lb/ton = 283.3 lb/hr
x 8760hrs/yr x ton/2000 lbs = 1,241 tpy

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

Emissions Unit Information Section 1 of 1 (Sulfuric Acid Plant)

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 100% H2SO4**		
4. Equivalent Allowable Emissions:	**283.3** lb/hour	**1241** 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: **99.8** **%**

3. Potential Emissions: **10.6** lb/hour **46.5** tons/year

4. Synthetically Limited?
   [ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions: **N/A**
   [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year

6. Emission Factor: **0.15 lb/ton 100% H2SO4**
   Reference: **Permit**

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

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

SAM = 1700 tpd/24 hrs x 0.15 lb/ton = 10.6 lb/hr
x 8760hrs/yr x ton/2000 lbs = 46.5 tpy

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

Emissions Unit Information Section 1 of 1 (Sulfuric Acid Plant)

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 100% H2SO4**		
4. Equivalent Allowable Emissions:	**10.6** lb/hour	**46.5** 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):		

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: Manufacturer: **DuPont** Model Number: **460**	Serial Number:
5. Installation Date: **1975**	
6. Performance Specification Test Date: **May 1977**	
7. Continuous Monitor Comment (limit to 200 characters): **40 C.F.R. 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	[X] C	[ ] E	[ ] Unknown
NO2	[X] 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 **IN FDEP FILES**
4. Description of Stack Sampling Facilities [ ] Attached, Document ID:_____ [ ] Not Applicable [X] Waiver Requested **IN FDEP FILES**
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 [X] Attached, Document ID: **Report** [ ] Not Applicable
9. Other Information Required by Rule or Statute [X] Attached, Document ID: **Report** [ ] Not Applicable

Additional Supplemental Requirements for Category I Applications Only **N/A**

10. Alternative Methods of Operation [ ] Attached, Document ID:_____ [ ] Not Applicable
11. Alternative Modes of Operation (Emissions Trading) [ ] Attached, Document ID:_____ [ ] Not Applicable
12. Identification of Additional Applicable Requirements [ ] Attached, Document ID:_____ [ ] Not Applicable
13. Compliance Assurance Monitoring Plan [ ] Attached, Document ID:_____ [ ] 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:_____ [ ] Not Applicable

REPORT IN SUPPORT OF
A PSD PERMIT APPLICATION

PREPARED FOR:

MULBERRY PHOSPHATES, INC.
MULBERRY PLANT
POLK COUNTY, FLORIDA

JANUARY 1997

PREPARED BY:

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GAINESVILLE, FLORIDA 32609
(352) 377-5822

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1.0 SYNOPSIS OF APPLICATION

1.1 APPLICANT

Mulberry Phosphates, Inc.
Mulberry Plant
SR 60, 1 Mile E. Of Mulberry
Mulberry, Polk County, Florida

1.2 FACILITY LOCATION

Mulberry Phosphates, Inc., Mulberry Plant, consists of a phosphate chemical fertilizer manufacturing facility approximately 1 mile east of Mulberry, on State Road 60 in Polk County, Florida. The UTM coordinates of the Mulberry facility are Zone 17, 406.8 km east and 3085.1 km north.

1.3 PROJECT OVERVIEW

Mulberry Phosphates proposes to increase the annual hours of operation of the double absorption sulfuric acid plant from 8,400 hours per year (hrs/yr) to continuous operation (8,760 hrs/yr). An increase in annual hours of operation will result in a net allowable annual production increase of 25,500 tons of 100% H2SO4. This represents about a 4 percent increase in the annual sulfuric acid production rate. The allowable annual air emissions will also increase proportionately.

The additional sulfuric acid produced annually will reduce the amount of sulfuric acid that has to be purchased. As a result, the facility will become more self sufficient. The proposed project will not affect the operation of any other plant in the chemical complex.

The proposed project will result in a significant net increase (in accordance with Rule 62-212, Florida Administrative Code), in the emission rates of sulfur dioxide (SO_2) and sulfuric acid mist (SAM).

Mulberry Phosphates, Inc. is submitting this report in support of the application to the Florida Department of Environmental Protection (FDEP) for increasing the annual hours of operation for the sulfuric acid plant. The report includes a description of the existing chemical complex and the sulfuric acid plant, a review of Best Available Control Technology, an ambient air quality analysis and an evaluation of the impact of the proposed modification on soils, vegetation and visibility.

2.0 FACILITY DESCRIPTION

Mulberry Phosphates' existing phosphate fertilizer manufacturing facility at Mulberry processes 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 a sulfuric acid plant, a phosphoric acid plant, an ammonium phosphate (MAP/DAP) plant, and storage, handling, grinding and shipping facilities for phosphate rock, ammonia, sulfur, and fertilizer products. The site location is shown in Figure 2-1. The layout of the existing facility is shown in Figure 2-2, Plot Plan.

2.1 PROCESS DESCRIPTION

There is one sulfuric acid plant at Mulberry. The sulfuric plant is permitted to produce 1700 tons per day (TPD) of 100 percent H_2SO_4. The plant is subject to Federal New Source Performance Standards (NSPS) as set forth in 40 CFR 60, Subpart H.

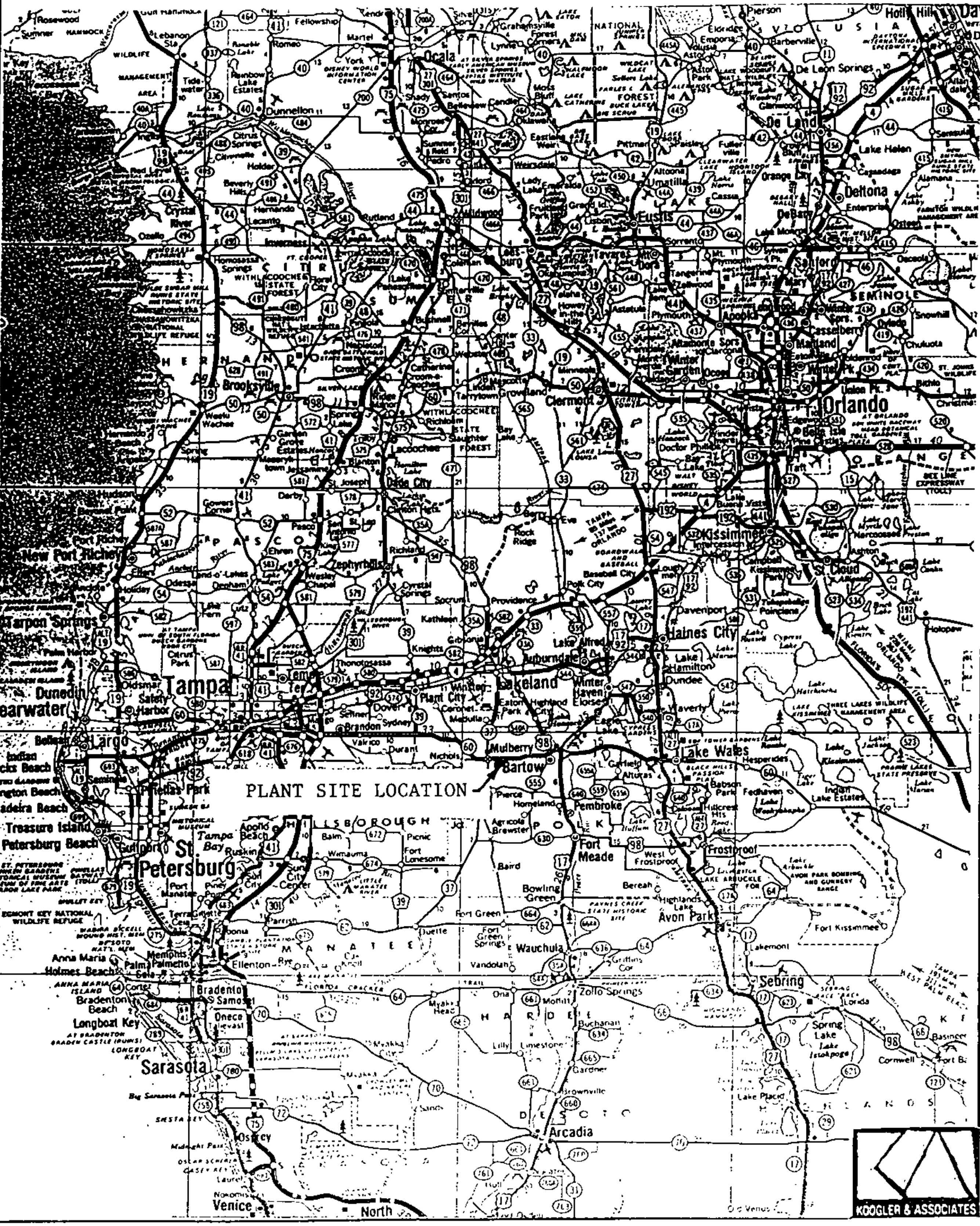
Molten sulfur is received by truck and rail, unloaded into molten sulfur pits, and stored in the molten sulfur storage tank. The sulfuric acid plant utilizes the double absorption process which produces sulfuric acid by burning sulfur to produce sulfur dioxide, converting the sulfur dioxide to sulfur trioxide using a catalyst, and then contacting the sulfur trioxide with sulfuric acid in primary and secondary absorption towers. A process flow diagram is presented in Figure 2-3.

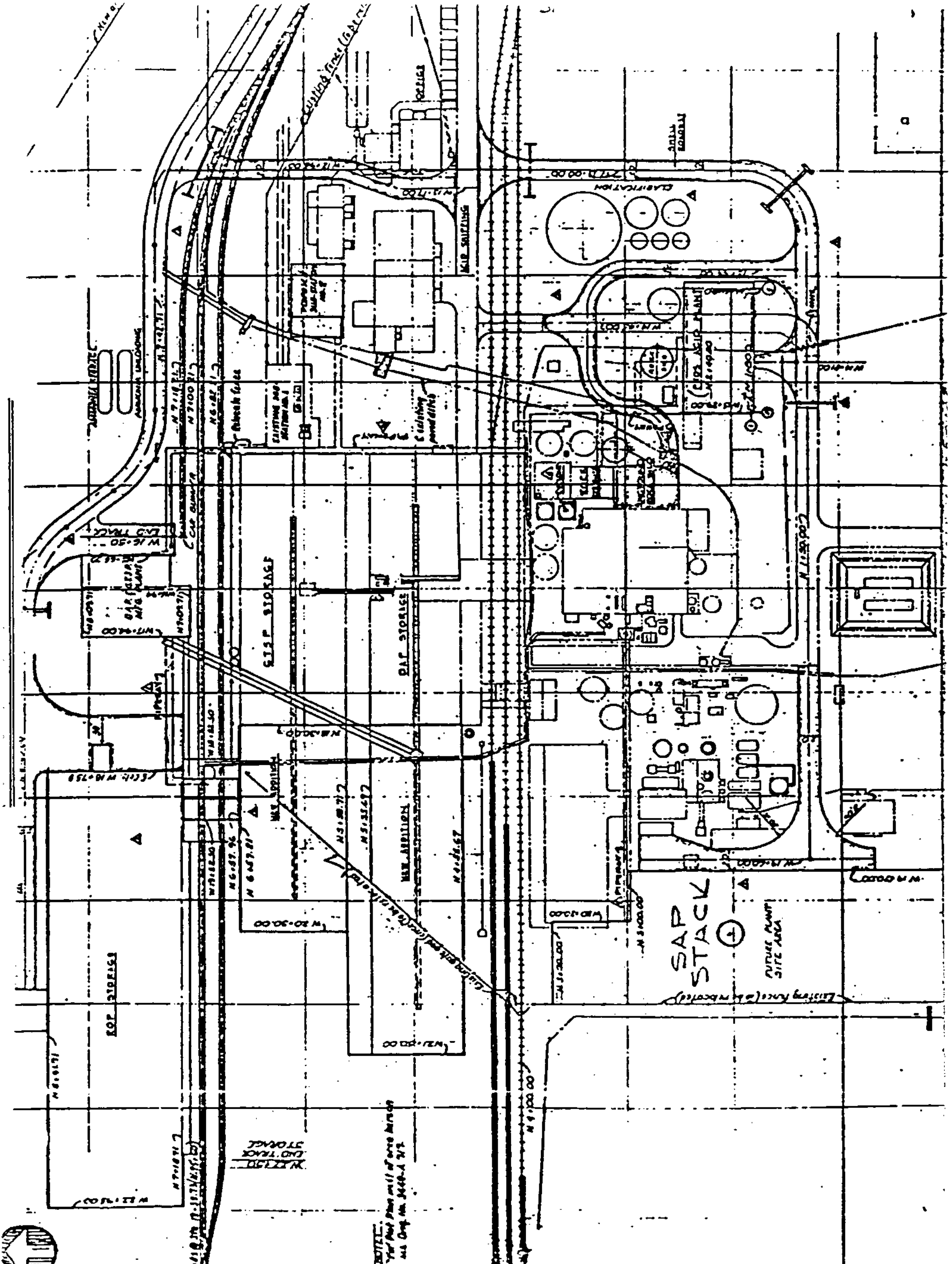
The current FDEP air permit number for the sulfuric acid plant is A053-198769 with an expiration date of 8-28-96. The expiration date is extended until the issuance of a Title V permit, in accordance with rule 62-213, FAC.

FIGURE 2-1

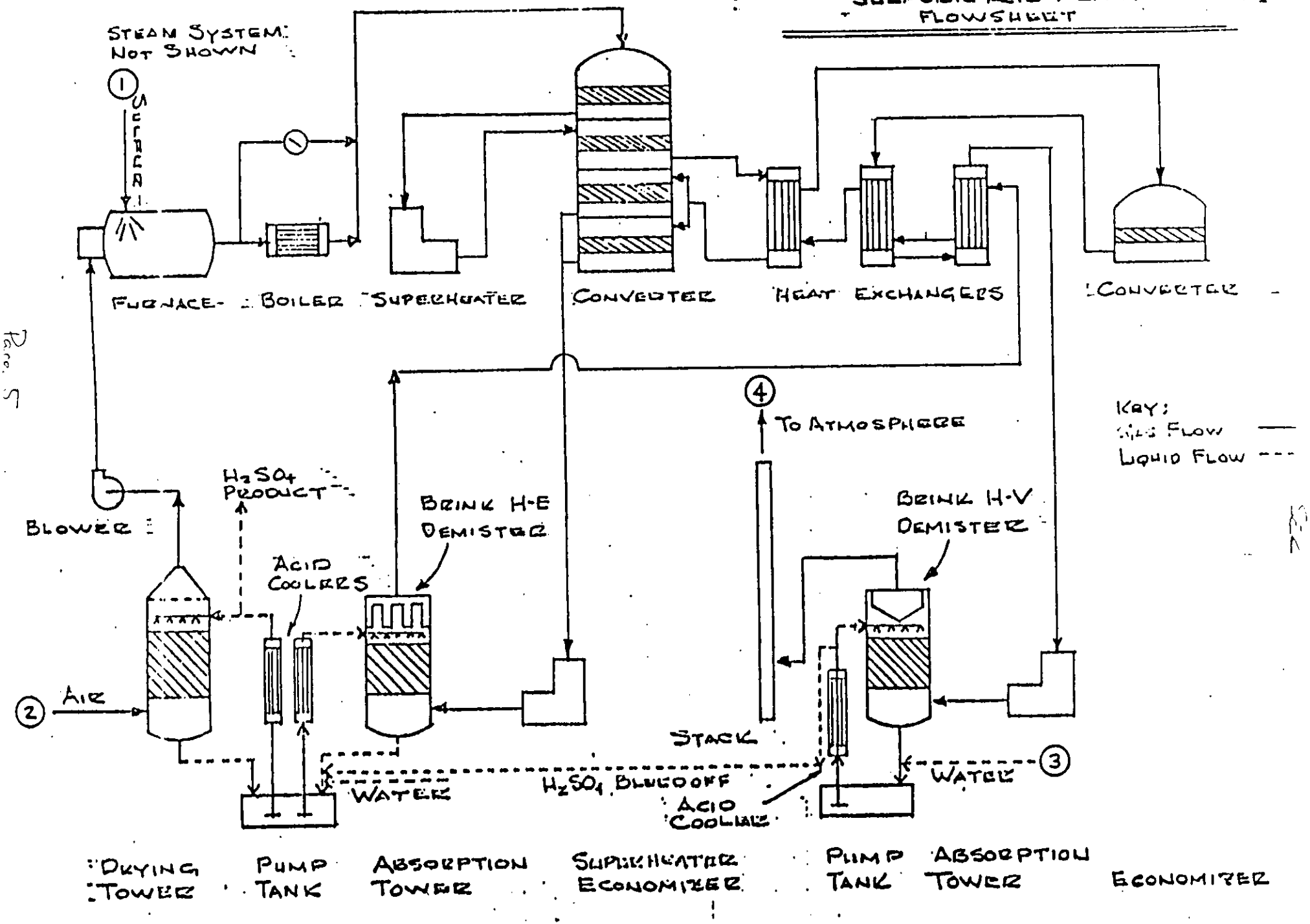
SITE LOCATION MAP

MULBERRY PHOSPHATES, INC. - MULBERRY PLANT




SAP STACK
FUTURE PLANT SITE AREA
GTSP STORAGE
DAP STORAGE
ROP STORAGE
NEW ADDITION
CLARIFICATION

DOUBLE CONTACT/DOUBLE ABSORPTION SULFURIC ACID PLANT FLOWSHEET



3.0 PROPOSED PROJECT

Mulberry Phosphates proposes to increase the annual hours of operation of the existing double absorption sulfuric acid plant from 8,400 to 8,760 hours/year. This will result in a net increase in the allowable annual production of 25,500 tons of 100% H2SO4. This represents about a 4 percent increase in the allowable annual sulfuric acid production.

3.1 AIR EMISSIONS

The emission limits for the sulfuric acid plant will be in accordance with the Federal New Source Performance Standards under 40 CFR 60, Subpart H, and the corresponding state rule, which limit SO_2 and SAM emissions to 4.0 and 0.15 pounds per ton of 100 percent sulfuric acid, respectively. Visible emissions are limited to 10 percent opacity.

A summary of the permitted, actual and proposed operating characteristics of the sulfuric acid plant is presented in Table 3-1. The emission changes as a result of the proposed project are presented in Table 3-2. As indicated in Table 3-2, there will be a significant net increase, as defined in Rule 62-212, FAC, in the emissions of SO_2 and SAM. The NOx emissions increase will be less than significant.

There are fugitive emissions from process operations and vehicular traffic on paved roads at the facility, as acknowledged by existing FDEP permits. Changes in fugitive emissions as a result of the proposed increase in annual hours of operation for the sulfuric acid plant are expected to be negligible and do not affect the rule applicability for the project. Emission calculations are presented in Appendix A.

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 facilities and major modifications to existing facilities 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 Clean Air Act. 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 CAA Amendments, Congress quantified concentration increases above air quality baseline concentration levels for sulfur dioxide (SO_2) and particulate matter less than 10 microns (PM10) 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, 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 PM10, 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 62-210, 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 recently 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 application 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 de minimis levels (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 along with an air quality related values (AQRV) analysis. Impacts due to commercial, residential, industrial, and other growth associated with the source must be addressed.

3.2.7 Good Engineering Practice Stack Height

In accordance with Rule 62-210, 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 highest 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 sulfuric acid production increase at Mulberry is classified as a major modification to a major facility subject to both state and federal regulations as set forth in Chapter 62-212, FAC. The facility is a major source in accordance with Title V requirements in Chapter 62-213, FAC.

The facility is located in an area classified as attainment for each of the regulated air pollutants.

The proposed modification to the sulfuric acid plant will result in significant increases in SO_2 and SAM emissions as defined by Rule 62-212, FAC, and will therefore be subject to PSD preconstruction review requirements. This will include a determination of Best Available Control Technology (BACT), an air quality review, Good Engineering Practice stack height analysis and an evaluation of impacts on soils, vegetation and visibility.

TABLE 3-1

CHANGES IN PRODUCTION AND EMISSION RATES

MULBERRY PHOSPHATES, INC. - MULBERRY PLANT
POLK COUNTY, FLORIDA

	Sulfuric Acid Plant
Permit Allowable Conditions : Based on permit	
Rate (TPD)	1700
SO_2 (lb/hr)	283.3
(TPY)	1190
Mist (lb/hr)	10.6
(TPY)	44.6
Annual Operating Hours	8400
Actual Conditions : Based on most recent 2-year data (FDEP files)	
Rate (TPD)	1700
SO_2 (lb/hr)	231.7
(TPY)	973
Mist (lb/hr)	3.4
(TPY)	14.4
NOx (lb/hr)	8.2
(TPY)	34.6
Annual Operating Hours	8400
Proposed Conditions	
Rate (TPD)	1700
SO_2 (lb/hr)	283.3
(TPY)	1241
Mist (lb/hr)	10.6
(TPY)	46.5
NOx (lb/hr)	8.5
(TPY)	37.2
Annual Operating Hours	8760

NOTE:
1. See Appendix for calculations of emission rates.
2. Actual operation data based on the most recent representative 2-year compliance test data and annual operating hours information submitted to FDEP and currently in FDEP files.

TABLE 3-2

NET EMISSION INCREASES(1)

MULBERRY PHOSPHATES, INC. - MULBERRY PLANT
POLK COUNTY, FLORIDA

Pollutant	Emissions (tons/yr) Sulfuric Acid Plant
SO_2	
Present Actual (2)	973
Proposed Allowable	1241
Change	268
Contemporaneous Changes	0
Total Increase	268
Significant Increase (3)	40
PSD Review ?	YES
SAM	
Present Actual (2)	14.4
Proposed Allowable	46.5
Change	32.1
Contemporaneous Changes	0
Total Increase	32.1
Significant Increase (3)	7
PSD Review ?	YES
NOx	
Present Actual (2)	34.6
Proposed Allowable	37.2
Change	2.6
Contemporaneous Changes (2)	0
Total Increase	2.6
Significant Increase (3)	40
PSD Review ?	NO

NOTES:
(1) See Appendix for emission calculations.
(2) Present actual emissions are estimated (see calculations).
(3) Significant levels are listed in Rule 62-212, FAC.

TABLE 3-3

MAJOR FACILITY CATEGORIES

MULBERRY PHOSPHATES, INC. - MULBERRY PLANT
POLK COUNTY, FLORIDA

Fossil fuel fired steam electric plants, 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

MULBERRY PHOSPHATES, INC. - MULBERRY PLANT
POLK COUNTY, FLORIDA

Pollutant	Significant Emission Rate tons/yr	De Minimis Ambient Impacts ug/m3
CO	100	575 (8-hour)
NOx	40	14 (NO2, 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)
H2SO4 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

MULBERRY PHOSPHATES, INC. - MULBERRY PLANT
POLK COUNTY, FLORIDA

Pollutant	FDEP (State)		USEPA (National)			
			Primary		Secondary	
	ug/m3	PPM	ug/m3	PPM	ug/m3	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

MULBERRY PHOSPHATES, INC. - MULBERRY PLANT
POLK COUNTY, FLORIDA

Pollutant		Allowable PSD Increments (State/National) Class I ug/m3	Class II ug/m3	Class III ug/m3
PM10,	Annual	4	17	34
	24-hour	8	30	60
SO_2,	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
NO2,	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 increase proposed by Mulberry Phosphates is summarized in Table 3-2. The SO_2 and SAM emissions increases from the proposed project will represent a significant increase.

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 sulfur dioxide emissions to be limited to no more than 4.0 pounds per ton of 100 percent acid produced and require that sulfuric acid mist 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 sulfuric acid plants to less than 10 percent. There are no emission standards for nitrogen oxides 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 sulfur dioxide 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 sulfuric acid mist, 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 1996 that would result in a consistent reduction in sulfur dioxide emission below 4.0 pounds per ton of acid.

4.2 CONTROL TECHNOLOGIES

The control of sulfur dioxide from sulfuric acid plants can be achieved by various processes. The process of choice for sulfur dioxide control has been dual absorption. The process has been selected based on cost, product recovery, the formation of no undesirable by-products and that the process does not introduce 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 dual absorption process for sulfur dioxide control with the remaining six using some type of acid gas scrubbing.

Also in the EPA review, several potential control technologies that had been used to control sulfur dioxide from sulfuric acid plants were addressed. The alternatives included the dual absorption process, ammonia scrubbing, sodium sulfite-bisulfite scrubbing, and molecular sieves for sulfur dioxide control. A review of the EPA BACT/LAER Clearinghouse information indicated that no other control alternatives have been considered for sulfuric acid plants.

4.2.1 Sulfur Dioxide Control

The control alternatives for sulfur dioxide have been summarized based upon information compiled by EPA in the 1985 NSPS review for sulfuric acid plants, and based on information recently submitted to FDEP by similar sulfuric acid plants during review of their production increase requests (refer to PSD-FL-225 & 229).

4.2.1.1 Dual Absorption Process

The dual absorption process has become the SO_2 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 sulfur dioxide control. The process offers the following advantages over other SO_2 control technologies:

1. 99.4 percent of the sulfur is converted to sulfuric acid compared with 97.7 percent conversion with a single absorption plant followed by scrubbing;

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 sulfur dioxide concentrations resulting in a reduction in equipment size;

5. there is no reduction in overall plant operating time efficiency; and

6. there is no increase in manpower requirements.

The dual absorption process is capable of reducing sulfur dioxide emission rates to less than 4.0 pounds per ton of acid as required by New Source Performance Standards. However, in an effort to maximize production, most plants in the fertilizer industry tend to run at emission levels close to the permitted rates. As the catalyst ages, the production level is gradually reduced to keep the emissions within permitted levels. When the production level drops below a given threshold, the plant is shut down for turnaround. This typically occurs every 18 months.

It should be noted that more frequent turnarounds would not alter the emissions from the plant. It would only result in a higher production rate, on average, at a greater operating cost.

4.2.1.2 Sodium Sulfite-Bisulfite Scrubbing

Between 1971 and 1985, two sulfuric acid plants were constructed employing sodium sulfite-bisulfite scrubbing to control sulfur dioxide 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 sulfur dioxide control alternative.

4.2.1.3 Ammonia Scrubbing

Ammonia scrubbing uses anhydrous ammonia and water in a scrubbing system to convert sulfur dioxide to ammonium sulfate. Depending upon the market, the ammonium sulfate can be converted to a fertilizer grade product.

Five sulfuric acid plants constructed between 1971 and 1985 use ammonia scrubbing for sulfur dioxide control. The process has proved effective for reducing sulfur dioxide emissions to below 4.0 pounds per ton and also for controlling sulfuric acid mist emissions. However, this process is used in conjunction with single absorption plants.

The major disadvantages of the ammonia scrubbing system, when compared with the dual absorption process are:

1. a waste by-product is produced unless there is a market for fertilizer grade ammonium sulfate;
2. the scrubbing system is a high maintenance item and requires additional manpower for operation; and
3. no sulfuric acid plant size reduction benefits are achieved with the scrubbing system.

4.2.1.4 Molecular Sieves

A molecular sieve was installed at one sulfuric acid plant in Florida for sulfur dioxide control. Extensive operating problems were experienced as the molecular sieve absorbed nitrogen oxides as well as sulfur dioxide. The regeneration of these gases 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 scrapped. As a result, molecular sieves are not considered a viable alternative for sulfur dioxide control in the sulfuric acid industry.

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 sulfuric acid mist control. Operations demonstrated that these types of mist eliminators can control sulfuric acid mist emissions to less than 0.15 pounds per ton of sulfuric acid.

The mist eliminators are the control of choice for sulfuric acid mist 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 sulfuric acid mist 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.

4.3 BACT CONCLUSION

The FDEP's BACT determinations for all the recently permitted sulfuric acid plants, with due consideration given to other available control technology options, reflect the use of the dual absorption process for sulfur dioxide control and fiber mist eliminators for acid mist control. Therefore, the dual absorption process with mist eliminators is selected by Mulberry Phosphates as BACT.

5.0 AIR QUALITY REVIEW

The air quality review for the proposed project included annual emission increases associated with the sulfuric acid plant. A preliminary modeling analysis was conducted, using the EPA approved ISC-ST model Version 96113 (ISC3), to determine the ambient air impacts resulting from increases in annual SO_2 and SAM emissions as a result of the proposed project. The model inputs are presented in Table 5-1.

The ISC3 modeling results, summarized in Table 5-2, indicate that the net annual SO2 emissions increase would result in a less than significant ambient air impact.

In the case of SAM, although there will be a 4 percent increase in the allowable annual emission rate, there is no corresponding Florida Air Reference Concentration (FARC) for SAM for the annual period. It should be noted that there will be no change in the short term emission rates.

Based on the results of the preliminary modeling, no additional modeling was deemed necessary.

TABLE 5-1

AIR MODELING INPUTS

MULBERRY PHOSPHATES, INC. - MULBERRY PLANT
POLK COUNTY, FLORIDA

Emission Unit	Stack Ht (m)	Stack Dia (m)	Stack Gas Vel (mps)	Stack Gas Temp (°K)	Net Emission Rates (1) SO_2 (g/s)	Net Emission Rates (1) SAM (g/s)
SAP, exist.	60.96	2.13	10.01	343	34.23	1.28
SAP, prop.	60.96	2.13	10.01	343	35.70	1.34

NOTES:

(1) The existing emission rates are scaled based on a ratio of present to proposed annual hours of operation,

Existing SO2 = 283.3 lb/hr x 8400/8760 x 0.126 (conv)
= 34.23 g/s

Proposed SO2 = 283.3 lb/hr x 0.126 (conv)
= 35.7 g/s

Existing SAM = 10.6 lb/hr x 8400/8760 x 0.126 (conv)
= 1.28 g/s

Proposed SAM = 10.6 lb/hr x 0.126 (conv)
= 1.34 g/s

(2) Only the annual impacts would change as a result of a change in the annual hours of operation. The short term impacts would not change as the short term emission rates will not change.

TABLE 5-2

SUMMARY OF MODELING RESULTS

MULBERRY PHOSPHATES, INC. - MULBERRY PLANT
POLK COUNTY, FLORIDA

METEOROLOGICAL DATA	MAXIMUM PREDICTED NET ANNUAL IMPACTS (ug/m^3) (1)			
	SULFUR DIOXIDE		SULFURIC ACID MIST	
	CLASS I	CLASS II	CLASS I	CLASS II
1987	0.001	0.043	(2)	0.002
1988	0.001	0.076	(2)	0.003
1989	0.002	0.113	(2)	0.004
1990	0.001	0.048	(2)	0.002
1991	0.001	0.046	(2)	0.002
Significant Impact EPA, Proposed	0.1	1.0	NA	NA
Significant Impact NPS, Guideline	0.03	NA	NA	NA

NOTE:

(1) The above maximum predicted net annual impacts represent the highest-high impact resulting from modeling of the net increase in allowable emissions on an annual basis.

(2) The maximum predicted impact was 0.00006 ug/m3 (1989), almost nil.

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.

Mulberry Phosphates' stack is less than 213 feet in height above-grade, and therefore, in compliance with GEP stack height criteria.

7.0 IMPACTS ON SOILS, VEGETATION AND VISIBILITY

The PSD review requirements include an analysis of the impact of the proposed emissions increase 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 demonstrated that the change in the maximum predicted annual levels of SO_2 as a result of the proposed project, will be insignificant. There will be no change in SO_2 levels on a short term basis as there will be no change in the short term emission rates. As a result, it is reasonable to conclude that there will be no adverse effect to the soils, vegetation or visibility of the area.

7.2 GROWTH RELATED IMPACTS

The proposed modification will require no increase in personnel to operate the sulfuric acid plants. Also, the increase in annual hours of 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 not result in adverse impacts on visiblity as there will be no change in hourly air emissions.

7.4 CLASS I AREA AQRV ANALYSIS

In the previous section, the impact of the air emission increases on air quality related values in the vicinity of the proposed project was addressed. The analysis addressed in this section extends the review of the impact of increased emissions on air quality related values to the Chassahowitzka Class I PSD area; an area in excess of 100 kilometers northwest of the proposed project.

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 sulfur dioxide emissions from the proposed project at Chassahowitzka.

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 sulfur dioxide 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.

Sulfur dioxide 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 sulfur dioxide. 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 sulfur dioxide 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 7-1 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 sulfur dioxide (Woltz and Howe, 1981) demonstrated that cypress, slash pine, live oak and mangrove exposed to 1300 micrograms per cubic meter of sulfur dioxide for 8-hours were not visibly damaged. This is consistent with the results reported in Table 7-1. 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 sulfur dioxide concentration of 920 micrograms per cubic meter for a 3-hour period.

Acute injury results from a plant's inability to quickly convert absorbed sulfur dioxide 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 sulfur dioxide 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 sulfur dioxide

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. As the sulfur dioxide impacts from the proposed project are predicted to be negligible, no adverse impacts are expected to vegetation.

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 SO_2 and sulfate concentrations in the Chassahowitzka area, 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.

7.4.3 Impact on Wildlife

As the predicted sulfur dioxide 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. Impact on Visibility

The proposed project will not result in adverse impacts on visiblity as there will be no change in hourly air emissions.

The cumulative SO2 impact at the Class I area can be estimated by adding the maximum predicted annual impact from the proposed project to the background SO2 concentration levels in or near the Class I area. In this case, the cumulative annual impact can be estimated to be 5 ug/m3, referenced in "Air Quality and Air Quality Related Values in Chassahowitzka National Wildlife Refuge and Wilderness Area" by Ellen Porter, U. S. Fish and Wildlife Service.

TABLE 7-1

SENSITIVITY OF VEGETATION TO SULFUR DIOXIDE

CONCENTRATION - TIME EXPOSURES TO
SULFUR DIOXIDE RESULTING IN DAMAGE TO
SEVERAL SPECIES COMMON TO FLORIDA

Sensitive Plants

Poplar	Radish	Cabbage
Lombardy Poplar	Cucumber	Broccoli
Black Willow	Squash	Spinach
Elm	Bean	Wheat
American Elm	Pea	Begonia
Southern pines	Soybean	Zinnia
Red Oak	Cotton	Rubber plant
Black Oak	Eggplant	Bluegrass
Sumac	Celery	Ryegrass

Intermediate Plants

Basswood	Yellow Poplar	Virginia creeper
Red Oxier Dogwood	Sweetgum	Rose
Maples	Locust	Hibiscus
Red Maple	Eastern Cottonwood	Gladiolus
Elm	Saltgrass	Honeysuckle
Pine	Cucumber	Wisteria
White Oak	Tobacco	Chrysanthemum
Pin Oak	Potato	

Tolerant Plants

Juniper	Pine	Gardenia
Ginkgo	Sumac	Citrus
Dogwood	Cantaloupe	Celery
Oak	Corn	
Live Oak	Lily	

TABLE 7-1 (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

REFERENCES

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McLaughlin, S.B. and N.T. Lee. 1974 Botanical Studies in the Vicinity of the Widows Creek Steam Plant. Review of Air Pollution Effects Studies, 1952-1972, and Results of 1973 Surveys. Internal Report I-EB-74-1. TVA.

United States Environmental Protection Agency, 1988. Workbook for Plume Visual Impact Screen and Analysis. EPA-450/4-88-015, September 1988.

United States Department of Agriculture, 1991. Surveys of Hernando and Citrus Counties, Florida. USDA Soil Conservation Service in cooperation with University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations and Soil Science Department.

Woltz, S.S. and T.K. Howe, 1981. Effects of Coal Burning Emissions on Florida Agriculture. In: The Impact of Increased Coal Use in Florida. Interdisciplinary Center for Aeronomy and (other) Atmospheric Sciences. University of Florida, Gainesville, Florida.

8.0 CONCLUSION

It can be concluded from the information in this report that the proposed increase in annual production hours of Mulberry Phosphates' sulfuric acid plant as described in this report will not cause or contribute to a violation of any air quality standard, PSD increment, or any other provision of Chapter 62, FAC.

APPENDIX A

EMISSION RATE CALCULATIONS

SULFURIC ACID PLANT

1.0 PERMITTED EMISSION RATES

SO_2 = 283.3 lbs/hr
x 8400 hrs/yr x ton/2000 lbs
= 1190 TPY

SAM = 10.6 lbs/hr
x 8400 hrs/yr x ton/2000 lbs
= 44.5 TPY

2.0 ACTUAL EMISSION RATE CALCULATIONS

The following calculations of actual emission rates for the sulfuric acid plants are specifically for demonstrating PSD applicability for the proposed project. The information is based on 1994 and 1996 compliance test results, emission factors and annual operation hours previously submitted to FDEP. The 1995 emission information, with the plant operating at less than 90 percent of the permitted rate, was not considered representative of normal operation.

YEAR	ANNUAL HOURS	RATE (TPH)	EMISSIONS (lb/hr)	
			SO2	SAM
1994	8400+	69.4	250.5	4.16
1995	8194	59.7	NA	NA
1996	8400+	67.8	212.9	2.71

* USE 1994 and 1996 data.

SO_2 = (250.5 + 212.9)/2 lbs/hr
= 231.7 lbs/hr
x 8400 hrs/yr x ton/2000 lbs
= 973 TPY

SAM = (4.16 + 2.71)/2 lbs/hr
= 3.44 lbs/hr
x 8400 hrs/yr x ton/2000 lbs
= 14.4 TPY

NOx = (69.4 + 67.8)/2 TPH x 0.12 lb NOx/ton acid
= 8.2 lbs/hr
x 8400 hrs/yr x ton/2000 lbs
= 34.6 TPY

3.0 PROPOSED EMISSION RATE CALCULATIONS:

SO_2 = 283.3 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 1241 TPY

SAM = 10.6 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 46.5 TPY

NOx = 8.5 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 37.2 TPY

4.0 NET ANNUAL EMISSION CHANGES

Net Emission Change = Contemporaneous + Proposed - Actual

There are no contemporaneous emissions. By adding all the values from the information above, the net emissions increases as a result of the proposed project are as follows:

SO2 = (1241 - 973) TPY = 268 TPY

SAM = (46.5 - 14.4) TPY = 32.1 TPY

NOx = (37.2 - 34.6) TPY = 2.6 TPY

NOTE : COPIES OF THE CURRENT AIR PERMITS AND COMPLIANCE TEST DATA ARE NOT ATTACHED HEREIN AS THIS INFORMATION IS ALREADY IN DEP FILES.

APPENDIX 2

MODELING OUTPUT
(SAMPLE)

APPENDIX 2

```
) STARTING
  TITLEONE  MULBERRY PHOSPHATES SCREEN FOR CLASS 1 SIA SO2 OP HR INCRESE MET=89
  MODELOPT  DFAULT CONC RURAL
  AVERTIME  PERIOD
  POLLUTID  SO2
  RUNORNOT  RUN
  ERRORFIL  ERRORS.OUT
) FINISHED

) STARTING

  LOCATION     SAP_N    POINT        0.00     0.00
               SAP_P    POINT        0.00     0.00

  POINT:    SRCID        QS           HS        TS       VS        DS
  SRCPARAM    SAP_N    -34.23        60.96     343.2    10.01      2.13
              SAP_P     35.70        60.96     343.2    10.01      2.13

  BUILDHGT SAP_N-SAP_P    36*21.03
  BUILDWID SAP_N-SAP_P    36*173.74

  SRCGROUP ALL
  FINISHED

  STARTING
  CLASS 1 Receptors
  DISCCART              -66400.          80500.
                        -66400.          82500.
                        -66400.          84600.
                        -66000.          86700.
                        -64700.          88800.
                        -63700.          91000.
                        -63000.          93100.
                        -64300.          95400.
                        -65600.          98200.
                        -67700.          98200.
                        -70200.          98200.
                        -72700.          98200.
                        -75200.          98200.

  FINISHED

  STARTING
  INPUTFIL  D:\ISC3\TAMPA89.ASC
  ANEMHGHT   6.700 METERS
  SURFDATA  12842      1989  TAMPA_IA FL
  UAIRDATA  12842      1989  RUSKIN_NWS FL
  FINISHED

  STARTING
  RECTABLE  ALLAVE  FIRST-SECOND
  FINISHED

**********************************
* SETUP Finishes Successfully ***
**********************************

** ISCST3 - VERSION 96113 ***    ***  MULBERRY PHOSPHATES SCREEN FOR CLASS 1 SIA SO2 OP HR INCRESE MET=89 ***        01/20/97
                                 ***                                                                  ***        17:02:28
                                                                                                                 PAGE    1

MODELOPTs: CONC                        RURAL  FLAT          DFAULT

                                     ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

Intermediate Terrain Processing is Selected

Model Is Setup For Calculation of Average CONCentration Values.

--  SCAVENGING/DEPOSITION LOGIC --
Model Uses NO DRY DEPLETION.  DDPLETE =  F
Model Uses NO WET DEPLETION.  WDPLETE =  F
NO WET SCAVENGING Data Provided.
Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

Model Uses RURAL Dispersion.

Model Uses Regulatory DEFAULT Options:
        1. Final Plume Rise.
        2. Stack-tip Downwash.
        3. Buoyancy-induced Dispersion.
        4. Use Calms Processing Routine.
        5. Not Use Missing Data Processing Routine.
```

6. Default Wind Profile Exponents.
7. Default Vertical Potential Temperature Gradients.
8. "Upper Bound" Values for Supersquat Buildings.
9. No Exponential Decay for RURAL Mode

lodel Assumes Receptors on FLAT Terrain.

lodel Assumes No FLAGPOLE Receptor Heights.

lodel Calculates PERIOD Averages Only

his Run Includes: 2 Source(s); 1 Source Group(s); and 13 Receptor(s)

he Model Assumes A Pollutant Type of: SO2

lodel Set To Continue RUNning After the Setup Testing.

utput Options Selected:
Model Outputs Tables of PERIOD Averages by Receptor
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

OTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

isc. Inputs: Anem. Hgt. (m) = 6.70 ; Decay Coef. = 0.0000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

nput Runstream File: MLB89C1.INP ; **Output Print File: MLB89C1.OUT
etailed Error/Message File: ERRORS.OUT

ODELOPTs: CONC RURAL FLAT DFAULT

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
AP_N	0	-.34230E+02	0.0	0.0	0.0	60.96	343.20	10.01	2.13	YES	
AP_P	0	0.35700E+02	0.0	0.0	0.0	60.96	343.20	10.01	2.13	YES	

ODELOPTs: CONC RURAL FLAT DFAULT

*** SOURCE IDs DEFINING SOURCE GROUPS ***

UP ID SOURCE IDs

L SAP_N , SAP_P ,

ODELOPTs: CONC RURAL FLAT DFAULT

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

RCE ID: SAP_N

V	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	21.0,	173.7,	0	2	21.0,	173.7,	0	3	21.0,	173.7,	0	4	21.0,	173.7,	0	5	21.0,	173.7,	0	6	21.0,	173.7,	0
7	21.0,	173.7,	0	8	21.0,	173.7,	0	9	21.0,	173.7,	0	10	21.0,	173.7,	0	11	21.0,	173.7,	0	12	21.0,	173.7,	0
3	21.0,	173.7,	0	14	21.0,	173.7,	0	15	21.0,	173.7,	0	16	21.0,	173.7,	0	17	21.0,	173.7,	0	18	21.0,	173.7,	0
9	21.0,	173.7,	0	20	21.0,	173.7,	0	21	21.0,	173.7,	0	22	21.0,	173.7,	0	23	21.0,	173.7,	0	24	21.0,	173.7,	0
5	21.0,	173.7,	0	26	21.0,	173.7,	0	27	21.0,	173.7,	0	28	21.0,	173.7,	0	29	21.0,	173.7,	0	30	21.0,	173.7,	0
1	21.0,	173.7,	0	32	21.0,	173.7,	0	33	21.0,	173.7,	0	34	21.0,	173.7,	0	35	21.0,	173.7,	0	36	21.0,	173.7,	0

RCE ID: SAP_P

V	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	21.0,	173.7,	0	2	21.0,	173.7,	0	3	21.0,	173.7,	0	4	21.0,	173.7,	0	5	21.0,	173.7,	0	6	21.0,	173.7,	0

7 21.0, 173.7, 0	8 21.0, 173.7, 0	9 21.0, 173.7, 0	10 21.0, 173.7, 0	11 21.0, 173.7, 0	12 21.0, 173.7, 0
13 21.0, 173.7, 0	14 21.0, 173.7, 0	15 21.0, 173.7, 0	16 21.0, 173.7, 0	17 21.0, 173.7, 0	18 21.0, 173.7, 0
19 21.0, 173.7, 0	20 21.0, 173.7, 0	21 21.0, 173.7, 0	22 21.0, 173.7, 0	23 21.0, 173.7, 0	24 21.0, 173.7, 0
25 21.0, 173.7, 0	26 21.0, 173.7, 0	27 21.0, 173.7, 0	28 21.0, 173.7, 0	29 21.0, 173.7, 0	30 21.0, 173.7, 0
31 21.0, 173.7, 0	32 21.0, 173.7, 0	33 21.0, 173.7, 0	34 21.0, 173.7, 0	35 21.0, 173.7, 0	36 21.0, 173.7, 0

MODELOPTs: CONC RURAL FLAT DFAULT

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZFLAG)
(METERS)

(-66400.0,	80500.0,	0.0,	0.0);	(-66400.0,	82500.0,	0.0,	0.0);
(-66400.0,	84600.0,	0.0,	0.0);	(-66000.0,	86700.0,	0.0,	0.0);
(-64700.0,	88800.0,	0.0,	0.0);	(-63700.0,	91000.0,	0.0,	0.0);
(-63000.0,	93100.0,	0.0,	0.0);	(-64300.0,	95400.0,	0.0,	0.0);
(-65600.0,	98200.0,	0.0,	0.0);	(-67700.0,	98200.0,	0.0,	0.0);
(-70200.0,	98200.0,	0.0,	0.0);	(-72700.0,	98200.0,	0.0,	0.0);
(-75200.0,	98200.0,	0.0,	0.0);				

MODELOPTs: CONC RURAL FLAT DFAULT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

MODELOPTs: CONC RURAL FLAT DFAULT

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: D:\ISC3\TAMPA89.ASC
SURFACE STATION NO.: 12842
NAME: TAMPA_IA
YEAR: 1989

FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
UPPER AIR STATION NO.: 12842
NAME: RUSKIN_NWS
YEAR: 1989

YEAR	MONTH	DAY	HOUR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-O (M)	IPCODE	PRATE (mm/HR)
89	1	1	1	181.0	1.00	293.2	6	995.0	590.0	0.0000	0.0	0.0000	0	0.00
89	1	1	2	338.0	2.06	293.7	5	995.0	590.0	0.0000	0.0	0.0000	0	0.00
89	1	1	3	4.0	1.54	293.7	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	4	13.0	1.54	293.2	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	5	353.0	2.06	293.2	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	6	352.0	1.54	292.6	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	7	355.0	2.06	292.6	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	8	333.0	2.06	292.0	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	9	337.0	2.06	293.2	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	10	351.0	2.57	294.3	3	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	11	24.0	3.09	298.2	3	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	12	6.0	4.12	297.6	3	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	13	3.0	5.14	299.3	3	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	14	9.0	5.14	299.3	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	15	12.0	4.63	298.7	3	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	16	24.0	3.60	298.7	3	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	17	41.0	3.60	297.6	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	18	57.0	3.60	295.4	5	994.0	992.0	0.0000	0.0	0.0000	0	0.00
89	1	1	19	64.0	3.09	294.3	6	990.0	980.0	0.0000	0.0	0.0000	0	0.00
89	1	1	20	27.0	2.57	293.7	6	987.0	969.0	0.0000	0.0	0.0000	0	0.00
89	1	1	21	20.0	2.57	293.2	5	984.0	958.0	0.0000	0.0	0.0000	0	0.00
89	1	1	22	92.0	3.09	293.2	4	980.0	980.0	0.0000	0.0	0.0000	0	0.00
89	1	1	23	110.0	1.54	292.6	5	977.0	936.0	0.0000	0.0	0.0000	0	0.00
89	1	1	24	70.0	2.06	292.6	4	973.0	973.0	0.0000	0.0	0.0000	0	0.00

NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

MODELOPTs: CONC RURAL FLAT DFAULT

*** THE PERIOD (8760 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): SAP_N , SAP_P ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
-66400.00	80500.00	0.00147	-66400.00	82500.00	0.00145
-66400.00	84600.00	0.00144	-66000.00	86700.00	0.00143
-64700.00	88800.00	0.00149	-63700.00	91000.00	0.00157
-63000.00	93100.00	0.00159	-64300.00	95400.00	0.00155
-65600.00	98200.00	0.00151	-67700.00	98200.00	0.00148
-70200.00	98200.00	0.00139	-72700.00	98200.00	0.00130
-75200.00	98200.00	0.00124			

MODELOPTs: CONC RURAL FLAT DFAULT

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
1ST HIGHEST VALUE IS	0.00159	AT (-63000.00, 93100.00, 0.00, 0.00)	DC	NA
2ND HIGHEST VALUE IS	0.00157	AT (-63700.00, 91000.00, 0.00, 0.00)	DC	NA
3RD HIGHEST VALUE IS	0.00155	AT (-64300.00, 95400.00, 0.00, 0.00)	DC	NA
4TH HIGHEST VALUE IS	0.00151	AT (-65600.00, 98200.00, 0.00, 0.00)	DC	NA
5TH HIGHEST VALUE IS	0.00149	AT (-64700.00, 88800.00, 0.00, 0.00)	DC	NA
6TH HIGHEST VALUE IS	0.00148	AT (-67700.00, 98200.00, 0.00, 0.00)	DC	NA

* RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR

MODELOPTs: CONC RURAL FLAT DFAULT

* Message Summary : ISCST3 Model Execution ***

-------- Summary of Total Messages --------

Total of 0 Fatal Error Message(s)
Total of 0 Warning Message(s)
Total of 524 Informational Message(s)

Total of 522 Calm Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
*** NONE ***

****
*** ISCST3 Finishes Successfully ***
****

```
STARTING
TITLEONE  MULBERRY PHOSPHATES SCREEN FOR CLASS 2 SIA SO2 OP HR INCRESE MET=89
MODELOPT  DFAULT CONC RURAL
AVERTIME  PERIOD
POLLUTID  SO2
RUNORNOT  RUN
ERRORFIL  ERRORS.OUT
FINISHED

STARTING

LOCATION    SAP_N    POINT        0.00     0.00
            SAP_P    POINT        0.00     0.00

POINT:   SRCID        QS          HS         TS      VS       DS
SRCPARAM   SAP_N   -34.23        60.96      343.2   10.01     2.13
           SAP_P    35.70        60.96      343.2   10.01     2.13

BUILDHGT SAP_N-SAP_P    36*21.03
BUILDWID SAP_N-SAP_P    36*173.74

SRCGROUP ALL
FINISHED

STARTING
RECEPTRORS STARTING AT SR60 HEADING NORTH
DISCCART                    0.            700.
                            0.            800.
                            0.            900.
                            0.           1000.
                            0.           1100.
                            0.           1200.
                            0.           1300.
                            0.           1400.
                            0.           1500.
                            0.           1600.
                            0.           1700.
                            0.           1800.
                            0.           1900.
                            0.           2000.
                            0.           2500.
                            0.           3000.
                            0.           4000.
                            0.           5000.
                            0.           6000.
                            0.           7000.
                            0.           8000.
                            0.           9000.
                            0.          10000.
                            0.          15000.
                            0.          20000.
```

```
 FINISHED

 STARTING
 INPUTFIL  D:\ISC3\TAMPA89.ASC
 ANEMHGHT   6.700 METERS
 SURFDATA  12842      1989  TAMPA_IA FL
 UAIRDATA  12842      1989  RUSKIN_NWS FL
 FINISHED

 STARTING
 RECTABLE  ALLAVE  FIRST-SECOND
 FINISHED

*********************************
* SETUP Finishes Successfully ***
*********************************

** ISCST3 - VERSION 96113 ***     ***  MULBERRY PHOSPHATES SCREEN FOR CLASS 2 SIA SO2 OP HR INCRESE MET=89 ***        01/20/97
                                  ***                                                                  ***        17:02:38
                                                                                                                  PAGE    1
MODELOPTs: CONC                         RURAL  FLAT          DFAULT

                                      ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

Intermediate Terrain Processing is Selected

Model Is Setup For Calculation of Average CONCentration Values.

--  SCAVENGING/DEPOSITION LOGIC --
Model Uses NO DRY DEPLETION.  DDPLETE =  F
Model Uses NO WET DEPLETION.  WDPLETE =  F
NO WET SCAVENGING Data Provided.
Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

Model Uses RURAL Dispersion.

Model Uses Regulatory DEFAULT Options:
        1. Final Plume Rise.
        2. Stack-tip Downwash.
        3. Buoyancy-induced Dispersion.
        4. Use Calms Processing Routine.
        5. Not Use Missing Data Processing Routine.
        6. Default Wind Profile Exponents.
        7. Default Vertical Potential Temperature Gradients.
        8. "Upper Bound" Values for Supersquat Buildings.
        9. No Exponential Decay for RURAL Mode

Model Assumes Receptors on FLAT Terrain.

Model Assumes No FLAGPOLE Receptor Heights.

Model Calculates PERIOD Averages Only

This Run Includes:    2 Source(s);      1 Source Group(s); and     25 Receptor(s)

The Model Assumes A Pollutant Type of:  SO2

Model Set To Continue RUNning After the Setup Testing.

Output Options Selected:
      Model Outputs Tables of PERIOD Averages by Receptor
      Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                              m for Missing Hours
                                                              b for Both Calm and Missing Hours

Misc. Inputs:  Anem. Hgt. (m) =     6.70 ;    Decay Coef. =   0.0000     ;    Rot. Angle =     0.0
               Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
               Output Units   = MICROGRAMS/M**3

Input Runstream File: ML889C2.INP                              ;  **Output Print File: ML889C2.OUT
Detailed Error/Message File:   ERRORS.OUT
* ISCST3 - VERSION 96113 ***    ***  MULBERRY PHOSPHATES SCREEN FOR CLASS 2 SIA SO2 OP HR INCRESE MET=89 ***        01/20/97
                                ***                                                                  ***        17:02:38
                                                                                                                  PAGE    2
MODELOPTs: CONC                         RURAL  FLAT          DFAULT


                                      *** POINT SOURCE DATA ***
```

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
SAP_N	0	-.34230E+02	0.0	0.0	0.0	60.96	343.20	10.01	2.13	YES	
SAP_P	0	0.35700E+02	0.0	0.0	0.0	60.96	343.20	10.01	2.13	YES	

MODELOPTs: CONC RURAL FLAT DFAULT

*** SOURCE IDs DEFINING SOURCE GROUPS ***

OUP ID	SOURCE IDs
LL	SAP_N , SAP_P ,

MODELOPTs: CONC RURAL FLAT DFAULT

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

JRCE ID: SAP_N

FV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	21.0,	173.7,	0	2	21.0,	173.7,	0	3	21.0,	173.7,	0	4	21.0,	173.7,	0	5	21.0,	173.7,	0	6	21.0,	173.7,	0
7	21.0,	173.7,	0	8	21.0,	173.7,	0	9	21.0,	173.7,	0	10	21.0,	173.7,	0	11	21.0,	173.7,	0	12	21.0,	173.7,	0
13	21.0,	173.7,	0	14	21.0,	173.7,	0	15	21.0,	173.7,	0	16	21.0,	173.7,	0	17	21.0,	173.7,	0	18	21.0,	173.7,	0
19	21.0,	173.7,	0	20	21.0,	173.7,	0	21	21.0,	173.7,	0	22	21.0,	173.7,	0	23	21.0,	173.7,	0	24	21.0,	173.7,	0
25	21.0,	173.7,	0	26	21.0,	173.7,	0	27	21.0,	173.7,	0	28	21.0,	173.7,	0	29	21.0,	173.7,	0	30	21.0,	173.7,	0
31	21.0,	173.7,	0	32	21.0,	173.7,	0	33	21.0,	173.7,	0	34	21.0,	173.7,	0	35	21.0,	173.7,	0	36	21.0,	173.7,	0

JRCE ID: SAP_P

FV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	21.0,	173.7,	0	2	21.0,	173.7,	0	3	21.0,	173.7,	0	4	21.0,	173.7,	0	5	21.0,	173.7,	0	6	21.0,	173.7,	0
7	21.0,	173.7,	0	8	21.0,	173.7,	0	9	21.0,	173.7,	0	10	21.0,	173.7,	0	11	21.0,	173.7,	0	12	21.0,	173.7,	0
13	21.0,	173.7,	0	14	21.0,	173.7,	0	15	21.0,	173.7,	0	16	21.0,	173.7,	0	17	21.0,	173.7,	0	18	21.0,	173.7,	0
19	21.0,	173.7,	0	20	21.0,	173.7,	0	21	21.0,	173.7,	0	22	21.0,	173.7,	0	23	21.0,	173.7,	0	24	21.0,	173.7,	0
25	21.0,	173.7,	0	26	21.0,	173.7,	0	27	21.0,	173.7,	0	28	21.0,	173.7,	0	29	21.0,	173.7,	0	30	21.0,	173.7,	0
31	21.0,	173.7,	0	32	21.0,	173.7,	0	33	21.0,	173.7,	0	34	21.0,	173.7,	0	35	21.0,	173.7,	0	36	21.0,	173.7,	0

MODELOPTs: CONC RURAL FLAT DFAULT

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZFLAG)
(METERS)

(0.0,	700.0,	0.0,	0.0);	(0.0,	800.0,	0.0,	0.0);
(0.0,	900.0,	0.0,	0.0);	(0.0,	1000.0,	0.0,	0.0);
(0.0,	1100.0,	0.0,	0.0);	(0.0,	1200.0,	0.0,	0.0);
(0.0,	1300.0,	0.0,	0.0);	(0.0,	1400.0,	0.0,	0.0);
(0.0,	1500.0,	0.0,	0.0);	(0.0,	1600.0,	0.0,	0.0);
(0.0,	1700.0,	0.0,	0.0);	(0.0,	1800.0,	0.0,	0.0);
(0.0,	1900.0,	0.0,	0.0);	(0.0,	2000.0,	0.0,	0.0);
(0.0,	2500.0,	0.0,	0.0);	(0.0,	3000.0,	0.0,	0.0);
(0.0,	4000.0,	0.0,	0.0);	(0.0,	5000.0,	0.0,	0.0);
(0.0,	6000.0,	0.0,	0.0);	(0.0,	7000.0,	0.0,	0.0);
(0.0,	8000.0,	0.0,	0.0);	(0.0,	9000.0,	0.0,	0.0);
(0.0,	10000.0,	0.0,	0.0);	(0.0,	15000.0,	0.0,	0.0);
(0.0,	20000.0,	0.0,	0.0);				

MODELOPTs: CONC RURAL FLAT DFAULT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

```
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
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NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

MODELOPTs: CONC RURAL FLAT DFAULT

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: D:\ISC3\TAMPA89.ASC FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 12842 UPPER AIR STATION NO.: 12842
NAME: TAMPA_IA NAME: RUSKIN_NWS
YEAR: 1989 YEAR: 1989

YEAR	MONTH	DAY	HOUR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
89	1	1	1	181.0	1.00	293.2	6	995.0	590.0	0.0000	0.0	0.0000	0	0.00
89	1	1	2	338.0	2.06	293.7	5	995.0	590.0	0.0000	0.0	0.0000	0	0.00
89	1	1	3	4.0	1.54	293.7	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	4	13.0	1.54	293.2	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	5	353.0	2.06	293.2	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	6	352.0	1.54	292.6	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	7	355.0	2.06	292.6	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	8	333.0	2.06	292.0	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	9	337.0	2.06	293.2	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	10	351.0	2.57	294.3	3	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	11	24.0	3.09	298.2	3	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	12	6.0	4.12	297.6	3	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	13	3.0	5.14	299.3	3	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	14	9.0	5.14	299.3	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	15	12.0	4.63	298.7	3	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	16	24.0	3.60	298.7	3	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	17	41.0	3.60	297.6	4	995.0	995.0	0.0000	0.0	0.0000	0	0.00
89	1	1	18	57.0	3.60	295.4	5	994.0	992.0	0.0000	0.0	0.0000	0	0.00
89	1	1	19	64.0	3.09	294.3	6	990.0	980.0	0.0000	0.0	0.0000	0	0.00
89	1	1	20	27.0	2.57	293.7	6	987.0	969.0	0.0000	0.0	0.0000	0	0.00
89	1	1	21	20.0	2.57	293.2	5	984.0	958.0	0.0000	0.0	0.0000	0	0.00
89	1	1	22	92.0	3.09	293.2	4	980.0	980.0	0.0000	0.0	0.0000	0	0.00
89	1	1	23	110.0	1.54	292.6	5	977.0	936.0	0.0000	0.0	0.0000	0	0.00
89	1	1	24	70.0	2.06	292.6	4	973.0	973.0	0.0000	0.0	0.0000	0	0.00

* NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

MODELOPTs: CONC RURAL FLAT DFAULT

*** THE PERIOD (8760 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): SAP_N , SAP_P ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
0.00	700.00	0.10754	0.00	800.00	0.11242
0.00	900.00	0.11317	0.00	1000.00	0.11154
0.00	1100.00	0.10791	0.00	1200.00	0.10358
0.00	1300.00	0.09901	0.00	1400.00	0.09446
0.00	1500.00	0.09007	0.00	1600.00	0.08589
0.00	1700.00	0.08197	0.00	1800.00	0.07830
0.00	1900.00	0.07489	0.00	2000.00	0.07172
0.00	2500.00	0.05882	0.00	3000.00	0.04970
0.00	4000.00	0.03777	0.00	5000.00	0.03047
0.00	6000.00	0.02562	0.00	7000.00	0.02216
0.00	8000.00	0.01952	0.00	9000.00	0.01744
0.00	10000.00	0.01577	0.00	15000.00	0.01065
0.00	20000.00	0.00793			

MODELOPTs: CONC RURAL FLAT DFAULT

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

OUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
L	1ST HIGHEST VALUE IS	0.11317 AT (0.00, 900.00, 0.00, 0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.11242 AT (0.00, 800.00, 0.00, 0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.11154 AT (0.00, 1000.00, 0.00, 0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.10791 AT (0.00, 1100.00, 0.00, 0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.10754 AT (0.00, 700.00, 0.00, 0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.10358 AT (0.00, 1200.00, 0.00, 0.00)	DC	NA

** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

MODELOPTs: CONC RURAL FLAT DFAULT

* Message Summary : ISCST3 Model Execution ***

-------- Summary of Total Messages --------

Total of 0 Fatal Error Message(s)
Total of 0 Warning Message(s)
Total of 524 Informational Message(s)

Total of 522 Calm Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
*** NONE ***

****
*** ISCST3 Finishes Successfully ***
****