DER PERMIT APPLICATION TRACKING SYSTEM MASTER RECORD

FILE#000000033822 COE# DER PROCESSOR:SVEC DER OFFICE:TLH
FILE NAME:USS AGRI-CHEMICALS DATE FIRST REC: 08/14/80 APPLICATION TYPE:AC
APPL NAME:BECK, GEORGE W. APPL PHONE:(813)533-0471 PROJECT COUNTY:53
ADDR:P.O. BOX 150 CITY:BARTOW ST:FLZIP:33830
AGNT NAME:CARROLL, JAMES H. AGNT PHONE:(813)533-0471
ADDR:P.O. BOX 150 CITY:BARTOW ST:FLZIP:33830

ADDITIONAL INFO REQ: / / / / / / REC: / / / / / /
APPL COMPLETE DATE: / / COMMENTS NEC:Y DATE REQ: / / DATE REC: / /
LETTER OF INTENT NEC:Y DATE WHEN INTENT ISSUED: / / WAIVER DATE: / /

HEARING REQUEST DATES: / / / / / /
HEARING WITHDRAWN/DENIED/ORDER -- DATES: / / / / / /
HEARING ORDER OR FINAL ACTION DUE DATE: / / MANUAL TRACKING DESIRED:N
THIS RECORD HAS BEEN SUCESSFULLY ADDED 08/18/80 09:18:19
FEE PD DATE#1:08/14/80 $0020 RECEIPT#00033548 REFUND DATE: / / REFUND $
FEE PD DATE#2: / / $ RECEIPT# REFUND DATE: / / REFUND $
APPL:ACTIVE/INACTIVE/DENIED/WITHDRAWN/TRANSFERRED/EXEMPT/ISSUED:AC DATE:08/14/80
REMARKS:AUXILIARY BOILER. H'WY 630 W. AT FT. MEADE. LAT./ LON. NOT GIVEN.
UTM = 416.19 E. / 3068.65 N.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION **Nº 33544**

RECEIPT FOR APPLICATION FEES AND MISCELLANEOUS REVENUE

Received from USS AGRI-CHEMICALS Date 14 August 19[illegible]

Address Hwy 630 West, Bartow Dollars $ 120.00 ([illegible])

Applicant Name & Address [illegible] Manager

Source of Revenue

Revenue Code 0101 Application Number AC 53 [illegible]

By [illegible]

To BT 8-29-80

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

JACOB D. VARN
SECRETARY

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

August 29, 1980

Mr. George W. Beck, Manager
U.S.S. Agri-Chemicals
P. O. Box 150
Bartow, Florida 33830

Dear Mr. Beck:

The Bureau of Air Quality Management acknowledges receipt of five applications for permits to construct two sulfuric acid plants, one Auxiliary boiler and two phosphoric acid plants at U.S.S. Agri-Chemicals Ft. Meade phosphate fertilizer complex. A preliminary review of the application has been made and the technical staff has concluded that more information will be needed before these applications can be processed.

The PSD analysis has been reviewed and found complete in all but one respect. The question of meeting the Florida AAQS for SO_2 has not been addressed. It is noted that there will be an increase in the 24-hour emission rate for the new sulfuric acid plant as compared to the old one. Your analysis of the ambient impact for the new plant configuration utilized a negative emission rate for the old plant with a positive emission rate from the new plant. Although this analysis is sufficient (in this case) for estimating the PSD increment consumption, it is not sufficient to assess the impact of the new sulfuric acid plant and auxiliary boiler in combination with other SO_2 emitting sources at the facility, for Florida AAQS. We suggest that another (CRSTER) model run be made incorporating the new sulfuric acid plant along with the other SO_2 emitting sources that are present at or proposed for the facility to estimate the sulfur dioxide ambient air quality.

For the application for permits to construct the sulfuric acid plants, please answer or comment on the questions in sections VI D and E. General information may be used to answer these questions. The Bureau is interested in the efficiency being obtained by the controls on the existing plant and if any technology, other than scrubbing or double absorption, was considered for the new plant.

There is some contradiction in the data on P_2O_5 production and fluoride emissions in the application and attachment for the phosphoric acid plants. Please give the average and maximum production in tons of P_2O_5/hour for each phosphoric acid train and the maximum and average fluoride emission from each point, including the storage area, within the plants. Include emission of streams 20, 21, 22 and 23 on the flow diagram drawing and any other equipment or stream in the new plants that emits fluoride and is not vented through the scrubbers.

If you have any questions on the data requested, please contact this office. Tom Rogers should be contacted on any question related to modeling and contact Willard Hanks on the other information requested. We will resume processing your applications as soon as this information is received.

Sincerely,

Steve Smallwood

SS:dav

AC 53-33818

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Air Pollution [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [X] Construction [ ] Operation [ ] Modification

COMPANY NAME: USS Agri-Chemicals COUNTY: Polk

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) Sulfuric Acid Plant - No. 1 Train

SOURCE LOCATION: Street Highway 630 West City Ft. Meade

UTM: East 416.26 (Zone 17) North 3068.79

Latitude ____ ° ____ ' ____ "N Longitude ____ ° ____ ' ____ "W

APPLICANT NAME AND TITLE: G. W. Beck, Manager, Florida Phosphate Operations

APPLICANT ADDRESS: P.O. Box 150, Bartow, Florida 33830

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of USS Agri-Chemicals

I certify that the statements made in this application for a construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: [signature]

George W. Beck, Manager, Fla Phosphate Operations
Name and Title (Please Type)

Date: 8/5/80 Telephone No. 813-533-0471

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed: [signature]

James H. Carroll
Name (Please Type)

(Affix Seal)

USS Agri-Chemicals
Company Name (Please Type)

P. O. Box 150, Bartow, Fl 33830
Mailing Address (Please Type)

Florida Registration No. 19407 Date: 8/5/80 Telephone No. 813-533-0471

[1] See Section 17-2.02(15) and (22), Florida Administrative Code, (F.A.C.)

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

This is a double absorption sulfuric acid plant, complete with cooling water tower and boiler feedwater treatment system. Emissions of sulfur dioxide and sulfuric acid mist will be in full compliance with Federal New Source Performance Standards and Florida Emission Limiting Standards.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction March, 1981   Completion of Construction March, 1983

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Second Stage Absorber - $3,100,000

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Operating permit A053-4528, issued 11/2/77, expires 11/2/82, 1500 ton/day sulfuric acid plant. This existing plant will be shut down as soon as the new plant is tested for service.

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes __X__ No

F. Normal equipment operating time:* hrs/day 24 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr ____ ;

if seasonal, describe: ____

*Plant will be shut down only when required for repairs.

G. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? No
   a. If yes, has "offset" been applied? ____
   b. If yes, has "Lowest Achievable Emission Rate" been applied? ____
   c. If yes, list non-attainment pollutants. ____
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. Yes
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. See Attachment H
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? Yes
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

USS
Agri-Chemicals
Division of United States Steel Corporation

MAIL: P. O. BOX 150
BARTOW, FLORIDA 33830
813-533-0471

August 5, 1980

Florida Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Fl 32301

Attention: Mr. William Thomas

Re: Construction Permits
Ft. Meade Phosphate Chemical Complex

Dear Mr. Thomas:

Enclosed are four copies each of Construction Permit Applications for new Sulfuric Acid and Phosphoric Acid Plants, and an Auxiliary Boiler proposed to be constructed at the Ft. Meade plant site. The applications incorporate suggestions and requests which developed at a meeting with members of USSAC's staff in your Tallahassee offices on May 29, 1980 to discuss "draft" applications which had been submitted for comment. Since that time the new GTSP plant and storage building additions have been deleted from the project. Present plans call for continued operation of the existing GTSP plant and storage facilities.

Separate checks are included as follows for each of the individual applications.

Sulfuric Acid Plant - Train No. 1 --- $20.00
Sulfuric Acid Plant - Train No. 2 --- $20.00
Auxiliary Boiler --- $20.00
Phosphoric Acid Plant - Train A --- $40.00 (two stacks)
Phosphoric Acid Plant - Train B --- $20.00

Also enclosed is a corporate certificate of good standing.

Very truly yours,
USS AGRI-CHEMICALS

G. W. Beck
Manager Florida Phosphate Operations

GWB/tsw

enclosures

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

This is a double absorption sulfuric acid plant, complete with cooling water tower and boiler feedwater treatment system. Emissions of sulfur dioxide and sulfuric acid mist will be in full compliance with Federal New Source Performance Standards and Florida Emission Limiting Standards.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction March, 1981   Completion of Construction March, 1983

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Second Stage Absorber - $3,100,000

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Operating permit A053-4528, issued 11/2/77, expires 11/2/82, 1500 ton/day sulfuric acid plant. This existing plant will be shut down as soon as the new plant is tested for service.

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes __X__ No

F. Normal equipment operating time:* hrs/day 24 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr ____ ;

if seasonal, describe:

*Plant will be shut down only when required for repairs.

G. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? No
   a. If yes, has "offset" been applied? ____
   b. If yes, has "Lowest Achievable Emission Rate" been applied? ____
   c. If yes, list non-attainment pollutants. ____
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. Yes
3. Does the State "Prevention of Significant Deteriorietion" (PSD) requirements apply to this source? If yes, see Sections VI and VII. See Attachment H
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? Yes
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Sulfur	S	99.46	60064	Pt. 2 on Atch E

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): 60390
2. Product Weight (lbs/hr): 187110 (98% H_2SO_4)

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr *	T/yr	
SO_2	367	1355	4 lb/ton 100% H_2SO_4	367	367	1355	Pt. 5
H_2SO_4 Mist	13.75	51	0.15 lb/ton 100% H_2SO_4	13.75	13.75	51	Atch E
*Emissions control is integral to double absorption process.							

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]
2nd Stage Absorber*	SO_2	99.7	N/A	See Atch A
Mist Eliminator	H_2SO_4 Mist	99.99+	N/A	See Atch A
*SO_2 control is achieved through components integral to process.				

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g., Section 17-2.05(6) Table II, E. (1), F.A.C. – 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard

[4]Emission, if source operated without control (See Section V, Item 3)

[5]If Applicable

E. Fuels

Type (Be Specific) **	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis:

Percent Sulfur: ______ Percent Ash: ______

Density: ______ lbs/gal Typical Percent Nitrogen: ______

Heat Capacity: ______ BTU/lb ______ BTU/gal

Other Fuel Contaminants (which may cause air pollution): ______

F. If applicable, indicate the percent of fuel used for space heating. Annual Average ______ Maximum ______

G. Indicate liquid or solid wastes generated and method of disposal.

Cooling tower blowdown, boiler blowdown, and feedwater treatment unit blowdown are non-process effluents and will be discharged to the plant outfall.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 175 ft. Stack Diameter: 8.5 ft.

Gas Flow Rate: 112,123 ACFM Gas Exit Temperature: 180 °F.

Water Vapor Content: nil % Velocity: 34 FPS

SECTION IV: INCINERATOR INFORMATION

NOT APPLICABLE

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated							

Description of Waste ______

Total Weight Incinerated (lbs/hr) ______ Design Capacity (lbs/hr) ______

Approximate Number of Hours of Operation per day ______ days/week ______

Manufacturer ______

Date Constructed ______ Model No. ______

	Volume (ft)^3	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: ______________ ft. Stack Diameter ______________ Stack Temp. ______________

Gas Flow Rate: ______________ ACFM ______________ DSCFM* Velocity ______________ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [ ] Other (specify) ______________

Brief description of operating characteristics of control devices: ______________

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight – show derivation. (See Attachment B)
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.,) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made. (See Attachment B)
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test). (See Attachment B)
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.). (See Attachment B)
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency). (See Attachment B)
6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained. (See Attachment E)
7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map). (See Attachment D)
8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram. (See Attachment F)

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?
[X] Yes [ ] No

Contaminant	Rate or Concentration
Sulfur Dioxide	4 lb/ton 100% H_2SO_4 produced
H_2SO_4 Mist	0.15 lb/ton 100% H_2SO_4 produced

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy) [X] Yes [ ] No

Contaminant	Rate or Concentration
Sulfur Dioxide	4 lb/ton 100% H_2SO_4 produced
H_2SO_4 Mist	0.15 lb/ton 100% H_2SO_4 produced
(See Attachment G)	

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration
Sulfur Dioxide	4 lb/ton 100% H_2SO_4 produced
H_2SO_4 Mist	0.15 lb/ton 100% H_2SO_4 produced

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:
5. Useful Life:
6. Operating Costs:
7. Energy:
8. Maintenance Cost:
9. Emissions:

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy*: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy**: h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

*Explain method of determining efficiency.

**Energy to be reported in units of electrical power — KWH design rate.

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space and operate within proposed levels:

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device: 2nd Stage Absorber
2. Efficiency*: 99.7%
3. Capital Cost: $3,100,000
4. Life: 20 years
5. Operating Cost: N.A.
6. Energy: Self-sufficient
7. Maintenance Cost: $92,000 per year, estimated @ 3% of capital cost
8. Manufacturer: Monsanto Enviro-Chem
9. Other locations where employed on similar processes:

a.

(1) Company: W. R. Grace and Company

(2) Mailing Address: P.O. Box 471

(3) City: Bartow

(4) State: Florida 33830

(5) Environmental Manager: Mike Altenburger

(6) Telephone No.: (813) 533-2171

*Explain method of determining efficiency above. Efficiency based on sulfur loss vs. sulfur gain

(7) Emissions*:

Contaminant	Rate or Concentration
Sulfur Dioxide	4 lb/ton 100% H_2SO_4 produced
H_2SO_4 Mist	0.15 lb/ton 100% H_2SO_4 produced

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

(See Attachment C)

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

(See Attachment H)

A. Company Monitored Data

1. 0 no sites ______ TSP ______ ( ) SO^2* ______ Wind spd/dir

   Period of monitoring ___ / ___ / ___ (month day year) to ___ / ___ / ___ (month day year)

   Other data recorded ______

   Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

   a) Was instrumentation EPA referenced or its equivalent? ___ Yes ___ No

   b) Was instrumentation calibrated in accordance with Department procedures? ___ Yes ___ No ___ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. 1 Year(s) of data from 01 / 01 / 72 (month day year) to 12 / 31 / 72 (month day year)
2. Surface data obtained from (location) Tampa
3. Upper air (mixing height) data obtained from (location) Tampa
4. Stability wind rose (STAR) data obtained from (location) N/A

C. Computer Models Used

1. CRSTER (See Attachment H) Modified? If yes, attach description.
2. ______ Modified? If yes, attach description.
3. ______ Modified? If yes, attach description.
4. ______ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	0 grams/sec
SO^2	(See Attachment H) grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description on point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time. (See Attachment H)

F. Attach all other information supportive to the PSD review.

*Specify bubbler (B) or continuous (C).

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

Monsanto Enviro-Chem ATTACHMENT A

SECTION V

GUARANTEES

A. PERFORMANCE GUARANTEES

1. Contractor guarantees that the plants shall be capable of operating at their rated capacity of 4,000 short tons (100% H_2SO_4) per twenty-four (24) hour day, with all product as 98% sulfuric acid (2000 short tons per plant).

2. Contractor guarantees that the plants shall be capable of operating at 50% of rate capacity of 2,000 short tons (100% H_2SO_4) per twenty-four (24) hour day, with all product as 98% sulfuric acid (1,000 short tons per plant).

3. Contractor guarantees when each plant is operated at its capacity of 2,000 short tons (100% H_2SO_4) per twenty-four (24) hour day, that the SO_2 content in the process gas leaving the final absorption tower shall average over a two (2) hour period not to exceed 4 lbs. per ton of acid produced, and that the H_2SO_4 mist content in the process gas leaving the inter-pass and final absorption tower shall average not to exceed 0.15 lb. per ton of acid produced.

4. Contractor guarantees that the combined cooling tower blowdown and boiler blowdown will average not to exceed 500 GPM when both cooling tower and boiler are operated per vendor recommendations and with inlet well water quality as specified in Section II.

5. Contractor guarantees that the demineralizer neutralized effluent will have a pH between 6.-9.5 as measured at battery limits.

6. Contractor guarantees that the product acid concentration will be between 98.0% and 99.0% as sampled from acid plants.

Performance Tests

The demonstration of performance guarantees A-1, A-2, A-4 and A-6 require the operation of both sulfuric acid plants. These guarantees shall be demonstrated after start-up of the second plant over an operating period of three (3) substantially consecutive days.

Performance guarantees A-3 and A-6 will be demonstrated sequentially as each plant is started up.

ATTACHMENT B

(For Section V of Application)

1. Total Process Input Rate and Product Weight

(Refer to Monsanto Enviro-Chem drawing in Attachment E)

Input

At nominal capacity, plant will use 54900 lb/h liquid sulfur feedstock. Assuming maximum operating level at 10 percent above nominal capacity, a maximum liquid sulfur feedstock input of 60390 lb/h (1.1 x 10980) is needed. However, feedstock is only 99.46% pure sulfur; therefore, maximum sulfur input is 60064 lb/h (0.9946 x 60390).

Output

Nominal production capacity of 98% H_2SO_4 is 170100 lb/h. Assuming maximum operating level at 10 percent above nominal capacity and converting 98% H_2SO_4 to 100% H_2SO_4, the maximum production of 100% H_2SO_4 is 183368 lb/h (170100 x 1.1 x 0.98). Based on this figure, the following calculations can be made:

(a) Sulfur in product $= 183368 \text{ lb/h } H_2SO_4 \times \frac{32 \text{ lb S}}{98 \text{ lb } H_2SO_4}$

$= 59875 \text{ lb/h}$

(b) Sulfur loss as SO_2 $= \frac{183368 \text{ lb/h } H_2SO_4}{2000 \text{ lb/ton}} \times \frac{1 \text{ lb S}}{2 \text{ lb } SO_2} \times \frac{4 \text{ lb } SO_2}{\text{ton } H_2SO_4}$

$= 184 \text{ lb/h}$

(c) Sulfur loss as mist $= \frac{183368 \text{ lb/h } H_2SO_4}{2000 \text{ lb/ton}} \times \frac{32 \text{ lb S}}{98 \text{ lb } H_2SO_4} \times \frac{0.15 \text{ lb mist}}{\text{ton } H_2SO_4}$

$= 5 \text{ lb/h}$

(d) Total sulfur = 59875 + 184 + 5 = 60064 lb/h

2. Emission Estimate and Test Methods

(a) Basis of emission estimate - performance guarantees from Monsanto Enviro-Chem (Attachment A) which equate to meeting Federal NSPS and Florida Emission Limiting Standards.

(b) Compliance Test Methods - in accordance with 40 CFR 60, or DER/EPA approved alternate methods.

3. Basis of Potential Discharge

Potential and actual emissions are equivalent in this case since control is achieved by components integral to overall process. Actual emissions are based on performance guarantees which equate to Federal NSPS and Florida Emission Limiting Standards.

4. Design Details of Pollution Control Equipment

Design details of the second stage absorber are the proprietary information of Monsanto Enviro-Chem.

5. Efficiency of Control Devices

$$\text{Efficiency} = \frac{\text{Sulfur in Product Acid}}{\text{Sulfur Input}} = \frac{59875 \text{ lb}}{60064 \text{ lb}} = 99.7\%$$

ATTACHMENT C

(For Section VI.F.10 of Application)

REASON FOR SELECTION

The double absorption system is a proven, reliable, and widely accepted process to minimize emissions from sulfuric acid plants.

DESCRIPTION OF SYSTEM

(Starts on next page.)

DESCRIPTION OF SULFURIC ACID PRODUCTION

The principal steps in the process consist of burning sulfur (S) in air to form sulfur dioxide (SO_2), combining the sulfur dioxide with oxygen (O_2) to form sulfur trioxide (SO_3), and combining the sulfur trioxide with water (H_2O) to form a solution containing sulfuric acid (H_2SO_4). The chemical reactions are:

$$S + O_2 = SO_2$$

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

$$SO_3 + H_2O = H_2SO_4$$

The sulfur is burned with air in a horizontal spray-type sulfur burner. Before the air is admitted to the sulfur burner, it is dried by contact with 98 percent sulfuric acid.

The temperature of the SO_2 gas from the sulfur burner is higher than is required for inlet to the conversion system; therefore, the gas is cooled in a waste heat boiler, which recovers the surplus heat as by-product steam.

From the waste heat boiler, the gas flows to the first pass of the converter system where it is partially converted to sulfur trioxide gas in the presence of vanadium catalyst. The conversion reaction produces heat. Gases leaving the first converter pass flow to the superheater where they are cooled. Temperature of the gas stream downstream of the superheater is controlled in the proper range by by-passing a portion of the gas flow around the superheater. The cool gas stream flows from the superheater to the second converter pass where additional conversion of sulfur dioxide to sulfur trioxide takes place, accompanied by the generation of additional heat. Hot gases leaving the second converter pass are cooled by sending them through the tube side of the hot interpass exchanger.

Cooled gases leaving the heat exchanger flow to the third converter pass where additional conversion of sulfur dioxide to sulfur trioxide takes place. Hot gases leaving the third converter pass are cooled by sending them through the tube side of two gas heat ex-

changers, called cold interpass heat exchangers, connected in series, and the economizer.

Gas leaving the economizer flows to the interpass absorbing tower where the SO_3 in the gas stream is removed. In the interpass absorbing tower, the SO_3 does not combine directly with water, but must be combined indirectly by absorbing it in sulfuric acid where the SO_3 reacts with water in the acid. The temperature of the 98 to 99 percent H_2SO_4 circulated over the interpass absorbing tower increases due to the heat of formation and the sensible heat of the gas stream entering the tower. Acid from the bottom of the interpass absorbing tower is circulated through coolers and returned to the top of the tower. Sufficient water is added to the interpass absorption tower system to control the strength of acid circulated over the interpass tower between 98 and 99 percent. Cool gas leaving the interpass absorbing tower, containing unreacted SO_2, flows to the shell side of the cold interpass gas heat exchangers where it is heated by gases leaving the third converter pass.

From the shell side of the cold interpass heat exchangers, the gas stream flows to the hot interpass heat exchanger where it is further heated by gases flowing from the second converter pass.

The temperature downstream of the interpass heat exchanger is controlled in the proper range by by-passing a portion of gas around the shell side of the heat exchanger. From the hot interpass heat exchanger, the gas stream flows to the fourth converter pass where final conversion of SO_2 in the gas stream to SO_3 is accomplished.

The gas stream from the fourth converter pass flows to the economizer where it is cooled by boiler feedwater and then flows to the final absorbing tower. In the final absorbing tower, SO_3 in the gas stream reacts with water in the 98 to 99 percent circulating acid. The temperature of the strong acid circulated over the final absorbing tower increases due to the heat of formation and the sensible heat of the gas stream entering the tower. Acid from the bottom of the final absorbing tower is circulated through coolers and returned to the top

of the tower. Sufficient water is admitted to the final absorbing tower system to control the strength of acid circulated over the final acid tower between 98 and 99 percent. That acid produced in the final absorbing tower underflows to the drying/interpass acid pump tank.

Gas leaving the final absorbing tower flows to the atmosphere through a stack.

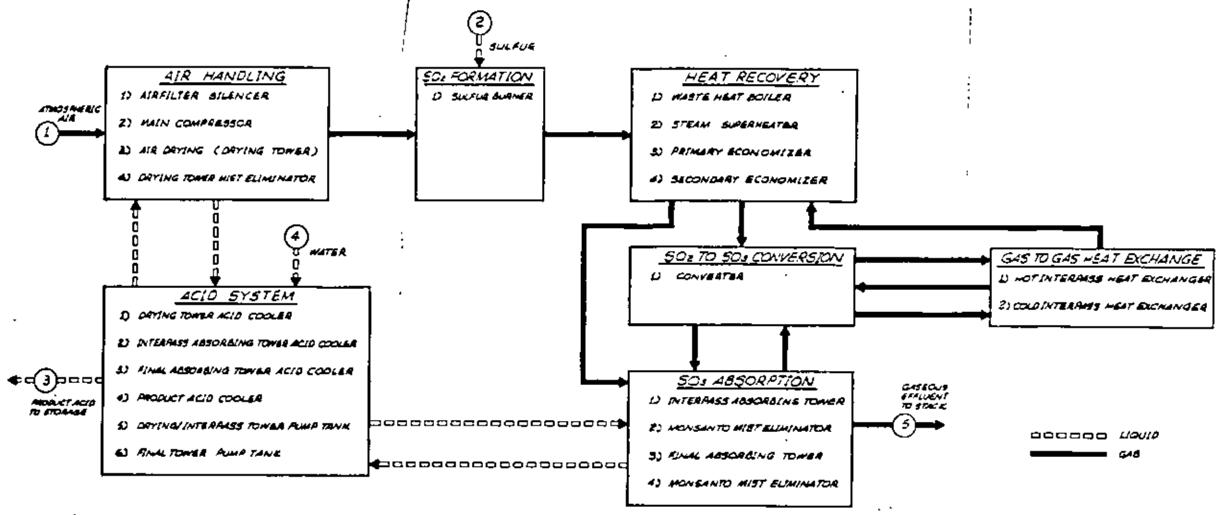
The 98 percent product acid from the drying acid system is pumped directly through a product cooler to storage.

Cooling Water System

Cooling requirements for the plant are achieved by use of cooling towers in which an upward draft is induced by fans located overhead. Water to be cooled is evenly distributed across the top of the tower and allowed to fall in evaporative contact with the upflow of air. The cooled water collects in a basin beneath the tower and is recirculated by pumps through non-contact coolers and back to the tower. The cooling towers provide non-contact cooling for other sections of the complex as well as the sulfuric acid plant.

Use of cooling towers greatly reduces the consumption of ground water. Ground water is required only for make-up of the water evaporated in the cooling process and lost on blowdown to prevent solids build-up in the cooling water system. Additionally, a very small fraction, about 0.1%, is lost by entrainment to the atmosphere.

Attachment D - Location of USS Agri-Chemicals
Fort Meade Phosphate Chemical Complex



STREAM / COMPONENT UNIT		1	5					
SO_2	SCFM		81					
SO_3	SCFM		0					
O_2	SCFM	20294	5014					
N_2	SCFM	74806	74806					
H_2O	SCFM	3360						
TOTAL	SCFM	102420	81833					
TOTAL	ACFM	115328	106479					
TEMPERATURE	°F	45	180					
STREAM / COMPONENT UNIT		2	3	4				
LIQUID		SULFUR	98%	WATER				
	LBS/MIN	415	2835	395				
	GPM	61	190	47				
TEMPERATURE	°F	270	100	45				

CLIENT: USS AGRICHEM
LOCATION: FORT MEADE, FLORIDA
PRODUCTION: 2000 STPD AS 98% ACID (100% H_2SO_4 BASIS)
NUMBER OF UNITS: TWO PLANTS
CONVERSION: 99.7 CONVERSION OF SO_2 TO SO_3 WITH 8.11 SO_2 TO CONVERTER
STANDARD CONDITIONS: 0°C AND 760 MM Hg.
EMISSIONS:
SO_2: 4 LBS SO_2/TON 100% H_2SO_4 PRODUCED
ACID MIST: LESS THAN OR EQUIVALENT TO 0.15 LBS H_2SO_4/TON 100% H_2SO_4 PRODUCED

STACK: 175' HIGH, 8'-6" I.D.

ATTACHMENT E

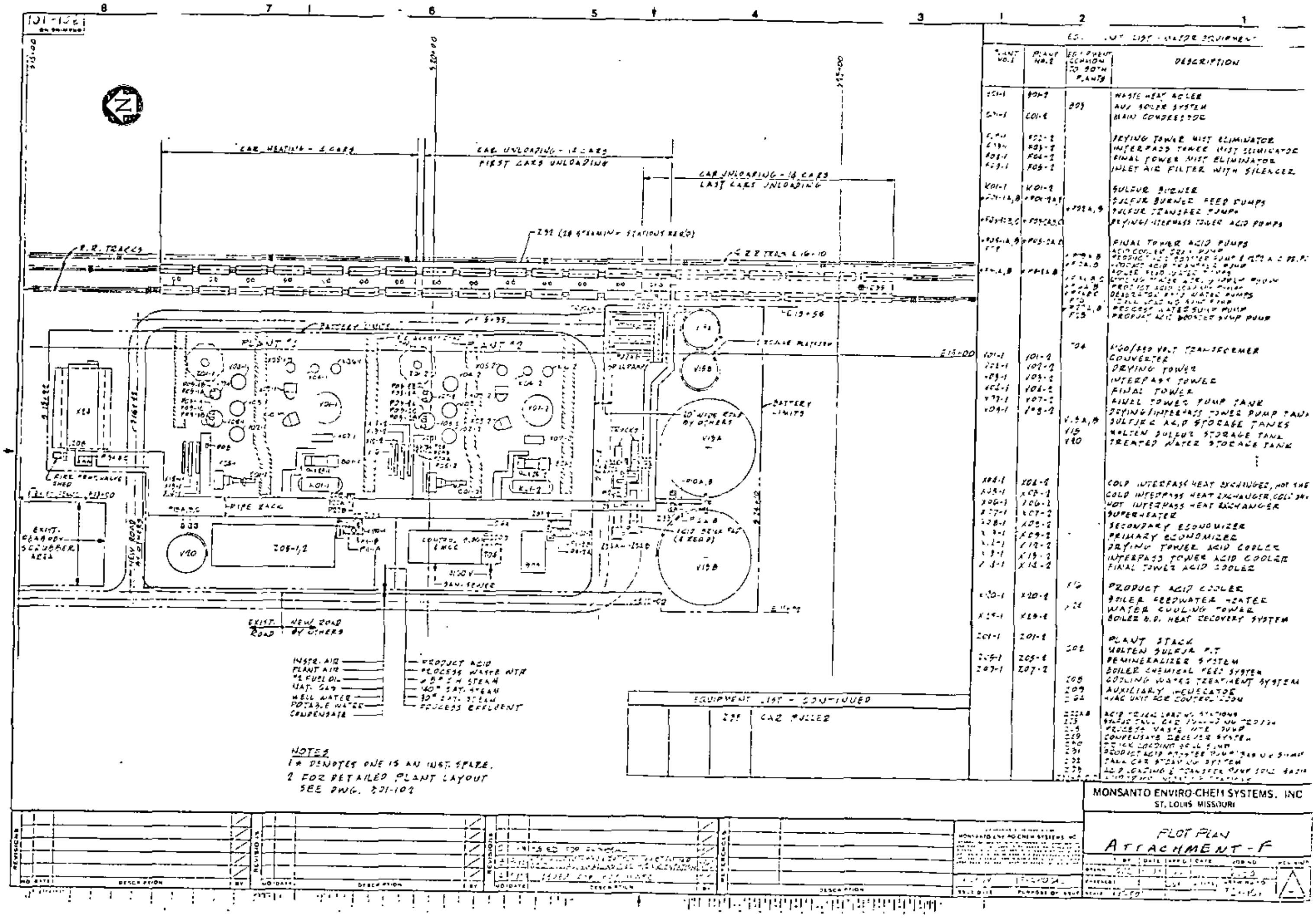
MONSANTO ENVIRO-CHEM SYSTEMS, INC.
ST. LOUIS MISSOURI

ENVIRONMENTAL
PROCESS MATERIAL FLOW DIAGRAM
SULFUR BURNING PLANT

ISSUED TO EPA

2189

321-121



CAR HEATING - 2 CARS
CAR UNLOADING - 12 CARS
FIRST CARS UNLOADING
CAR UNLOADING - 12 CARS
LAST CARS UNLOADING
R.R. TRACKS
PLANT #1
PLANT #2
BATTERY LIMITS
PIPE RACK
EXIST. ROAD
NEW ROAD BY OTHERS
INSTR. AIR
PLANT AIR
WELL WATER
CONDENSATE
PRODUCT ACID
PROCESS WASTE WTR
PROCESS EFFLUENT
EQUIPMENT LIST - CONTINUED
CAR PULLER
NOTES
1 * DENOTES ONE IS AN INST. SPARE.
2 FOR DETAILED PLANT LAYOUT SEE DWG. 201-102
DESCRIPTION
WASTE HEAT BOILER
AUX BOILER SYSTEM
MAIN COMPRESSOR
DRYING TOWER MIST ELIMINATOR
INTERPASS TOWER MIST ELIMINATOR
FINAL TOWER MIST ELIMINATOR
INLET AIR FILTER WITH SILENCER
SULFUR BURNER
SULFUR BURNER FEED PUMPS
SULFUR TRANSFER PUMPS
FINAL TOWER ACID PUMPS
CONVERTER
DRYING TOWER
INTERPASS TOWER
FINAL TOWER
FINAL TOWER PUMP TANK
SULFURIC ACID STORAGE TANKS
MOLTEN SULFUR STORAGE TANK
TREATED WATER STORAGE TANK
SUPERHEATER
SECONDARY ECONOMIZER
PRIMARY ECONOMIZER
DRYING TOWER ACID COOLER
INTERPASS TOWER ACID COOLER
FINAL TOWER ACID COOLER
PRODUCT ACID COOLER
BOILER FEEDWATER HEATER
WATER COOLING TOWER
BOILER B.D. HEAT RECOVERY SYSTEM
PLANT STACK
MOLTEN SULFUR PIT
DEMINERALIZER SYSTEM
BOILER CHEMICAL FEED SYSTEM
COOLING WATER TREATMENT SYSTEM
AUXILIARY INCINERATOR
MONSANTO ENVIRO-CHEM SYSTEMS, INC
ST. LOUIS MISSOURI
PLOT PLAN
ATTACHMENT - F

EPA-450/2-79-003

ATTACHMENT G

(For Section VI. B. of Application)

Compilation of BACT/LAER Determinations

by

Jack A. Wunderle

PEDCo Environmental, Inc.
Chester Towers
11499 Chester Rd.
Cincinnati, Ohio 45246

Contract No. 68-02-2603
Task No. 42

EPA Project Officer: Gary Rust

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air, Noise, and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

May 1979

BACT/LAER CLEARINGHOUSE REPORT

SOURCE TYPE/SIZE: PHOSPHATE FERTILIZER CHEMICAL COMPLEX EXPANSION /2000 TON/DAY

NAME/ADDRESS: OXIDENTAL CHEMICAL COMPANY, WHITE SPRINGS FL

DETERMINATION IS: CONDITIONAL/FINAL/PENDING: DATE OF ISSUE: 2/2/78 BASIS:* BACT[1]/LAER/BACT[2] (circled)
FOR NEW (circled)/MODIFIED SOURCE

BY EPA REGION IV
(Agency) (Person) (Phone)

PERMIT PARAMETERS: AFFECTED FACILITIES	THROUGHPUT CAPACITY, weight rate	POLLUTANT(S) EMITTED	EMISSION LIMIT(S) AND BASIS FOR**		CONTROL STRATEGY DESCRIPTION Equipment type, etc.	Eff.,%
New contact type		SO_2	333 lb/hr			
double absorption	2000 ton/day	H_2SO_4 Mist	12.5 lb/hr	(N)	Mist Eliminator	99+
sulfuric acid plant						
Fossil-fuel-fired	$125x10^6$ MMBtu/hr	SO_2		(B)	Low sulfur oil	
steam generator		Part		(B)		
Vacuum evaporation						
super phosphoric	700 ton/day	SiF_4	0.29 lb/hr	(N)	Venturi scrubber	
acid (SPA) plant		(silicon tetra-flouride)				

NOTES:

* Circle one. BACT-1 indicates determination made under pre-1977 amendments; BACT-2 indicates post-1977 amendments to CAA.

** Basis symbols: Use B = BACT, N = NSPS, S = SIP, L = LAER, P = PSD Increment

ATTACHMENT G (continued)

BACT/LAER CLEARINGHOUSE REPORT

SOURCE TYPE/SIZE: PHOSPHATE FERTILIZER CHEMICAL COMPLEX EXPANSION /2000TON/DAY

NAME/ADDRESS: OXIDENTAL CHEMICAL COMPANY, WHITE SPRINGS, FL

DETERMINATION IS: CONDITIONAL/FINAL/PENDING: DATE OF ISSUE: 2/2/78 BASIS:* BACT[1]/LAER/BACT[2] (BACT[2] circled)
FOR NEW/MODIFIED SOURCE (NEW circled)

BY EPA REGION IV (Agency) ______ (Person) ______ (Phone)

PERMIT PARAMETERS: AFFECTED FACILITIES	THROUGHPUT CAPACITY, weight rate	POLLUTANT(S) EMITTED	EMISSION LIMIT(S) AND BASIS FOR**	CONTROL STRATEGY DESCRIPTION: Equipment type, etc.	Eff.,%
Fossil fuel-fired		Part			
steam generator	75,000 lb/hr	SO_2	(B)	Low sulfur oil	
		SiF_4			
Phosphoric Acid Train	1500 ton/day	SiF_4	1.54 lb/hr (N)	Hoods and cyclone	99.9%
				scrubber	
		Part	46 lb/hr (N)	baghouse	99.8

NOTES:

* Circle one. BACT-1 indicates determination made under pre-1977 amendments; BACT-2 indicates post-1977 amendments to CAA.

** Basis symbols: Use B = BACT, N = NSPS, S = SIP, L = LAER, P = PSD Increment

ATTACHMENT H

PREVENTION OF SIGNIFICANT DETERIORATION

(For Section VII of Application)

1. INTRODUCTION

USS Agri-Chemicals (USSAC) is proposing to replace an existing sulfuric acid plant at its Fort Meade Phosphate Chemical Complex with a new sulfuric acid plant. This new plant will have a greater production capacity than the existing plant, but at the same time will be able to achieve a much lower sulfur dioxide (SO_2) emission rate on a pounds per ton basis. In fact, annual average SO_2 emissions from the new plant are expected to be less than those from the existing plant even though sulfuric acid production will substantially increase.

On a short-term basis, however, SO_2 emissions from the new plant can exceed those from the existing plant. At its permitted production rate of 1500 tons per day (100 percent H_2SO_4), the existing plant is allowed to emit and frequently does emit SO_2 at the rate of 10 pounds per ton (lb/ton), which is equivalent to a rate of 625 pounds per hour (lb/h) or 15,000 pounds per day (lb/d). In comparison, the new plant is expected to be able to achieve a daily production rate of up to 4400 tons. At the maximum allowable SO_2 emission rate of 4 lb/ton, maximum short-term SO_2 emissions from the new plant would be 733 lb/h and 17,600 lb/d. The primary purpose of this analysis is to assess whether or not this difference in short-term emissions might result in a significant change in ambient ground-level SO_2 concentrations.

2. ANALYSIS PROCEDURES

Model

EPA's CRSTER model was used to assess 3-hour, 24-hour, and annual average SO_2 concentrations.

Emissions Characteristics

Specific emission source characteristics for the old and new sulfuric acid plants as used for modeling purposes are listed in Attachment A (a copy from one of the modeling run printouts). The SO_2 emission rate for the existing plant was treated as a negative number since this plant will be replaced by the new plant.

The only difference between these characteristics and those listed in Table 4-1 of the original permit application is that the temperature of the existing plant as used for modeling purposes is 98°F (310 K) rather than 87°F. This slight temperature change was made to ensure that stack exit temperature would never be lower than ambient temperatures. Making this change actually increases the conservatism of the analysis since it results in slightly lower concentrations attributable to the existing plant, thereby providing a greater chance for new plant concentrations to exceed existing plant concentrations.

For modeling purposes, the existing and new plant stacks were treated as though located at the same point. In reality, the new plant will be located about 200 to 300 meters southeast of the existing plant, but this distance is slight enough to be ignored.

It should also be noted that the two-stack configuration of the new plant was treated as one stack. This was done in the typical conservative fashion of assuming all SO_2 emissions are emitted at one point with a volumetric flow and velocity equal to that of one of the identical individual stacks.

Meteorological Input

The meteorological observation station normally used for central Florida modeling studies is Tampa. Following this normal practice, Tampa surface and upper air data were used for the present analysis. Although several years of Tampa data are available in the correct format for the CRSTER Model, only a single year was used. The year 1972 was selected because of the high 24-hour concentrations typically resulting from use of this data set. As will be evident when modeling results are presented, use of this single year of data is easily sufficient to show that shutting down the existing plant will offset the effect of the new plant in comparsion with PSD increments.

Receptor Grid

A point midway between the locations of the existing sulfuric acid plant and the proposed new plant was selected as the point from which SO_2 emissions originate. This point is at least 0.6 km from the nearest USSAC property line (State Road 630 to the north), and in most directions is even further away from the boundaries of USSAC-owned property. Therefore, the receptor distances evaluated through the CRSTER Model began at 0.6 km and continued outward. (The CRSTER Model establishes a polar coordinate receptor grid so that it is only necessary to specify radial distances and calculations are automatically made at ten-degree direction increments for each distance selected.)

The following distances were evaluated using the entire year of meteorological data: 0.6, 1.0, 2.0, 3.0, 4.0, 6.0, 12.0, 15.0, 20.0, 25.0, 30.0, 35.0, 40.0, 45.0, and 50.0 km. Based on the results obtained from these initial calculations, specific days were selected for additional evaluations using a smaller grid spacing. The days and receptor separation distances evaluated are shown in the attached computer printouts.

3. MODELING RESULTS

Modeling results are summarized in Table 1. Highest 3-hour, 24-hour, and annual average SO_2 concentrations are listed in comparison with PSD Class II increments, Florida ambient air quality standards (which are more restrictive than the national standards), and EPA significance levels. (Concentrations lower than these defined significance levels are considered to be inconsequential.) As can be seen, not only are the highest concentrations predicted well below the PSD Class II increments, they are also well below the significance levels. This result is attributable to the better dispersion characteristics of the new plant (taller stacks and higher exit temperature) which compensate for the greater maximum hourly emission rate.

TABLE 1

SO_2 Modeling Results

Averaging Period	Highest Predicted Concentration (µg/m3)	Distance and Direction to Highest Concentration	PSD Class II Increment (µg/m^3)	Florida Ambient Standards (µg/m^3)	EPA Significance Level (µg/m^3)
3-Hour	3[a]	3.0 km, 340°	512	1300	25
24-Hour	< 1	1.0 km, 90°	91	260	5
Annual	< 0[b]	50.0 km, 10°	20	60	1

[a] This is the highest concentration excluding one period containing two consecutive hours with calm winds.

[b] The highest annual concentration is actually a negative number, representing a decrease in concentrations. Annual concentrations are based on continuous emissions at the maximum hourly rate.

The conclusion is reached, therefore, that replacement of the existing sulfuric acid plant should not result in adverse ambient air quality effects. PSD Class II increments should not be consumed to a significant extent, and SO_2 ambient air quality standards in this designated attainment area should not be threatened as a result of the proposed project.

4. OTHER CONSIDERATIONS

GEP Stack Height

The height of the new sulfuric acid plant stacks, 175 ft, will not exceed Good Engineering Practice stack height guidelines.

Effect on PSD Class I Areas

As stated in the original permit application, the nearest PSD Class I area is located 125 km away. This large separation distance combined with the offsetting effects of shutting down the existing plant should ensure that the proposed new sulfuric acid plant will not adversely affect the nearest Class I area.

Effect on Nonattainment Areas

The nearest designated SO_2 nonattainment is in Pinellas County, approximately 80 km away. This large separation distance combined with the offsetting effects of shutting down the existing plant should ensure that the proposed new sulfuric acid plant will not contribute to a condition of nonattainment in the nearest designated SO_2 nonattainment area.

Effect on Visibility, Vegetation, and Soils

Since the predicted highest concentration differences resulting from replacement of the existing plant by the proposed new plant are below the EPA levels of significance, it is expected that the proposed change in SO_2 emissions will not have a significant impact on present conditions affecting visibility, vegetation, and soils.

Effect on Associated Growth

Since the operational labor force required for the proposed modification is only about 15 employees more than is required at present, the air quality effects of associated population, commercial, and industrial growth should be negligible.

ATTACHMENT H

PART A

Emission Source Characteristics Used in all Modeling Runs

STACK # 1--OLD SO2 STACK
STACK # 2--NEW SO2 STACK

STACK	MONTH	EMISSION RATE (GMS/SEC)	HEIGHT (METERS)	DIAMETER (METERS)	EXIT VELOCITY (M/SEC)	TEMP (DEG.K)	VOLUMETRIC FLOW (M**3/SEC)
1	ALL	-78.7500	29.00	3.02	6.77	310.00	48.49
2	ALL	92.3600	53.30	2.59	9.45	355.00	49.79

ATTACHMENT H

PART B

Concentrations at Distances of 0.6, 1.0, 2.0, 4.0, and 12.0 km
Using Entire 1972 Meteorolgoical Data Set

Note: 24-hour concentrations of 4.1667 E-32 and 3-hour concentrations of 1.0000 E-30 are presumed to represent negative concentrations which have been set to these values by initializing statements in the CRSTER Model.

PLANT NAME: FORT MEADE SULFURIC ACID   POLLUTANT: SO2   EMISSION UNITS: GM/SEC   AIR QUALITY UNITS: GM/M**3

MAXIMUM MEAN CONC= -1.1547E-07 DIRECTION= 1 DISTANCE= 12.0 KM

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	.6 KM	1.0 KM	2.0 KM	4.0 KM	12.0 KM
1	-1.10542E-05	-7.77197E-06	-2.94133E-06	-8.95733E-07	-1.15470E-07
2	-1.46742E-05	-1.03298E-05	-3.93054E-06	-1.25532E-06	-1.98908E-07
3	-1.24830E-05	-8.11257E-06	-3.13668E-06	-1.10965E-06	-2.00033E-07
4	-9.90308E-06	-5.96867E-06	-2.49501E-06	-1.04164E-06	-2.05925E-07
5	-1.16780E-05	-6.67876E-06	-2.82968E-06	-1.27302E-06	-2.93225E-07
6	-1.40093E-05	-7.68884E-06	-2.80865E-06	-1.02109E-06	-1.91637E-07
7	-1.53911E-05	-8.68870E-06	-2.99980E-06	-1.00457E-06	-1.88987E-07
8	-2.09687E-05	-1.16222E-05	-3.67459E-06	-1.02566E-06	-1.38505E-07
9	-3.42884E-05	-2.10838E-05	-6.93821E-06	-1.96792E-06	-2.61061E-07
10	-2.34083E-05	-1.42342E-05	-4.78774E-06	-1.43625E-06	-2.24421E-07
11	-1.30885E-05	-9.40348E-06	-3.86834E-06	-1.34680E-06	-2.01020E-07
12	-9.31209E-06	-6.87312E-06	-3.22213E-06	-1.43340E-06	-2.82924E-07
13	-9.58068E-06	-7.58986E-06	-3.64509E-06	-1.58522E-06	-3.25117E-07
14	-8.67399E-06	-7.52583E-06	-3.90528E-06	-2.08881E-06	-5.91310E-07
15	-8.27493E-06	-7.66021E-06	-3.78493E-06	-1.54615E-06	-2.81247E-07
16	-7.42289E-06	-6.22478E-06	-2.82652E-06	-1.21546E-06	-2.58991E-07
17	-7.20656E-06	-5.65697E-06	-2.51092E-06	-1.09590E-06	-2.61473E-07
18	-7.58701E-06	-6.44791E-06	-3.17323E-06	-1.43442E-06	-3.34403E-07
19	-5.81166E-06	-4.80295E-06	-2.35876E-06	-1.08393E-06	-2.54282E-07
20	-5.72867E-06	-4.46657E-06	-2.22037E-06	-1.00097E-06	-2.09963E-07
21	-8.36406E-06	-6.88062E-06	-3.56591E-06	-1.89453E-06	-5.51526E-07
22	-1.16052E-05	-9.43266E-06	-4.43107E-06	-1.82323E-06	-3.91715E-07
23	-1.50103E-05	-1.30771E-05	-7.06495E-06	-3.65920E-06	-9.33540E-07
24	-1.68126E-05	-1.45578E-05	-7.89537E-06	-3.93650E-06	-9.46232E-07
25	-1.78138E-05	-1.50033E-05	-8.70667E-06	-5.02639E-06	-1.41723E-06
26	-1.96873E-05	-1.65320E-05	-9.16150E-06	-4.63878E-06	-1.11971E-06
27	-2.61885E-05	-2.27847E-05	-1.25240E-05	-6.13369E-06	-1.38436E-06
28	-2.08464E-05	-1.67132E-05	-8.19345E-06	-3.97323E-06	-9.80295E-07
29	-1.57892E-05	-1.22523E-05	-6.39000E-06	-3.28791E-06	-8.50878E-07
30	-1.43464E-05	-1.06056E-05	-5.40110E-06	-3.06494E-06	-8.65826E-07
31	-1.25796E-05	-9.70860E-06	-4.78671E-06	-2.18875E-06	-5.15405E-07
32	-1.16940E-05	-8.79881E-06	-3.74055E-06	-1.34271E-06	-2.47835E-07
33	-1.22111E-05	-9.06788E-06	-4.25415E-06	-1.90688E-06	-4.31577E-07
34	-1.02747E-05	-7.66862E-06	-3.22892E-06	-1.24575E-06	-2.63563E-07
35	-7.25032E-06	-5.60549E-06	-2.53656E-06	-9.92435E-07	-1.77595E-07
36	-9.91598E-06	-7.84184E-06	-3.43708E-06	-1.26375E-06	-2.18088E-07

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 24-HOUR CONC= 2.5751E-07 DIRECTION= 9 DISTANCE= 1.0 KM DAY=249

HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	.6 KM	1.0 KM	2.0 KM	4.0 KM	12.0 KM
1	4.1667E-32 (6)	1.0753E-07 (215)	5.2191E-08 (215)	4.9553E-08 (233)	4.8874E-08 (143)
2	4.1667E-32 (1)	2.3252E-07 (215)	1.2980E-07 (215)	6.8928E-08 (215)	1.5404E-07 (237)
3	4.1667E-32 (1)	9.7767E-08 (241)	2.6331E-08 (241)	7.1846E-08 (205)	1.3901E-07 (237)
4	4.1667E-32 (1)	1.9784E-07 (241)	7.1022E-08 (241)	9.5140E-08 (150)	3.2640E-08 (237)
5	4.1667E-32 (1)	2.4011E-09 (248)	8.1338E-08 (241)	1.1342E-07 (150)	4.6776E-08 (261)
6	4.1667E-32 (1)	2.0984E-08 (248)	1.1502E-07 (215)	1.5622E-07 (216)	6.5695E-08 (244)
7	4.1667E-32 (1)	9.1052E-08 (248)	7.3394E-08 (215)	1.1630E-07 (216)	3.6355E-08 (78)
8	4.1667E-32 (1)	1.8752E-07 (248)	1.3798E-07 (248)	9.6519E-08 (195)	3.6415E-08 (53)
9	4.1667E-32 (1)	2.5751E-07 (249)	1.1164E-07 (248)	1.2315E-07 (195)	7.3483E-08 (46)
10	4.1667E-32 (1)	2.3665E-07 (189)	6.9779E-08 (189)	1.2660E-07 (87)	4.7159E-08 (87)
11	4.1667E-32 (1)	1.0963E-07 (189)	5.4455E-08 (87)	3.2143E-08 (87)	3.8896E-08 (96)
12	4.1667E-32 (1)	2.7029E-08 (150)	9.7408E-09 (87)	3.7419E-08 (112)	9.0301E-08 (184)
13	4.1667E-32 (1)	2.4551E-09 (150)	6.8074E-10 (87)	1.1327E-07 (182)	4.4795E-08 (182)
14	4.1667E-32 (1)	6.5083E-10 (247)	5.1894E-11 (247)	6.4337E-08 (194)	3.5312E-08 (208)
15	8.1251E-32 (3)	4.1667E-32 (1)	9.1201E-10 (247)	5.8791E-08 (194)	2.5405E-08 (194)
16	5.4064E-32 (304)	4.0937E-11 (163)	1.1569E-09 (247)	4.7446E-08 (189)	1.1943E-07 (48)
17	7.5937E-32 (73)	9.5234E-10 (163)	8.1939E-11 (163)	6.5331E-08 (45)	8.3112E-08 (245)
18	6.1800E-32 (290)	1.0284E-08 (163)	2.6490E-11 (265)	1.1385E-07 (245)	4.9315E-08 (245)
19	8.3333E-32 (72)	4.5719E-08 (163)	7.4300E-09 (263)	6.8235E-08 (252)	5.8084E-08 (208)
20	4.1667E-32 (1)	1.7060E-07 (163)	4.0329E-08 (163)	8.2430E-08 (252)	1.9772E-08 (193)
21	8.3084E-32 (215)	4.1667E-32 (1)	4.7816E-08 (163)	9.2082E-08 (189)	2.4883E-08 (359)
22	7.5015E-32 (119)	5.6569E-08 (186)	1.5704E-08 (158)	8.3797E-08 (283)	6.0149E-08 (363)
23	8.3333E-32 (78)	1.5726E-07 (186)	8.2974E-08 (186)	1.3909E-07 (283)	5.1370E-08 (283)
24	8.3333E-32 (75)	8.2016E-08 (248)	2.1806E-08 (248)	1.5150E-07 (237)	4.8484E-08 (237)
25	8.3333E-32 (75)	8.3333E-32 (75)	8.3333E-32 (75)	9.6259E-08 (363)	4.1879E-08 (363)
26	1.1096E-31 (215)	8.3333E-32 (75)	2.6479E-11 (214)	8.7529E-08 (323)	5.8262E-08 (323)
27	8.3333E-32 (211)	8.3333E-32 (211)	8.3333E-32 (211)	3.1747E-10 (64)	4.6778E-08 (141)
28	4.1667E-32 (2)	4.1667E-32 (2)	8.3333E-32 (98)	3.3382E-08 (253)	3.5232E-08 (237)
29	4.1667E-32 (5)	4.1667E-32 (5)	2.0419E-10 (158)	4.8339E-08 (248)	3.9044E-08 (253)
30	4.1667E-32 (6)	4.1667E-32 (6)	3.0600E-09 (186)	6.2801E-08 (248)	1.1458E-07 (291)
31	8.3309E-32 (290)	1.4462E-11 (156)	9.0461E-13 (156)	4.5277E-08 (73)	4.5035E-08 (241)
32	4.1667E-32 (6)	4.1667E-32 (6)	2.0230E-16 (267)	5.3898E-08 (231)	3.6493E-08 (231)
33	8.3333E-32 (194)	8.3333E-32 (194)	4.1074E-16 (154)	1.0503E-07 (314)	6.8065E-08 (206)
34	4.1667E-32 (6)	4.1667E-32 (6)	1.8889E-09 (196)	7.0332E-08 (314)	9.2772E-08 (210)
35	4.1667E-32 (6)	4.1667E-32 (6)	4.1667E-32 (6)	5.6760E-08 (54)	3.9191E-08 (78)
36	4.1667E-32 (6)	1.5913E-08 (215)	9.1138E-09 (215)	5.2853E-08 (29)	4.4532E-08 (135)

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 24-HOUR CONC= 2.5379E-07 DIRECTION= 9 DISTANCE= 1.0 KM DAY=189

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	.6 KM	1.0 KM	2.0 KM	4.0 KM	12.0 KM
1	4.1667E-32 (7)	2.2506E-09 (241)	3.0114E-10 (241)	4.8109E-08 (206)	4.1214E-08 (237)
2	4.1667E-32 (6)	2.1092E-08 (241)	4.2600E-09 (241)	5.9162E-08 (210)	3.8925E-08 (124)
3	4.1667E-32 (6)	2.6900E-09 (229)	1.0273E-08 (112)	6.4362E-08 (209)	3.7804E-08 (45)
4	4.1667E-32 (6)	1.3652E-10 (248)	2.5420E-08 (112)	9.4958E-08 (195)	2.9447E-08 (162)
5	4.1667E-32 (6)	3.0824E-10 (189)	2.9068E-08 (224)	7.7962E-08 (216)	3.6300E-08 (210)
6	4.1667E-32 (6)	5.7834E-09 (222)	2.8707E-08 (224)	9.5157E-08 (194)	6.3318E-08 (216)
7	4.1667E-32 (6)	3.5817E-08 (189)	5.5517E-08 (248)	1.0354E-07 (259)	3.6210E-08 (298)
8	4.1667E-32 (2)	1.3525E-07 (189)	6.9517E-08 (249)	9.3246E-08 (259)	2.7767E-08 (234)
9	4.1667E-32 (2)	2.5379E-07 (189)	1.0707E-07 (249)	8.1506E-08 (238)	5.3964E-08 (137)
10	4.1667E-32 (2)	4.1667E-32 (1)	5.5039E-08 (150)	1.0768E-07 (195)	3.3074E-08 (222)
11	4.1667E-32 (2)	5.6851E-08 (150)	2.8067E-08 (189)	2.7085E-08 (314)	2.3925E-08 (222)
12	4.1667E-32 (2)	2.1468E-08 (189)	4.8901E-09 (189)	7.2172E-09 (222)	5.6470E-08 (250)
13	4.1667E-32 (2)	1.6630E-09 (87)	6.7514E-10 (222)	4.7066E-08 (23)	3.6461E-08 (245)
14	4.1667E-32 (3)	1.2007E-10 (87)	4.2175E-11 (222)	3.7012E-08 (182)	3.1906E-08 (194)
15	4.1667E-32 (1)	4.1667E-32 (3)	4.1667E-32 (1)	4.8778E-08 (189)	1.6563E-08 (26)
16	4.1667E-32 (1)	4.1667E-32 (1)	1.9742E-12 (163)	3.7784E-08 (240)	1.6007E-08 (245)
17	4.1667E-32 (1)	4.1667E-32 (1)	1.9331E-13 (265)	5.0990E-08 (216)	3.4079E-08 (45)
18	4.1667E-32 (1)	4.1667E-32 (1)	1.7468E-15 (158)	8.4680E-08 (247)	4.1938E-08 (208)
19	8.3296E-32 (55)	3.0153E-11 (186)	7.9920E-10 (265)	5.8731E-08 (247)	2.9058E-08 (231)
20	4.1667E-32 (3)	7.5228E-10 (186)	4.2833E-09 (265)	5.6308E-08 (189)	1.8200E-08 (205)
21	6.9290E-32 (150)	4.1667E-32 (2)	2.8272E-09 (158)	5.8691E-08 (359)	2.3677E-08 (288)
22	6.9290E-32 (195)	4.1667E-32 (1)	4.1667E-32 (1)	5.9319E-08 (265)	2.8056E-08 (283)
23	8.3269E-32 (355)	2.3460E-08 (248)	1.0393E-09 (248)	4.6469E-08 (52)	2.4056E-08 (52)
24	4.1667E-32 (2)	8.3333E-32 (75)	8.3333E-32 (75)	1.0381E-07 (283)	3.6116E-08 (283)
25	8.3084E-32 (215)	4.1667E-32 (2)	8.3333E-32 (216)	6.5432E-09 (185)	3.7467E-08 (186)
26	8.3333E-32 (75)	8.3333E-32 (215)	8.3333E-32 (75)	7.5076E-08 (237)	3.8629E-08 (363)
27	4.1667E-32 (2)	4.1667E-32 (2)	4.1667E-32 (2)	5.2316E-11 (291)	1.0079E-08 (363)
28	4.1667E-32 (5)	4.1667E-32 (5)	4.1667E-32 (2)	2.3560E-09 (291)	2.1544E-08 (253)
29	4.1667E-32 (6)	4.1667E-32 (6)	4.9651E-11 (217)	3.3762E-08 (251)	2.5666E-08 (198)
30	4.1667E-32 (7)	4.1667E-32 (7)	2.7527E-11 (156)	4.8561E-08 (251)	8.7801E-08 (185)
31	4.1667E-32 (6)	4.1667E-32 (6)	1.6467E-13 (267)	3.4496E-08 (240)	3.9906E-08 (216)
32	4.1667E-32 (7)	4.1667E-32 (7)	4.1667E-32 (6)	5.3880E-08 (314)	3.1482E-08 (75)
33	6.5493E-32 (363)	4.1667E-32 (6)	8.3333E-32 (194)	1.0210E-07 (229)	4.1783E-08 (314)
34	4.1667E-32 (7)	4.1667E-32 (7)	4.1667E-32 (6)	5.9613E-08 (218)	5.2884E-08 (103)
35	4.1667E-32 (7)	4.1667E-32 (7)	4.1667E-32 (7)	5.3016E-08 (238)	2.3506E-08 (87)
36	4.1667E-32 (7)	2.2276E-09 (248)	2.1952E-09 (111)	5.1906E-08 (87)	3.1041E-08 (259)

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 3-HOUR CONC= 2.4641E-06 DIRECTION= 22 DISTANCE= 1.0 KM DAY=189 TIME PERIOD= 5

HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	.6 KM	1.0 KM	2.0 KM	4.0 KM	12.0 KM
1	1.0000E-30 (1, 1)	8.6025E-07 (215, 4)	4.1753E-07 (215, 4)	4.0117E-07 (196, 4)	4.7383E-07 (143, 3)
2	1.0000E-30 (1, 1)	1.8602E-06 (215, 4)	1.0384E-06 (215, 4)	5.5143E-07 (215, 4)	1.2186E-06 (237, 6)
3	1.0000E-30 (1, 1)	2.0285E-06 (215, 4)	1.1361E-06 (215, 4)	6.1061E-07 (215, 4)	6.0052E-07 (237, 4)
4	1.0000E-30 (1, 1)	1.8130E-06 (241, 5)	6.2790E-07 (215, 4)	7.0544E-07 (124, 3)	2.9211E-07 (124, 3)
5	1.0000E-30 (1, 1)	1.7675E-06 (241, 5)	1.3203E-06 (206, 4)	6.9397E-07 (206, 4)	2.5878E-07 (244, 4)
6	1.0000E-30 (1, 1)	1.9752E-06 (215, 4)	1.5582E-06 (206, 4)	1.0121E-06 (216, 3)	5.2556E-07 (244, 4)
7	1.0000E-30 (1, 1)	1.9375E-06 (229, 4)	8.6676E-07 (215, 4)	5.8092E-07 (299, 4)	2.7637E-07 (78, 4)
8	1.0000E-30 (1, 1)	1.5734E-06 (248, 4)	1.1042E-06 (248, 4)	6.2934E-07 (53, 4)	2.2714E-07 (290, 4)
9	1.0000E-30 (1, 1)	2.1595E-06 (87, 4)	1.5142E-06 (87, 4)	1.2366E-06 (207, 4)	5.8786E-07 (46, 5)
10	1.0000E-30 (1, 1)	1.8932E-06 (189, 4)	1.2832E-06 (87, 4)	7.8188E-07 (242, 4)	2.8703E-07 (303, 4)
11	1.0000E-30 (1, 1)	8.7723E-07 (189, 4)	5.9638E-07 (222, 4)	4.1638E-07 (195, 4)	3.3186E-07 (96, 3)
12	1.0000E-30 (1, 1)	2.1623E-07 (150, 5)	1.7999E-07 (222, 4)	4.1828E-07 (112, 4)	7.2241E-07 (184, 4)
13	1.0000E-30 (1, 1)	2.7847E-08 (150, 5)	1.5564E-08 (222, 4)	9.0617E-07 (182, 3)	3.5836E-07 (182, 3)
14	1.0000E-30 (1, 1)	5.7570E-09 (247, 5)	2.4935E-07 (184, 4)	5.6043E-07 (194, 3)	2.8249E-07 (208, 6)
15	1.0000E-30 (1, 1)	7.1374E-08 (247, 5)	7.3128E-08 (184, 4)	4.7033E-07 (194, 3)	2.0324E-07 (194, 3)
16	1.0000E-30 (1, 1)	4.3972E-07 (247, 5)	7.0955E-08 (247, 5)	4.9012E-07 (216, 4)	7.8707E-07 (48, 6)
17	1.0000E-30 (1, 1)	1.3462E-06 (247, 5)	2.6687E-07 (247, 5)	1.2779E-06 (245, 3)	4.9261E-07 (245, 3)
18	1.0000E-30 (1, 1)	2.0480E-06 (247, 5)	4.3858E-07 (247, 5)	1.0725E-06 (245, 3)	3.9056E-07 (245, 3)
19	1.0000E-30 (1, 1)	1.7618E-06 (189, 5)	3.5019E-07 (189, 5)	4.5350E-07 (19, 4)	2.3672E-06 (236, 6)
20	1.0000E-30 (1, 1)	2.3910E-06 (189, 5)	4.8078E-07 (189, 5)	3.9630E-07 (205, 4)	7.9001E-07 (236, 6)
21	1.0000E-30 (1, 1)	2.4504E-06 (189, 5)	5.2214E-07 (189, 5)	4.9573E-07 (264, 4)	6.6774E-07 (245, 3)
22	1.0000E-30 (1, 1)	2.4641E-06 (189, 5)	6.0721E-07 (189, 5)	6.7038E-07 (283, 4)	4.8119E-07 (363, 4)
23	1.0000E-30 (1, 1)	1.7813E-06 (189, 5)	6.7227E-07 (186, 4)	1.1127E-06 (283, 4)	4.1096E-07 (283, 4)
24	1.0000E-30 (1, 1)	2.1313E-06 (186, 4)	1.1048E-06 (186, 4)	1.2120E-06 (237, 4)	3.9888E-07 (284, 3)
25	1.0000E-30 (1, 2)	1.9593E-06 (247, 5)	7.9180E-07 (186, 4)	2.0506E-06 (237, 4)	7.7825E-07 (237, 4)
26	1.0000E-30 (1, 5)	1.9375E-06 (248, 5)	6.1279E-07 (248, 5)	7.3392E-07 (323, 3)	4.6475E-07 (323, 3)
27	1.0000E-30 (1, 5)	1.0325E-06 (248, 5)	2.9087E-07 (248, 5)	7.0615E-07 (208, 5)	3.7456E-07 (141, 3)
28	1.0000E-30 (1, 5)	1.1862E-06 (163, 4)	5.8578E-07 (163, 4)	5.0779E-07 (230, 3)	3.7665E-07 (231, 3)
29	1.0000E-30 (1, 8)	1.8049E-06 (163, 4)	9.6268E-07 (163, 4)	8.7982E-07 (185, 4)	4.2127E-07 (283, 3)
30	1.0000E-30 (1, 1)	1.3645E-06 (163, 4)	6.9127E-07 (163, 4)	1.7167E-06 (185, 4)	7.1111E-07 (185, 4)
31	1.0000E-30 (1, 1)	5.1259E-07 (163, 4)	2.1689E-07 (163, 4)	1.0272E-06 (185, 4)	3.5005E-07 (185, 4)
32	1.0000E-30 (1, 1)	1.7921E-07 (248, 4)	1.0715E-06 (248, 4)	6.0956E-07 (248, 4)	2.9195E-07 (231, 4)
33	1.0000E-30 (1, 1)	1.7557E-06 (248, 4)	9.4544E-07 (248, 4)	8.2783E-07 (229, 4)	5.4982E-07 (206, 3)
34	1.0000E-30 (1, 1)	7.7812E-07 (248, 4)	3.5028E-07 (248, 4)	2.1390E-06 (236, 4)	8.2890E-07 (236, 4)
35	1.0000E-30 (1, 1)	1.6713E-07 (248, 4)	5.6669E-08 (248, 4)	4.7385E-07 (54, 4)	5.1679E-07 (236, 4)
36	1.0000E-30 (1, 1)	1.2731E-07 (215, 4)	7.2911E-08 (215, 4)	4.5750E-07 (309, 4)	6.0460E-07 (236, 4)

PLANT NAME: FORT MEADE SULFURIC ACID   POLLUTANT: SO2   EMISSION UNITS: GM/SEC   AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM   3-HOUR CONC= 2.1591E-06   DIRECTION= 9   DISTANCE= 1.0 KM   DAY=249   TIME PERIOD= 4

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	.6 KM	1.0 KM	2.0 KM	4.0 KM	12.0 KM
1	1.0000E-30 (1, 2)	1.8005E-08 (241, 5)	7.8360E-08 (211, 4)	3.9643E-07 (233, 4)	3.2971E-07 (237, 6)
2	1.0000E-30 (1, 2)	1.6875E-07 (241, 5)	1.1102E-07 (211, 4)	4.7598E-07 (210, 5)	3.1140E-07 (124, 3)
3	1.0000E-30 (1, 2)	7.8594E-07 (241, 5)	2.1065E-07 (241, 5)	5.8199E-07 (205, 4)	5.1155E-07 (237, 6)
4	1.0000E-30 (1, 2)	1.3354E-06 (215, 4)	5.6892E-07 (241, 5)	5.8175E-07 (102, 5)	2.3473E-07 (162, 3)
5	1.0000E-30 (1, 2)	1.5061E-06 (206, 4)	6.7033E-07 (241, 5)	6.6917E-07 (261, 5)	2.5768E-07 (233, 4)
6	1.0000E-30 (1, 2)	1.8067E-06 (229, 4)	9.5121E-07 (215, 4)	8.4607E-07 (206, 4)	4.6828E-07 (216, 3)
7	1.0000E-30 (1, 2)	1.8097E-06 (215, 4)	8.0344E-07 (206, 4)	5.5827E-07 (78, 4)	2.2470E-07 (24, 5)
8	1.0000E-30 (1, 2)	1.5220E-06 (249, 4)	7.8079E-07 (87, 4)	6.2112E-07 (207, 4)	2.1410E-07 (248, 4)
9	1.0000E-30 (1, 2)	2.1591E-06 (249, 4)	1.1995E-06 (248, 4)	1.1201E-06 (124, 4)	4.6105E-07 (207, 4)
10	1.0000E-30 (1, 2)	1.8777E-06 (87, 4)	9.1295E-07 (222, 4)	7.1205E-07 (124, 4)	2.8012E-07 (181, 3)
11	1.0000E-30 (1, 2)	8.1127E-07 (87, 4)	4.7511E-07 (87, 4)	3.6670E-07 (193, 4)	1.4805E-07 (184, 4)
12	1.0000E-30 (1, 2)	2.0199E-07 (189, 4)	7.6864E-08 (87, 4)	4.1191E-07 (245, 4)	4.7371E-07 (250, 4)
13	1.0000E-30 (1, 2)	2.3112E-08 (189, 4)	5.4335E-09 (87, 4)	4.0244E-07 (184, 4)	3.4459E-07 (184, 4)
14	1.0000E-30 (1, 2)	1.7025E-09 (150, 5)	4.1842E-10 (247, 5)	4.7211E-07 (102, 4)	2.5634E-07 (194, 3)
15	1.0000E-30 (1, 2)	1.0000E-30 (1, 1)	8.2430E-09 (247, 5)	3.9023E-07 (189, 5)	1.4938E-07 (362, 5)
16	1.0000E-30 (1, 2)	2.0250E-08 (184, 4)	5.8104E-09 (184, 4)	3.9047E-07 (189, 5)	2.2944E-07 (216, 4)
17	1.0000E-30 (1, 2)	7.6187E-09 (163, 4)	1.0114E-07 (263, 5)	6.0038E-07 (148, 3)	2.7144E-07 (45, 5)
18	1.0000E-30 (1, 2)	8.8074E-08 (163, 4)	2.1322E-07 (263, 5)	5.0620E-07 (193, 3)	3.3551E-07 (208, 5)
19	1.0000E-30 (1, 2)	1.5483E-06 (247, 5)	3.1493E-07 (247, 5)	3.5161E-07 (231, 4)	4.6467E-07 (208, 5)
20	1.0000E-30 (1, 2)	1.3649E-06 (163, 4)	3.2467E-07 (163, 4)	3.6153E-07 (252, 5)	1.5679E-07 (322, 3)
21	1.0000E-30 (1, 2)	1.1041E-07 (247, 5)	3.8261E-07 (163, 4)	4.9524E-07 (189, 4)	1.9907E-07 (359, 4)
22	1.0000E-30 (1, 2)	4.5967E-07 (186, 4)	1.7874E-07 (186, 4)	4.9974E-07 (189, 4)	2.2445E-07 (283, 4)
23	1.0000E-30 (1, 2)	1.4072E-06 (186, 4)	4.4167E-07 (189, 5)	5.2613E-07 (158, 5)	1.8126E-07 (163, 4)
24	1.0000E-30 (1, 2)	9.8835E-07 (247, 5)	4.0095E-07 (156, 4)	8.3051E-07 (283, 4)	3.8787E-07 (237, 4)
25	1.0000E-30 (1, 4)	1.8066E-06 (248, 5)	6.9314E-07 (156, 4)	7.7106E-07 (363, 4)	4.1789E-07 (235, 3)
26	1.0000E-30 (1, 6)	5.8619E-07 (247, 5)	4.6254E-07 (247, 5)	7.0615E-07 (208, 5)	3.0903E-07 (363, 4)
27	1.0000E-30 (1, 6)	3.5511E-07 (163, 4)	1.5523E-07 (163, 4)	5.7599E-07 (247, 4)	2.8997E-07 (323, 3)
28	1.0000E-30 (1, 7)	2.7344E-07 (248, 5)	1.9524E-07 (185, 4)	3.9970E-07 (247, 5)	3.4753E-07 (230, 4)
29	1.0000E-30 (2, 1)	3.5984E-08 (248, 5)	9.5745E-08 (154, 4)	7.0207E-07 (283, 3)	3.4857E-07 (234, 3)
30	1.0000E-30 (2, 1)	2.3532E-09 (248, 5)	7.1161E-08 (212, 5)	6.1255E-07 (241, 4)	5.5328E-07 (291, 4)
31	1.0000E-30 (1, 2)	1.1569E-10 (156, 4)	2.0218E-07 (212, 5)	5.7948E-07 (241, 4)	3.1925E-07 (216, 3)
32	1.0000E-30 (1, 2)	9.5692E-08 (163, 4)	3.3687E-07 (185, 4)	4.8929E-07 (229, 4)	2.7084E-07 (234, 4)
33	1.0000E-30 (1, 2)	8.8771E-09 (163, 4)	7.6749E-08 (186, 4)	7.5458E-07 (236, 4)	3.0123E-07 (218, 3)
34	1.0000E-30 (1, 2)	4.0922E-10 (163, 4)	4.2260E-08 (186, 4)	4.7690E-07 (218, 3)	6.9121E-07 (210, 3)
35	1.0000E-30 (1, 2)	1.0000E-30 (1, 1)	5.2351E-09 (186, 4)	4.2417E-07 (238, 4)	3.1353E-07 (78, 4)
36	1.0000E-30 (1, 2)	1.7832E-08 (248, 4)	1.9753E-08 (111, 5)	4.2647E-07 (135, 3)	4.7383E-07 (143, 3)

ATTACHMENT H

PART C

Concentrations at Distances of 3.0, 6.0, 15.0, 20.0, and 25.0 km
Using Entire 1972 Meteorological Data Set

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

MAXIMUM MEAN CONC= -2.9060E-08 DIRECTION= 1 DISTANCE= 25.0 KM

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	3.0 KM	6.0 KM	15.0 KM	20.0 KM	25.0 KM
1	-1.48482E-06	-4.28374E-07	-7.53402E-08	-4.36503E-08	-2.90598E-08
2	-2.02334E-06	-6.39973E-07	-1.35861E-07	-8.37117E-08	-5.80183E-08
3	-1.71103E-06	-6.00876E-07	-1.38348E-07	-8.64185E-08	-6.03063E-08
4	-1.50699E-06	-6.00240E-07	-1.41404E-07	-8.68955E-08	-5.96974E-08
5	-1.78153E-06	-7.74205E-07	-2.08397E-07	-1.34225E-07	-9.55128E-08
6	-1.55597E-06	-5.58626E-07	-1.35216E-07	-8.68542E-08	-6.24348E-08
7	-1.56830E-06	-5.46357E-07	-1.32489E-07	-8.42090E-08	-5.93372E-08
8	-1.74245E-06	-4.87365E-07	-9.31609E-08	-5.68413E-08	-3.93695E-08
9	-3.31836E-06	-9.39211E-07	-1.72470E-07	-1.01663E-07	-6.82819E-08
10	-2.36106E-06	-7.20764E-07	-1.54451E-07	-9.63104E-08	-6.76043E-08
11	-2.11494E-06	-6.87884E-07	-1.34138E-07	-8.02434E-08	-5.47071E-08
12	-2.03619E-06	-8.31539E-07	-1.94517E-07	-1.19885E-07	-8.28587E-08
13	-2.26734E-06	-9.25597E-07	-2.25635E-07	-1.40890E-07	-9.80789E-08
14	-2.71352E-06	-1.40127E-06	-4.28190E-07	-2.80182E-07	-2.00450E-07
15	-2.27930E-06	-8.59571E-07	-1.91797E-07	-1.16839E-07	-8.03500E-08
16	-1.72701E-06	-7.24185E-07	-1.79031E-07	-1.10791E-07	-7.62778E-08
17	-1.54011E-06	-6.73105E-07	-1.87024E-07	-1.21480E-07	-8.67394E-08
18	-2.00672E-06	-8.72049E-07	-2.40088E-07	-1.57519E-07	-1.14068E-07
19	-1.50229E-06	-6.70645E-07	-1.79044E-07	-1.13013E-07	-7.89136E-08
20	-1.41368E-06	-5.91433E-07	-1.46148E-07	-9.15255E-08	-6.39548E-08
21	-2.46230E-06	-1.28032E-06	-4.02562E-07	-2.66794E-07	-1.92760E-07
22	-2.65215E-06	-1.06227E-06	-2.79130E-07	-1.81001E-07	-1.29980E-07
23	-4.86354E-06	-2.35432E-06	-6.65179E-07	-4.27743E-07	-3.02607E-07
24	-5.34023E-06	-2.45623E-06	-6.74421E-07	-4.35613E-07	-3.11047E-07
25	-6.42198E-06	-3.38081E-06	-1.02698E-06	-6.76077E-07	-4.87211E-07
26	-6.26427E-06	-2.90478E-06	-7.96952E-07	-5.12576E-07	-3.64248E-07
27	-8.41495E-06	-3.74330E-06	-9.74235E-07	-6.18986E-07	-4.37096E-07
28	-5.39460E-06	-2.50571E-06	-6.99014E-07	-4.51265E-07	-3.20720E-07
29	-4.38583E-06	-2.10825E-06	-6.16476E-07	-4.06662E-07	-2.95276E-07
30	-3.90869E-06	-2.07130E-06	-6.25165E-07	-4.09241E-07	-2.93125E-07
31	-3.05246E-06	-1.34031E-06	-3.67169E-07	-2.36094E-07	-1.67700E-07
32	-2.06799E-06	-7.27055E-07	-1.73721E-07	-1.10188E-07	-7.78038E-08
33	-2.67768E-06	-1.15082E-06	-3.06404E-07	-1.96694E-07	-1.39564E-07
34	-1.84982E-06	-7.12698E-07	-1.89736E-07	-1.25425E-07	-9.16650E-08
35	-1.48529E-06	-5.44392E-07	-1.21541E-07	-7.45988E-08	-5.14759E-08
36	-1.93655E-06	-6.74960E-07	-1.50684E-07	-9.45823E-08	-6.70230E-08

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 24-HOUR CONC= 2.2376E-07 DIRECTION= 3 DISTANCE= 6.0 KM DAY=237

HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	3.0 KM	6.0 KM	15.0 KM	20.0 KM	25.0 KM
1	5.9935E-08 (187)	3.4566E-08 (206)	4.1166E-08 (143)	3.2179E-08 (143)	2.6190E-08 (143)
2	8.9646E-08 (215)	4.9039E-08 (162)	1.2917E-07 (237)	9.9015E-08 (237)	8.0445E-08 (237)
3	8.0115E-08 (209)	2.2376E-07 (237)	1.1172E-07 (237)	8.3951E-08 (237)	6.7161E-08 (237)
4	1.1867E-07 (150)	6.9734E-08 (237)	2.4850E-08 (237)	1.8720E-08 (195)	1.5421E-08 (195)
5	1.0146E-07 (102)	8.2520E-08 (261)	3.8026E-08 (261)	2.9079E-08 (261)	2.3649E-08 (261)
6	1.1569E-07 (194)	1.2185E-07 (216)	5.4528E-08 (244)	4.1982E-08 (244)	3.4246E-08 (244)
7	1.3639E-07 (259)	7.6044E-08 (298)	2.9652E-08 (78)	2.2874E-08 (78)	1.8760E-08 (78)
8	1.3333E-07 (195)	5.9193E-08 (53)	2.8329E-08 (53)	2.0284E-08 (53)	1.5777E-08 (53)
9	1.6461E-07 (195)	9.8483E-08 (46)	6.0008E-08 (46)	4.6232E-08 (46)	3.7775E-08 (46)
10	1.2973E-07 (195)	9.2105E-08 (87)	3.7733E-08 (87)	3.4197E-08 (183)	3.3224E-08 (183)
11	4.6094E-08 (87)	4.0477E-08 (222)	3.3956E-08 (96)	2.6708E-08 (96)	2.1983E-08 (96)
12	1.7789E-08 (112)	9.7082E-08 (184)	7.4527E-08 (184)	5.7937E-08 (184)	4.7680E-08 (184)
13	5.9097E-08 (23)	8.4169E-08 (182)	3.6581E-08 (182)	2.8183E-08 (182)	2.3027E-08 (182)
14	3.9132E-08 (198)	5.8391E-08 (194)	3.0046E-08 (208)	2.3014E-08 (208)	1.8666E-08 (208)
15	5.0797E-08 (198)	4.9517E-08 (194)	2.0410E-08 (194)	1.5354E-08 (194)	1.2285E-08 (194)
16	4.4269E-08 (240)	2.1635E-07 (48)	9.7545E-08 (48)	7.5075E-08 (48)	6.1267E-08 (48)
17	3.5210E-08 (283)	6.1954E-08 (45)	6.9360E-08 (245)	5.3377E-08 (245)	4.3437E-08 (245)
18	6.7778E-08 (247)	9.3374E-08 (245)	3.9583E-08 (245)	2.9717E-08 (245)	2.3743E-08 (245)
19	8.5858E-08 (252)	5.1229E-08 (231)	4.7641E-08 (208)	3.6394E-08 (208)	2.9500E-08 (208)
20	8.0594E-08 (252)	4.7182E-08 (252)	1.7164E-08 (260)	1.3912E-08 (260)	1.9129E-08 (236)
21	1.1325E-07 (189)	5.3101E-08 (189)	2.1454E-08 (250)	1.6997E-08 (250)	1.3957E-08 (250)
22	8.2056E-08 (283)	1.0265E-07 (363)	4.9119E-08 (363)	3.7842E-08 (363)	3.0920E-08 (363)
23	1.3176E-07 (283)	9.8223E-08 (283)	4.1735E-08 (283)	3.1953E-08 (283)	2.5990E-08 (283)
24	1.8509E-07 (237)	1.0017E-07 (237)	3.8157E-08 (237)	2.7870E-08 (237)	2.1738E-08 (237)
25	5.5488E-08 (363)	7.6239E-08 (363)	3.4459E-08 (363)	2.6846E-08 (363)	2.2151E-08 (363)
26	9.5843E-08 (237)	1.1324E-07 (323)	4.6849E-08 (323)	3.5325E-08 (323)	2.8345E-08 (323)
27	7.4231E-11 (64)	8.3577E-08 (141)	3.8405E-08 (141)	2.9803E-08 (141)	2.4498E-08 (141)
28	2.2724E-13 (52)	4.0913E-08 (253)	2.9005E-08 (237)	2.2351E-08 (237)	1.8263E-08 (237)
29	2.3278E-08 (248)	5.5140E-08 (253)	3.2101E-08 (253)	2.4657E-08 (253)	2.0058E-08 (253)
30	5.3872E-08 (251)	5.2946E-08 (248)	9.4458E-08 (291)	7.3026E-08 (291)	5.9806E-08 (291)
31	5.7020E-08 (73)	4.4551E-08 (241)	3.7297E-08 (241)	2.8743E-08 (241)	2.3466E-08 (241)
32	5.3637E-08 (315)	6.6779E-08 (231)	2.9754E-08 (231)	2.2860E-08 (231)	1.8625E-08 (231)
33	1.0991E-07 (229)	7.9807E-08 (314)	5.5928E-08 (206)	4.3295E-08 (206)	3.5461E-08 (206)
34	6.6433E-08 (314)	6.8325E-08 (210)	7.5454E-08 (210)	5.7607E-08 (210)	4.6715E-08 (210)
35	5.8293E-08 (238)	3.7945E-08 (87)	3.3730E-08 (78)	2.6073E-08 (78)	2.1303E-08 (78)
36	5.2957E-08 (224)	7.8132E-08 (135)	3.6642E-08 (135)	2.8440E-08 (135)	2.3356E-08 (135)

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 24-HOUR CONC= 1.2873E-07 DIRECTION= 7 DISTANCE= 3.0 KM DAY=209

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	3.0 KM	6.0 KM	15.0 KM	20.0 KM	25.0 KM
1	5.9818E-08 (233)	3.4406E-08 (233)	3.3709E-08 (237)	2.3874E-08 (237)	1.8123E-08 (237)
2	6.0026E-08 (210)	4.7565E-08 (215)	3.1806E-08 (124)	2.4547E-08 (124)	2.0103E-08 (124)
3	5.6692E-08 (187)	6.3256E-08 (205)	3.1630E-08 (45)	2.4615E-08 (45)	2.0136E-08 (45)
4	1.1168E-07 (195)	6.1465E-08 (195)	2.4059E-08 (195)	1.8268E-08 (245)	1.5114E-08 (245)
5	9.3912E-08 (218)	7.1674E-08 (150)	3.0326E-08 (210)	2.3400E-08 (210)	1.8977E-08 (210)
6	1.0595E-07 (299)	5.3890E-08 (299)	5.1880E-08 (216)	4.0182E-08 (216)	3.2982E-08 (216)
7	1.2873E-07 (209)	6.8550E-08 (216)	2.9148E-08 (298)	2.2067E-08 (298)	1.7876E-08 (298)
8	1.2604E-07 (185)	5.6773E-08 (216)	2.2465E-08 (234)	1.6753E-08 (234)	1.3539E-08 (248)
9	1.0098E-07 (248)	6.7417E-08 (137)	4.6817E-08 (87)	3.9944E-08 (87)	3.4169E-08 (87)
10	1.1985E-07 (87)	5.9826E-08 (195)	2.5839E-08 (183)	2.8296E-08 (87)	2.2611E-08 (87)
11	3.3943E-08 (314)	3.9863E-08 (195)	1.8597E-08 (195)	1.3553E-08 (195)	1.0632E-08 (195)
12	5.1494E-09 (87)	6.7114E-08 (250)	4.7578E-08 (250)	3.7676E-08 (250)	3.1291E-08 (250)
13	3.5931E-08 (225)	3.2617E-08 (245)	3.0709E-08 (245)	2.3742E-08 (245)	1.9126E-08 (245)
14	2.4813E-08 (23)	2.4933E-08 (182)	2.6070E-08 (194)	2.0056E-08 (194)	1.6348E-08 (194)
15	2.7664E-08 (189)	3.1467E-08 (189)	1.4763E-08 (26)	1.0575E-08 (26)	7.9781E-09 (47)
16	2.3715E-08 (189)	3.1211E-08 (189)	1.2541E-08 (245)	8.7058E-09 (216)	9.7138E-09 (216)
17	3.1932E-08 (193)	5.9449E-08 (245)	2.8008E-08 (45)	2.1770E-08 (45)	1.7921E-08 (45)
18	5.9315E-08 (157)	7.1250E-08 (208)	3.4008E-08 (208)	2.5911E-08 (208)	2.0982E-08 (208)
19	4.8767E-08 (206)	3.8701E-08 (208)	2.3692E-08 (231)	1.8202E-08 (231)	1.4830E-08 (231)
20	4.8767E-08 (206)	3.9473E-08 (189)	1.6035E-08 (193)	1.1711E-08 (193)	1.1335E-08 (260)
21	7.0864E-08 (265)	4.6699E-08 (359)	2.0288E-08 (359)	1.5587E-08 (359)	1.2700E-08 (359)
22	6.9093E-08 (265)	5.8327E-08 (283)	2.2426E-08 (189)	1.7885E-08 (189)	1.4820E-08 (189)
23	5.5732E-08 (186)	4.4799E-08 (52)	1.9425E-08 (52)	1.4695E-08 (52)	1.1824E-08 (52)
24	1.0593E-07 (283)	7.1278E-08 (283)	2.8962E-08 (283)	2.1747E-08 (283)	1.7384E-08 (283)
25	9.3984E-09 (185)	4.4402E-08 (314)	3.2033E-08 (186)	2.4400E-08 (186)	1.9582E-08 (186)
26	3.8062E-08 (185)	5.0665E-08 (363)	3.0772E-08 (363)	2.2902E-08 (363)	1.8183E-08 (363)
27	5.8881E-11 (52)	8.8261E-09 (117)	1.1056E-08 (337)	1.1135E-08 (337)	1.5358E-08 (323)
28	1.3143E-18 (289)	8.3272E-09 (291)	1.7129E-08 (253)	1.3604E-08 (363)	1.7585E-08 (363)
29	1.6373E-08 (251)	4.3540E-08 (27)	2.0785E-08 (231)	1.6127E-08 (231)	1.2920E-08 (231)
30	3.5373E-08 (248)	3.5078E-08 (251)	8.1279E-08 (185)	6.7619E-08 (185)	5.7204E-08 (185)
31	1.7827E-08 (24)	2.5427E-08 (240)	3.2435E-08 (216)	2.4783E-08 (216)	2.0101E-08 (216)
32	5.2723E-08 (240)	4.0362E-08 (314)	2.6350E-08 (75)	2.0343E-08 (75)	1.6627E-08 (75)
33	9.3665E-08 (314)	6.9857E-08 (218)	3.3847E-08 (314)	2.5768E-08 (314)	2.0831E-08 (314)
34	5.8780E-08 (240)	5.1372E-08 (314)	4.3646E-08 (103)	3.6223E-08 (147)	3.0637E-08 (147)
35	4.8449E-08 (139)	3.7938E-08 (238)	2.0276E-08 (307)	1.6367E-08 (307)	1.3469E-08 (307)
36	5.2348E-08 (87)	3.8090E-08 (87)	2.6695E-08 (259)	2.0788E-08 (259)	1.7086E-08 (259)

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 3-HOUR CONC= 4.1699E-06 DIRECTION= 19 DISTANCE= 6.0 KM DAY=236 TIME PERIOD= 6

HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	3.0 KM	6.0 KM	15.0 KM	20.0 KM	25.0 KM
1	4.7856E-07 (233, 4)	2.7653E-07 (206, 4)	3.7704E-07 (143, 3)	2.8008E-07 (143, 3)	2.2187E-07 (143, 3)
2	7.1717E-07 (215, 4)	4.0003E-07 (162, 4)	1.0242E-06 (237, 6)	7.8681E-07 (237, 6)	6.4016E-07 (237, 6)
3	7.8954E-07 (215, 4)	1.0626E-06 (237, 4)	4.8738E-07 (237, 4)	3.7225E-07 (237, 4)	3.0192E-07 (237, 4)
4	7.7856E-07 (102, 5)	5.3448E-07 (124, 3)	2.4081E-07 (124, 3)	1.8796E-07 (124, 3)	1.5524E-07 (124, 3)
5	9.0677E-07 (206, 4)	4.8178E-07 (216, 3)	2.1430E-07 (233, 4)	1.6676E-07 (233, 4)	1.4656E-07 (98, 3)
6	1.0896E-06 (206, 4)	8.6132E-07 (216, 3)	4.3623E-07 (244, 4)	3.3586E-07 (244, 4)	2.7397E-07 (244, 4)
7	6.6116E-07 (259, 4)	5.0460E-07 (78, 4)	2.2733E-07 (78, 4)	1.7688E-07 (78, 4)	1.4569E-07 (78, 4)
8	7.6575E-07 (207, 4)	4.0477E-07 (248, 4)	1.8418E-07 (290, 4)	1.3865E-07 (290, 4)	1.1202E-07 (290, 4)
9	1.3674E-06 (207, 4)	8.6081E-07 (207, 4)	4.8007E-07 (46, 5)	3.6986E-07 (46, 5)	3.0220E-07 (46, 5)
10	1.0074E-06 (242, 4)	5.3505E-07 (181, 3)	2.3630E-07 (303, 4)	1.8351E-07 (303, 4)	1.5092E-07 (303, 4)
11	5.1230E-07 (222, 4)	2.9844E-07 (184, 4)	2.8104E-07 (96, 3)	2.6484E-07 (183, 3)	2.3026E-07 (183, 3)
12	3.7458E-07 (112, 4)	7.7685E-07 (184, 4)	5.9622E-07 (184, 4)	4.6350E-07 (184, 4)	3.8144E-07 (184, 4)
13	4.7279E-07 (23, 5)	6.7335E-07 (182, 3)	2.9265E-07 (182, 3)	2.2546E-07 (182, 3)	1.8422E-07 (182, 3)
14	4.7079E-07 (282, 4)	4.8078E-07 (194, 3)	2.4037E-07 (208, 6)	1.8411E-07 (208, 6)	1.4933E-07 (208, 6)
15	4.2183E-07 (240, 5)	3.9613E-07 (194, 3)	1.6328E-07 (194, 3)	1.2283E-07 (194, 3)	1.0370E-07 (303, 3)
16	3.5813E-07 (240, 5)	1.3903E-06 (48, 6)	6.4652E-07 (48, 6)	5.0129E-07 (48, 6)	4.1152E-07 (48, 6)
17	6.3642E-07 (245, 3)	9.2802E-07 (245, 3)	4.0164E-07 (245, 3)	3.0857E-07 (245, 3)	2.5142E-07 (245, 3)
18	5.4031E-07 (245, 3)	7.6463E-07 (245, 3)	3.1378E-07 (245, 3)	2.3605E-07 (245, 3)	1.8886E-07 (245, 3)
19	3.9014E-07 (206, 4)	4.1699E-06 (236, 6)	1.9260E-06 (236, 6)	1.4766E-06 (236, 6)	1.2018E-06 (236, 6)
20	4.6753E-07 (252, 5)	1.5456E-06 (236, 6)	6.1797E-07 (236, 6)	4.4915E-07 (236, 6)	3.4996E-07 (236, 6)
21	5.8172E-07 (189, 4)	9.6478E-07 (245, 3)	5.4800E-07 (245, 3)	4.2514E-07 (245, 3)	3.4942E-07 (245, 3)
22	6.5645E-07 (283, 4)	8.2123E-07 (363, 4)	3.9295E-07 (363, 4)	3.0274E-07 (363, 4)	2.4736E-07 (363, 4)
23	1.0541E-06 (283, 4)	7.8578E-07 (283, 4)	3.3388E-07 (283, 4)	2.5562E-07 (283, 4)	2.0792E-07 (283, 4)
24	1.4807E-06 (237, 4)	8.0137E-07 (237, 4)	3.2539E-07 (284, 3)	2.4896E-07 (284, 3)	2.0227E-07 (284, 3)
25	2.4198E-06 (237, 4)	1.4327E-06 (237, 4)	6.4016E-07 (237, 4)	4.9809E-07 (237, 4)	4.1028E-07 (237, 4)
26	8.2159E-07 (247, 4)	9.0610E-07 (323, 3)	3.7395E-07 (323, 3)	2.8216E-07 (323, 3)	2.2650E-07 (323, 3)
27	7.1383E-07 (247, 4)	6.7197E-07 (141, 3)	3.0739E-07 (141, 3)	2.5017E-07 (207, 3)	2.1231E-07 (207, 3)
28	4.6128E-07 (339, 4)	5.7168E-07 (231, 3)	3.0640E-07 (231, 3)	2.7748E-07 (197, 3)	2.4911E-07 (197, 3)
29	1.0100E-06 (185, 4)	7.8835E-07 (283, 3)	3.4332E-07 (283, 3)	2.6393E-07 (283, 3)	2.1536E-07 (283, 3)
30	1.8100E-06 (185, 4)	1.2832E-06 (185, 4)	5.8784E-07 (185, 4)	4.6054E-07 (185, 4)	4.7628E-07 (137, 3)
31	1.1919E-06 (185, 4)	7.1254E-07 (185, 4)	2.7652E-07 (185, 4)	2.0301E-07 (185, 4)	1.6081E-07 (216, 3)
32	7.8283E-07 (248, 4)	5.3423E-07 (231, 4)	2.3803E-07 (231, 4)	1.8288E-07 (231, 4)	1.4900E-07 (231, 4)
33	9.7219E-07 (236, 4)	5.5886E-07 (218, 3)	4.4976E-07 (206, 3)	3.4712E-07 (206, 3)	2.8401E-07 (206, 3)
34	2.4839E-06 (236, 4)	1.5184E-06 (236, 4)	6.8292E-07 (236, 4)	5.3269E-07 (236, 4)	4.3981E-07 (236, 4)
35	4.6662E-07 (238, 4)	8.8221E-07 (236, 4)	4.0404E-07 (236, 4)	2.9287E-07 (236, 4)	2.2729E-07 (236, 4)
36	4.7422E-07 (315, 4)	6.3885E-07 (135, 3)	4.8997E-07 (236, 4)	3.7393E-07 (236, 4)	3.0354E-07 (236, 4)

Note: Day 236, Period 6 contains two consecutive hours with calm winds.

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 3-HOUR CONC= 1.2468E-06 DIRECTION= 9 DISTANCE= 3.0 KM DAY=124 TIME PERIOD= 4

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	3.0 KM	6.0 KM	15.0 KM	20.0 KM	25.0 KM
1	4.6123E-07 (196, 4)	2.7525E-07 (233, 4)	2.6967E-07 (237, 6)	1.9099E-07 (237, 6)	1.4498E-07 (237, 6)
2	4.8865E-07 (210, 5)	3.8052E-07 (215, 4)	2.5445E-07 (124, 3)	1.9638E-07 (124, 3)	1.6082E-07 (124, 3)
3	6.4091E-07 (209, 4)	7.2750E-07 (237, 6)	4.0635E-07 (237, 6)	2.9936E-07 (237, 6)	2.3537E-07 (237, 6)
4	6.2245E-07 (209, 4)	4.7215E-07 (237, 4)	1.8655E-07 (162, 3)	1.4614E-07 (245, 5)	1.2091E-07 (245, 5)
5	8.6464E-07 (261, 5)	4.7530E-07 (206, 4)	2.0648E-07 (244, 4)	1.6324E-07 (98, 3)	1.3722E-07 (233, 4)
6	9.0711E-07 (194, 4)	5.9310E-07 (206, 4)	3.8519E-07 (216, 3)	2.9970E-07 (216, 3)	2.4687E-07 (216, 3)
7	6.0412E-07 (238, 5)	4.1848E-07 (24, 5)	1.9243E-07 (290, 4)	1.5121E-07 (290, 4)	1.2255E-07 (290, 4)
8	7.6278E-07 (248, 4)	4.0423E-07 (207, 4)	1.7421E-07 (248, 4)	1.3339E-07 (248, 4)	1.0831E-07 (248, 4)
9	1.2468E-06 (124, 4)	7.8786E-07 (46, 5)	3.7819E-07 (207, 4)	2.9305E-07 (207, 4)	2.4052E-07 (207, 4)
10	8.8120E-07 (87, 4)	4.8899E-07 (303, 4)	2.1991E-07 (181, 3)	1.6741E-07 (183, 3)	1.3427E-07 (183, 3)
11	4.9054E-07 (195, 4)	2.5422E-07 (195, 4)	1.4149E-07 (183, 3)	2.1692E-07 (96, 3)	1.7724E-07 (96, 3)
12	3.2557E-07 (225, 4)	7.7087E-07 (250, 4)	3.9052E-07 (250, 4)	3.0481E-07 (250, 4)	2.5176E-07 (250, 4)
13	3.8291E-07 (225, 4)	5.8479E-07 (184, 4)	2.7456E-07 (184, 4)	2.0405E-07 (184, 4)	1.6175E-07 (184, 4)
14	4.5095E-07 (216, 4)	4.0443E-07 (102, 4)	2.0900E-07 (194, 3)	1.6057E-07 (194, 3)	1.3083E-07 (194, 3)
15	4.1348E-07 (362, 5)	2.8111E-07 (362, 5)	1.2279E-07 (38, 5)	1.1799E-07 (303, 3)	9.8276E-08 (194, 3)
16	2.2837E-07 (216, 4)	4.2871E-07 (216, 4)	1.8699E-07 (216, 4)	1.4360E-07 (216, 4)	1.1698E-07 (216, 4)
17	3.9617E-07 (59, 4)	4.9482E-07 (45, 5)	2.2328E-07 (45, 5)	1.7373E-07 (45, 5)	1.4310E-07 (45, 5)
18	4.7451E-07 (157, 5)	5.7000E-07 (208, 5)	2.7206E-07 (208, 5)	2.0729E-07 (208, 5)	1.6785E-07 (208, 5)
19	3.8559E-07 (260, 4)	4.0983E-07 (231, 4)	3.8113E-07 (208, 5)	2.9115E-07 (208, 5)	2.3600E-07 (208, 5)
20	4.4513E-07 (205, 4)	2.7345E-07 (205, 4)	1.2942E-07 (260, 3)	1.0628E-07 (260, 3)	8.7209E-08 (260, 3)
21	4.9793E-07 (264, 4)	3.7359E-07 (359, 4)	1.7163E-07 (250, 4)	1.3598E-07 (250, 4)	1.1165E-07 (250, 4)
22	5.8601E-07 (189, 4)	4.6662E-07 (283, 4)	1.7688E-07 (283, 4)	1.2989E-07 (283, 4)	1.0209E-07 (283, 4)
23	7.0179E-07 (158, 5)	3.5573E-07 (163, 4)	1.4686E-07 (163, 4)	1.1201E-07 (163, 4)	9.0806E-08 (163, 4)
24	8.4745E-07 (283, 4)	5.7022E-07 (283, 4)	3.0526E-07 (237, 4)	2.2296E-07 (237, 4)	1.7390E-07 (237, 4)
25	5.8332E-07 (247, 4)	6.3924E-07 (86, 5)	3.3624E-07 (235, 3)	2.5370E-07 (235, 3)	2.0366E-07 (235, 3)
26	7.6925E-07 (237, 4)	4.9761E-07 (208, 5)	2.4972E-07 (338, 4)	1.9448E-07 (338, 4)	1.5991E-07 (338, 4)
27	6.4250E-07 (208, 5)	6.0400E-07 (323, 3)	2.8034E-07 (207, 3)	2.3847E-07 (141, 3)	1.9600E-07 (141, 3)
28	4.0867E-07 (54, 5)	4.0204E-07 (230, 3)	2.8121E-07 (230, 4)	2.3484E-07 (231, 3)	1.9109E-07 (231, 3)
29	6.7502E-07 (163, 4)	6.8120E-07 (291, 4)	3.0430E-07 (234, 3)	2.3757E-07 (234, 3)	1.9287E-07 (234, 3)
30	7.0713E-07 (241, 4)	1.0034E-06 (291, 4)	4.5344E-07 (291, 4)	3.5095E-07 (291, 4)	3.8154E-07 (185, 4)
31	5.8042E-07 (241, 4)	4.1236E-07 (241, 4)	2.5948E-07 (216, 3)	1.9826E-07 (216, 3)	1.5901E-07 (185, 4)
32	5.6911E-07 (229, 4)	4.2671E-07 (248, 4)	2.2232E-07 (234, 4)	1.7218E-07 (234, 4)	1.4130E-07 (234, 4)
33	9.3003E-07 (229, 4)	5.5565E-07 (229, 4)	2.4687E-07 (218, 3)	1.9107E-07 (218, 3)	1.5693E-07 (229, 4)
34	4.6738E-07 (240, 5)	7.3393E-07 (308, 3)	5.6345E-07 (210, 3)	4.3157E-07 (210, 3)	3.5089E-07 (210, 3)
35	3.8760E-07 (139, 4)	3.0356E-07 (87, 4)	2.6984E-07 (78, 4)	2.0859E-07 (78, 4)	1.7043E-07 (78, 4)
36	4.3101E-07 (309, 4)	3.7644E-07 (30, 3)	3.7704E-07 (143, 3)	2.8008E-07 (143, 3)	2.2187E-07 (143, 3)

ATTACHMENT H

PART D

Concentrations at Distances of 30.0, 35.0, 40.0, 45.0, and 50.0 km
Using Entire 1972 Meteorological Data Set

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

MAXIMUM MEAN CONC= -8.6185E-09 DIRECTION= 1 DISTANCE= 50.0 KM

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	30.0 KM	35.0 KM	40.0 KM	45.0 KM	50.0 KM
1	-2.08296E-08	-1.58832E-08	-1.25602E-08	-1.02960E-08	-8.61845E-09
2	-4.29763E-08	-3.37038E-08	-2.73112E-08	-2.27748E-08	-1.93571E-08
3	-4.48737E-08	-3.52952E-08	-2.86594E-08	-2.39101E-08	-2.03253E-08
4	-4.36753E-08	-3.38080E-08	-2.70407E-08	-2.22871E-08	-1.87286E-08
5	-7.19673E-08	-5.70773E-08	-4.66320E-08	-3.91104E-08	-3.33878E-08
6	-4.77814E-08	-3.84258E-08	-3.18603E-08	-2.71317E-08	-2.35131E-08
7	-4.44445E-08	-3.51454E-08	-2.86591E-08	-2.39753E-08	-2.04274E-08
8	-2.93083E-08	-2.31347E-08	-1.89034E-08	-1.59016E-08	-1.36453E-08
9	-4.92834E-08	-3.78143E-08	-3.00546E-08	-2.46862E-08	-2.06966E-08
10	-5.07016E-08	-4.01774E-08	-3.28948E-08	-2.77112E-08	-2.37915E-08
11	-4.00627E-08	-3.11235E-08	-2.50453E-08	-2.08226E-08	-1.76665E-08
12	-6.10344E-08	-4.75129E-08	-3.82145E-08	-3.16739E-08	-2.67612E-08
13	-7.25967E-08	-5.67497E-08	-4.57905E-08	-3.80164E-08	-3.21594E-08
14	-1.51265E-07	-1.20011E-07	-9.79689E-08	-8.19560E-08	-6.97546E-08
15	-5.89175E-08	-4.56483E-08	-3.65593E-08	-3.02536E-08	-2.55227E-08
16	-5.59049E-08	-4.33952E-08	-3.47921E-08	-2.87102E-08	-2.41524E-08
17	-6.55453E-08	-5.21685E-08	-4.27632E-08	-3.59284E-08	-3.07254E-08
18	-8.75149E-08	-7.05527E-08	-5.85608E-08	-4.98206E-08	-4.31212E-08
19	-5.84623E-08	-4.56871E-08	-3.68243E-08	-3.04989E-08	-2.57319E-08
20	-4.75229E-08	-3.72606E-08	-3.01499E-08	-2.51108E-08	-2.13055E-08
21	-1.46877E-07	-1.17577E-07	-9.68068E-08	-8.15858E-08	-6.99445E-08
22	-9.90245E-08	-7.93337E-08	-6.54920E-08	-5.54628E-08	-4.78099E-08
23	-2.26512E-07	-1.78718E-07	-1.45278E-07	-1.21188E-07	-1.02927E-07
24	-2.35391E-07	-1.87420E-07	-1.53784E-07	-1.29545E-07	-1.11096E-07
25	-3.70686E-07	-2.96424E-07	-2.43911E-07	-2.05622E-07	-1.76355E-07
26	-2.74091E-07	-2.17022E-07	-1.77058E-07	-1.48340E-07	-1.26520E-07
27	-3.27584E-07	-2.58670E-07	-2.10645E-07	-1.76385E-07	-1.50410E-07
28	-2.41203E-07	-1.91058E-07	-1.55897E-07	-1.30533E-07	-1.11267E-07
29	-2.26682E-07	-1.82621E-07	-1.51425E-07	-1.28736E-07	-1.11339E-07
30	-2.21796E-07	-1.76503E-07	-1.44596E-07	-1.21391E-07	-1.03727E-07
31	-1.26164E-07	-9.99426E-08	-8.15765E-08	-6.83698E-08	-5.83317E-08
32	-5.83585E-08	-4.61534E-08	-3.76361E-08	-3.15233E-08	-2.68842E-08
33	-1.04994E-07	-8.31597E-08	-6.78793E-08	-5.68736E-08	-4.85182E-08
34	-7.10710E-08	-5.78358E-08	-4.84624E-08	-4.15977E-08	-3.63230E-08
35	-3.79060E-08	-2.94879E-08	-2.37109E-08	-1.96502E-08	-1.66046E-08
36	-5.07589E-08	-4.05556E-08	-3.34765E-08	-2.84539E-08	-2.46377E-08

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 24-HOUR CONC= 6.7889E-08 DIRECTION= 2 DISTANCE= 30.0 KM DAY=237

HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	30.0 KM	35.0 KM	40.0 KM	45.0 KM	50.0 KM
1	2.1967E-08 (143)	1.8846E-08 (143)	1.6453E-08 (143)	1.4564E-08 (143)	1.3038E-08 (143)
2	6.7889E-08 (237)	5.8812E-08 (237)	5.1933E-08 (237)	4.6533E-08 (237)	4.2178E-08 (237)
3	5.5908E-08 (237)	4.7837E-08 (237)	4.1766E-08 (237)	3.7032E-08 (237)	3.3237E-08 (237)
4	1.3168E-08 (195)	1.1525E-08 (195)	1.0271E-08 (195)	9.2812E-09 (195)	8.4780E-09 (195)
5	1.9992E-08 (261)	1.7354E-08 (261)	1.5357E-08 (261)	1.3791E-08 (261)	1.2529E-08 (261)
6	2.9004E-08 (244)	2.5209E-08 (244)	2.2328E-08 (244)	2.0064E-08 (244)	1.8235E-08 (244)
7	1.5975E-08 (78)	1.3954E-08 (78)	1.2416E-08 (78)	1.1203E-08 (78)	1.0220E-08 (78)
8	1.3001E-08 (53)	1.1131E-08 (53)	9.7720E-09 (53)	8.7262E-09 (53)	7.8897E-09 (53)
9	3.2032E-08 (46)	2.7866E-08 (46)	2.4699E-08 (46)	2.2208E-08 (46)	2.0193E-08 (46)
10	3.0401E-08 (183)	2.7358E-08 (183)	2.4663E-08 (183)	2.2347E-08 (183)	2.0367E-08 (183)
11	1.8704E-08 (96)	1.6299E-08 (96)	1.4461E-08 (96)	1.3010E-08 (96)	1.1834E-08 (96)
12	4.0680E-08 (184)	3.5580E-08 (184)	3.1689E-08 (184)	2.8616E-08 (184)	2.6124E-08 (184)
13	1.9526E-08 (182)	1.6987E-08 (182)	1.5057E-08 (182)	1.3538E-08 (182)	1.2310E-08 (182)
14	1.5726E-08 (208)	1.3601E-08 (208)	1.1992E-08 (208)	1.0729E-08 (208)	9.7108E-09 (208)
15	1.0979E-08 (48)	1.1197E-08 (48)	1.0369E-08 (48)	9.3427E-09 (48)	8.3789E-09 (48)
16	5.1898E-08 (48)	4.5110E-08 (48)	3.9957E-08 (48)	3.5906E-08 (48)	3.2634E-08 (48)
17	3.6693E-08 (245)	3.1805E-08 (245)	2.8094E-08 (245)	2.5176E-08 (245)	2.2819E-08 (245)
18	1.9733E-08 (245)	1.6855E-08 (245)	1.4688E-08 (245)	1.2997E-08 (245)	1.1641E-08 (245)
19	2.4837E-08 (208)	2.1466E-08 (208)	1.8913E-08 (208)	2.4464E-08 (236)	3.0590E-08 (236)
20	2.6894E-08 (236)	2.6583E-08 (236)	2.4508E-08 (236)	2.2155E-08 (236)	1.9969E-08 (236)
21	1.1881E-08 (250)	1.0372E-08 (250)	9.2229E-09 (250)	8.3170E-09 (250)	7.5836E-09 (250)
22	2.6219E-08 (363)	2.2809E-08 (363)	2.0217E-08 (363)	1.8178E-08 (363)	1.6529E-08 (363)
23	2.1963E-08 (283)	1.9055E-08 (283)	1.6853E-08 (283)	1.5125E-08 (283)	1.3732E-08 (283)
24	1.7679E-08 (237)	1.4803E-08 (237)	1.2662E-08 (237)	1.1011E-08 (237)	9.7006E-09 (237)
25	1.8951E-08 (363)	1.6620E-08 (363)	1.4842E-08 (363)	1.3438E-08 (363)	1.2299E-08 (363)
26	2.3658E-08 (323)	2.0292E-08 (323)	1.7755E-08 (323)	1.5774E-08 (323)	1.4185E-08 (323)
27	2.0882E-08 (141)	1.8251E-08 (141)	1.6247E-08 (141)	1.4666E-08 (141)	1.3385E-08 (141)
28	1.5841E-08 (363)	1.3910E-08 (363)	1.2391E-08 (363)	1.1158E-08 (363)	1.0161E-08 (363)
29	1.6943E-08 (253)	1.4689E-08 (253)	1.3420E-08 (47)	1.2258E-08 (47)	1.1170E-08 (47)
30	5.0805E-08 (291)	4.4263E-08 (291)	3.9283E-08 (291)	3.5502E-08 (185)	3.2525E-08 (185)
31	1.9890E-08 (241)	1.7299E-08 (241)	1.5333E-08 (241)	1.3787E-08 (241)	1.2539E-08 (241)
32	1.5749E-08 (231)	1.3663E-08 (231)	1.2077E-08 (231)	1.0830E-08 (231)	9.8210E-09 (231)
33	3.0118E-08 (206)	2.6232E-08 (206)	2.3273E-08 (206)	2.0941E-08 (206)	1.9054E-08 (206)
34	3.9362E-08 (210)	3.4055E-08 (210)	3.0040E-08 (210)	2.6893E-08 (210)	2.4358E-08 (210)
35	1.8065E-08 (78)	1.5715E-08 (78)	1.3930E-08 (78)	1.2524E-08 (78)	1.1388E-08 (78)
36	1.9887E-08 (135)	1.7633E-08 (236)	1.7660E-08 (236)	1.7193E-08 (236)	1.6551E-08 (236)

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 24-HOUR CONC= 4.9523E-08 DIRECTION= 30 DISTANCE= 30.0 KM DAY=185

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	30.0 KM	35.0 KM	40.0 KM	45.0 KM	50.0 KM
1	1.4420E-08 (237)	1.2291E-08 (107)	1.0808E-08 (107)	9.6484E-09 (107)	8.7162E-09 (107)
2	1.7089E-08 (124)	1.4904E-08 (124)	1.3244E-08 (124)	1.1937E-08 (124)	1.0880E-08 (124)
3	1.7077E-08 (45)	1.4856E-08 (45)	1.3167E-08 (45)	1.1837E-08 (45)	1.0761E-08 (45)
4	1.2856E-08 (245)	1.1196E-08 (245)	9.9298E-09 (245)	8.9323E-09 (245)	8.1251E-09 (245)
5	1.5967E-08 (210)	1.3791E-08 (210)	1.2146E-08 (210)	1.0858E-08 (210)	9.8216E-09 (210)
6	2.8083E-08 (216)	2.4521E-08 (216)	2.1808E-08 (216)	1.9669E-08 (216)	1.7937E-08 (216)
7	1.5117E-08 (298)	1.3150E-08 (298)	1.1666E-08 (298)	1.0501E-08 (298)	9.5588E-09 (298)
8	1.1410E-08 (248)	9.9026E-09 (290)	8.8563E-09 (290)	8.0087E-09 (290)	7.3109E-09 (290)
9	2.9712E-08 (87)	2.6241E-08 (87)	2.3506E-08 (87)	2.1302E-08 (87)	1.9490E-08 (87)
10	1.8797E-08 (87)	1.6055E-08 (87)	1.3989E-08 (87)	1.2376E-08 (87)	1.1082E-08 (87)
11	8.7789E-09 (195)	7.5153E-09 (195)	6.5996E-09 (195)	5.9009E-09 (195)	5.3463E-09 (195)
12	2.6850E-08 (250)	2.3582E-08 (250)	2.1075E-08 (250)	1.9087E-08 (250)	1.7472E-08 (250)
13	1.5915E-08 (245)	1.3570E-08 (245)	1.1793E-08 (245)	1.0401E-08 (245)	9.2842E-09 (245)
14	1.4458E-08 (48)	1.2752E-08 (48)	1.1282E-08 (48)	1.0081E-08 (48)	9.0999E-09 (48)
15	1.0220E-08 (194)	8.7364E-09 (194)	7.6176E-09 (194)	6.7438E-09 (194)	6.0425E-09 (194)
16	9.5234E-09 (216)	8.9497E-09 (216)	8.3161E-09 (216)	7.7082E-09 (216)	7.1527E-09 (216)
17	1.5296E-08 (45)	1.3384E-08 (45)	1.1925E-08 (45)	1.0774E-08 (45)	9.8400E-09 (45)
18	1.7657E-08 (208)	1.5260E-08 (208)	1.3446E-08 (208)	1.2025E-08 (208)	1.0880E-08 (208)
19	1.2540E-08 (231)	1.0879E-08 (231)	1.3448E-08 (236)	1.6909E-08 (208)	1.5294E-08 (208)
20	9.5622E-09 (260)	8.2836E-09 (260)	7.3171E-09 (260)	6.5602E-09 (260)	5.9507E-09 (260)
21	1.0739E-08 (359)	9.3163E-09 (359)	8.2351E-09 (359)	7.3843E-09 (359)	6.6965E-09 (359)
22	1.2665E-08 (189)	1.1074E-08 (189)	9.8522E-09 (189)	8.8843E-09 (189)	8.0992E-09 (189)
23	9.8985E-09 (52)	8.5159E-09 (52)	7.4745E-09 (52)	6.6614E-09 (52)	6.0087E-09 (52)
24	1.4460E-08 (283)	1.2363E-08 (283)	1.0787E-08 (283)	9.7459E-09 (186)	8.9340E-09 (186)
25	1.6337E-08 (186)	1.4002E-08 (186)	1.2241E-08 (186)	1.0865E-08 (186)	9.7590E-09 (186)
26	1.5042E-08 (363)	1.2804E-08 (363)	1.1129E-08 (363)	9.9060E-09 (226)	9.0837E-09 (226)
27	1.6281E-08 (323)	1.5337E-08 (323)	1.4008E-08 (323)	1.2667E-08 (323)	1.1437E-08 (323)
28	1.5486E-08 (237)	1.3472E-08 (237)	1.1941E-08 (237)	1.0737E-08 (237)	9.7627E-09 (237)
29	1.4020E-08 (47)	1.4382E-08 (47)	1.2981E-08 (253)	1.1640E-08 (253)	1.0559E-08 (253)
30	4.9523E-08 (185)	4.3686E-08 (185)	3.9140E-08 (185)	3.5358E-08 (291)	3.2181E-08 (291)
31	1.6935E-08 (216)	1.4647E-08 (216)	1.2914E-08 (216)	1.1554E-08 (216)	1.0457E-08 (216)
32	1.4406E-08 (195)	1.3011E-08 (195)	1.1581E-08 (195)	1.0318E-08 (195)	9.2473E-09 (195)
33	1.7493E-08 (314)	1.5082E-08 (314)	1.3255E-08 (314)	1.1823E-08 (314)	1.0785E-08 (229)
34	2.6441E-08 (147)	2.3219E-08 (147)	2.0703E-08 (147)	1.8688E-08 (147)	1.7039E-08 (147)
35	1.1473E-08 (307)	1.0017E-08 (307)	8.9078E-09 (307)	8.0330E-09 (307)	7.3245E-09 (307)
36	1.6495E-08 (236)	1.7363E-08 (135)	1.5439E-08 (135)	1.3923E-08 (135)	1.2695E-08 (135)

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 3-HOUR CONC= 1.0158E-06 DIRECTION= 19 DISTANCE= 30.0 KM DAY=236 TIME PERIOD= 6

HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	30.0 KM	35.0 KM	40.0 KM	45.0 KM	50.0 KM
1	1.8309E-07 (143, 3)	1.5542E-07 (143, 3)	1.3471E-07 (143, 3)	1.1864E-07 (143, 3)	1.0581E-07 (143, 3)
2	5.4078E-07 (237, 6)	4.6882E-07 (237, 6)	4.1422E-07 (237, 6)	3.7132E-07 (237, 6)	3.3668E-07 (237, 6)
3	2.5436E-07 (237, 4)	2.2000E-07 (237, 4)	1.9396E-07 (237, 4)	1.7354E-07 (237, 4)	1.5707E-07 (237, 4)
4	1.3288E-07 (124, 3)	1.1656E-07 (124, 3)	1.0409E-07 (124, 3)	9.4239E-08 (124, 3)	8.6239E-08 (124, 3)
5	1.2429E-07 (98, 3)	1.0672E-07 (98, 3)	9.3322E-08 (98, 3)	8.2814E-08 (98, 3)	7.5222E-08 (233, 4)
6	2.3204E-07 (244, 4)	2.0167E-07 (244, 4)	1.7863E-07 (244, 4)	1.6051E-07 (244, 4)	1.4588E-07 (244, 4)
7	1.2440E-07 (78, 4)	1.0888E-07 (78, 4)	9.7040E-08 (78, 4)	8.7685E-08 (78, 4)	8.0096E-08 (78, 4)
8	9.4519E-08 (290, 4)	8.2003E-08 (290, 4)	7.2559E-08 (290, 4)	6.5166E-08 (290, 4)	5.9214E-08 (290, 4)
9	2.5625E-07 (46, 5)	2.2292E-07 (46, 5)	1.9759E-07 (46, 5)	1.7766E-07 (46, 5)	1.6155E-07 (46, 5)
10	1.2870E-07 (303, 4)	1.1253E-07 (303, 4)	1.0021E-07 (303, 4)	9.0494E-08 (303, 4)	8.2619E-08 (303, 4)
11	1.9421E-07 (183, 3)	1.6698E-07 (183, 3)	1.4625E-07 (183, 3)	1.3006E-07 (183, 3)	1.1708E-07 (183, 3)
12	3.2544E-07 (184, 4)	2.8464E-07 (184, 4)	2.5351E-07 (184, 4)	2.2893E-07 (184, 4)	2.0899E-07 (184, 4)
13	1.5621E-07 (182, 3)	1.3590E-07 (182, 3)	1.2045E-07 (182, 3)	1.0830E-07 (182, 3)	9.8479E-08 (182, 3)
14	1.2581E-07 (208, 6)	1.0881E-07 (208, 6)	9.5932E-08 (208, 6)	8.5830E-08 (208, 6)	7.7686E-08 (208, 6)
15	9.0755E-08 (97, 3)	9.3521E-08 (97, 3)	8.9985E-08 (97, 3)	8.4430E-08 (97, 3)	7.8560E-08 (97, 3)
16	3.5034E-07 (48, 6)	3.0585E-07 (48, 6)	2.7196E-07 (48, 6)	2.4525E-07 (48, 6)	2.2362E-07 (48, 6)
17	2.1259E-07 (245, 3)	1.8443E-07 (245, 3)	1.6303E-07 (245, 3)	1.4618E-07 (245, 3)	1.3257E-07 (245, 3)
18	1.5713E-07 (245, 3)	1.3431E-07 (245, 3)	1.1711E-07 (245, 3)	1.0368E-07 (245, 3)	9.2895E-08 (245, 3)
19	1.0158E-06 (236, 6)	8.8133E-07 (236, 6)	7.7935E-07 (236, 6)	6.9929E-07 (236, 6)	6.3470E-07 (236, 6)
20	2.8500E-07 (236, 6)	2.3932E-07 (236, 6)	2.0553E-07 (236, 6)	1.7958E-07 (236, 6)	1.5906E-07 (236, 6)
21	2.9783E-07 (245, 3)	2.6031E-07 (245, 3)	2.3172E-07 (245, 3)	2.0916E-07 (245, 3)	1.9089E-07 (245, 3)
22	2.0975E-07 (363, 4)	1.8247E-07 (363, 4)	1.6174E-07 (363, 4)	1.4542E-07 (363, 4)	1.3223E-07 (363, 4)
23	1.7570E-07 (283, 4)	1.5244E-07 (283, 4)	1.3482E-07 (283, 4)	1.2100E-07 (283, 4)	1.0986E-07 (283, 4)
24	1.7071E-07 (284, 3)	1.4789E-07 (284, 3)	1.3061E-07 (284, 3)	1.1705E-07 (284, 3)	1.0611E-07 (284, 3)
25	3.5032E-07 (237, 4)	3.0662E-07 (237, 4)	2.7327E-07 (237, 4)	2.4692E-07 (237, 4)	2.2555E-07 (237, 4)
26	1.8910E-07 (323, 3)	1.6222E-07 (323, 3)	1.4196E-07 (323, 3)	1.2614E-07 (323, 3)	1.1344E-07 (323, 3)
27	1.8207E-07 (207, 3)	1.5902E-07 (207, 3)	1.4127E-07 (207, 3)	1.2723E-07 (207, 3)	1.1586E-07 (207, 3)
28	2.1496E-07 (197, 3)	1.8728E-07 (197, 3)	1.6578E-07 (197, 3)	1.4878E-07 (197, 3)	1.3505E-07 (197, 3)
29	1.8245E-07 (283, 3)	1.5862E-07 (283, 3)	1.4053E-07 (283, 3)	1.2631E-07 (283, 3)	1.1482E-07 (283, 3)
30	5.0569E-07 (137, 3)	4.6246E-07 (137, 3)	4.1636E-07 (137, 3)	3.7658E-07 (137, 3)	3.4380E-07 (137, 3)
31	1.3548E-07 (216, 3)	1.1718E-07 (216, 3)	1.0331E-07 (216, 3)	9.2430E-08 (216, 3)	9.7303E-08 (195, 3)
32	1.2600E-07 (231, 4)	1.0930E-07 (231, 4)	9.6619E-08 (231, 4)	8.6637E-08 (231, 4)	7.8568E-08 (231, 4)
33	2.4110E-07 (206, 3)	2.0994E-07 (206, 3)	1.8623E-07 (206, 3)	1.6756E-07 (206, 3)	1.5245E-07 (206, 3)
34	3.7635E-07 (236, 4)	3.3007E-07 (236, 4)	2.9473E-07 (236, 4)	2.6680E-07 (236, 4)	2.4413E-07 (236, 4)
35	1.8424E-07 (236, 4)	1.5393E-07 (236, 4)	1.3151E-07 (236, 4)	1.1429E-07 (236, 4)	1.0069E-07 (236, 4)
36	2.5616E-07 (236, 4)	2.2203E-07 (236, 4)	1.9622E-07 (236, 4)	1.7601E-07 (236, 4)	1.5973E-07 (236, 4)

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 3-HOUR CONC= 3.2743E-07 DIRECTION= 30 DISTANCE= 30.0 KM DAY=185 TIME PERIOD= 4

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	30.0 KM	35.0 KM	40.0 KM	45.0 KM	50.0 KM
1	1.1536E-07 (237, 6)	9.4857E-08 (237, 6)	7.9913E-08 (237, 6)	6.8594E-08 (237, 6)	5.9759E-08 (237, 6)
2	1.3671E-07 (124, 3)	1.1923E-07 (124, 3)	1.0595E-07 (124, 3)	9.5494E-08 (124, 3)	8.7039E-08 (124, 3)
3	1.9290E-07 (237, 6)	1.6270E-07 (237, 6)	1.4016E-07 (237, 6)	1.2272E-07 (237, 6)	1.0883E-07 (237, 6)
4	1.0285E-07 (245, 5)	8.9567E-08 (245, 5)	7.9438E-08 (245, 5)	7.1458E-08 (245, 5)	6.5001E-08 (245, 5)
5	1.1708E-07 (233, 4)	1.0240E-07 (233, 4)	9.1215E-08 (233, 4)	8.2383E-08 (233, 4)	7.4385E-08 (98, 3)
6	2.1079E-07 (216, 3)	1.8449E-07 (216, 3)	1.6443E-07 (216, 3)	1.4857E-07 (216, 3)	1.3572E-07 (216, 3)
7	1.0314E-07 (290, 4)	8.9170E-08 (290, 4)	7.8620E-08 (290, 4)	7.0367E-08 (290, 4)	6.3731E-08 (290, 4)
8	9.1280E-08 (248, 4)	7.8928E-08 (248, 4)	6.9541E-08 (248, 4)	6.2158E-08 (248, 4)	5.6191E-08 (248, 4)
9	2.0470E-07 (207, 4)	1.7862E-07 (207, 4)	1.5875E-07 (207, 4)	1.4306E-07 (207, 4)	1.3035E-07 (207, 4)
10	1.1146E-07 (183, 3)	9.4908E-08 (183, 3)	8.2404E-08 (183, 3)	7.2646E-08 (183, 3)	6.5904E-08 (209, 6)
11	1.5029E-07 (96, 3)	1.3074E-07 (96, 3)	1.1589E-07 (96, 3)	1.0420E-07 (96, 3)	9.4746E-08 (96, 3)
12	2.1549E-07 (250, 4)	1.8903E-07 (250, 4)	1.6881E-07 (250, 4)	1.5283E-07 (250, 4)	1.3986E-07 (250, 4)
13	1.3358E-07 (184, 4)	1.1350E-07 (184, 4)	9.9212E-08 (138, 3)	8.8925E-08 (138, 3)	8.0645E-08 (138, 3)
14	1.1564E-07 (48, 4)	1.0193E-07 (48, 4)	9.0176E-08 (48, 4)	8.0578E-08 (48, 4)	7.2743E-08 (48, 4)
15	8.8563E-08 (303, 3)	7.7036E-08 (303, 3)	6.8298E-08 (303, 3)	6.1434E-08 (303, 3)	5.5893E-08 (303, 3)
16	9.8904E-08 (216, 4)	8.5796E-08 (216, 4)	7.5835E-08 (216, 4)	6.7998E-08 (216, 4)	6.1664E-08 (216, 4)
17	1.2219E-07 (45, 5)	1.0695E-07 (45, 5)	9.5312E-08 (45, 5)	8.6123E-08 (45, 5)	7.8670E-08 (45, 5)
18	1.4126E-07 (208, 5)	1.2208E-07 (208, 5)	1.0757E-07 (208, 5)	9.6199E-08 (208, 5)	8.7041E-08 (208, 5)
19	1.9870E-07 (208, 5)	1.7173E-07 (208, 5)	1.5130E-07 (208, 5)	1.3527E-07 (208, 5)	1.2235E-07 (208, 5)
20	7.3962E-08 (260, 3)	6.4343E-08 (260, 3)	5.7032E-08 (260, 3)	5.1279E-08 (260, 3)	4.6627E-08 (260, 3)
21	9.5048E-08 (250, 4)	8.2976E-08 (250, 4)	7.3783E-08 (250, 4)	6.6536E-08 (250, 4)	6.0669E-08 (250, 4)
22	9.0211E-08 (59, 3)	8.2081E-08 (59, 3)	7.3662E-08 (59, 3)	6.6658E-08 (59, 3)	6.0796E-08 (59, 3)
23	7.6502E-08 (163, 4)	6.6467E-08 (39, 5)	5.8917E-08 (39, 5)	5.3399E-08 (285, 3)	4.9032E-08 (285, 3)
24	1.4143E-07 (237, 4)	1.1842E-07 (237, 4)	1.0130E-07 (237, 4)	8.9006E-08 (70, 3)	8.0933E-08 (70, 3)
25	1.7351E-07 (86, 5)	1.5201E-07 (86, 5)	1.3559E-07 (86, 5)	1.2262E-07 (86, 5)	1.1210E-07 (86, 5)
26	1.3626E-07 (338, 4)	1.1904E-07 (338, 4)	1.0591E-07 (338, 4)	9.5566E-08 (338, 4)	8.7188E-08 (338, 4)
27	1.6706E-07 (141, 3)	1.4602E-07 (141, 3)	1.2998E-07 (141, 3)	1.1733E-07 (141, 3)	1.0708E-07 (141, 3)
28	1.6149E-07 (231, 3)	1.4009E-07 (231, 3)	1.2386E-07 (231, 3)	1.1113E-07 (231, 3)	1.0086E-07 (231, 3)
29	1.6232E-07 (234, 3)	1.4024E-07 (234, 3)	1.2354E-07 (234, 3)	1.1045E-07 (234, 3)	9.9917E-08 (234, 3)
30	3.2743E-07 (185, 4)	2.8788E-07 (185, 4)	2.5763E-07 (185, 4)	2.3368E-07 (185, 4)	2.1421E-07 (185, 4)
31	1.2979E-07 (185, 4)	1.0901E-07 (185, 4)	9.3513E-08 (185, 4)	8.1526E-08 (185, 4)	8.3659E-08 (216, 3)
32	1.2029E-07 (234, 4)	1.0501E-07 (234, 4)	9.3374E-08 (234, 4)	8.4204E-08 (234, 4)	7.6778E-08 (234, 4)
33	1.3400E-07 (229, 4)	1.1728E-07 (229, 4)	1.0453E-07 (229, 4)	9.4448E-08 (229, 4)	8.6274E-08 (229, 4)
34	2.9632E-07 (210, 3)	2.5688E-07 (210, 3)	2.2698E-07 (210, 3)	2.0352E-07 (210, 3)	1.8461E-07 (210, 3)
35	1.4452E-07 (78, 4)	1.2572E-07 (78, 4)	1.1144E-07 (78, 4)	1.0019E-07 (78, 4)	9.1106E-08 (78, 4)
36	1.8309E-07 (143, 3)	1.5542E-07 (143, 3)	1.3471E-07 (143, 3)	1.1864E-07 (143, 3)	1.0581E-07 (143, 3)

ATTACHMENT H

PART E

24-Hour Concentrations on Day 249 at Distances of 0.8, 1.2, 1.4, 1.6, and 1.8 km.

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 24-HOUR CONC= 2.1302E-07 DIRECTION= 9 DISTANCE= 1.2 KM DAY=249

HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	.8 KM		1.2 KM		1.4 KM		1.6 KM		1.8 KM	
1	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
2	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
3	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
4	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
5	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
6	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
7	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
8	0.	(0)	1.2438E-07	(249)	9.7874E-08	(249)	8.3329E-08	(249)	7.5562E-08	(249)
9	0.	(0)	2.1302E-07	(249)	1.5888E-07	(249)	1.3103E-07	(249)	1.1694E-07	(249)
10	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
11	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
12	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
13	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
14	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
15	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
16	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
17	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
18	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
19	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
20	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
21	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
22	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
23	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
24	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
25	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
26	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
27	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
28	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
29	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
30	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
31	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
32	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
33	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)
34	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)
35	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)
36	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)

ATTACHMENT H

PART F

24-Hour Concentrations on Day 189 at Distances of 0.8, 1.2, 1.4, 1.6, and 1.8 km.

ATTACHMENT H

PART G

24-Hour Concentrations on Day 48 at Distances of 5.0, 5.5, 6.5, 8.0, and 10.0 km.

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 24-HOUR CONC= 2.2277E-07 DIRECTION= 16 DISTANCE= 5.5 KM DAY= 48

HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	5.0 KM		5.5 KM		6.5 KM		8.0 KM		10.0 KM	
1	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)
2	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)
3	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)
4	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)
5	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)	4.1667E-32	(48)
6	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
7	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
8	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
9	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
10	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
11	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
12	1.1124E-12	(48)	8.4134E-13	(48)	4.8669E-13	(48)	2.3581E-13	(48)	1.0379E-13	(48)
13	0.	(0)	0.	(0)	0.	(0)	0.	(0)	2.5052E-10	(48)
14	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
15	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
16	2.1062E-07	(48)	2.2277E-07	(48)	2.0486E-07	(48)	1.7182E-07	(48)	1.4079E-07	(48)
17	0.	(0)	0.	(0)	0.	(0)	0.	(0)	1.2511E-08	(48)
18	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
19	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
20	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
21	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
22	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
23	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
24	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
25	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
26	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
27	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
28	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
29	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
30	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
31	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
32	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
33	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
34	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
35	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
36	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)

ATTACHMENT H

PART H

3-Hour Concentrations on Day 236 at Distances of 2.5, 3.5, 4.0, 4.5, and 5.0 km.

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 3-HOUR CONC= 3.9162E-06 DIRECTION= 19 DISTANCE= 5.5 KM DAY=236 TIME PERIOD= 6

HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	2.5 KM	3.5 KM	4.5 KM	5.0 KM	5.5 KM
1	1.0000E-30 (236, 6)	1.0000E-30 (236, 6)	1.0391E-15 (236, 5)	2.8653E-15 (236, 5)	2.5717E-15 (236, 5)
2	1.0000E-30 (236, 6)	1.0000E-30 (236, 6)	1.0000E-30 (236, 6)	1.0000E-30 (236, 6)	1.0000E-30 (236, 6)
3	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
4	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
5	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
6	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
7	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
8	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
9	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
10	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
11	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
12	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
13	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
14	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
15	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	5.4441E-20 (236, 6)	1.4108E-19 (236, 6)	9.6794E-20 (236, 6)
16	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.5016E-14 (236, 6)	9.0876E-14 (236, 6)	8.3462E-14 (236, 6)
17	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.5673E-11 (236, 6)	1.2220E-09 (236, 6)	1.3967E-09 (236, 6)
18	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	3.5424E-07 (236, 6)	4.6928E-07 (236, 6)
19	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	2.6912E-06 (236, 6)	3.9162E-06 (236, 6)
20	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	9.4430E-07 (236, 6)	1.4491E-06 (236, 6)
21	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.4741E-08 (236, 6)	2.1474E-08 (236, 6)
22	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	5.7664E-12 (236, 6)	7.2205E-12 (236, 6)
23	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	4.6950E-17 (236, 6)	4.6549E-17 (236, 6)
24	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
25	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
26	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
27	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
28	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
29	2.4456E-15 (236, 4)	6.2779E-16 (236, 4)	1.2795E-16 (236, 4)	6.3159E-17 (236, 4)	3.2695E-17 (236, 4)
30	3.3393E-12 (236, 4)	1.5469E-12 (236, 4)	5.1296E-13 (236, 4)	3.1458E-13 (236, 4)	1.9957E-13 (236, 4)
31	9.4916E-10 (236, 4)	6.9793E-10 (236, 4)	3.3874E-10 (236, 4)	2.4619E-10 (236, 4)	1.8313E-10 (236, 4)
32	5.6162E-08 (236, 4)	5.7655E-08 (236, 4)	3.6845E-08 (236, 4)	3.0273E-08 (236, 4)	2.5261E-08 (236, 4)
33	6.9140E-07 (236, 4)	8.7201E-07 (236, 4)	6.6011E-07 (236, 4)	5.8489E-07 (236, 4)	5.2383E-07 (236, 4)
34	1.5082E-06 (236, 4)	2.3651E-06 (236, 4)	1.9414E-06 (236, 4)	1.7762E-06 (236, 4)	1.6370E-06 (236, 4)
35	1.0000E-30 (236, 6)	1.0000E-30 (236, 6)	3.4582E-07 (236, 4)	6.6440E-07 (236, 4)	8.2095E-07 (236, 4)
36	1.0000E-30 (236, 6)	1.0000E-30 (236, 6)	2.1436E-11 (236, 5)	7.3455E-11 (236, 5)	8.0764E-11 (236, 5)

ATTACHMENT H

PART I

3-Hour Concentrations on Day 189 at Distances of 0.8, 1.2, 1.4, 1.6, and 1.8 km.

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 3-HOUR CONC= 1.9656E-06 DIRECTION= 22 DISTANCE= 1.2 KM DAY=189 TIME PERIOD= 5

HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	.8 KM	1.2 KM	1.4 KM	1.6 KM	1.8 KM
1	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
2	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
3	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
4	1.0000E-30 (189, 1)	4.1897E-11 (189, 4)	1.9854E-11 (189, 4)	1.0018E-11 (189, 4)	5.7548E-12 (189, 4)
5	1.0000E-30 (189, 1)	1.5014E-09 (189, 4)	8.1502E-10 (189, 4)	4.6523E-10 (189, 4)	2.9936E-10 (189, 4)
6	1.0000E-30 (189, 1)	2.5916E-08 (189, 4)	1.5676E-08 (189, 4)	9.8714E-09 (189, 4)	6.9522E-09 (189, 4)
7	1.0000E-30 (189, 1)	2.1551E-07 (189, 4)	1.4127E-07 (189, 4)	9.5699E-08 (189, 4)	7.2080E-08 (189, 4)
8	1.0000E-30 (189, 1)	8.6328E-07 (189, 4)	5.9652E-07 (189, 4)	4.2389E-07 (189, 4)	3.3363E-07 (189, 4)
9	1.0000E-30 (189, 1)	1.6658E-06 (189, 4)	1.1802E-06 (189, 4)	8.5787E-07 (189, 4)	6.8941E-07 (189, 4)
10	1.0000E-30 (189, 1)	1.5485E-06 (189, 4)	1.0940E-06 (189, 4)	7.9324E-07 (189, 4)	6.3600E-07 (189, 4)
11	1.0000E-30 (189, 1)	6.9341E-07 (189, 4)	4.7517E-07 (189, 4)	3.3512E-07 (189, 4)	2.6194E-07 (189, 4)
12	1.0000E-30 (189, 1)	1.4958E-07 (189, 4)	9.6700E-08 (189, 4)	6.4687E-08 (189, 4)	4.8161E-08 (189, 4)
13	1.0000E-30 (189, 1)	1.5543E-08 (189, 4)	9.2206E-09 (189, 4)	5.7049E-09 (189, 4)	3.9533E-09 (189, 4)
14	1.0000E-30 (189, 1)	7.7804E-10 (189, 4)	4.1195E-10 (189, 4)	2.2988E-10 (189, 4)	1.4487E-10 (189, 4)
15	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
16	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
17	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
18	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	8.0427E-08 (189, 5)	1.0711E-07 (189, 5)	1.0334E-07 (189, 5)
19	7.4651E-07 (189, 5)	1.2916E-06 (189, 5)	8.7988E-07 (189, 5)	6.0890E-07 (189, 5)	4.4203E-07 (189, 5)
20	8.6411E-07 (189, 5)	1.7613E-06 (189, 5)	1.1990E-06 (189, 5)	8.2921E-07 (189, 5)	6.0372E-07 (189, 5)
21	2.1602E-07 (189, 5)	1.8610E-06 (189, 5)	1.2711E-06 (189, 5)	8.7851E-07 (189, 5)	6.4529E-07 (189, 5)
22	1.0000E-30 (189, 1)	1.9656E-06 (189, 5)	1.3742E-06 (189, 5)	9.6785E-07 (189, 5)	7.2898E-07 (189, 5)
23	1.0000E-30 (189, 1)	1.4316E-06 (189, 5)	1.0004E-06 (189, 5)	7.0356E-07 (189, 5)	5.2989E-07 (189, 5)
24	1.0000E-30 (189, 1)	5.4478E-07 (189, 5)	3.6811E-07 (189, 5)	2.5099E-07 (189, 5)	1.8375E-07 (189, 5)
25	1.0000E-30 (189, 2)	1.0127E-07 (189, 5)	6.4235E-08 (189, 5)	4.1350E-08 (189, 5)	2.8711E-08 (189, 5)
26	1.0000E-30 (189, 2)	9.0881E-09 (189, 5)	5.2613E-09 (189, 5)	3.1171E-09 (189, 5)	2.0053E-09 (189, 5)
27	1.0000E-30 (189, 2)	3.9310E-10 (189, 5)	2.0199E-10 (189, 5)	1.0739E-10 (189, 5)	6.2539E-11 (189, 5)
28	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)
29	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)
30	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)
31	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)
32	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
33	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
34	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
35	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
36	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)

ATTACHMENT H

PART J

3-Hour Concentrations on Day 237 at Distances of 2.6, 2.8, 3.2, and 3.6 km.

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 3-HOUR CONC= 2.4081E-06 DIRECTION= 25 DISTANCE= 3.2 KM DAY=237 TIME PERIOD= 4

HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	2.6 KM	2.8 KM	3.2 KM	3.4 KM	3.6 KM
1	1.0000E-30 (237, 2)	1.0000E-30 (237, 2)	1.0000E-30 (237, 2)	1.0000E-30 (237, 2)	1.0000E-30 (237, 2)
2	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
3	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
4	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	3.9878E-08 (237, 6)
5	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.3419E-09 (237, 6)
6	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	5.6787E-12 (237, 6)
7	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	4.3322E-15 (237, 6)
8	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
9	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
10	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
11	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
12	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
13	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
14	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
15	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
16	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
17	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
18	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
19	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
20	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
21	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
22	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
23	1.0431E-07 (237, 4)	1.4412E-07 (237, 4)	1.5413E-07 (237, 4)	1.4713E-07 (237, 4)	1.3834E-07 (237, 4)
24	1.1556E-06 (237, 4)	1.4108E-06 (237, 4)	1.4625E-06 (237, 4)	1.4078E-06 (237, 4)	1.3416E-06 (237, 4)
25	1.8585E-06 (237, 4)	2.2876E-06 (237, 4)	2.4081E-06 (237, 4)	2.3346E-06 (237, 4)	2.2403E-06 (237, 4)
26	6.1338E-07 (237, 4)	7.4066E-07 (237, 4)	7.5226E-07 (237, 4)	7.1718E-07 (237, 4)	6.7719E-07 (237, 4)
27	4.1547E-08 (237, 4)	4.7884E-08 (237, 4)	4.4587E-08 (237, 4)	4.0811E-08 (237, 4)	3.7055E-08 (237, 4)
28	5.7753E-10 (237, 4)	6.1816E-10 (237, 4)	5.0141E-10 (237, 4)	4.3019E-10 (237, 4)	3.6703E-10 (237, 4)
29	1.6476E-12 (237, 4)	1.5935E-12 (237, 4)	1.0699E-12 (237, 4)	8.4001E-13 (237, 4)	6.5810E-13 (237, 4)
30	9.6466E-16 (237, 4)	8.2021E-16 (237, 4)	4.3311E-16 (237, 4)	3.0384E-16 (237, 4)	2.1360E-16 (237, 4)
31	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)
32	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)
33	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)
34	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	2.5697E-17 (237, 6)
35	1.0000E-30 (237, 7)	1.0000E-30 (237, 7)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	9.2275E-14 (237, 6)
36	1.0000E-30 (237, 7)	1.0000E-30 (237, 7)	1.0000E-30 (237, 7)	1.0000E-30 (237, 7)	1.0000E-30 (237, 7)

ATTACHMENT H

PART K

CRSTER Modifications

Note: The attached minor modifications (consisting of resetting some initialization statements) were made in the CRSTER Model used for this analysis. Without these modifications, execution of the program will terminate when printing out results if all of the maximum annual mean concentrations are negative as they are in this case. A comparsion was made on several days of meteorological data using the modified and unmodified forms of CRSTER, and the modifications appear not to have any affect on the actual concentrations calculated.

NOTE: ALL CHANGES ARE IN SUBROUTINE CRS

```
EQUIVALENCE (QTAPE1(1),CHI(1)),(QTAPE2(1),CHI25(1)),(QTAPE3(1),
*CHI26(1)),(TAPIN(1),JYR),(DMAXYR(1),JMAX3(1)),(DX(1),JM(1))
DATA HMAXT,DMAXT,NNN,MMM/-1.E+30,-1.E+30,1,1,1/
DATA IHC,P/6,13,18,24,.1,.15,.2,.25,.3,.3/
DATA DTH/-50.,-40.,-30.,-20.,-10.,0.,10.,20.,30.,40.,50./
DATA LOOP/1,1,2,3,4,4,11,11,10,9,8,8/
```

Original statement is:

DATA HMAXT,DMAXT,NNN,MMM/0.,0.,1,1,1/

```
C***RE-INITIALIZE DAILY AVERAGE AT BEGINNING OF EACH DAY***
 1000 DO 1310 IR=1,180
 1310 CHI25(IR)=1.0E-30
      TDAY=TDAY+1.
      DMAXT=-1.E+30
      HMAXT=-1.E+30
C***INPUT INFORMATION FROM MET FILE***
```

Original statements are:

DMAXT=0.
HMAXT=0.

```
C***CALCULATE ANNUAL MEANS AND DETERMINE THE MAXIMUM
      IST1=1
      K1=1
      AMMAX=-1.E+30
      MAXI=0
      DO 5200 IR=1,180
```

Original statement is:

AMMAX=0.

State of Florida

Department of State

I certify from the records of this office that UNITED STATES STEEL CORPORATION, is a corporation organized under the laws of the State of Delaware, and is authorized to transact business within the State of Florida.

The charter number for this corporation is 819214.

I further certify that said corporation has filed all annual reports and has paid all annual report filing fees due this office through December 31, 1979, and its status is active.

Given under my hand and the Great Seal of the State of Florida, at Tallahassee, the Capital, this the 3rd day of March, 1980.

George Firestone
Secretary of State

CER 101 Rev. 5-79

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

This is a double absorption sulfuric acid plant, complete with cooling water tower and boiler feedwater treatment system. Emissions of sulfur dioxide and sulfuric acid mist will be in full compliance with Federal New Source Performance Standards and Florida Emission Limiting Standards.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction March, 1981 Completion of Construction March, 1983

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Second Stage Absorber - $3,100,000

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Operating permit A053-4528, issued 11/2/77, expires 11/2/82, 1500 ton/day sulfuric acid plant. This existing plant will be shut down as soon as the new plant is tested for service.

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes X No

F. Normal equipment operating time:* hrs/day 24 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr ____ ;

If seasonal, describe: ____

*Plant will be shut down only when required for repairs.

G. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? No
   a. If yes, has "offset" been applied? ____
   b. If yes, has "Lowest Achievable Emission Rate" been applied? ____
   c. If yes, list non-attainment pollutants. ____
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. Yes
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. See Attachment H
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? Yes
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

AC 53-33819

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Air Pollution [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [X] Construction [ ] Operation [ ] Modification

COMPANY NAME: USS Agri-Chemicals COUNTY: Polk

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) Sulfuric Acid Plant - No. 2 Train

SOURCE LOCATION: Street Highway 630 West City Ft. Meade

UTM: East 416.26 (Zone 17) North 3068.71

Latitude ___ ° ___ ' ___ "N Longitude ___ ° ___ ' ___ "W

APPLICANT NAME AND TITLE: G. W. Beck, Manager, Florida Phosphate Operations

APPLICANT ADDRESS: P.O. Box 150, Bartow, Florida 33830

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of USS Agri-Chemicals

I certify that the statements made in this application for a construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: George W. Beck

George W. Beck, Manager, Fl Phosphate Operations
Name and Title (Please Type)

Date: 8/5/80 Telephone No. 813-533-0471

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed: James H. Carroll

James H. Carroll
Name (Please Type)

(Affix Seal)

USS Agri-Chemicals
Company Name (Please Type)

P. O. Box 150, Bartow, Fl 33830
Mailing Address (Please Type)

Florida Registration No. 19407 Date: 8/5/80 Telephone No. 813-533-0471

[1]See Section 17-2.02(15) and (22), Florida Administrative Code, (F.A.C.)

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Sulfur	S	99.46	60064	Pt. 2 on Atch E

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): 60390
2. Product Weight (lbs/hr): 187110 (98% H_2SO_4)

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr *	T/yr	
SO_2	367	1355	4 lb/ton 100% H_2SO_4	367	367	1355	Pt. 5
H_2SO_4 Mist	13.75	51	0.15 lb/ton 100% H_2SO_4	13.75	13.75	51	Atch E
*Emissions control is integral to double absorption process.							

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]
2nd Stage Absorber*	SO_2	99.7	N/A	See Atch A
Mist Eliminator	H_2SO_4 Mist	99.99+	N/A	See Atch A
*SO_2 control is achieved through components integral to process.				

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g., Section 17-2.05(6) Table II, E. (1), F.A.C. – 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard

[4]Emission, if source operated without control (See Section V, Item 3)

[5]If Applicable

E. Fuels

Type (Be Specific) **	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis:

Percent Sulfur: ____________ Percent Ash: ____________

Density: ____________ lbs/gal Typical Percent Nitrogen: ____________

Heat Capacity: ____________ BTU/lb ____________ BTU/gal

Other Fuel Contaminants (which may cause air pollution): ____________

F. If applicable, indicate the percent of fuel used for space heating. Annual Average ________ Maximum ________

G. Indicate liquid or solid wastes generated and method of disposal.

Cooling tower blowdown, boiler blowdown, and feedwater treatment unit blowdown are non-process effluents and will be discharged to the plant outfall.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 175 ft. Stack Diameter: 8.5 ft.

Gas Flow Rate: 112,123 ACFM Gas Exit Temperature: 180 °F.

Water Vapor Content: nil % Velocity: 34 FPS

SECTION IV: INCINERATOR INFORMATION

NOT APPLICABLE

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated							

Description of Waste ____________

Total Weight Incinerated (lbs/hr) ____________ Design Capacity (lbs/hr) ____________

Approximate Number of Hours of Operation per day ____________ days/week ____________

Manufacturer ____________

Date Constructed ____________ Model No. ____________

	Volume (ft)^3	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: ______________ ft. Stack Diameter ______________ Stack Temp. ______________

Gas Flow Rate: ______________ ACFM ______________ DSCFM* Velocity ______________ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [ ] Other (specify) ______________

Brief description of operating characteristics of control devices: ______________

____

____

____

____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

____

____

____

____

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight – show derivation. (See Attachment B)
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.,) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made. (See Attachment B)
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test). (See Attachment B)
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.). (See Attachment B)
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency). (See Attachment B)
6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained. (See Attachment E)
7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map). (See Attachment D)
8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram. (See Attachment F)

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?
[X] Yes [ ] No

Contaminant	Rate or Concentration
Sulfur Dioxide	4 lb/ton 100% H_2SO_4 produced
H_2SO_4 Mist	0.15 lb/ton 100% H_2SO_4 produced

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy) [X] Yes [ ] No

Contaminant	Rate or Concentration
Sulfur Dioxide	4 lb/ton 100% H_2SO_4 produced
H_2SO_4 Mist	0.15 lb/ton 100% H_2SO_4 produced
(See Attachment G)	

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration
Sulfur Dioxide	4 lb/ton 100% H_2SO_4 produced
H_2SO_4 Mist	0.15 lb/ton 100% H_2SO_4 produced

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:
5. Useful Life:
6. Operating Costs:
7. Energy:
8. Maintenance Cost:
9. Emissions:

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy*: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy**: h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

*Explain method of determining efficiency.

**Energy to be reported in units of electrical power — KWH design rate.

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction m[illegible]ls and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space and operate within proposed levels:

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device: 2nd Stage Absorber

2. Efficiency*: 99.7%

3. Capital Cost: $3,100,000

4. Life: 20 years

5. Operating Cost: N.A.

6. Energy: Self-sufficient

7. Maintenance Cost: $92,000 per year, estimated @ 3% of capital cost

8. Manufacturer: Monsanto Enviro-Chem

9. Other locations where employed on similar processes:

a.

(1) Company: W. R. Grace and Company

(2) Mailing Address: P.O. Box 471

(3) City: Bartow

(4) State: Florida 33830

(5) Environmental Manager: Mike Altenburger

(6) Telephone No.: (813) 533-2171

*Explain method of determining efficiency above. Efficiency based on sulfur loss vs. sulfur gain

(7) Emissions*:

Contaminant	Rate or Concentration
Sulfur Dioxide	4 lb/ton 100% H_2SO_4 produced
H_2SO_4 Mist	0.15 lb/ton 100% H_2SO_4 produced

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

(See Attachment C)

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

(See Attachment H)

A. Company Monitored Data

1. 0 no sites ______ TSP ______ ( ) SO^2* ______ Wind spd/dir

   Period of monitoring ___/___/___ (month day year) to ___/___/___ (month day year)

   Other data recorded ______

   Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

   a) Was instrumentation EPA referenced or its equivalent? ___ Yes ___ No

   b) Was instrumentation calibrated in accordance with Department procedures? ___ Yes ___ No ___ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. 1 Year(s) of data from 01 / 01 / 72 (month day year) to 12 / 31 / 72 (month day year)
2. Surface data obtained from (location) Tampa
3. Upper air (mixing height) data obtained from (location) Tampa
4. Stability wind rose (STAR) data obtained from (location) N/A

C. Computer Models Used

1. CRSTER (See Attachment H) Modified? If yes, attach description.
2. ______ Modified? If yes, attach description.
3. ______ Modified? If yes, attach description.
4. ______ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	0 grams/sec
SO^2	(See Attachment H) grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description on point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time. (See Attachment H)

F. Attach all other information supportive to the PSD review.

*Specify bubbler (B) or continuous (C).

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

ATTACHMENT A

2189
11/28/79

. ATTACHMENT-A

SECTION V

GUARANTEES

A. PERFORMANCE GUARANTEES

1. Contractor guarantees that the plants shall be capable of operating at their rated capacity of 4,000 short tons (100% H_2SO_4) per twenty-four (24) hour day, with all product as 98% sulfuric acid (2000 short tons per plant).

2. Contractor guarantees that the plants shall be capable of operating at 50% of rate capacity of 2,000 short tons (100% H_2SO_4) per twenty-four (24) hour day, with all product as 98% sulfuric acid (1,000 short tons per plant).

3. Contractor guarantees when each plant is operated at its capacity of 2,000 short tons (100% H_2SO_4) per twenty-four (24) hour day, that the SO_2 content in the process gas leaving the final absorption tower shall average over a two (2) hour period not to exceed 4 lbs. per ton of acid produced, and that the H_2SO_4 mist content in the process gas leaving the inter-pass and final absorption tower shall average not to exceed 0.15 lb. per ton of acid produced.

4. Contractor guarantees that the combined cooling tower blowdown and boiler blowdown will average not to exceed 500 GPM when both cooling tower and boiler are operated per vendor recommendations and with inlet well water quality as specified in Section II.

5. Contractor guarantees that the demineralizer neutralized effluent will have a pH between 6.-9.5 as measured at battery limits.

6. Contractor guarantees that the product acid concentration will be between 98.0% and 99.0% as sampled from acid plants.

Performance Tests

The demonstration of performance guarantees A-1, A-2, A-4 and A-6 require the operation of both sulfuric acid plants. These guarantees shall be demonstrated after start-up of the second plant over an operating period of three (3) substantially consecutive days.

Performance guarantees A-3 and A-6 will be demonstrated sequentially as each plant is started up.

ATTACHMENT B

(For Section V of Application)

1. Total Process Input Rate and Product Weight

(Refer to Monsanto Enviro-Chem drawing in Attachment E)

Input

At nominal capacity, plant will use 54900 lb/h liquid sulfur feedstock. Assuming maximum operating level at 10 percent above nominal capacity, a maximum liquid sulfur feedstock input of 60390 lb/h (1.1 x 10980) is needed. However, feedstock is only 99.46% pure sulfur; therefore, maximum sulfur input is 60064 lb/h (0.9946 x 60390).

Output

Nominal production capacity of 98% H_2SO_4 is 170100 lb/h. Assuming maximum operating level at 10 percent above nominal capacity and converting 98% H_2SO_4 to 100% H_2SO_4, the maximum production of 100% H_2SO_4 is 183368 lb/h (170100 x 1.1 x 0.98). Based on this figure, the following calculations can be made:

(a) Sulfur in product $= 183368 \text{ lb/h } H_2SO_4 \times \frac{32 \text{ lb S}}{98 \text{ lb } H_2SO_4}$

$= 59875$ lb/h

(b) Sulfur loss as SO_2 $= \frac{183368 \text{ lb/h } H_2SO_4}{2000 \text{ lb/ton}} \times \frac{1 \text{ lb S}}{2 \text{ lb } SO_2} \times \frac{4 \text{ lb } SO_2}{\text{ton } H_2SO_4}$

$= 184$ lb/h

(c) Sulfur loss as mist $= \frac{183368 \text{ lb/h } H_2SO_4}{2000 \text{ lb/ton}} \times \frac{32 \text{ lb S}}{98 \text{ lb } H_2SO_4} \times \frac{0.15 \text{ lb mist}}{\text{ton } H_2SO_4}$

$= 5$ lb/h

(d) Total sulfur = 59875 + 184 + 5 = 60064 lb/h

2. Emission Estimate and Test Methods

(a) Basis of emission estimate - performance guarantees from Monsanto Enviro-Chem (Attachment A) which equate to meeting Federal NSPS and Florida Emission Limiting Standards.

(b) Compliance Test Methods - in accordance with 40 CFR 60, or DER/EPA approved alternate methods.

3. Basis of Potential Discharge

Potential and actual emissions are equivalent in this case since control is achieved by components integral to overall process. Actual emissions are based on performance guarantees which equate to Federal NSPS and Florida Emission Limiting Standards.

4. Design Details of Pollution Control Equipment

Design details of the second stage absorber are the proprietary information of Monsanto Enviro-Chem.

5. Efficiency of Control Devices

$$\text{Efficiency} = \frac{\text{Sulfur in Product Acid}}{\text{Sulfur Input}} = \frac{59875 \text{ lb}}{60064 \text{ lb}} = 99.7\%$$

ATTACHMENT C

(For Section VI.F.10 of Application)

REASON FOR SELECTION

The double absorption system is a proven, reliable, and widely accepted process to minimize emissions from sulfuric acid plants.

DESCRIPTION OF SYSTEM

(Starts on next page.)

DESCRIPTION OF SULFURIC ACID PRODUCTION

The principal steps in the process consist of burning sulfur (S) in air to form sulfur dioxide (SO_2), combining the sulfur dioxide with oxygen (O_2) to form sulfur trioxide (SO_3), and combining the sulfur trioxide with water (H_2O) to form a solution containing sulfuric acid (H_2SO_4). The chemical reactions are:

$$S + O_2 = SO_2$$

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

$$SO_3 + H_2O = H_2SO_4$$

The sulfur is burned with air in a horizontal spray-type sulfur burner. Before the air is admitted to the sulfur burner, it is dried by contact with 98 percent sulfuric acid.

The temperature of the SO_2 gas from the sulfur burner is higher than is required for inlet to the conversion system; therefore, the gas is cooled in a waste heat boiler, which recovers the surplus heat as by-product steam.

From the waste heat boiler, the gas flows to the first pass of the converter system where it is partially converted to sulfur trioxide gas in the presence of vanadium catalyst. The conversion reaction produces heat. Gases leaving the first converter pass flow to the superheater where they are cooled. Temperature of the gas stream downstream of the superheater is controlled in the proper range by by-passing a portion of the gas flow around the superheater. The cool gas stream flows from the superheater to the second converter pass where additional conversion of sulfur dioxide to sulfur trioxide takes place, accompanied by the generation of additional heat. Hot gases leaving the second converter pass are cooled by sending them through the tube side of the hot interpass exchanger.

Cooled gases leaving the heat exchanger flow to the third converter pass where additional conversion of sulfur dioxide to sulfur trioxide takes place. Hot gases leaving the third converter pass are cooled by sending them through the tube side of two gas heat ex-

changers, called cold interpass heat exchangers, connected in series, and the economizer.

Gas leaving the economizer flows to the interpass absorbing tower where the SO_3 in the gas stream is removed. In the interpass absorbing tower, the SO_3 does not combine directly with water, but must be combined indirectly by absorbing it in sulfuric acid where the SO_3 reacts with water in the acid. The temperature of the 98 to 99 percent H_2SO_4 circulated over the interpass absorbing tower increases due to the heat of formation and the sensible heat of the gas stream entering the tower. Acid from the bottom of the interpass absorbing tower is circulated through coolers and returned to the top of the tower. Sufficient water is added to the interpass absorption tower system to control the strength of acid circulated over the interpass tower between 98 and 99 percent. Cool gas leaving the interpass absorbing tower, containing unreacted SO_2, flows to the shell side of the cold interpass gas heat exchangers where it is heated by gases leaving the third converter pass.

From the shell side of the cold interpass heat exchangers, the gas stream flows to the hot interpass heat exchanger where it is further heated by gases flowing from the second converter pass.

The temperature downstream of the interpass heat exchanger is controlled in the proper range by by-passing a portion of gas around the shell side of the heat exchanger. From the hot interpass heat exchanger, the gas stream flows to the fourth converter pass where final conversion of SO_2 in the gas stream to SO_3 is accomplished.

The gas stream from the fourth converter pass flows to the economizer where it is cooled by boiler feedwater and then flows to the final absorbing tower. In the final absorbing tower, SO_3 in the gas stream reacts with water in the 98 to 99 percent circulating acid. The temperature of the strong acid circulated over the final absorbing tower increases due to the heat of formation and the sensible heat of the gas stream entering the tower. Acid from the bottom of the final absorbing tower is circulated through coolers and returned to the top

of the tower. Sufficient water is admitted to the final absorbing tower system to control the strength of acid circulated over the final acid tower between 98 and 99 percent. That acid produced in the final absorbing tower underflows to the drying/interpass acid pump tank.

Gas leaving the final absorbing tower flows to the atmosphere through a stack.

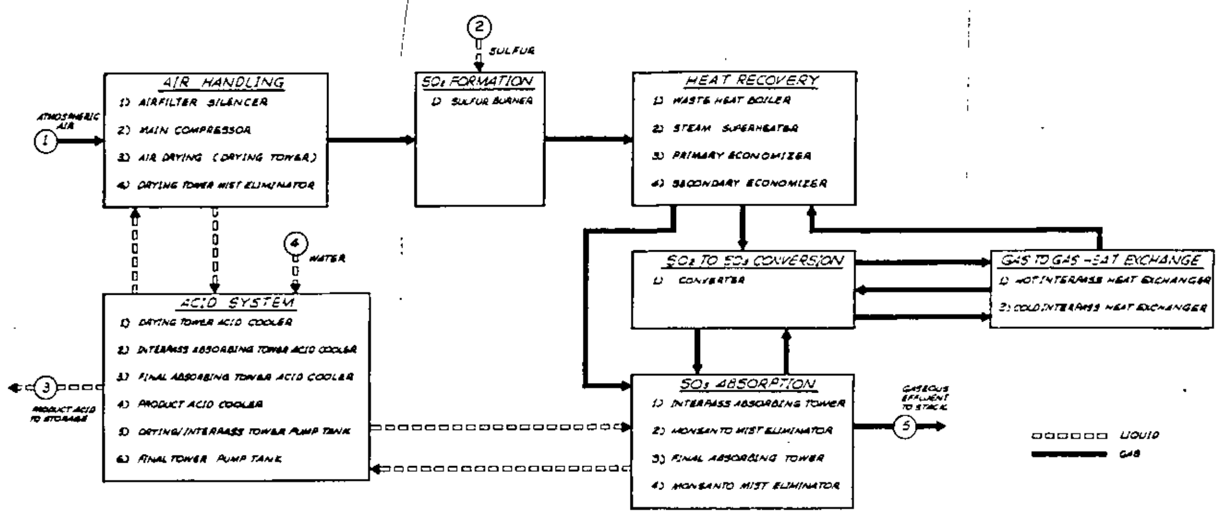
The 98 percent product acid from the drying acid system is pumped directly through a product cooler to storage.

Cooling Water System

Cooling requirements for the plant are achieved by use of cooling towers in which an upward draft is induced by fans located overhead. Water to be cooled is evenly distributed across the top of the tower and allowed to fall in evaporative contact with the upflow of air. The cooled water collects in a basin beneath the tower and is recirculated by pumps through non-contact coolers and back to the tower. The cooling towers provide non-contact cooling for other sections of the complex as well as the sulfuric acid plant.

Use of cooling towers greatly reduces the consumption of ground water. Ground water is required only for make-up of the water evaporated in the cooling process and lost on blowdown to prevent solids build-up in the cooling water system. Additionally, a very small fraction, about 0.1%, is lost by entrainment to the atmosphere.

Attachment D - Location of USS Agri-Chemicals
Fort Meade Phosphate Chemical Complex



STREAM / COMPONENT UNIT		1	5
SO_2	SCFM		81
SO_3	SCFM		0
O_2	SCFM	20894	5016
N_2	SCFM	[illegible]4806	76806
H_2O	SCFM	3340	
TOTAL	SCFM	100440	81855
TOTAL	ACFM	113585	106475
TEMPERATURE	°F	95	180

STREAM / COMPONENT UNIT		2	3	4
LIQUID		SULFUR	98%	WATER
	LBS/MIN	415	2855	598
	GPM	41	190	47
TEMPERATURE	°F	270	100	95

CLIENT: USS AGRICHEM
LOCATION: FORT MEADE, FLORIDA
PRODUCTION: 2000 STPD AS 98% ACID (100% H_2SO_4 BASIS)
NUMBER OF UNITS: TWO PLANTS
CONVERSION: 99.7 CONVERSION OF SO_2 TO SO_3 WITH 8.31 SO_2 TO CONVERTER
STANDARD CONDITIONS: 0°C AND 760 MM Hg.
EMISSIONS:
SO_2: 4 LBS SO_2/TON 100% H_2SO_4 PRODUCED
ACID MIST: LESS THAN OR EQUIVALENT TO 0.15 LBS H_2SO_4/TON 100% H_2SO_4 PRODUCED

STACK: 175' HIGH, 8'-6" I.D.

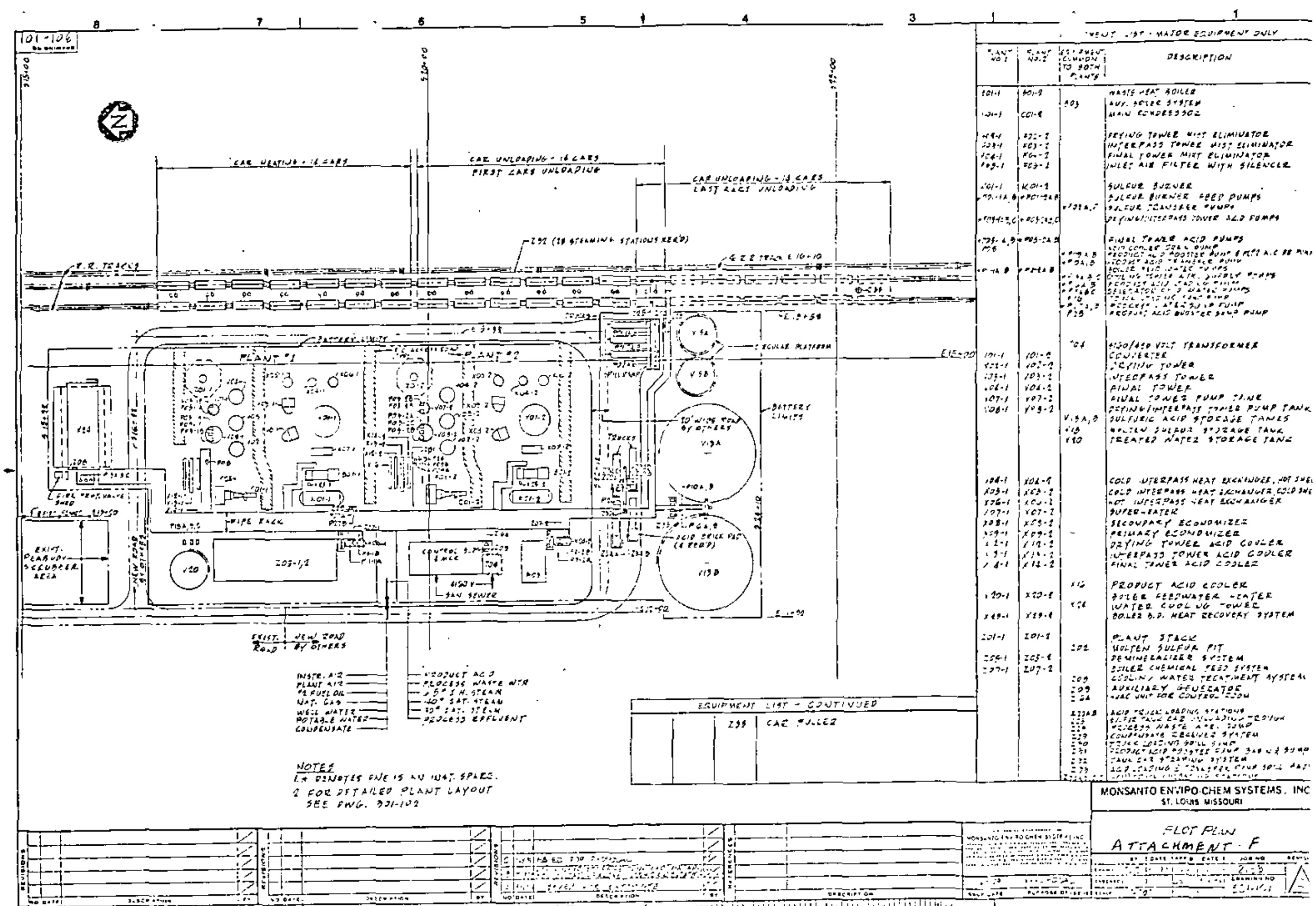
ATTACHMENT E

MONSANTO ENVIRO-CHEM SYSTEMS, INC.
ST. LOUIS MISSOURI

ENVIRONMENTAL
PROCESS MATERIAL FLOW DIAGRAM
SULFUR BURNING PLANT

JOB NO. 2159
DRAWING NO. 321-121

ISSUED TO EPA


EQUIPMENT LIST - MAJOR EQUIPMENT ONLY
PLANT NO 1
PLANT NO 2
EQUIPMENT COMMON TO BOTH PLANTS
DESCRIPTION
WASTE HEAT BOILER
AUX. BOILER SYSTEM
MAIN COMPRESSOR
DRYING TOWER MIST ELIMINATOR
INTERPASS TOWER MIST ELIMINATOR
FINAL TOWER MIST ELIMINATOR
INLET AIR FILTER WITH SILENCER
SULFUR BURNER
SULFUR BURNER FEED PUMPS
FINAL TOWER ACID PUMPS
PRODUCT ACID BOOSTER SUMP PUMP
4160/480 VOLT TRANSFORMER
CONVERTER
DRYING TOWER
INTERPASS TOWER
FINAL TOWER
FINAL TOWER PUMP TANK
DRYING/INTERPASS TOWER PUMP TANK
SULFURIC ACID STORAGE TANKS
MOLTEN SULFUR STORAGE TANK
TREATED WATER STORAGE TANK
COLD INTERPASS HEAT EXCHANGER, HOT SHELL
COLD INTERPASS HEAT EXCHANGER, COLD SHELL
HOT INTERPASS HEAT EXCHANGER
SUPER-HEATER
SECONDARY ECONOMIZER
PRIMARY ECONOMIZER
DRYING TOWER ACID COOLER
INTERPASS TOWER ACID COOLER
FINAL TOWER ACID COOLER
PRODUCT ACID COOLER
BOILER FEEDWATER HEATER
WATER COOLING TOWER
BOILER B.D. HEAT RECOVERY SYSTEM
PLANT STACK
MOLTEN SULFUR PIT
DEMINERALIZER SYSTEM
BOILER CHEMICAL FEED SYSTEM
COOLING WATER TREATMENT SYSTEM
AUXILIARY GENERATOR
HVAC UNIT FOR CONTROL ROOM
CAR UNLOADING - 16 CARS
FIRST CARS UNLOADING
CAR UNLOADING - 16 CARS
LAST CARS UNLOADING
R.R. TRACKS
BATTERY LIMITS
PLANT #1
PLANT #2
CONTROL BLDG
PIPE RACK
SAN SEWER
EXIST. ROAD
NEW ROAD BY OTHERS
EXIST. PEABODY SCRUBBER AREA
INSTR. AIR
PLANT AIR
WELL WATER
POTABLE WATER
CONDENSATE
PRODUCT ACID
PROCESS WASTE WTR
SAN SEWER
PROCESS EFFLUENT
EQUIPMENT LIST - CONTINUED
235 CAR PULLER
NOTES
1. * DENOTES ONE IS AN INST. SPARE.
2. FOR DETAILED PLANT LAYOUT SEE DWG. 331-102
MONSANTO ENVIRO-CHEM SYSTEMS, INC
ST. LOUIS MISSOURI
PLOT PLAN
ATTACHMENT - F

EPA-450/2-79-003

ATTACHMENT G

(For Section VI. B. of Application)

Compilation of BACT/LAER Determinations

by

Jack A. Wunderle

PEDCo Environmental, Inc.
Chester Towers
11499 Chester Rd.
Cincinnati, Ohio 45246

Contract No. 68-02-2603
Task No. 42

EPA Project Officer: Gary Rust

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air, Noise, and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

May 1979

BACT/LAER CLEARINGHOUSE REPORT

SOURCE TYPE/SIZE: PHOSPHATE FERTILIZER CHEMICAL COMPLEX EXPANSION /2000 TON/DAY

NAME/ADDRESS: OXIDENTAL CHEMICAL COMPANY, WHITE SPRINGS FL

DETERMINATION IS: CONDITIONAL/FINAL/PENDING: DATE OF ISSUE: 2/2/78 BASIS:* BACT[1]/LAER/BACT[2] (circled)
FOR NEW (circled)/MODIFIED SOURCE

BY EPA REGION IV (Agency) ____ (Person) ____ (Phone)

PERMIT PARAMETERS: AFFECTED FACILITIES	THROUGHPUT CAPACITY, weight rate	POLLUTANT(S) EMITTED	EMISSION LIMIT(S) AND BASIS FOR**	CONTROL STRATEGY DESCRIPTION Equipment type, etc.	Eff.,%
New contact type		SO_2	333 lb/hr		
double absorption	2000 ton/day	H_2SO_4 Mist	12.5 lb/hr (N)	Mist Eliminator	99+
sulfuric acid plant					
Fossil-fuel-fired	$125x10^6$ MMBtu/hr	SO_2	(B)	Low sulfur oil	
steam generator		Part	(B)		
Vacuum evaporation					
super phosphoric	700 ton/day	SiF_4	0.29 lb/hr (N)	Venturi scrubber	
acid (SPA) plant		(silicon tetra-flouride)			

NOTES:

* Circle one. BACT-1 indicates determination made under pre-1977 amendments; BACT-2 indicates post-1977 amendments to CAA.

** Basis symbols: Use B = BACT, N = NSPS, S = SIP, L = LAER, P = PSD Increment

ATTACHMENT G (continued)

BACT/LAER CLEARINGHOUSE REPORT

SOURCE TYPE/SIZE: PHOSPHATE FERTILIZER CHEMICAL COMPLEX EXPANSION /2000TON/DAY

NAME/ADDRESS: OXIDENTAL CHEMICAL COMPANY, WHITE SPRINGS, FL

DETERMINATION IS: CONDITIONAL/FINAL/PENDING: DATE OF ISSUE: 2/2/78 BASIS:* BACT[1]/LAER/(BACT[2] circled)
FOR (NEW circled)/MODIFIED SOURCE

BY EPA REGION IV (Agency) ______ (Person) ______ (Phone)

PERMIT PARAMETERS: AFFECTED FACILITIES	THROUGHPUT CAPACITY, weight rate	POLLUTANT(S) EMITTED	EMISSION LIMIT(S) AND BASIS FOR**	CONTROL STRATEGY DESCRIPTION: Equipment type, etc.	Eff., %
Fossil fuel-fired steam generator	75,000 lb/hr	Part, SO_2, SiF_4	(B)	Low sulfur oil	
Phosphoric Acid Train	1500 ton/day	SiF_4	1.54 lb/hr (N)	Hoods and cyclone scrubber	99.9%
		Part	46 lb/hr (N)	baghouse	99.8

NOTES:

* Circle one. BACT-1 indicates determination made under pre-1977 amendments; BACT-2 indicates post-1977 amendments to CAA.

** Basis symbols: Use B = BACT, N = NSPS, S = SIP, L = LAER, P = PSD Increment

ATTACHMENT G (continued)

ATTACHMENT H

PREVENTION OF SIGNIFICANT DETERIORATION

(For Section VII of Application)

1. INTRODUCTION

USS Agri-Chemicals (USSAC) is proposing to replace an existing sulfuric acid plant at its Fort Meade Phosphate Chemical Complex with a new sulfuric acid plant. This new plant will have a greater production capacity than the existing plant, but at the same time will be able to achieve a much lower sulfur dioxide (SO_2) emission rate on a pounds per ton basis. In fact, annual average SO_2 emissions from the new plant are expected to be less than those from the existing plant even though sulfuric acid production will substantially increase.

On a short-term basis, however, SO_2 emissions from the new plant can exceed those from the existing plant. At its permitted production rate of 1500 tons per day (100 percent H_2SO_4), the existing plant is allowed to emit and frequently does emit SO_2 at the rate of 10 pounds per ton (lb/ton), which is equivalent to a rate of 625 pounds per hour (lb/h) or 15,000 pounds per day (lb/d). In comparison, the new plant is expected to be able to achieve a daily production rate of up to 4400 tons. At the maximum allowable SO_2 emission rate of 4 lb/ton, maximum short-term SO_2 emissions from the new plant would be 733 lb/h and 17,600 lb/d. The primary purpose of this analysis is to assess whether or not this difference in short-term emissions might result in a significant change in ambient ground-level SO_2 concentrations.

2. ANALYSIS PROCEDURES

Model

EPA's CRSTER model was used to assess 3-hour, 24-hour, and annual average SO_2 concentrations.

Emissions Characteristics

Specific emission source characteristics for the old and new sulfuric acid plants as used for modeling purposes are listed in Attachment A (a copy from one of the modeling run printouts). The SO_2 emission rate for the existing plant was treated as a negative number since this plant will be replaced by the new plant.

The only difference between these characteristics and those listed in Table 4-1 of the original permit application is that the temperature of the existing plant as used for modeling purposes is 98°F (310 K) rather than 87°F. This slight temperature change was made to ensure that stack exit temperature would never be lower than ambient temperatures. Making this change actually increases the conservatism of the analysis since it results in slightly lower concentrations attributable to the existing plant, thereby providing a greater chance for new plant concentrations to exceed existing plant concentrations.

For modeling purposes, the existing and new plant stacks were treated as though located at the same point. In reality, the new plant will be located about 200 to 300 meters southeast of the existing plant, but this distance is slight enough to be ignored.

It should also be noted that the two-stack configuration of the new plant was treated as one stack. This was done in the typical conservative fashion of assuming all SO_2 emissions are emitted at one point with a volumetric flow and velocity equal to that of one of the identical individual stacks.

Meteorological Input

The meteorological observation station normally used for central Florida modeling studies is Tampa. Following this normal practice, Tampa surface and upper air data were used for the present analysis. Although several years of Tampa data are available in the correct format for the CRSTER Model, only a single year was used. The year 1972 was selected because of the high 24-hour concentrations typically resulting from use of this data set. As will be evident when modeling results are presented, use of this single year of data is easily sufficient to show that shutting down the existing plant will offset the effect of the new plant in comparsion with PSD increments.

Receptor Grid

A point midway between the locations of the existing sulfuric acid plant and the proposed new plant was selected as the point from which SO_2 emissions originate. This point is at least 0.6 km from the nearest USSAC property line (State Road 630 to the north), and in most directions is even further away from the boundaries of USSAC-owned property. Therefore, the receptor distances evaluated through the CRSTER Model began at 0.6 km and continued outward. (The CRSTER Model establishes a polar coordinate receptor grid so that it is only necessary to specify radial distances and calculations are automatically made at ten-degree direction increments for each distance selected.)

The following distances were evaluated using the entire year of meteorological data: 0.6, 1.0, 2.0, 3.0, 4.0, 6.0, 12.0, 15.0, 20.0, 25.0, 30.0, 35.0, 40.0, 45.0, and 50.0 km. Based on the results obtained from these initial calculations, specific days were selected for additional evaluations using a smaller grid spacing. The days and receptor separation distances evaluated are shown in the attached computer printouts.

3. MODELING RESULTS

Modeling results are summarized in Table 1. Highest 3-hour, 24-hour, and annual average SO_2 concentrations are listed in comparison with PSD Class II increments, Florida ambient air quality standards (which are more restrictive than the national standards), and EPA significance levels. (Concentrations lower than these defined significance levels are considered to be inconsequential.) As can be seen, not only are the highest concentrations predicted well below the PSD Class II increments, they are also well below the significance levels. This result is attributable to the better dispersion characteristics of the new plant (taller stacks and higher exit temperature) which compensate for the greater maximum hourly emission rate.

TABLE 1

SO_2 Modeling Results

Averaging Period	Highest Predicted Concentration (μg/m3)	Distance and Direction to Highest Concentration	PSD Class II Increment ($\mu g/m^3$)	Florida Ambient Standards ($\mu g/m^3$)	EPA Significance Level ($\mu g/m^3$)
3-Hour	3[a]	3.0 km, 340°	512	1300	25
24-Hour	< 1	1.0 km, 90°	91	260	5
Annual	< 0[b]	50.0 km, 10°	20	60	1

[a] This is the highest concentration excluding one period containing two consecutive hours with calm winds.

[b] The highest annual concentration is actually a negative number, representing a decrease in concentrations. Annual concentrations are based on continuous emissions at the maximum hourly rate.

ATTACHMENT H

PART A

Emission Source Characteristics Used in all Modeling Runs

STACK # 1--OLD SO2 STACK
STACK # 2--NEW SO2 STACK

STACK	MONTH	EMISSION RATE (GMS/SEC)	HEIGHT (METERS)	DIAMETER (METERS)	EXIT VELOCITY (M/SEC)	TEMP (DEG.K)	VOLUMETRIC FLOW (M**3/SEC)
1	ALL	-78.7500	29.00	3.02	6.77	310.00	48.49
2	ALL	92.3600	53.30	2.59	9.45	355.00	49.79

ATTACHMENT H

PART B

Concentrations at Distances of 0.6, 1.0, 2.0, 4.0, and 12.0 km
Using Entire 1972 Meteorolgoical Data Set

Note: 24-hour concentrations of 4.1667 E-32 and 3-hour concentrations of 1.0000 E-30 are presumed to represent negative concentrations which have been set to these values by initializing statements in the CRSTER Model.

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

MAXIMUM MEAN CONC= -1.1547E-07 DIRECTION= 1 DISTANCE= 12.0 KM

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	.6 KM	1.0 KM	2.0 KM	4.0 KM	12.0 KM
1	-1.10542E-05	-7.77197E-06	-2.94133E-06	-8.95733E-07	-1.15470E-07
2	-1.46742E-05	-1.03298E-05	-3.93054E-06	-1.25532E-06	-1.98908E-07
3	-1.24830E-05	-8.11257E-06	-3.13668E-06	-1.10965E-06	-2.00033E-07
4	-9.90308E-06	-5.96867E-06	-2.49501E-06	-1.04164E-06	-2.05925E-07
5	-1.16780E-05	-6.67876E-06	-2.82968E-06	-1.27302E-06	-2.93225E-07
6	-1.40093E-05	-7.68884E-06	-2.80865E-06	-1.02109E-06	-1.91637E-07
7	-1.53911E-05	-8.68870E-06	-2.99980E-06	-1.00457E-06	-1.88987E-07
8	-2.09687E-05	-1.16222E-05	-3.67459E-06	-1.02566E-06	-1.38505E-07
9	-3.42884E-05	-2.10838E-05	-6.93821E-06	-1.96792E-06	-2.61061E-07
10	-2.34083E-05	-1.42342E-05	-4.78774E-06	-1.43625E-06	-2.24421E-07
11	-1.30885E-05	-9.40348E-06	-3.86834E-06	-1.34680E-06	-2.01020E-07
12	-9.31209E-06	-6.87312E-06	-3.22213E-06	-1.43340E-06	-2.82924E-07
13	-9.58068E-06	-7.58986E-06	-3.64509E-06	-1.58522E-06	-3.25117E-07
14	-8.67399E-06	-7.52583E-06	-3.90528E-06	-2.08881E-06	-5.91310E-07
15	-8.27493E-06	-7.66021E-06	-3.78493E-06	-1.54615E-06	-2.81247E-07
16	-7.42289E-06	-6.22478E-06	-2.82652E-06	-1.21546E-06	-2.58991E-07
17	-7.20656E-06	-5.65697E-06	-2.51092E-06	-1.09590E-06	-2.61473E-07
18	-7.58701E-06	-6.44791E-06	-3.17323E-06	-1.43442E-06	-3.34403E-07
19	-5.81166E-06	-4.80295E-06	-2.35876E-06	-1.08393E-06	-2.54282E-07
20	-5.72867E-06	-4.46657E-06	-2.22037E-06	-1.00097E-06	-2.09963E-07
21	-8.36406E-06	-6.88062E-06	-3.56591E-06	-1.89453E-06	-5.51526E-07
22	-1.16052E-05	-9.43266E-06	-4.43107E-06	-1.82323E-06	-3.91715E-07
23	-1.50103E-05	-1.30771E-05	-7.06495E-06	-3.65920E-06	-9.33540E-07
24	-1.68126E-05	-1.45578E-05	-7.89537E-06	-3.93650E-06	-9.46232E-07
25	-1.78138E-05	-1.50033E-05	-8.70667E-06	-5.02639E-06	-1.41723E-06
26	-1.96873E-05	-1.65320E-05	-9.16150E-06	-4.63878E-06	-1.11971E-06
27	-2.61885E-05	-2.27847E-05	-1.25240E-05	-6.13369E-06	-1.38436E-06
28	-2.08464E-05	-1.67132E-05	-8.19345E-06	-3.97323E-06	-9.80295E-07
29	-1.57892E-05	-1.22523E-05	-6.39000E-06	-3.28791E-06	-8.50878E-07
30	-1.43464E-05	-1.06056E-05	-5.40110E-06	-3.06494E-06	-8.65826E-07
31	-1.25796E-05	-9.70860E-06	-4.78671E-06	-2.18875E-06	-5.15405E-07
32	-1.16940E-05	-8.79881E-06	-3.74055E-06	-1.34271E-06	-2.47835E-07
33	-1.22111E-05	-9.06788E-06	-4.25415E-06	-1.90688E-06	-4.31577E-07
34	-1.02747E-05	-7.66862E-06	-3.22892E-06	-1.24575E-06	-2.63563E-07
35	-7.25032E-06	-5.60549E-06	-2.53656E-06	-9.92435E-07	-1.77595E-07
36	-9.91598E-06	-7.84184E-06	-3.43708E-06	-1.26375E-06	-2.18088E-07

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 24-HOUR CONC= 2.5751E-07 DIRECTION= 9 DISTANCE= 1.0 KM DAY=249

HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	.6 KM	1.0 KM	2.0 KM	4.0 KM	12.0 KM
1	4.1667E-32 (6)	1.0753E-07 (215)	5.2191E-08 (215)	4.9553E-08 (233)	4.8874E-08 (143)
2	4.1667E-32 (1)	2.3252E-07 (215)	1.2980E-07 (215)	6.8928E-08 (215)	1.5404E-07 (237)
3	4.1667E-32 (1)	9.7767E-08 (241)	2.6331E-08 (241)	7.1846E-08 (205)	1.3901E-07 (237)
4	4.1667E-32 (1)	1.9784E-07 (241)	7.1022E-08 (241)	9.5140E-08 (150)	3.2640E-08 (237)
5	4.1667E-32 (1)	2.4011E-09 (248)	8.1338E-08 (241)	1.1342E-07 (150)	4.6776E-08 (261)
6	4.1667E-32 (1)	2.0984E-08 (248)	1.1502E-07 (215)	1.5622E-07 (216)	6.5695E-08 (244)
7	4.1667E-32 (1)	9.1052E-08 (248)	7.3394E-08 (215)	1.1630E-07 (216)	3.6355E-08 (78)
8	4.1667E-32 (1)	1.8752E-07 (248)	1.3798E-07 (248)	9.6519E-08 (195)	3.6415E-08 (53)
9	4.1667E-32 (1)	2.5751E-07 (249)	1.1164E-07 (248)	1.2315E-07 (195)	7.3483E-08 (46)
10	4.1667E-32 (1)	2.3665E-07 (189)	6.9779E-08 (189)	1.2660E-07 (87)	4.7159E-08 (87)
11	4.1667E-32 (1)	1.0963E-07 (189)	5.4455E-08 (87)	3.2143E-08 (87)	3.8896E-08 (96)
12	4.1667E-32 (1)	2.7029E-08 (150)	9.7408E-09 (87)	3.7419E-08 (112)	9.0301E-08 (184)
13	4.1667E-32 (1)	2.4551E-09 (150)	6.8074E-10 (87)	1.1327E-07 (182)	4.4795E-08 (182)
14	4.1667E-32 (1)	6.5083E-10 (247)	5.1894E-11 (247)	6.4337E-08 (194)	3.5312E-08 (208)
15	8.1251E-32 (3)	4.1667E-32 (1)	9.1201E-10 (247)	5.8791E-08 (194)	2.5405E-08 (194)
16	5.4064E-32 (304)	4.0937E-11 (163)	1.1569E-09 (247)	4.7446E-08 (189)	1.1943E-07 (48)
17	7.5937E-32 (73)	9.5234E-10 (163)	8.1939E-11 (163)	6.5331E-08 (45)	8.3112E-08 (245)
18	6.1800E-32 (290)	1.0284E-08 (163)	2.6490E-11 (265)	1.1385E-07 (245)	4.9315E-08 (245)
19	8.3333E-32 (72)	4.5719E-08 (163)	7.4300E-09 (263)	6.8235E-08 (252)	5.8084E-08 (208)
20	4.1667E-32 (1)	1.7060E-07 (163)	4.0329E-08 (163)	8.2430E-08 (252)	1.9772E-08 (193)
21	8.3084E-32 (215)	4.1667E-32 (1)	4.7816E-08 (163)	9.2082E-08 (189)	2.4883E-08 (359)
22	7.5015E-32 (119)	5.6569E-08 (186)	1.5704E-08 (158)	8.3797E-08 (283)	6.0149E-08 (363)
23	8.3333E-32 (78)	1.5726E-07 (186)	8.2974E-08 (186)	1.3909E-07 (283)	5.1370E-08 (283)
24	8.3333E-32 (75)	8.2016E-08 (248)	2.1806E-08 (248)	1.5150E-07 (237)	4.8484E-08 (237)
25	8.3333E-32 (75)	8.3333E-32 (75)	8.3333E-32 (75)	9.6259E-08 (363)	4.1879E-08 (363)
26	1.1096E-31 (215)	8.3333E-32 (75)	2.6479E-11 (214)	8.7529E-08 (323)	5.8262E-08 (323)
27	8.3333E-32 (211)	8.3333E-32 (211)	8.3333E-32 (211)	3.1747E-10 (64)	4.6778E-08 (141)
28	4.1667E-32 (2)	4.1667E-32 (2)	8.3333E-32 (98)	3.3382E-08 (253)	3.5232E-08 (237)
29	4.1667E-32 (5)	4.1667E-32 (5)	2.0419E-10 (158)	4.8339E-08 (248)	3.9044E-08 (253)
30	4.1667E-32 (6)	4.1667E-32 (6)	3.0600E-09 (186)	6.2801E-08 (248)	1.1458E-07 (291)
31	8.3309E-32 (290)	1.4462E-11 (156)	9.0461E-13 (156)	4.5277E-08 (73)	4.5035E-08 (241)
32	4.1667E-32 (6)	4.1667E-32 (6)	2.0230E-16 (267)	5.3898E-08 (231)	3.6493E-08 (231)
33	8.3333E-32 (194)	8.3333E-32 (194)	4.1074E-16 (154)	1.0503E-07 (314)	6.8065E-08 (206)
34	4.1667E-32 (6)	4.1667E-32 (6)	1.8889E-09 (196)	7.0332E-08 (314)	9.2772E-08 (210)
35	4.1667E-32 (6)	4.1667E-32 (6)	4.1667E-32 (6)	5.6760E-08 (54)	3.9191E-08 (78)
36	4.1667E-32 (6)	1.5913E-08 (215)	9.1138E-09 (215)	5.2853E-08 (29)	4.4532E-08 (135)

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 24-HOUR CONC= 2.5379E-07 DIRECTION= 9 DISTANCE= 1.0 KM DAY=189

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	.6 KM	1.0 KM	2.0 KM	4.0 KM	12.0 KM
1	4.1667E-32 (7)	2.2506E-09 (241)	3.0114E-10 (241)	4.8109E-08 (206)	4.1214E-08 (237)
2	4.1667E-32 (6)	2.1092E-08 (241)	4.2600E-09 (241)	5.9162E-08 (210)	3.8925E-08 (124)
3	4.1667E-32 (6)	2.6900E-09 (229)	1.0273E-08 (112)	6.4362E-08 (209)	3.7804E-08 (45)
4	4.1667E-32 (6)	1.3652E-10 (248)	2.5420E-08 (112)	9.4958E-08 (195)	2.9447E-08 (162)
5	4.1667E-32 (6)	3.0824E-10 (189)	2.9068E-08 (224)	7.7962E-08 (216)	3.6300E-08 (210)
6	4.1667E-32 (6)	5.7834E-09 (222)	2.8707E-08 (224)	9.5157E-08 (194)	6.3318E-08 (216)
7	4.1667E-32 (6)	3.5817E-08 (189)	5.5517E-08 (248)	1.0354E-07 (259)	3.6210E-08 (298)
8	4.1667E-32 (2)	1.3525E-07 (189)	6.9517E-08 (249)	9.3246E-08 (259)	2.7767E-08 (234)
9	4.1667E-32 (2)	2.5379E-07 (189)	1.0707E-07 (249)	8.1506E-08 (238)	5.3964E-08 (137)
10	4.1667E-32 (2)	4.1667E-32 (1)	5.5039E-08 (150)	1.0768E-07 (195)	3.3074E-08 (222)
11	4.1667E-32 (2)	5.6851E-08 (150)	2.8067E-08 (189)	2.7085E-08 (314)	2.3925E-08 (222)
12	4.1667E-32 (2)	2.1468E-08 (189)	4.8901E-09 (189)	7.2172E-09 (222)	5.6470E-08 (250)
13	4.1667E-32 (2)	1.6630E-09 (87)	6.7514E-10 (222)	4.7066E-08 (23)	3.6461E-08 (245)
14	4.1667E-32 (3)	1.2007E-10 (87)	4.2175E-11 (222)	3.7012E-08 (182)	3.1906E-08 (194)
15	4.1667E-32 (1)	4.1667E-32 (3)	4.1667E-32 (1)	4.8778E-08 (189)	1.6563E-08 (26)
16	4.1667E-32 (1)	4.1667E-32 (1)	1.9742E-12 (163)	3.7784E-08 (240)	1.6007E-08 (245)
17	4.1667E-32 (1)	4.1667E-32 (1)	1.9331E-13 (265)	5.0990E-08 (216)	3.4079E-08 (45)
18	4.1667E-32 (1)	4.1667E-32 (1)	1.7468E-15 (158)	8.4680E-08 (247)	4.1938E-08 (208)
19	8.3296E-32 (55)	3.0153E-11 (186)	7.9920E-10 (265)	5.8731E-08 (247)	2.9058E-08 (231)
20	4.1667E-32 (3)	7.5228E-10 (186)	4.2833E-09 (265)	5.6308E-08 (189)	1.8200E-08 (205)
21	6.9290E-32 (150)	4.1667E-32 (2)	2.8272E-09 (158)	5.8691E-08 (359)	2.3677E-08 (288)
22	6.9290E-32 (195)	4.1667E-32 (1)	4.1667E-32 (1)	5.9319E-08 (265)	2.8056E-08 (283)
23	8.3269E-32 (355)	2.3460E-08 (248)	1.0393E-09 (248)	4.6469E-08 (52)	2.4056E-08 (52)
24	4.1667E-32 (2)	8.3333E-32 (75)	8.3333E-32 (75)	1.0381E-07 (283)	3.6116E-08 (283)
25	8.3084E-32 (215)	4.1667E-32 (2)	8.3333E-32 (216)	6.5432E-09 (185)	3.7467E-08 (186)
26	8.3333E-32 (75)	8.3333E-32 (215)	8.3333E-32 (75)	7.5076E-08 (237)	3.8629E-08 (363)
27	4.1667E-32 (2)	4.1667E-32 (2)	4.1667E-32 (2)	5.2316E-11 (291)	1.0079E-08 (363)
28	4.1667E-32 (5)	4.1667E-32 (5)	4.1667E-32 (2)	2.3560E-09 (291)	2.1544E-08 (253)
29	4.1667E-32 (6)	4.1667E-32 (6)	4.9651E-11 (217)	3.3762E-08 (251)	2.5666E-08 (198)
30	4.1667E-32 (7)	4.1667E-32 (7)	2.7527E-11 (156)	4.8561E-08 (251)	8.7801E-08 (185)
31	4.1667E-32 (6)	4.1667E-32 (6)	1.6467E-13 (267)	3.4496E-08 (240)	3.9906E-08 (216)
32	4.1667E-32 (7)	4.1667E-32 (7)	4.1667E-32 (6)	5.3880E-08 (314)	3.1482E-08 (75)
33	6.5493E-32 (363)	4.1667E-32 (6)	8.3333E-32 (194)	1.0210E-07 (229)	4.1783E-08 (314)
34	4.1667E-32 (7)	4.1667E-32 (7)	4.1667E-32 (6)	5.9613E-08 (218)	5.2884E-08 (103)
35	4.1667E-32 (7)	4.1667E-32 (7)	4.1667E-32 (7)	5.3016E-08 (238)	2.3506E-08 (87)
36	4.1667E-32 (7)	2.2276E-09 (248)	2.1952E-09 (111)	5.1906E-08 (87)	3.1041E-08 (259)

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 3-HOUR CONC= 2.4641E-06 DIRECTION= 22 DISTANCE= 1.0 KM DAY=189 TIME PERIOD= 5

HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	.6 KM	1.0 KM	2.0 KM	4.0 KM	12.0 KM
1	1.0000E-30 (1, 1)	8.6025E-07 (215, 4)	4.1753E-07 (215, 4)	4.0117E-07 (196, 4)	4.7383E-07 (143, 3)
2	1.0000E-30 (1, 1)	1.8602E-06 (215, 4)	1.0384E-06 (215, 4)	5.5143E-07 (215, 4)	1.2186E-06 (237, 6)
3	1.0000E-30 (1, 1)	2.0285E-06 (215, 4)	1.1361E-06 (215, 4)	6.1061E-07 (215, 4)	6.0052E-07 (237, 4)
4	1.0000E-30 (1, 1)	1.8130E-06 (241, 5)	6.2790E-07 (215, 4)	7.0544E-07 (124, 3)	2.9211E-07 (124, 3)
5	1.0000E-30 (1, 1)	1.7675E-06 (241, 5)	1.3203E-06 (206, 4)	6.9397E-07 (206, 4)	2.5878E-07 (244, 4)
6	1.0000E-30 (1, 1)	1.9752E-06 (215, 4)	1.5582E-06 (206, 4)	1.0121E-06 (216, 3)	5.2556E-07 (244, 4)
7	1.0000E-30 (1, 1)	1.9375E-06 (229, 4)	8.6676E-07 (215, 4)	5.8092E-07 (299, 4)	2.7637E-07 (78, 4)
8	1.0000E-30 (1, 1)	1.5734E-06 (248, 4)	1.1042E-06 (248, 4)	6.2934E-07 (53, 4)	2.2714E-07 (290, 4)
9	1.0000E-30 (1, 1)	2.1595E-06 (87, 4)	1.5142E-06 (87, 4)	1.2366E-06 (207, 4)	5.8786E-07 (46, 5)
10	1.0000E-30 (1, 1)	1.8932E-06 (189, 4)	1.2832E-06 (87, 4)	7.8188E-07 (242, 4)	2.8703E-07 (303, 4)
11	1.0000E-30 (1, 1)	8.7723E-07 (189, 4)	5.9638E-07 (222, 4)	4.1638E-07 (195, 4)	3.3186E-07 (96, 3)
12	1.0000E-30 (1, 1)	2.1623E-07 (150, 5)	1.7999E-07 (222, 4)	4.1828E-07 (112, 4)	7.2241E-07 (184, 4)
13	1.0000E-30 (1, 1)	2.7847E-08 (150, 5)	1.5564E-08 (222, 4)	9.0617E-07 (182, 3)	3.5836E-07 (182, 3)
14	1.0000E-30 (1, 1)	5.7570E-09 (247, 5)	2.4935E-07 (184, 4)	5.6043E-07 (194, 3)	2.8249E-07 (208, 6)
15	1.0000E-30 (1, 1)	7.1374E-08 (247, 5)	7.3128E-08 (184, 4)	4.7033E-07 (194, 3)	2.0324E-07 (194, 3)
16	1.0000E-30 (1, 1)	4.3972E-07 (247, 5)	7.0955E-08 (247, 5)	4.9012E-07 (216, 4)	7.8707E-07 (48, 6)
17	1.0000E-30 (1, 1)	1.3462E-06 (247, 5)	2.6687E-07 (247, 5)	1.2779E-06 (245, 3)	4.9261E-07 (245, 3)
18	1.0000E-30 (1, 1)	2.0480E-06 (247, 5)	4.3858E-07 (247, 5)	1.0725E-06 (245, 3)	3.9056E-07 (245, 3)
19	1.0000E-30 (1, 1)	1.7618E-06 (189, 5)	3.5019E-07 (189, 5)	4.5350E-07 (19, 4)	2.3672E-06 (236, 6)
20	1.0000E-30 (1, 1)	2.3910E-06 (189, 5)	4.8078E-07 (189, 5)	3.9630E-07 (205, 4)	7.9001E-07 (236, 6)
21	1.0000E-30 (1, 1)	2.4504E-06 (189, 5)	5.2214E-07 (189, 5)	4.9573E-07 (264, 4)	6.6774E-07 (245, 3)
22	1.0000E-30 (1, 1)	2.4641E-06 (189, 5)	6.0721E-07 (189, 5)	6.7038E-07 (283, 4)	4.8119E-07 (363, 4)
23	1.0000E-30 (1, 1)	1.7813E-06 (189, 5)	6.7227E-07 (186, 4)	1.1127E-06 (283, 4)	4.1096E-07 (283, 4)
24	1.0000E-30 (1, 1)	2.1313E-06 (186, 4)	1.1048E-06 (186, 4)	1.2120E-06 (237, 4)	3.9888E-07 (284, 3)
25	1.0000E-30 (1, 2)	1.9593E-06 (247, 5)	7.9180E-07 (186, 4)	2.0506E-06 (237, 4)	7.7825E-07 (237, 4)
26	1.0000E-30 (1, 5)	1.9375E-06 (248, 5)	6.1279E-07 (248, 5)	7.3392E-07 (323, 3)	4.6475E-07 (323, 3)
27	1.0000E-30 (1, 5)	1.0325E-06 (248, 5)	2.9087E-07 (248, 5)	7.0615E-07 (208, 5)	3.7456E-07 (141, 3)
28	1.0000E-30 (1, 5)	1.1862E-06 (163, 4)	5.8578E-07 (163, 4)	5.0779E-07 (230, 3)	3.7665E-07 (231, 3)
29	1.0000E-30 (1, 8)	1.8049E-06 (163, 4)	9.6268E-07 (163, 4)	8.7982E-07 (185, 4)	4.2127E-07 (283, 3)
30	1.0000E-30 (1, 1)	1.3645E-06 (163, 4)	6.9127E-07 (163, 4)	1.7167E-06 (185, 4)	7.1111E-07 (185, 4)
31	1.0000E-30 (1, 1)	5.1259E-07 (163, 4)	2.1689E-07 (163, 4)	1.0272E-06 (185, 4)	3.5005E-07 (185, 4)
32	1.0000E-30 (1, 1)	1.7921E-07 (248, 4)	1.0715E-06 (248, 4)	6.0956E-07 (248, 4)	2.9195E-07 (231, 4)
33	1.0000E-30 (1, 1)	1.7557E-06 (248, 4)	9.4544E-07 (248, 4)	8.2783E-07 (229, 4)	5.4982E-07 (206, 3)
34	1.0000E-30 (1, 1)	7.7812E-07 (248, 4)	3.5028E-07 (248, 4)	2.1390E-06 (236, 4)	8.2890E-07 (236, 4)
35	1.0000E-30 (1, 1)	1.6713E-07 (248, 4)	5.6669E-08 (248, 4)	4.7385E-07 (54, 4)	5.1679E-07 (236, 4)
36	1.0000E-30 (1, 1)	1.2731E-07 (215, 4)	7.2911E-08 (215, 4)	4.5750E-07 (309, 4)	6.0460E-07 (236, 4)

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 3-HOUR CONC= 2.1591E-06 DIRECTION= 9 DISTANCE= 1.0 KM DAY=249 TIME PERIOD= 4

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	.6 KM	1.0 KM	2.0 KM	4.0 KM	12.0 KM
1	1.0000E-30 (1, 2)	1.8005E-08 (241, 5)	7.8360E-08 (211, 4)	3.9643E-07 (233, 4)	3.2971E-07 (237, 6)
2	1.0000E-30 (1, 2)	1.6875E-07 (241, 5)	1.1102E-07 (211, 4)	4.7598E-07 (210, 5)	3.1140E-07 (124, 3)
3	1.0000E-30 (1, 2)	7.8594E-07 (241, 5)	2.1065E-07 (241, 5)	5.8199E-07 (205, 4)	5.1155E-07 (237, 6)
4	1.0000E-30 (1, 2)	1.3354E-06 (215, 4)	5.6892E-07 (241, 5)	5.8175E-07 (102, 5)	2.3473E-07 (162, 3)
5	1.0000E-30 (1, 2)	1.5061E-06 (206, 4)	6.7033E-07 (241, 5)	6.6917E-07 (261, 5)	2.5768E-07 (233, 4)
6	1.0000E-30 (1, 2)	1.8067E-06 (229, 4)	9.5121E-07 (215, 4)	8.4607E-07 (206, 4)	4.6828E-07 (216, 3)
7	1.0000E-30 (1, 2)	1.8097E-06 (215, 4)	8.0344E-07 (206, 4)	5.5827E-07 (78, 4)	2.2470E-07 (24, 5)
8	1.0000E-30 (1, 2)	1.5220E-06 (249, 4)	7.8079E-07 (87, 4)	6.2112E-07 (207, 4)	2.1410E-07 (248, 4)
9	1.0000E-30 (1, 2)	2.1591E-06 (249, 4)	1.1995E-06 (248, 4)	1.1201E-06 (124, 4)	4.6105E-07 (207, 4)
10	1.0000E-30 (1, 2)	1.8777E-06 (87, 4)	9.1295E-07 (222, 4)	7.1205E-07 (124, 4)	2.8012E-07 (181, 3)
11	1.0000E-30 (1, 2)	8.1127E-07 (87, 4)	4.7511E-07 (87, 4)	3.6670E-07 (193, 4)	1.4805E-07 (184, 4)
12	1.0000E-30 (1, 2)	2.0199E-07 (189, 4)	7.6864E-08 (87, 4)	4.1191E-07 (245, 4)	4.7371E-07 (250, 4)
13	1.0000E-30 (1, 2)	2.3112E-08 (189, 4)	5.4335E-09 (87, 4)	4.0244E-07 (184, 4)	3.4459E-07 (184, 4)
14	1.0000E-30 (1, 2)	1.7025E-09 (150, 5)	4.1842E-10 (247, 5)	4.7211E-07 (102, 4)	2.5634E-07 (194, 3)
15	1.0000E-30 (1, 2)	1.0000E-30 (1, 1)	8.2430E-09 (247, 5)	3.9023E-07 (189, 5)	1.4938E-07 (362, 5)
16	1.0000E-30 (1, 2)	2.0250E-08 (184, 4)	5.8104E-09 (184, 4)	3.9047E-07 (189, 5)	2.2944E-07 (216, 4)
17	1.0000E-30 (1, 2)	7.6187E-09 (163, 4)	1.0114E-07 (263, 5)	6.0038E-07 (148, 3)	2.7144E-07 (45, 5)
18	1.0000E-30 (1, 2)	8.8074E-08 (163, 4)	2.1322E-07 (263, 5)	5.0620E-07 (193, 3)	3.3551E-07 (208, 5)
19	1.0000E-30 (1, 2)	1.5483E-06 (247, 5)	3.1493E-07 (247, 5)	3.5161E-07 (231, 4)	4.6467E-07 (208, 5)
20	1.0000E-30 (1, 2)	1.3649E-06 (163, 4)	3.2467E-07 (163, 4)	3.6153E-07 (252, 5)	1.5679E-07 (322, 3)
21	1.0000E-30 (1, 2)	1.1041E-07 (247, 5)	3.8261E-07 (163, 4)	4.9524E-07 (189, 4)	1.9907E-07 (359, 4)
22	1.0000E-30 (1, 2)	4.5967E-07 (186, 4)	1.7874E-07 (186, 4)	4.9974E-07 (189, 4)	2.2445E-07 (283, 4)
23	1.0000E-30 (1, 2)	1.4072E-06 (186, 4)	4.4167E-07 (189, 5)	5.2613E-07 (158, 5)	1.8126E-07 (163, 4)
24	1.0000E-30 (1, 2)	9.8835E-07 (247, 5)	4.0095E-07 (156, 4)	8.3051E-07 (283, 4)	3.8787E-07 (237, 4)
25	1.0000E-30 (1, 4)	1.8066E-06 (248, 5)	6.9314E-07 (156, 4)	7.7106E-07 (363, 4)	4.1789E-07 (235, 3)
26	1.0000E-30 (1, 6)	5.8619E-07 (247, 5)	4.6254E-07 (247, 5)	7.0615E-07 (208, 5)	3.0903E-07 (363, 4)
27	1.0000E-30 (1, 6)	3.5511E-07 (163, 4)	1.5523E-07 (163, 4)	5.7599E-07 (247, 4)	2.8997E-07 (323, 3)
28	1.0000E-30 (1, 7)	2.7344E-07 (248, 5)	1.9524E-07 (185, 4)	3.9970E-07 (247, 5)	3.4753E-07 (230, 4)
29	1.0000E-30 (2, 1)	3.5984E-08 (248, 5)	9.5745E-08 (154, 4)	7.0207E-07 (283, 3)	3.4857E-07 (234, 3)
30	1.0000E-30 (2, 1)	2.3532E-09 (248, 5)	7.1161E-08 (212, 5)	6.1255E-07 (241, 4)	5.5328E-07 (291, 4)
31	1.0000E-30 (1, 2)	1.1569E-10 (156, 4)	2.0218E-07 (212, 5)	5.7948E-07 (241, 4)	3.1925E-07 (216, 3)
32	1.0000E-30 (1, 2)	9.5692E-08 (163, 4)	3.3687E-07 (185, 4)	4.8929E-07 (229, 4)	2.7084E-07 (234, 4)
33	1.0000E-30 (1, 2)	8.8771E-09 (163, 4)	7.6749E-08 (186, 4)	7.5458E-07 (236, 4)	3.0123E-07 (218, 3)
34	1.0000E-30 (1, 2)	4.0922E-10 (163, 4)	4.2260E-08 (186, 4)	4.7690E-07 (218, 3)	6.9121E-07 (210, 3)
35	1.0000E-30 (1, 2)	1.0000E-30 (1, 1)	5.2351E-09 (186, 4)	4.2417E-07 (238, 4)	3.1353E-07 (78, 4)
36	1.0000E-30 (1, 2)	1.7832E-08 (248, 4)	1.9753E-08 (111, 5)	4.2647E-07 (135, 3)	4.7383E-07 (143, 3)

ATTACHMENT H

PART C

Concentrations at Distances of 3.0, 6.0, 15.0, 20.0, and 25.0 km
Using Entire 1972 Meteorological Data Set

PLANT NAME: FORT MEADE SULFURIC ACID   POLLUTANT: SO2   EMISSION UNITS: GM/SEC   AIR QUALITY UNITS: GM/M**3

MAXIMUM MEAN CONC= -2.9060E-08 DIRECTION= 1 DISTANCE= 25.0 KM

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	3.0 KM	6.0 KM	15.0 KM	20.0 KM	25.0 KM
1	-1.48482E-06	-4.28374E-07	-7.53402E-08	-4.36503E-08	-2.90598E-08
2	-2.02334E-06	-6.39973E-07	-1.35861E-07	-8.37117E-08	-5.80183E-08
3	-1.71103E-06	-6.00876E-07	-1.38348E-07	-8.64185E-08	-6.03063E-08
4	-1.50699E-06	-6.00240E-07	-1.41404E-07	-8.68955E-08	-5.96974E-08
5	-1.78153E-06	-7.74205E-07	-2.08397E-07	-1.34225E-07	-9.55128E-08
6	-1.55597E-06	-5.58626E-07	-1.35216E-07	-8.68542E-08	-6.24348E-08
7	-1.56830E-06	-5.46357E-07	-1.32489E-07	-8.42090E-08	-5.93372E-08
8	-1.74245E-06	-4.87365E-07	-9.31609E-08	-5.68413E-08	-3.93695E-08
9	-3.31836E-06	-9.39211E-07	-1.72470E-07	-1.01663E-07	-6.82819E-08
10	-2.36106E-06	-7.20764E-07	-1.54451E-07	-9.63104E-08	-6.76043E-08
11	-2.11494E-06	-6.87884E-07	-1.34138E-07	-8.02434E-08	-5.47071E-08
12	-2.03619E-06	-8.31539E-07	-1.94517E-07	-1.19885E-07	-8.28587E-08
13	-2.26734E-06	-9.25597E-07	-2.25635E-07	-1.40890E-07	-9.80789E-08
14	-2.71352E-06	-1.40127E-06	-4.28190E-07	-2.80182E-07	-2.00450E-07
15	-2.27930E-06	-8.59571E-07	-1.91797E-07	-1.16839E-07	-8.03500E-08
16	-1.72701E-06	-7.24185E-07	-1.79031E-07	-1.10791E-07	-7.62778E-08
17	-1.54011E-06	-6.73105E-07	-1.87024E-07	-1.21480E-07	-8.67394E-08
18	-2.00672E-06	-8.72049E-07	-2.40088E-07	-1.57519E-07	-1.14068E-07
19	-1.50229E-06	-6.70645E-07	-1.79044E-07	-1.13013E-07	-7.89136E-08
20	-1.41368E-06	-5.91433E-07	-1.46148E-07	-9.15255E-08	-6.39548E-08
21	-2.46230E-06	-1.28032E-06	-4.02562E-07	-2.66794E-07	-1.92760E-07
22	-2.65215E-06	-1.06227E-06	-2.79130E-07	-1.81001E-07	-1.29980E-07
23	-4.86354E-06	-2.35432E-06	-6.65179E-07	-4.27743E-07	-3.02607E-07
24	-5.34023E-06	-2.45623E-06	-6.74421E-07	-4.35613E-07	-3.11047E-07
25	-6.42198E-06	-3.38081E-06	-1.02698E-06	-6.76077E-07	-4.87211E-07
26	-6.26427E-06	-2.90478E-06	-7.96952E-07	-5.12576E-07	-3.64248E-07
27	-8.41495E-06	-3.74330E-06	-9.74235E-07	-6.18986E-07	-4.37096E-07
28	-5.39460E-06	-2.50571E-06	-6.99014E-07	-4.51265E-07	-3.20720E-07
29	-4.38583E-06	-2.10825E-06	-6.16476E-07	-4.06662E-07	-2.95276E-07
30	-3.90869E-06	-2.07130E-06	-6.25165E-07	-4.09241E-07	-2.93125E-07
31	-3.05246E-06	-1.34031E-06	-3.67169E-07	-2.36094E-07	-1.67700E-07
32	-2.06799E-06	-7.27055E-07	-1.73721E-07	-1.10188E-07	-7.78038E-08
33	-2.67768E-06	-1.15082E-06	-3.06404E-07	-1.96694E-07	-1.39564E-07
34	-1.84982E-06	-7.12698E-07	-1.89736E-07	-1.25425E-07	-9.16650E-08
35	-1.48529E-06	-5.44392E-07	-1.21541E-07	-7.45988E-08	-5.14759E-08
36	-1.93655E-06	-6.74960E-07	-1.50684E-07	-9.45823E-08	-6.70230E-08

PLANT NAME: FORT MEADE SULFURIC ACID   POLLUTANT: SO2   EMISSION UNITS: GM/SEC   AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 24-HOUR CONC= 2.2376E-07 DIRECTION= 3 DISTANCE= 6.0 KM DAY=237

HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	3.0 KM	6.0 KM	15.0 KM	20.0 KM	25.0 KM
1	5.9935E-08 (187)	3.4566E-08 (206)	4.1166E-08 (143)	3.2179E-08 (143)	2.6190E-08 (143)
2	8.9646E-08 (215)	4.9039E-08 (162)	1.2917E-07 (237)	9.9015E-08 (237)	8.0445E-08 (237)
3	8.0115E-08 (209)	2.2376E-07 (237)	1.1172E-07 (237)	8.3951E-08 (237)	6.7161E-08 (237)
4	1.1867E-07 (150)	6.9734E-08 (237)	2.4850E-08 (237)	1.8720E-08 (195)	1.5421E-08 (195)
5	1.0146E-07 (102)	8.2520E-08 (261)	3.8026E-08 (261)	2.9079E-08 (261)	2.3649E-08 (261)
6	1.1569E-07 (194)	1.2185E-07 (216)	5.4528E-08 (244)	4.1982E-08 (244)	3.4246E-08 (244)
7	1.3639E-07 (259)	7.6044E-08 (298)	2.9652E-08 (78)	2.2874E-08 (78)	1.8760E-08 (78)
8	1.3333E-07 (195)	5.9193E-08 (53)	2.8329E-08 (53)	2.0284E-08 (53)	1.5777E-08 (53)
9	1.6461E-07 (195)	9.8483E-08 (46)	6.0008E-08 (46)	4.6232E-08 (46)	3.7775E-08 (46)
10	1.2973E-07 (195)	9.2105E-08 (87)	3.7733E-08 (87)	3.4197E-08 (183)	3.3224E-08 (183)
11	4.6094E-08 (87)	4.0477E-08 (222)	3.3956E-08 (96)	2.6708E-08 (96)	2.1983E-08 (96)
12	1.7789E-08 (112)	9.7082E-08 (184)	7.4527E-08 (184)	5.7937E-08 (184)	4.7680E-08 (184)
13	5.9097E-08 (23)	8.4169E-08 (182)	3.6581E-08 (182)	2.8183E-08 (182)	2.3027E-08 (182)
14	3.9132E-08 (198)	5.8391E-08 (194)	3.0046E-08 (208)	2.3014E-08 (208)	1.8666E-08 (208)
15	5.0797E-08 (198)	4.9517E-08 (194)	2.0410E-08 (194)	1.5354E-08 (194)	1.2285E-08 (194)
16	4.4269E-08 (240)	2.1635E-07 (48)	9.7545E-08 (48)	7.5075E-08 (48)	6.1267E-08 (48)
17	3.5210E-08 (283)	6.1954E-08 (45)	6.9360E-08 (245)	5.3377E-08 (245)	4.3437E-08 (245)
18	6.7778E-08 (247)	9.3374E-08 (245)	3.9583E-08 (245)	2.9717E-08 (245)	2.3743E-08 (245)
19	8.5858E-08 (252)	5.1229E-08 (231)	4.7641E-08 (208)	3.6394E-08 (208)	2.9500E-08 (208)
20	8.0594E-08 (252)	4.7182E-08 (252)	1.7164E-08 (260)	1.3912E-08 (260)	1.9129E-08 (236)
21	1.1325E-07 (189)	5.3101E-08 (189)	2.1454E-08 (250)	1.6997E-08 (250)	1.3957E-08 (250)
22	8.2056E-08 (283)	1.0265E-07 (363)	4.9119E-08 (363)	3.7842E-08 (363)	3.0920E-08 (363)
23	1.3176E-07 (283)	9.8223E-08 (283)	4.1735E-08 (283)	3.1953E-08 (283)	2.5990E-08 (283)
24	1.8509E-07 (237)	1.0017E-07 (237)	3.8157E-08 (237)	2.7870E-08 (237)	2.1738E-08 (237)
25	5.5488E-08 (363)	7.6239E-08 (363)	3.4459E-08 (363)	2.6846E-08 (363)	2.2151E-08 (363)
26	9.5843E-08 (237)	1.1324E-07 (323)	4.6849E-08 (323)	3.5325E-08 (323)	2.8345E-08 (323)
27	7.4231E-11 (64)	8.3577E-08 (141)	3.8405E-08 (141)	2.9803E-08 (141)	2.4498E-08 (141)
28	2.2724E-13 (52)	4.0913E-08 (253)	2.9005E-08 (237)	2.2351E-08 (237)	1.8263E-08 (237)
29	2.3278E-08 (248)	5.5140E-08 (253)	3.2101E-08 (253)	2.4657E-08 (253)	2.0058E-08 (253)
30	5.3872E-08 (251)	5.2946E-08 (248)	9.4458E-08 (291)	7.3026E-08 (291)	5.9806E-08 (291)
31	5.7020E-08 (73)	4.4551E-08 (241)	3.7297E-08 (241)	2.8743E-08 (241)	2.3466E-08 (241)
32	5.3637E-08 (315)	6.6779E-08 (231)	2.9754E-08 (231)	2.2860E-08 (231)	1.8625E-08 (231)
33	1.0991E-07 (229)	7.9807E-08 (314)	5.5928E-08 (206)	4.3295E-08 (206)	3.5461E-08 (206)
34	6.6433E-08 (314)	6.8325E-08 (210)	7.5454E-08 (210)	5.7607E-08 (210)	4.6715E-08 (210)
35	5.8293E-08 (238)	3.7945E-08 (87)	3.3730E-08 (78)	2.6073E-08 (78)	2.1303E-08 (78)
36	5.2957E-08 (224)	7.8132E-08 (135)	3.6642E-08 (135)	2.8440E-08 (135)	2.3356E-08 (135)

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 24-HOUR CONC= 1.2873E-07 DIRECTION= 7 DISTANCE= 3.0 KM DAY=209

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	3.0 KM	6.0 KM	15.0 KM	20.0 KM	25.0 KM
1	5.9818E-08 (233)	3.4406E-08 (233)	3.3709E-08 (237)	2.3874E-08 (237)	1.8123E-08 (237)
2	6.0026E-08 (210)	4.7565E-08 (215)	3.1806E-08 (124)	2.4547E-08 (124)	2.0103E-08 (124)
3	5.6692E-08 (187)	6.3256E-08 (205)	3.1630E-08 (45)	2.4615E-08 (45)	2.0136E-08 (45)
4	1.1168E-07 (195)	6.1465E-08 (195)	2.4059E-08 (195)	1.8268E-08 (245)	1.5114E-08 (245)
5	9.3912E-08 (218)	7.1674E-08 (150)	3.0326E-08 (210)	2.3400E-08 (210)	1.8977E-08 (210)
6	1.0595E-07 (299)	5.3890E-08 (299)	5.1880E-08 (216)	4.0182E-08 (216)	3.2982E-08 (216)
7	1.2873E-07 (209)	6.8550E-08 (216)	2.9148E-08 (298)	2.2067E-08 (298)	1.7876E-08 (298)
8	1.2604E-07 (185)	5.6773E-08 (216)	2.2465E-08 (234)	1.6753E-08 (234)	1.3539E-08 (248)
9	1.0098E-07 (248)	6.7417E-08 (137)	4.6817E-08 (87)	3.9944E-08 (87)	3.4169E-08 (87)
10	1.1985E-07 (87)	5.9826E-08 (195)	2.5839E-08 (183)	2.8296E-08 (87)	2.2611E-08 (87)
11	3.3943E-08 (314)	3.9863E-08 (195)	1.8597E-08 (195)	1.3553E-08 (195)	1.0632E-08 (195)
12	5.1494E-09 (87)	6.7114E-08 (250)	4.7578E-08 (250)	3.7676E-08 (250)	3.1291E-08 (250)
13	3.5931E-08 (225)	3.2617E-08 (245)	3.0709E-08 (245)	2.3742E-08 (245)	1.9126E-08 (245)
14	2.4813E-08 (23)	2.4933E-08 (182)	2.6070E-08 (194)	2.0056E-08 (194)	1.6348E-08 (194)
15	2.7664E-08 (189)	3.1467E-08 (189)	1.4763E-08 (26)	1.0575E-08 (26)	7.9781E-09 (47)
16	2.3715E-08 (189)	3.1211E-08 (189)	1.2541E-08 (245)	8.7058E-09 (216)	9.7138E-09 (216)
17	3.1932E-08 (193)	5.9449E-08 (245)	2.8008E-08 (45)	2.1770E-08 (45)	1.7921E-08 (45)
18	5.9315E-08 (157)	7.1250E-08 (208)	3.4008E-08 (208)	2.5911E-08 (208)	2.0982E-08 (208)
19	4.8767E-08 (206)	3.8701E-08 (208)	2.3692E-08 (231)	1.8202E-08 (231)	1.4830E-08 (231)
20	4.8767E-08 (206)	3.9473E-08 (189)	1.6035E-08 (193)	1.1711E-08 (193)	1.1335E-08 (260)
21	7.0864E-08 (265)	4.6699E-08 (359)	2.0288E-08 (359)	1.5587E-08 (359)	1.2700E-08 (359)
22	6.9093E-08 (265)	5.8327E-08 (283)	2.2426E-08 (189)	1.7885E-08 (189)	1.4820E-08 (189)
23	5.5732E-08 (186)	4.4799E-08 (52)	1.9425E-08 (52)	1.4695E-08 (52)	1.1824E-08 (52)
24	1.0593E-07 (283)	7.1278E-08 (283)	2.8962E-08 (283)	2.1747E-08 (283)	1.7384E-08 (283)
25	9.3984E-09 (185)	4.4402E-08 (314)	3.2033E-08 (186)	2.4400E-08 (186)	1.9582E-08 (186)
26	3.8062E-08 (185)	5.0665E-08 (363)	3.0772E-08 (363)	2.2902E-08 (363)	1.8183E-08 (363)
27	5.8881E-11 (52)	8.8261E-09 (117)	1.1056E-08 (337)	1.1135E-08 (337)	1.5358E-08 (323)
28	1.3143E-18 (289)	8.3272E-09 (291)	1.7129E-08 (253)	1.3604E-08 (363)	1.7585E-08 (363)
29	1.6373E-08 (251)	4.3540E-08 (27)	2.0785E-08 (231)	1.6127E-08 (231)	1.2920E-08 (231)
30	3.5373E-08 (248)	3.5078E-08 (251)	8.1279E-08 (185)	6.7619E-08 (185)	5.7204E-08 (185)
31	1.7827E-08 (24)	2.5427E-08 (240)	3.2435E-08 (216)	2.4783E-08 (216)	2.0101E-08 (216)
32	5.2723E-08 (240)	4.0362E-08 (314)	2.6350E-08 (75)	2.0343E-08 (75)	1.6627E-08 (75)
33	9.3665E-08 (314)	6.9857E-08 (218)	3.3847E-08 (314)	2.5768E-08 (314)	2.0831E-08 (314)
34	5.8780E-08 (240)	5.1372E-08 (314)	4.3646E-08 (103)	3.6223E-08 (147)	3.0637E-08 (147)
35	4.8449E-08 (139)	3.7938E-08 (238)	2.0276E-08 (307)	1.6367E-08 (307)	1.3469E-08 (307)
36	5.2348E-08 (87)	3.8090E-08 (87)	2.6695E-08 (259)	2.0788E-08 (259)	1.7086E-08 (259)

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 3-HOUR CONC= 4.1699E-06 DIRECTION= 19 DISTANCE= 6.0 KM DAY=236 TIME PERIOD= 6

HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	3.0 KM	6.0 KM	15.0 KM	20.0 KM	25.0 KM
1	4.7856E-07 (233, 4)	2.7653E-07 (206, 4)	3.7704E-07 (143, 3)	2.8008E-07 (143, 3)	2.2187E-07 (143, 3)
2	7.1717E-07 (215, 4)	4.0003E-07 (162, 4)	1.0242E-06 (237, 6)	7.8681E-07 (237, 6)	6.4016E-07 (237, 6)
3	7.8954E-07 (215, 4)	1.0626E-06 (237, 4)	4.8738E-07 (237, 4)	3.7225E-07 (237, 4)	3.0192E-07 (237, 4)
4	7.7856E-07 (102, 5)	5.3448E-07 (124, 3)	2.4081E-07 (124, 3)	1.8796E-07 (124, 3)	1.5524E-07 (124, 3)
5	9.0677E-07 (206, 4)	4.8178E-07 (216, 3)	2.1430E-07 (233, 4)	1.6676E-07 (233, 4)	1.4656E-07 (98, 3)
6	1.0896E-06 (206, 4)	8.6132E-07 (216, 3)	4.3623E-07 (244, 4)	3.3586E-07 (244, 4)	2.7397E-07 (244, 4)
7	6.6116E-07 (259, 4)	5.0460E-07 (78, 4)	2.2733E-07 (78, 4)	1.7688E-07 (78, 4)	1.4569E-07 (78, 4)
8	7.6575E-07 (207, 4)	4.0477E-07 (248, 4)	1.8418E-07 (290, 4)	1.3865E-07 (290, 4)	1.1202E-07 (290, 4)
9	1.3674E-06 (207, 4)	8.6081E-07 (207, 4)	4.8007E-07 (46, 5)	3.6986E-07 (46, 5)	3.0220E-07 (46, 5)
10	1.0074E-06 (242, 4)	5.3505E-07 (181, 3)	2.3630E-07 (303, 4)	1.8351E-07 (303, 4)	1.5092E-07 (303, 4)
11	5.1230E-07 (222, 4)	2.9844E-07 (184, 4)	2.8104E-07 (96, 3)	2.6484E-07 (183, 3)	2.3026E-07 (183, 3)
12	3.7458E-07 (112, 4)	7.7685E-07 (184, 4)	5.9622E-07 (184, 4)	4.6350E-07 (184, 4)	3.8144E-07 (184, 4)
13	4.7279E-07 (23, 5)	6.7335E-07 (182, 3)	2.9265E-07 (182, 3)	2.2546E-07 (182, 3)	1.8422E-07 (182, 3)
14	4.7079E-07 (282, 4)	4.8078E-07 (194, 3)	2.4037E-07 (208, 6)	1.8411E-07 (208, 6)	1.4933E-07 (208, 6)
15	4.2183E-07 (240, 5)	3.9613E-07 (194, 3)	1.6328E-07 (194, 3)	1.2283E-07 (194, 3)	1.0370E-07 (303, 3)
16	3.5813E-07 (240, 5)	1.3903E-06 (48, 6)	6.4652E-07 (48, 6)	5.0129E-07 (48, 6)	4.1152E-07 (48, 6)
17	6.3642E-07 (245, 3)	9.2802E-07 (245, 3)	4.0164E-07 (245, 3)	3.0857E-07 (245, 3)	2.5142E-07 (245, 3)
18	5.4031E-07 (245, 3)	7.6463E-07 (245, 3)	3.1378E-07 (245, 3)	2.3605E-07 (245, 3)	1.8886E-07 (245, 3)
19	3.9014E-07 (206, 4)	4.1699E-06 (236, 6)	1.9260E-06 (236, 6)	1.4766E-06 (236, 6)	1.2018E-06 (236, 6)
20	4.6753E-07 (252, 5)	1.5456E-06 (236, 6)	6.1797E-07 (236, 6)	4.4915E-07 (236, 6)	3.4996E-07 (236, 6)
21	5.8172E-07 (189, 4)	9.6478E-07 (245, 3)	5.4800E-07 (245, 3)	4.2514E-07 (245, 3)	3.4942E-07 (245, 3)
22	6.5645E-07 (283, 4)	8.2123E-07 (363, 4)	3.9295E-07 (363, 4)	3.0274E-07 (363, 4)	2.4736E-07 (363, 4)
23	1.0541E-06 (283, 4)	7.8578E-07 (283, 4)	3.3388E-07 (283, 4)	2.5562E-07 (283, 4)	2.0792E-07 (283, 4)
24	1.4807E-06 (237, 4)	8.0137E-07 (237, 4)	3.2539E-07 (284, 3)	2.4896E-07 (284, 3)	2.0227E-07 (284, 3)
25	2.4198E-06 (237, 4)	1.4327E-06 (237, 4)	6.4016E-07 (237, 4)	4.9809E-07 (237, 4)	4.1028E-07 (237, 4)
26	8.2159E-07 (247, 4)	9.0610E-07 (323, 3)	3.7395E-07 (323, 3)	2.8216E-07 (323, 3)	2.2650E-07 (323, 3)
27	7.1383E-07 (247, 4)	6.7197E-07 (141, 3)	3.0739E-07 (141, 3)	2.5017E-07 (207, 3)	2.1231E-07 (207, 3)
28	4.6128E-07 (339, 4)	5.7168E-07 (231, 3)	3.0640E-07 (231, 3)	2.7748E-07 (197, 3)	2.4911E-07 (197, 3)
29	1.0100E-06 (185, 4)	7.8835E-07 (283, 3)	3.4332E-07 (283, 3)	2.6393E-07 (283, 3)	2.1536E-07 (283, 3)
30	1.8100E-06 (185, 4)	1.2832E-06 (185, 4)	5.8784E-07 (185, 4)	4.6054E-07 (185, 4)	4.7628E-07 (137, 3)
31	1.1919E-06 (185, 4)	7.1254E-07 (185, 4)	2.7652E-07 (185, 4)	2.0301E-07 (185, 4)	1.6081E-07 (216, 3)
32	7.8283E-07 (248, 4)	5.3423E-07 (231, 4)	2.3803E-07 (231, 4)	1.8288E-07 (231, 4)	1.4900E-07 (231, 4)
33	9.7219E-07 (236, 4)	5.5886E-07 (218, 3)	4.4976E-07 (206, 3)	3.4712E-07 (206, 3)	2.8401E-07 (206, 3)
34	2.4839E-06 (236, 4)	1.5184E-06 (236, 4)	6.8292E-07 (236, 4)	5.3269E-07 (236, 4)	4.3981E-07 (236, 4)
35	4.6662E-07 (238, 4)	8.8221E-07 (236, 4)	4.0404E-07 (236, 4)	2.9287E-07 (236, 4)	2.2729E-07 (236, 4)
36	4.7422E-07 (315, 4)	6.3885E-07 (135, 3)	4.8997E-07 (236, 4)	3.7393E-07 (236, 4)	3.0354E-07 (236, 4)

Note: Day 236, Period 6 contains two consecutive hours with calm winds.

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 3-HOUR CONC= 1.2468E-06 DIRECTION= 9 DISTANCE= 3.0 KM DAY=124 TIME PERIOD= 4

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	3.0 KM	6.0 KM	15.0 KM	20.0 KM	25.0 KM
1	4.6123E-07 (196, 4)	2.7525E-07 (233, 4)	2.6967E-07 (237, 6)	1.9099E-07 (237, 6)	1.4498E-07 (237, 6)
2	4.8865E-07 (210, 5)	3.8052E-07 (215, 4)	2.5445E-07 (124, 3)	1.9638E-07 (124, 3)	1.6082E-07 (124, 3)
3	6.4091E-07 (209, 4)	7.2750E-07 (237, 6)	4.0635E-07 (237, 6)	2.9936E-07 (237, 6)	2.3537E-07 (237, 6)
4	6.2245E-07 (209, 4)	4.7215E-07 (237, 4)	1.8655E-07 (162, 3)	1.4614E-07 (245, 5)	1.2091E-07 (245, 5)
5	8.6464E-07 (261, 5)	4.7530E-07 (206, 4)	2.0648E-07 (244, 4)	1.6324E-07 (98, 3)	1.3722E-07 (233, 4)
6	9.0711E-07 (194, 4)	5.9310E-07 (206, 4)	3.8519E-07 (216, 3)	2.9970E-07 (216, 3)	2.4687E-07 (216, 3)
7	6.0412E-07 (238, 5)	4.1848E-07 (24, 5)	1.9243E-07 (290, 4)	1.5121E-07 (290, 4)	1.2255E-07 (290, 4)
8	7.6278E-07 (248, 4)	4.0423E-07 (207, 4)	1.7421E-07 (248, 4)	1.3339E-07 (248, 4)	1.0831E-07 (248, 4)
9	1.2468E-06 (124, 4)	7.8786E-07 (46, 5)	3.7819E-07 (207, 4)	2.9305E-07 (207, 4)	2.4052E-07 (207, 4)
10	8.8120E-07 (87, 4)	4.8899E-07 (303, 4)	2.1991E-07 (181, 3)	1.6741E-07 (183, 3)	1.3427E-07 (183, 3)
11	4.9054E-07 (195, 4)	2.5422E-07 (195, 4)	1.4149E-07 (183, 3)	2.1692E-07 (96, 3)	1.7724E-07 (96, 3)
12	3.2557E-07 (225, 4)	7.7087E-07 (250, 4)	3.9052E-07 (250, 4)	3.0481E-07 (250, 4)	2.5176E-07 (250, 4)
13	3.8291E-07 (225, 4)	5.8479E-07 (184, 4)	2.7456E-07 (184, 4)	2.0405E-07 (184, 4)	1.6175E-07 (184, 4)
14	4.5095E-07 (216, 4)	4.0443E-07 (102, 4)	2.0900E-07 (194, 3)	1.6057E-07 (194, 3)	1.3083E-07 (194, 3)
15	4.1348E-07 (362, 5)	2.8111E-07 (362, 5)	1.2279E-07 (38, 5)	1.1799E-07 (303, 3)	9.8276E-08 (194, 3)
16	2.2837E-07 (216, 4)	4.2871E-07 (216, 4)	1.8699E-07 (216, 4)	1.4360E-07 (216, 4)	1.1698E-07 (216, 4)
17	3.9617E-07 (59, 4)	4.9482E-07 (45, 5)	2.2328E-07 (45, 5)	1.7373E-07 (45, 5)	1.4310E-07 (45, 5)
18	4.7451E-07 (157, 5)	5.7000E-07 (208, 5)	2.7206E-07 (208, 5)	2.0729E-07 (208, 5)	1.6785E-07 (208, 5)
19	3.8559E-07 (260, 4)	4.0983E-07 (231, 4)	3.8113E-07 (208, 5)	2.9115E-07 (208, 5)	2.3600E-07 (208, 5)
20	4.4513E-07 (205, 4)	2.7345E-07 (205, 4)	1.2942E-07 (260, 3)	1.0628E-07 (260, 3)	8.7209E-08 (260, 3)
21	4.9793E-07 (264, 4)	3.7359E-07 (359, 4)	1.7163E-07 (250, 4)	1.3598E-07 (250, 4)	1.1165E-07 (250, 4)
22	5.8601E-07 (189, 4)	4.6662E-07 (283, 4)	1.7688E-07 (283, 4)	1.2989E-07 (283, 4)	1.0209E-07 (283, 4)
23	7.0179E-07 (158, 5)	3.5573E-07 (163, 4)	1.4686E-07 (163, 4)	1.1201E-07 (163, 4)	9.0806E-08 (163, 4)
24	8.4745E-07 (283, 4)	5.7022E-07 (283, 4)	3.0526E-07 (237, 4)	2.2296E-07 (237, 4)	1.7390E-07 (237, 4)
25	5.8332E-07 (247, 4)	6.3924E-07 (86, 5)	3.3624E-07 (235, 3)	2.5370E-07 (235, 3)	2.0366E-07 (235, 3)
26	7.6925E-07 (237, 4)	4.9761E-07 (208, 5)	2.4972E-07 (338, 4)	1.9448E-07 (338, 4)	1.5991E-07 (338, 4)
27	6.4250E-07 (208, 5)	6.0400E-07 (323, 3)	2.8034E-07 (207, 3)	2.3847E-07 (141, 3)	1.9600E-07 (141, 3)
28	4.0867E-07 (54, 5)	4.0204E-07 (230, 3)	2.8121E-07 (230, 4)	2.3484E-07 (231, 3)	1.9109E-07 (231, 3)
29	6.7502E-07 (163, 4)	6.8120E-07 (291, 4)	3.0430E-07 (234, 3)	2.3757E-07 (234, 3)	1.9287E-07 (234, 3)
30	7.0713E-07 (241, 4)	1.0034E-06 (291, 4)	4.5344E-07 (291, 4)	3.5095E-07 (291, 4)	3.8154E-07 (185, 4)
31	5.8042E-07 (241, 4)	4.1236E-07 (241, 4)	2.5948E-07 (216, 3)	1.9826E-07 (216, 3)	1.5901E-07 (185, 4)
32	5.6911E-07 (229, 4)	4.2671E-07 (248, 4)	2.2232E-07 (234, 4)	1.7218E-07 (234, 4)	1.4130E-07 (234, 4)
33	9.3003E-07 (229, 4)	5.5565E-07 (229, 4)	2.4687E-07 (218, 3)	1.9107E-07 (218, 3)	1.5693E-07 (229, 4)
34	4.6738E-07 (240, 5)	7.3393E-07 (308, 3)	5.6345E-07 (210, 3)	4.3157E-07 (210, 3)	3.5089E-07 (210, 3)
35	3.8760E-07 (139, 4)	3.0356E-07 (87, 4)	2.6984E-07 (78, 4)	2.0859E-07 (78, 4)	1.7043E-07 (78, 4)
36	4.3101E-07 (309, 4)	3.7644E-07 (30, 3)	3.7704E-07 (143, 3)	2.8008E-07 (143, 3)	2.2187E-07 (143, 3)

ATTACHMENT H

PART D

Concentrations at Distances of 30.0, 35.0, 40.0, 45.0, and 50.0 km
Using Entire 1972 Meteorological Data Set

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

MAXIMUM MEAN CONC= -8.6185E-09 DIRECTION= 1 DISTANCE= 50.0 KM

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	30.0 KM	35.0 KM	40.0 KM	45.0 KM	50.0 KM
1	-2.08296E-08	-1.58832E-08	-1.25602E-08	-1.02960E-08	-8.61845E-09
2	-4.29763E-08	-3.37038E-08	-2.73112E-08	-2.27748E-08	-1.93571E-08
3	-4.48737E-08	-3.52952E-08	-2.86594E-08	-2.39101E-08	-2.03253E-08
4	-4.36753E-08	-3.38080E-08	-2.70407E-08	-2.22871E-08	-1.87286E-08
5	-7.19673E-08	-5.70773E-08	-4.66320E-08	-3.91104E-08	-3.33878E-08
6	-4.77814E-08	-3.84258E-08	-3.18603E-08	-2.71317E-08	-2.35131E-08
7	-4.44445E-08	-3.51454E-08	-2.86591E-08	-2.39753E-08	-2.04274E-08
8	-2.93083E-08	-2.31347E-08	-1.89034E-08	-1.59016E-08	-1.36453E-08
9	-4.92834E-08	-3.78143E-08	-3.00546E-08	-2.46862E-08	-2.06966E-08
10	-5.07016E-08	-4.01774E-08	-3.28948E-08	-2.77112E-08	-2.37915E-08
11	-4.00627E-08	-3.11235E-08	-2.50453E-08	-2.08226E-08	-1.76665E-08
12	-6.10344E-08	-4.75129E-08	-3.82145E-08	-3.16739E-08	-2.67612E-08
13	-7.25967E-08	-5.67497E-08	-4.57905E-08	-3.80164E-08	-3.21594E-08
14	-1.51265E-07	-1.20011E-07	-9.79689E-08	-8.19560E-08	-6.97546E-08
15	-5.89175E-08	-4.56483E-08	-3.65593E-08	-3.02536E-08	-2.55227E-08
16	-5.59049E-08	-4.33952E-08	-3.47921E-08	-2.87102E-08	-2.41524E-08
17	-6.55453E-08	-5.21685E-08	-4.27632E-08	-3.59284E-08	-3.07254E-08
18	-8.75149E-08	-7.05527E-08	-5.85608E-08	-4.98206E-08	-4.31212E-08
19	-5.84623E-08	-4.56871E-08	-3.68243E-08	-3.04989E-08	-2.57319E-08
20	-4.75229E-08	-3.72606E-08	-3.01499E-08	-2.51108E-08	-2.13055E-08
21	-1.46877E-07	-1.17577E-07	-9.68068E-08	-8.15858E-08	-6.99445E-08
22	-9.90245E-08	-7.93337E-08	-6.54920E-08	-5.54628E-08	-4.78099E-08
23	-2.26512E-07	-1.78718E-07	-1.45278E-07	-1.21188E-07	-1.02927E-07
24	-2.35391E-07	-1.87420E-07	-1.53784E-07	-1.29545E-07	-1.11096E-07
25	-3.70686E-07	-2.96424E-07	-2.43911E-07	-2.05622E-07	-1.76355E-07
26	-2.74091E-07	-2.17022E-07	-1.77058E-07	-1.48340E-07	-1.26520E-07
27	-3.27584E-07	-2.58670E-07	-2.10645E-07	-1.76385E-07	-1.50410E-07
28	-2.41203E-07	-1.91058E-07	-1.55897E-07	-1.30533E-07	-1.11267E-07
29	-2.26682E-07	-1.82621E-07	-1.51425E-07	-1.28736E-07	-1.11339E-07
30	-2.21796E-07	-1.76503E-07	-1.44596E-07	-1.21391E-07	-1.03727E-07
31	-1.26164E-07	-9.99426E-08	-8.15765E-08	-6.83698E-08	-5.83317E-08
32	-5.83585E-08	-4.61534E-08	-3.76361E-08	-3.15233E-08	-2.68842E-08
33	-1.04994E-07	-8.31597E-08	-6.78793E-08	-5.68736E-08	-4.85182E-08
34	-7.10710E-08	-5.78358E-08	-4.84624E-08	-4.15977E-08	-3.63230E-08
35	-3.79060E-08	-2.94879E-08	-2.37109E-08	-1.96502E-08	-1.66046E-08
36	-5.07589E-08	-4.05556E-08	-3.34765E-08	-2.84539E-08	-2.46377E-08

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 24-HOUR CONC= 6.7889E-08 DIRECTION= 2 DISTANCE= 30.0 KM DAY=237

HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	30.0 KM	35.0 KM	40.0 KM	45.0 KM	50.0 KM
1	2.1967E-08 (143)	1.8846E-08 (143)	1.6453E-08 (143)	1.4564E-08 (143)	1.3038E-08 (143)
2	6.7889E-08 (237)	5.8812E-08 (237)	5.1933E-08 (237)	4.6533E-08 (237)	4.2178E-08 (237)
3	5.5908E-08 (237)	4.7837E-08 (237)	4.1766E-08 (237)	3.7032E-08 (237)	3.3237E-08 (237)
4	1.3168E-08 (195)	1.1525E-08 (195)	1.0271E-08 (195)	9.2812E-09 (195)	8.4780E-09 (195)
5	1.9992E-08 (261)	1.7354E-08 (261)	1.5357E-08 (261)	1.3791E-08 (261)	1.2529E-08 (261)
6	2.9004E-08 (244)	2.5209E-08 (244)	2.2328E-08 (244)	2.0064E-08 (244)	1.8235E-08 (244)
7	1.5975E-08 (78)	1.3954E-08 (78)	1.2416E-08 (78)	1.1203E-08 (78)	1.0220E-08 (78)
8	1.3001E-08 (53)	1.1131E-08 (53)	9.7720E-09 (53)	8.7262E-09 (53)	7.8897E-09 (53)
9	3.2032E-08 (46)	2.7866E-08 (46)	2.4699E-08 (46)	2.2208E-08 (46)	2.0193E-08 (46)
10	3.0401E-08 (183)	2.7358E-08 (183)	2.4663E-08 (183)	2.2347E-08 (183)	2.0367E-08 (183)
11	1.8704E-08 (96)	1.6299E-08 (96)	1.4461E-08 (96)	1.3010E-08 (96)	1.1834E-08 (96)
12	4.0680E-08 (184)	3.5580E-08 (184)	3.1689E-08 (184)	2.8616E-08 (184)	2.6124E-08 (184)
13	1.9526E-08 (182)	1.6987E-08 (182)	1.5057E-08 (182)	1.3538E-08 (182)	1.2310E-08 (182)
14	1.5726E-08 (208)	1.3601E-08 (208)	1.1992E-08 (208)	1.0729E-08 (208)	9.7108E-09 (208)
15	1.0979E-08 (48)	1.1197E-08 (48)	1.0369E-08 (48)	9.3427E-09 (48)	8.3789E-09 (48)
16	5.1898E-08 (48)	4.5110E-08 (48)	3.9957E-08 (48)	3.5906E-08 (48)	3.2634E-08 (48)
17	3.6693E-08 (245)	3.1805E-08 (245)	2.8094E-08 (245)	2.5176E-08 (245)	2.2819E-08 (245)
18	1.9733E-08 (245)	1.6855E-08 (245)	1.4688E-08 (245)	1.2997E-08 (245)	1.1641E-08 (245)
19	2.4837E-08 (208)	2.1466E-08 (208)	1.8913E-08 (208)	2.4464E-08 (236)	3.0590E-08 (236)
20	2.6894E-08 (236)	2.6583E-08 (236)	2.4508E-08 (236)	2.2155E-08 (236)	1.9969E-08 (236)
21	1.1881E-08 (250)	1.0372E-08 (250)	9.2229E-09 (250)	8.3170E-09 (250)	7.5836E-09 (250)
22	2.6219E-08 (363)	2.2809E-08 (363)	2.0217E-08 (363)	1.8178E-08 (363)	1.6529E-08 (363)
23	2.1963E-08 (283)	1.9055E-08 (283)	1.6853E-08 (283)	1.5125E-08 (283)	1.3732E-08 (283)
24	1.7679E-08 (237)	1.4803E-08 (237)	1.2662E-08 (237)	1.1011E-08 (237)	9.7006E-09 (237)
25	1.8951E-08 (363)	1.6620E-08 (363)	1.4842E-08 (363)	1.3438E-08 (363)	1.2299E-08 (363)
26	2.3658E-08 (323)	2.0292E-08 (323)	1.7755E-08 (323)	1.5774E-08 (323)	1.4185E-08 (323)
27	2.0882E-08 (141)	1.8251E-08 (141)	1.6247E-08 (141)	1.4666E-08 (141)	1.3385E-08 (141)
28	1.5841E-08 (363)	1.3910E-08 (363)	1.2391E-08 (363)	1.1158E-08 (363)	1.0161E-08 (363)
29	1.6943E-08 (253)	1.4689E-08 (253)	1.3420E-08 (47)	1.2258E-08 (47)	1.1170E-08 (47)
30	5.0805E-08 (291)	4.4263E-08 (291)	3.9283E-08 (291)	3.5502E-08 (185)	3.2525E-08 (185)
31	1.9890E-08 (241)	1.7299E-08 (241)	1.5333E-08 (241)	1.3787E-08 (241)	1.2539E-08 (241)
32	1.5749E-08 (231)	1.3663E-08 (231)	1.2077E-08 (231)	1.0830E-08 (231)	9.8210E-09 (231)
33	3.0118E-08 (206)	2.6232E-08 (206)	2.3273E-08 (206)	2.0941E-08 (206)	1.9054E-08 (206)
34	3.9362E-08 (210)	3.4055E-08 (210)	3.0040E-08 (210)	2.6893E-08 (210)	2.4358E-08 (210)
35	1.8065E-08 (78)	1.5715E-08 (78)	1.3930E-08 (78)	1.2524E-08 (78)	1.1388E-08 (78)
36	1.9887E-08 (135)	1.7633E-08 (236)	1.7660E-08 (236)	1.7193E-08 (236)	1.6551E-08 (236)

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 24-HOUR CONC= 4.9523E-08 DIRECTION= 30 DISTANCE= 30.0 KM DAY=185

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	30.0 KM	35.0 KM	40.0 KM	45.0 KM	50.0 KM
1	1.4420E-08 (237)	1.2291E-08 (107)	1.0808E-08 (107)	9.6484E-09 (107)	8.7162E-09 (107)
2	1.7089E-08 (124)	1.4904E-08 (124)	1.3244E-08 (124)	1.1937E-08 (124)	1.0880E-08 (124)
3	1.7077E-08 (45)	1.4856E-08 (45)	1.3167E-08 (45)	1.1837E-08 (45)	1.0761E-08 (45)
4	1.2856E-08 (245)	1.1196E-08 (245)	9.9298E-09 (245)	8.9323E-09 (245)	8.1251E-09 (245)
5	1.5967E-08 (210)	1.3791E-08 (210)	1.2146E-08 (210)	1.0858E-08 (210)	9.8216E-09 (210)
6	2.8083E-08 (216)	2.4521E-08 (216)	2.1808E-08 (216)	1.9669E-08 (216)	1.7937E-08 (216)
7	1.5117E-08 (298)	1.3150E-08 (298)	1.1666E-08 (298)	1.0501E-08 (298)	9.5588E-09 (298)
8	1.1410E-08 (248)	9.9026E-09 (290)	8.8563E-09 (290)	8.0087E-09 (290)	7.3109E-09 (290)
9	2.9712E-08 (87)	2.6241E-08 (87)	2.3506E-08 (87)	2.1302E-08 (87)	1.9490E-08 (87)
10	1.8797E-08 (87)	1.6055E-08 (87)	1.3989E-08 (87)	1.2376E-08 (87)	1.1082E-08 (87)
11	8.7789E-09 (195)	7.5153E-09 (195)	6.5996E-09 (195)	5.9009E-09 (195)	5.3463E-09 (195)
12	2.6850E-08 (250)	2.3582E-08 (250)	2.1075E-08 (250)	1.9087E-08 (250)	1.7472E-08 (250)
13	1.5915E-08 (245)	1.3570E-08 (245)	1.1793E-08 (245)	1.0401E-08 (245)	9.2842E-09 (245)
14	1.4458E-08 (48)	1.2752E-08 (48)	1.1282E-08 (48)	1.0081E-08 (48)	9.0999E-09 (48)
15	1.0220E-08 (194)	8.7364E-09 (194)	7.6176E-09 (194)	6.7438E-09 (194)	6.0425E-09 (194)
16	9.5234E-09 (216)	8.9497E-09 (216)	8.3161E-09 (216)	7.7082E-09 (216)	7.1527E-09 (216)
17	1.5296E-08 (45)	1.3384E-08 (45)	1.1925E-08 (45)	1.0774E-08 (45)	9.8400E-09 (45)
18	1.7657E-08 (208)	1.5260E-08 (208)	1.3446E-08 (208)	1.2025E-08 (208)	1.0880E-08 (208)
19	1.2540E-08 (231)	1.0879E-08 (231)	1.3448E-08 (236)	1.6909E-08 (208)	1.5294E-08 (208)
20	9.5622E-09 (260)	8.2836E-09 (260)	7.3171E-09 (260)	6.5602E-09 (260)	5.9507E-09 (260)
21	1.0739E-08 (359)	9.3163E-09 (359)	8.2351E-09 (359)	7.3843E-09 (359)	6.6965E-09 (359)
22	1.2665E-08 (189)	1.1074E-08 (189)	9.8522E-09 (189)	8.8843E-09 (189)	8.0992E-09 (189)
23	9.8985E-09 (52)	8.5159E-09 (52)	7.4745E-09 (52)	6.6614E-09 (52)	6.0087E-09 (52)
24	1.4460E-08 (283)	1.2363E-08 (283)	1.0787E-08 (283)	9.7459E-09 (186)	8.9340E-09 (186)
25	1.6337E-08 (186)	1.4002E-08 (186)	1.2241E-08 (186)	1.0865E-08 (186)	9.7590E-09 (186)
26	1.5042E-08 (363)	1.2804E-08 (363)	1.1129E-08 (363)	9.9060E-09 (226)	9.0837E-09 (226)
27	1.6281E-08 (323)	1.5337E-08 (323)	1.4008E-08 (323)	1.2667E-08 (323)	1.1437E-08 (323)
28	1.5486E-08 (237)	1.3472E-08 (237)	1.1941E-08 (237)	1.0737E-08 (237)	9.7627E-09 (237)
29	1.4020E-08 (47)	1.4382E-08 (47)	1.2981E-08 (253)	1.1640E-08 (253)	1.0559E-08 (253)
30	4.9523E-08 (185)	4.3686E-08 (185)	3.9140E-08 (185)	3.5358E-08 (291)	3.2181E-08 (291)
31	1.6935E-08 (216)	1.4647E-08 (216)	1.2914E-08 (216)	1.1554E-08 (216)	1.0457E-08 (216)
32	1.4406E-08 (195)	1.3011E-08 (195)	1.1581E-08 (195)	1.0318E-08 (195)	9.2473E-09 (195)
33	1.7493E-08 (314)	1.5082E-08 (314)	1.3255E-08 (314)	1.1823E-08 (314)	1.0785E-08 (229)
34	2.6441E-08 (147)	2.3219E-08 (147)	2.0703E-08 (147)	1.8688E-08 (147)	1.7039E-08 (147)
35	1.1473E-08 (307)	1.0017E-08 (307)	8.9078E-09 (307)	8.0330E-09 (307)	7.3245E-09 (307)
36	1.6495E-08 (236)	1.7363E-08 (135)	1.5439E-08 (135)	1.3923E-08 (135)	1.2695E-08 (135)

PLANT NAME: FORT MEADE SULFURIC ACID   POLLUTANT: SO2   EMISSION UNITS: GM/SEC   AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM   3-HOUR CONC= 1.0158E-06 DIRECTION= 19 DISTANCE= 30.0 KM DAY=236   TIME PERIOD= 6

HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	30.0 KM	35.0 KM	40.0 KM	45.0 KM	50.0 KM
1	1.8309E-07 (143, 3)	1.5542E-07 (143, 3)	1.3471E-07 (143, 3)	1.1864E-07 (143, 3)	1.0581E-07 (143, 3)
2	5.4078E-07 (237, 6)	4.6882E-07 (237, 6)	4.1422E-07 (237, 6)	3.7132E-07 (237, 6)	3.3668E-07 (237, 6)
3	2.5436E-07 (237, 4)	2.2000E-07 (237, 4)	1.9396E-07 (237, 4)	1.7354E-07 (237, 4)	1.5707E-07 (237, 4)
4	1.3288E-07 (124, 3)	1.1656E-07 (124, 3)	1.0409E-07 (124, 3)	9.4239E-08 (124, 3)	8.6239E-08 (124, 3)
5	1.2429E-07 (98, 3)	1.0672E-07 (98, 3)	9.3322E-08 (98, 3)	8.2814E-08 (98, 3)	7.5222E-08 (233, 4)
6	2.3204E-07 (244, 4)	2.0167E-07 (244, 4)	1.7863E-07 (244, 4)	1.6051E-07 (244, 4)	1.4588E-07 (244, 4)
7	1.2440E-07 (78, 4)	1.0888E-07 (78, 4)	9.7040E-08 (78, 4)	8.7685E-08 (78, 4)	8.0096E-08 (78, 4)
8	9.4519E-08 (290, 4)	8.2003E-08 (290, 4)	7.2559E-08 (290, 4)	6.5166E-08 (290, 4)	5.9214E-08 (290, 4)
9	2.5625E-07 (46, 5)	2.2292E-07 (46, 5)	1.9759E-07 (46, 5)	1.7766E-07 (46, 5)	1.6155E-07 (46, 5)
10	1.2870E-07 (303, 4)	1.1253E-07 (303, 4)	1.0021E-07 (303, 4)	9.0494E-08 (303, 4)	8.2619E-08 (303, 4)
11	1.9421E-07 (183, 3)	1.6698E-07 (183, 3)	1.4625E-07 (183, 3)	1.3006E-07 (183, 3)	1.1708E-07 (183, 3)
12	3.2544E-07 (184, 4)	2.8464E-07 (184, 4)	2.5351E-07 (184, 4)	2.2893E-07 (184, 4)	2.0899E-07 (184, 4)
13	1.5621E-07 (182, 3)	1.3590E-07 (182, 3)	1.2045E-07 (182, 3)	1.0830E-07 (182, 3)	9.8479E-08 (182, 3)
14	1.2581E-07 (208, 6)	1.0881E-07 (208, 6)	9.5932E-08 (208, 6)	8.5830E-08 (208, 6)	7.7686E-08 (208, 6)
15	9.0755E-08 (97, 3)	9.3521E-08 (97, 3)	8.9985E-08 (97, 3)	8.4430E-08 (97, 3)	7.8560E-08 (97, 3)
16	3.5034E-07 (48, 6)	3.0585E-07 (48, 6)	2.7196E-07 (48, 6)	2.4525E-07 (48, 6)	2.2362E-07 (48, 6)
17	2.1259E-07 (245, 3)	1.8443E-07 (245, 3)	1.6303E-07 (245, 3)	1.4618E-07 (245, 3)	1.3257E-07 (245, 3)
18	1.5713E-07 (245, 3)	1.3431E-07 (245, 3)	1.1711E-07 (245, 3)	1.0368E-07 (245, 3)	9.2895E-08 (245, 3)
19	1.0158E-06 (236, 6)	8.8133E-07 (236, 6)	7.7935E-07 (236, 6)	6.9929E-07 (236, 6)	6.3470E-07 (236, 6)
20	2.8500E-07 (236, 6)	2.3932E-07 (236, 6)	2.0553E-07 (236, 6)	1.7958E-07 (236, 6)	1.5906E-07 (236, 6)
21	2.9783E-07 (245, 3)	2.6031E-07 (245, 3)	2.3172E-07 (245, 3)	2.0916E-07 (245, 3)	1.9089E-07 (245, 3)
22	2.0975E-07 (363, 4)	1.8247E-07 (363, 4)	1.6174E-07 (363, 4)	1.4542E-07 (363, 4)	1.3223E-07 (363, 4)
23	1.7570E-07 (283, 4)	1.5244E-07 (283, 4)	1.3482E-07 (283, 4)	1.2100E-07 (283, 4)	1.0986E-07 (283, 4)
24	1.7071E-07 (284, 3)	1.4789E-07 (284, 3)	1.3061E-07 (284, 3)	1.1705E-07 (284, 3)	1.0611E-07 (284, 3)
25	3.5032E-07 (237, 4)	3.0662E-07 (237, 4)	2.7327E-07 (237, 4)	2.4692E-07 (237, 4)	2.2555E-07 (237, 4)
26	1.8910E-07 (323, 3)	1.6222E-07 (323, 3)	1.4196E-07 (323, 3)	1.2614E-07 (323, 3)	1.1344E-07 (323, 3)
27	1.8207E-07 (207, 3)	1.5902E-07 (207, 3)	1.4127E-07 (207, 3)	1.2723E-07 (207, 3)	1.1586E-07 (207, 3)
28	2.1496E-07 (197, 3)	1.8728E-07 (197, 3)	1.6578E-07 (197, 3)	1.4878E-07 (197, 3)	1.3505E-07 (197, 3)
29	1.8245E-07 (283, 3)	1.5862E-07 (283, 3)	1.4053E-07 (283, 3)	1.2631E-07 (283, 3)	1.1482E-07 (283, 3)
30	5.0569E-07 (137, 3)	4.6246E-07 (137, 3)	4.1636E-07 (137, 3)	3.7658E-07 (137, 3)	3.4380E-07 (137, 3)
31	1.3548E-07 (216, 3)	1.1718E-07 (216, 3)	1.0331E-07 (216, 3)	9.2430E-08 (216, 3)	9.7303E-08 (195, 3)
32	1.2600E-07 (231, 4)	1.0930E-07 (231, 4)	9.6619E-08 (231, 4)	8.6637E-08 (231, 4)	7.8568E-08 (231, 4)
33	2.4110E-07 (206, 3)	2.0994E-07 (206, 3)	1.8623E-07 (206, 3)	1.6756E-07 (206, 3)	1.5245E-07 (206, 3)
34	3.7635E-07 (236, 4)	3.3007E-07 (236, 4)	2.9473E-07 (236, 4)	2.6680E-07 (236, 4)	2.4413E-07 (236, 4)
35	1.8424E-07 (236, 4)	1.5393E-07 (236, 4)	1.3151E-07 (236, 4)	1.1429E-07 (236, 4)	1.0069E-07 (236, 4)
36	2.5616E-07 (236, 4)	2.2203E-07 (236, 4)	1.9622E-07 (236, 4)	1.7601E-07 (236, 4)	1.5973E-07 (236, 4)

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 3-HOUR CONC= 3.2743E-07 DIRECTION= 30 DISTANCE= 30.0 KM DAY=185 TIME PERIOD= 4

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	30.0 KM	35.0 KM	40.0 KM	45.0 KM	50.0 KM
1	1.1536E-07 (237, 6)	9.4857E-08 (237, 6)	7.9913E-08 (237, 6)	6.8594E-08 (237, 6)	5.9759E-08 (237, 6)
2	1.3671E-07 (124, 3)	1.1923E-07 (124, 3)	1.0595E-07 (124, 3)	9.5494E-08 (124, 3)	8.7039E-08 (124, 3)
3	1.9290E-07 (237, 6)	1.6270E-07 (237, 6)	1.4016E-07 (237, 6)	1.2272E-07 (237, 6)	1.0883E-07 (237, 6)
4	1.0285E-07 (245, 5)	8.9567E-08 (245, 5)	7.9438E-08 (245, 5)	7.1458E-08 (245, 5)	6.5001E-08 (245, 5)
5	1.1708E-07 (233, 4)	1.0240E-07 (233, 4)	9.1215E-08 (233, 4)	8.2383E-08 (233, 4)	7.4385E-08 (98, 3)
6	2.1079E-07 (216, 3)	1.8449E-07 (216, 3)	1.6443E-07 (216, 3)	1.4857E-07 (216, 3)	1.3572E-07 (216, 3)
7	1.0314E-07 (290, 4)	8.9170E-08 (290, 4)	7.8620E-08 (290, 4)	7.0367E-08 (290, 4)	6.3731E-08 (290, 4)
8	9.1280E-08 (248, 4)	7.8928E-08 (248, 4)	6.9541E-08 (248, 4)	6.2158E-08 (248, 4)	5.6191E-08 (248, 4)
9	2.0470E-07 (207, 4)	1.7862E-07 (207, 4)	1.5875E-07 (207, 4)	1.4306E-07 (207, 4)	1.3035E-07 (207, 4)
10	1.1146E-07 (183, 3)	9.4908E-08 (183, 3)	8.2404E-08 (183, 3)	7.2646E-08 (183, 3)	6.5904E-08 (209, 6)
11	1.5029E-07 (96, 3)	1.3074E-07 (96, 3)	1.1589E-07 (96, 3)	1.0420E-07 (96, 3)	9.4746E-08 (96, 3)
12	2.1549E-07 (250, 4)	1.8903E-07 (250, 4)	1.6881E-07 (250, 4)	1.5283E-07 (250, 4)	1.3986E-07 (250, 4)
13	1.3358E-07 (184, 4)	1.1350E-07 (184, 4)	9.9212E-08 (138, 3)	8.8925E-08 (138, 3)	8.0645E-08 (138, 3)
14	1.1564E-07 (48, 4)	1.0193E-07 (48, 4)	9.0176E-08 (48, 4)	8.0578E-08 (48, 4)	7.2743E-08 (48, 4)
15	8.8563E-08 (303, 3)	7.7036E-08 (303, 3)	6.8298E-08 (303, 3)	6.1434E-08 (303, 3)	5.5893E-08 (303, 3)
16	9.8904E-08 (216, 4)	8.5796E-08 (216, 4)	7.5835E-08 (216, 4)	6.7998E-08 (216, 4)	6.1664E-08 (216, 4)
17	1.2219E-07 (45, 5)	1.0695E-07 (45, 5)	9.5312E-08 (45, 5)	8.6123E-08 (45, 5)	7.8670E-08 (45, 5)
18	1.4126E-07 (208, 5)	1.2208E-07 (208, 5)	1.0757E-07 (208, 5)	9.6199E-08 (208, 5)	8.7041E-08 (208, 5)
19	1.9870E-07 (208, 5)	1.7173E-07 (208, 5)	1.5130E-07 (208, 5)	1.3527E-07 (208, 5)	1.2235E-07 (208, 5)
20	7.3962E-08 (260, 3)	6.4343E-08 (260, 3)	5.7032E-08 (260, 3)	5.1279E-08 (260, 3)	4.6627E-08 (260, 3)
21	9.5048E-08 (250, 4)	8.2976E-08 (250, 4)	7.3783E-08 (250, 4)	6.6536E-08 (250, 4)	6.0669E-08 (250, 4)
22	9.0211E-08 (59, 3)	8.2081E-08 (59, 3)	7.3662E-08 (59, 3)	6.6658E-08 (59, 3)	6.0796E-08 (59, 3)
23	7.6502E-08 (163, 4)	6.6467E-08 (39, 5)	5.8917E-08 (39, 5)	5.3399E-08 (285, 3)	4.9032E-08 (285, 3)
24	1.4143E-07 (237, 4)	1.1842E-07 (237, 4)	1.0130E-07 (237, 4)	8.9006E-08 (70, 3)	8.0933E-08 (70, 3)
25	1.7351E-07 (86, 5)	1.5201E-07 (86, 5)	1.3559E-07 (86, 5)	1.2262E-07 (86, 5)	1.1210E-07 (86, 5)
26	1.3626E-07 (338, 4)	1.1904E-07 (338, 4)	1.0591E-07 (338, 4)	9.5566E-08 (338, 4)	8.7188E-08 (338, 4)
27	1.6706E-07 (141, 3)	1.4602E-07 (141, 3)	1.2998E-07 (141, 3)	1.1733E-07 (141, 3)	1.0708E-07 (141, 3)
28	1.6149E-07 (231, 3)	1.4009E-07 (231, 3)	1.2386E-07 (231, 3)	1.1113E-07 (231, 3)	1.0086E-07 (231, 3)
29	1.6232E-07 (234, 3)	1.4024E-07 (234, 3)	1.2354E-07 (234, 3)	1.1045E-07 (234, 3)	9.9917E-08 (234, 3)
30	3.2743E-07 (185, 4)	2.8788E-07 (185, 4)	2.5763E-07 (185, 4)	2.3368E-07 (185, 4)	2.1421E-07 (185, 4)
31	1.2979E-07 (185, 4)	1.0901E-07 (185, 4)	9.3513E-08 (185, 4)	8.1526E-08 (185, 4)	8.3659E-08 (216, 3)
32	1.2029E-07 (234, 4)	1.0501E-07 (234, 4)	9.3374E-08 (234, 4)	8.4204E-08 (234, 4)	7.6778E-08 (234, 4)
33	1.3400E-07 (229, 4)	1.1728E-07 (229, 4)	1.0453E-07 (229, 4)	9.4448E-08 (229, 4)	8.6274E-08 (229, 4)
34	2.9632E-07 (210, 3)	2.5688E-07 (210, 3)	2.2698E-07 (210, 3)	2.0352E-07 (210, 3)	1.8461E-07 (210, 3)
35	1.4452E-07 (78, 4)	1.2572E-07 (78, 4)	1.1144E-07 (78, 4)	1.0019E-07 (78, 4)	9.1106E-08 (78, 4)
36	1.8309E-07 (143, 3)	1.5542E-07 (143, 3)	1.3471E-07 (143, 3)	1.1864E-07 (143, 3)	1.0581E-07 (143, 3)

ATTACHMENT H

PART E

24-Hour Concentrations on Day 249 at Distances of 0.8, 1.2, 1.4, 1.6, and 1.8 km.

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 24-HOUR CONC= 2.1302E-07 DIRECTION= 9 DISTANCE= 1.2 KM DAY=249

HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	.8 KM		1.2 KM		1.4 KM		1.6 KM		1.8 KM	
1	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
2	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
3	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
4	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
5	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
6	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
7	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
8	0.	(0)	1.2438E-07	(249)	9.7874E-08	(249)	8.3329E-08	(249)	7.5562E-08	(249)
9	0.	(0)	2.1302E-07	(249)	1.5888E-07	(249)	1.3103E-07	(249)	1.1694E-07	(249)
10	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
11	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
12	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
13	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
14	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
15	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
16	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
17	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
18	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
19	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
20	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
21	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
22	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
23	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
24	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
25	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
26	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
27	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
28	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
29	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
30	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
31	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
32	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)
33	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)
34	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)
35	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)	4.1667E-32	(249)
36	0.	(0)	0.	(0)	0.	(0)	0.	(0)	0.	(0)

ATTACHMENT H

PART F

24-Hour Concentrations on Day 189 at Distances of 0.8, 1.2, 1.4, 1.6, and 1.8 km.

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 24-HOUR CONC= 2.0823E-07 DIRECTION= 9 DISTANCE= 1.2 KM DAY=189

HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	.8 KM	1.2 KM	1.4 KM	1.6 KM	1.8 KM
1	4.1667E-32 (189)	4.1667E-32 (189)	4.1667E-32 (189)	4.1667E-32 (189)	4.1667F-32 (189)
2	4.1667E-32 (189)	4.1667E-32 (189)	4.1667E-32 (189)	4.1667E-32 (189)	4.1667F-32 (189)
3	4.1667E-32 (189)	4.1667E-32 (189)	4.1667E-32 (189)	4.1667E-32 (189)	4.1667E-32 (189)
4	0. (0)	5.2372E-12 (189)	2.4818E-12 (189)	1.2522E-12 (189)	7.1935E-13 (189)
5	0. (0)	1.8767E-10 (189)	1.0188E-10 (189)	5.8154E-11 (189)	3.7420E-11 (189)
6	0. (0)	3.2396E-09 (189)	1.9595E-09 (189)	1.2339E-09 (189)	8.6903E-10 (189)
7	0. (0)	2.6939E-08 (189)	1.7659E-08 (189)	1.1962E-08 (189)	9.0100E-09 (189)
8	0. (0)	1.0791E-07 (189)	7.4565E-08 (189)	5.2987E-08 (189)	4.1704F-08 (189)
9	0. (0)	2.0823E-07 (189)	1.4752E-07 (189)	1.0723E-07 (189)	8.6177E-08 (189)
10	0. (0)	1.9356E-07 (189)	1.3675E-07 (189)	9.9154E-08 (189)	7.9500E-08 (189)
11	0. (0)	8.6670E-08 (189)	5.9394E-08 (189)	4.1889E-08 (189)	3.2742E-08 (189)
12	0. (0)	1.7338E-08 (189)	1.1554E-08 (189)	7.8630E-09 (189)	5.9233E-09 (189)
13	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
14	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
15	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
16	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
17	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
18	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
19	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
20	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
21	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
22	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
23	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
24	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
25	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
26	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
27	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
28	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
29	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
30	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
31	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
32	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
33	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
34	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
35	4.1667E-32 (189)	4.1667E-32 (189)	4.1667E-32 (189)	4.1667E-32 (189)	4.1667E-32 (189)
36	4.1667E-32 (189)	4.1667E-32 (189)	4.1667E-32 (189)	4.1667E-32 (189)	4.1667E-32 (189)

ATTACHMENT H

PART G

24-Hour Concentrations on Day 48 at Distances of 5.0, 5.5, 6.5, 8.0, and 10.0 km.

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 24-HOUR CONC= 2.2277E-07 DIRECTION= 16 DISTANCE= 5.5 KM DAY= 48

HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	5.0 KM	5.5 KM	6.5 KM	8.0 KM	10.0 KM
1	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)
2	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)
3	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)
4	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)
5	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)	4.1667E-32 (48)
6	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
7	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
8	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
9	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
10	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
11	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
12	1.1124E-12 (48)	8.4134E-13 (48)	4.8669E-13 (48)	2.3581E-13 (48)	1.0379E-13 (48)
13	0. (0)	0. (0)	0. (0)	0. (0)	2.5052E-10 (48)
14	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
15	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
16	2.1062E-07 (48)	2.2277E-07 (48)	2.0486E-07 (48)	1.7182E-07 (48)	1.4079E-07 (48)
17	0. (0)	0. (0)	0. (0)	0. (0)	1.2511E-08 (48)
18	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
19	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
20	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
21	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
22	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
23	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
24	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
25	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
26	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
27	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
28	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
29	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
30	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
31	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
32	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
33	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
34	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
35	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)
36	0. (0)	0. (0)	0. (0)	0. (0)	0. (0)

ATTACHMENT H

PART H

3-Hour Concentrations on Day 236 at Distances of 2.5, 3.5, 4.0, 4.5, and 5.0 km.

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 3-HOUR CONC= 3.9162E-06 DIRECTION= 19 DISTANCE= 5.5 KM DAY=236 TIME PERIOD= 6

HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE / DIR	2.5 KM	3.5 KM	4.5 KM	5.0 KM	5.5 KM
1	1.0000E-30 (236, 6)	1.0000E-30 (236, 6)	1.0391E-15 (236, 5)	2.8653E-15 (236, 5)	2.5717E-15 (236, 5)
2	1.0000E-30 (236, 6)	1.0000E-30 (236, 6)	1.0000E-30 (236, 6)	1.0000E-30 (236, 6)	1.0000E-30 (236, 6)
3	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
4	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
5	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
6	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
7	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
8	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
9	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
10	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
11	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
12	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
13	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
14	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
15	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	5.4441E-20 (236, 6)	1.4108E-19 (236, 6)	9.6794E-20 (236, 6)
16	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.5016E-14 (236, 6)	9.0876E-14 (236, 6)	8.3462E-14 (236, 6)
17	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.5673E-11 (236, 6)	1.2220E-09 (236, 6)	1.3967E-09 (236, 6)
18	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	3.5424E-07 (236, 6)	4.6928E-07 (236, 6)
19	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	2.6912E-06 (236, 6)	3.9162E-06 (236, 6)
20	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	9.4430E-07 (236, 6)	1.4491E-06 (236, 6)
21	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.4741E-08 (236, 6)	2.1474E-08 (236, 6)
22	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	5.7664E-12 (236, 6)	7.2205E-12 (236, 6)
23	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	4.6950E-17 (236, 6)	4.6549E-17 (236, 6)
24	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
25	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
26	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
27	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
28	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)	1.0000E-30 (236, 1)
29	2.4456E-15 (236, 4)	6.2779E-16 (236, 4)	1.2795E-16 (236, 4)	6.3159E-17 (236, 4)	3.2695E-17 (236, 4)
30	3.3393E-12 (236, 4)	1.5469E-12 (236, 4)	5.1296E-13 (236, 4)	3.1458E-13 (236, 4)	1.9957E-13 (236, 4)
31	9.4916E-10 (236, 4)	6.9793E-10 (236, 4)	3.3874E-10 (236, 4)	2.4619E-10 (236, 4)	1.8313E-10 (236, 4)
32	5.6162E-08 (236, 4)	5.7655E-08 (236, 4)	3.6845E-08 (236, 4)	3.0273E-08 (236, 4)	2.5261E-08 (236, 4)
33	6.9140E-07 (236, 4)	8.7201E-07 (236, 4)	6.6011E-07 (236, 4)	5.8489E-07 (236, 4)	5.2383E-07 (236, 4)
34	1.5082E-06 (236, 4)	2.3651E-06 (236, 4)	1.9414E-06 (236, 4)	1.7762E-06 (236, 4)	1.6370E-06 (236, 4)
35	1.0000E-30 (236, 6)	1.0000E-30 (236, 6)	3.4582E-07 (236, 4)	6.6440E-07 (236, 4)	8.2095E-07 (236, 4)
36	1.0000E-30 (236, 6)	1.0000E-30 (236, 6)	2.1436E-11 (236, 5)	7.3455E-11 (236, 5)	8.0764E-11 (236, 5)

ATTACHMENT H

PART I

3-Hour Concentrations on Day 189 at Distances of 0.8, 1.2, 1.4, 1.6, and 1.8 km.

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 3-HOUR CONC= 1.9656E-06 DIRECTION= 22 DISTANCE= 1.2 KM DAY=189 TIME PERIOD= 5

HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	.8 KM	1.2 KM	1.4 KM	1.6 KM	1.8 KM
1	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
2	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
3	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
4	1.0000E-30 (189, 1)	4.1897E-11 (189, 4)	1.9854E-11 (189, 4)	1.0018E-11 (189, 4)	5.7548E-12 (189, 4)
5	1.0000E-30 (189, 1)	1.5014E-09 (189, 4)	8.1502E-10 (189, 4)	4.6523E-10 (189, 4)	2.9936E-10 (189, 4)
6	1.0000E-30 (189, 1)	2.5916E-08 (189, 4)	1.5676E-08 (189, 4)	9.8714E-09 (189, 4)	6.9522E-09 (189, 4)
7	1.0000E-30 (189, 1)	2.1551E-07 (189, 4)	1.4127E-07 (189, 4)	9.5699E-08 (189, 4)	7.2080E-08 (189, 4)
8	1.0000E-30 (189, 1)	8.6328E-07 (189, 4)	5.9652E-07 (189, 4)	4.2389E-07 (189, 4)	3.3363E-07 (189, 4)
9	1.0000E-30 (189, 1)	1.6658E-06 (189, 4)	1.1802E-06 (189, 4)	8.5787E-07 (189, 4)	6.8941E-07 (189, 4)
10	1.0000E-30 (189, 1)	1.5485E-06 (189, 4)	1.0940E-06 (189, 4)	7.9324E-07 (189, 4)	6.3600E-07 (189, 4)
11	1.0000E-30 (189, 1)	6.9341E-07 (189, 4)	4.7517E-07 (189, 4)	3.3512E-07 (189, 4)	2.6194E-07 (189, 4)
12	1.0000E-30 (189, 1)	1.4958E-07 (189, 4)	9.6700E-08 (189, 4)	6.4687E-08 (189, 4)	4.8161E-08 (189, 4)
13	1.0000E-30 (189, 1)	1.5543E-08 (189, 4)	9.2206E-09 (189, 4)	5.7049E-09 (189, 4)	3.9533E-09 (189, 4)
14	1.0000E-30 (189, 1)	7.7804E-10 (189, 4)	4.1195E-10 (189, 4)	2.2988E-10 (189, 4)	1.4487E-10 (189, 4)
15	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
16	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
17	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
18	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	8.0427E-08 (189, 5)	1.0711E-07 (189, 5)	1.0334E-07 (189, 5)
19	7.4651E-07 (189, 5)	1.2916E-06 (189, 5)	8.7988E-07 (189, 5)	6.0890E-07 (189, 5)	4.4203E-07 (189, 5)
20	8.6411E-07 (189, 5)	1.7613E-06 (189, 5)	1.1990E-06 (189, 5)	8.2921E-07 (189, 5)	6.0372E-07 (189, 5)
21	2.1602E-07 (189, 5)	1.8610E-06 (189, 5)	1.2711E-06 (189, 5)	8.7851E-07 (189, 5)	6.4529E-07 (189, 5)
22	1.0000E-30 (189, 1)	1.9656E-06 (189, 5)	1.3742E-06 (189, 5)	9.6785E-07 (189, 5)	7.2898E-07 (189, 5)
23	1.0000E-30 (189, 1)	1.4316E-06 (189, 5)	1.0004E-06 (189, 5)	7.0356E-07 (189, 5)	5.2989E-07 (189, 5)
24	1.0000E-30 (189, 1)	5.4478E-07 (189, 5)	3.6811E-07 (189, 5)	2.5099E-07 (189, 5)	1.8375E-07 (189, 5)
25	1.0000E-30 (189, 2)	1.0127E-07 (189, 5)	6.4235E-08 (189, 5)	4.1350E-08 (189, 5)	2.8711E-08 (189, 5)
26	1.0000E-30 (189, 2)	9.0881E-09 (189, 5)	5.2613E-09 (189, 5)	3.1171E-09 (189, 5)	2.0053E-09 (189, 5)
27	1.0000E-30 (189, 2)	3.9310E-10 (189, 5)	2.0199E-10 (189, 5)	1.0739E-10 (189, 5)	6.2539E-11 (189, 5)
28	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)
29	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)
30	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)
31	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)	1.0000E-30 (189, 2)
32	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
33	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
34	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
35	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)
36	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)	1.0000E-30 (189, 1)

ATTACHMENT H

PART J

3-Hour Concentrations on Day 237 at Distances of 2.6, 2.8, 3.2, and 3.6 km.

PLANT NAME: FORT MEADE SULFURIC ACID POLLUTANT: SO2 EMISSION UNITS: GM/SEC AIR QUALITY UNITS: GM/M**3

YEARLY MAXIMUM 3-HOUR CONC= 2.4081E-06 DIRECTION= 25 DISTANCE= 3.2 KM DAY=237 TIME PERIOD= 4

HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	2.6 KM	2.8 KM	3.2 KM	3.4 KM	3.6 KM
1	1.0000E-30 (237, 2)	1.0000E-30 (237, 2)	1.0000E-30 (237, 2)	1.0000E-30 (237, 2)	1.0000E-30 (237, 2)
2	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
3	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
4	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	3.9878E-08 (237, 6)
5	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.3419E-09 (237, 6)
6	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	5.6787E-12 (237, 6)
7	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	4.3322E-15 (237, 6)
8	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
9	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
10	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
11	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
12	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
13	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
14	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
15	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
16	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
17	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
18	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
19	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
20	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
21	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
22	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)	1.0000E-30 (237, 1)
23	1.0431E-07 (237, 4)	1.4412E-07 (237, 4)	1.5413E-07 (237, 4)	1.4713E-07 (237, 4)	1.3834E-07 (237, 4)
24	1.1556E-06 (237, 4)	1.4108E-06 (237, 4)	1.4625E-06 (237, 4)	1.4078E-06 (237, 4)	1.3416E-06 (237, 4)
25	1.8585E-06 (237, 4)	2.2876E-06 (237, 4)	2.4081E-06 (237, 4)	2.3346E-06 (237, 4)	2.2403E-06 (237, 4)
26	6.1338E-07 (237, 4)	7.4066E-07 (237, 4)	7.5226E-07 (237, 4)	7.1718E-07 (237, 4)	6.7719E-07 (237, 4)
27	4.1547E-08 (237, 4)	4.7884E-08 (237, 4)	4.4587E-08 (237, 4)	4.0811E-08 (237, 4)	3.7055E-08 (237, 4)
28	5.7753E-10 (237, 4)	6.1816E-10 (237, 4)	5.0141E-10 (237, 4)	4.3019E-10 (237, 4)	3.6703E-10 (237, 4)
29	1.6476E-12 (237, 4)	1.5935E-12 (237, 4)	1.0699E-12 (237, 4)	8.4001E-13 (237, 4)	6.5810E-13 (237, 4)
30	9.6466E-16 (237, 4)	8.2021E-16 (237, 4)	4.3311E-16 (237, 4)	3.0384E-16 (237, 4)	2.1360E-16 (237, 4)
31	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)
32	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)
33	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	2.5697E-17 (237, 6)
34	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	1.0000E-30 (237, 4)	9.2275E-14 (237, 6)
35	1.0000E-30 (237, 7)	1.0000E-30 (237, 7)	1.0000E-30 (237, 7)	1.0000E-30 (237, 7)	1.0000E-30 (237, 7)
36	1.0000E-30 (237, 7)	1.0000E-30 (237, 7)	1.0000E-30 (237, 7)	1.0000E-30 (237, 7)	1.0000E-30 (237, 7)

ATTACHMENT H

PART K

CRSTER Modifications

Note: The attached minor modifications (consisting of resetting some initialization statements) were made in the CRSTER Model used for this analysis. Without these modifications, execution of the program will terminate when printing out results if all of the maximum annual mean concentrations are negative as they are in this case. A comparsion was made on several days of meteorological data using the modified and unmodified forms of CRSTER, and the modifications appear not to have any affect on the actual concentrations calculated.

NOTE: ALL CHANGES ARE IN SUBROUTINE CRS

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EQUIVALENCE (QTAPE1(1),CHI(1)),(QTAPE2(1),CHI25(1)),(QTAPE3(1),
*CHI26(1)),(TAPIN(1),JYR),(DMAXYR(1),JMAX3(1)),(DX(1),JM(1))
DATA HMAXT,DMAXT,NNN,MMM/-1.E+30,-1.E+30,1,1,1/
DATA IHC,P/6,13,18,24,.1,.15,.2,.25,.3,.3/
DATA DTH/-50.,-40.,-30.,-20.,-10.,0.,10.,20.,30.,40.,50./
DATA LOOP/1,1,2,3,4,4,11,11,10,9,8,8/
```

Original statement is:

```
DATA HMAXT,DMAXT,NNN,MMM/0.,0.,1,1,1/
```

```
C***RE-INITIALIZE DAILY AVERAGE AT BEGINNING OF EACH DAY***
 1000 DO 1310 IR=1,180
 1310 CHI25(IR)=1.0E-30
      TDAY=TDAY+1.
      DMAXT=-1.E+30
      HMAXT=-1.E+30
C***INPUT INFORMATION FROM MET FILE***
```

Original statements are:

```
DMAXT=0.
HMAXT=0.
```

```
C***CALCULATE ANNUAL MEANS AND DETERMINE THE MAXIMUM
      IST1=1
      K1=1
      AMMAX=-1.E+30
      MAXI=0
      DO 5200 IR=1,180
```

Original statement is:

```
AMMAX=0.
```

State of Florida

Department of State

I certify from the records of this office that UNITED STATES STEEL CORPORATION, is a corporation organized under the laws of the State of Delaware, and is authorized to transact business within the State of Florida.

The charter number for this corporation is 819214.

I further certify that said corporation has filed all annual reports and has paid all annual report filing fees due this office through December 31, 1979, and its status is active.

Given under my hand and the Great Seal of the State of Florida, at Tallahassee, the Capital, this the 3rd day of March, 1980.

George Firestone
Secretary of State

CER 101 Rev. 5-79

AC 53-33820

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Air Pollution [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [X] Construction [ ] Operation [ ] Modification

COMPANY NAME: USS Agri-Chemicals COUNTY: Polk

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) Phosphoric Acid Plant - Train B

SOURCE LOCATION: Street Highway 630 West City Ft. Meade

UTM: East 416.07 (Zone 17) North 3068.70

Latitude ____ ° ____ ' ____ "N Longitude ____ ° ____ ' ____ "W

APPLICANT NAME AND TITLE: G. W. Beck, Manager, Florida Phosphate Operations

APPLICANT ADDRESS: P.O. Box 150, Bartow, Florida 33830

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of USS Agri-Chemicals

I certify that the statements made in this application for a Construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: [signature]

George W. Beck, Manager, Fla Phosphate Operations
Name and Title (Please Type)

Date: 8/5/80 Telephone No. 813-533-0471

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed: [signature]

James H. Carroll
Name (Please Type)

(Affix Seal)

USS Agri-Chemicals
Company Name (Please Type)

P. O. Box 150, Bartow, Fl 33830
Mailing Address (Please Type)

Florida Registration No. 19407 Date: 8/5/80 Telephone No. 813-533-0471

[1]See Section 17-2.02(15) and (22), Florida Administrative Code, (F.A.C.)

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

This phosphoric acid plant uses wet rock grinding to save energy and reduce particulate emissions, and includes a processing section for recovery of fluorine. Emissions will be in full compliance with Federal New Source Performance Standards and Florida Emission Limiting Standards. (Also see attachments.)

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction March 1981 Completion of Construction March 1983

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

1 - Scrubber System for Reaction and Filtration Area	$1,375,000
*1/2 - Scrubber System for Clarification and Storage Area	425,000
*1/2 - Fluorine Recovery System	1,800,000
*Note: These systems common to Train A and Train B	$2,600,000

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Existing plant to be replaced by the new plant has operating permit A053-4563, issued 11/15/77, expiring 11/10/82. The permitted capacity of the existing plant is 321 tons/day P_2O_5. The existing plant will be shut down as soon as the new plant is tested for service.

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes X No

F. Normal equipment operating time: *hrs/day 24 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr ____ ;

If seasonal, describe:

*Plant will be shut down only when required for repairs.

G. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? No
   a. If yes, has "offset" been applied? ____
   b. If yes, has "Lowest Achievable Emission Rate" been applied? ____
   c. If yes, list non-attainment pollutants. ____
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. Yes
3. Does the State "Prevention of Significant Deteriorioration" (PSD) requirements apply to this source? If yes, see Sections VI and VII. No (see Attachment H)
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? Yes
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Sulfuric Acid	N/A			Pt. 2 on Atch E
Wet Phosphate Rock	Fluorine	3.5	233,510	Pt. 1 on Atch E
		(dry basis)	(dry basis)	

B. Process Rate, if applicable: (See Section V, Item 1)

846 TPD P2O5

1. Total Process Input Rate (lbs/hr): 233,510 lbs/hr phosphate rock; 70,510 lbs/hr P_2O_5
2. Product Weight (lbs/hr): 64,165 lbs/hr P_2O_5 770 TPD

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1] Maximum lbs/hr	Emission[1] Actual T/yr	Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4] lbs/hr	Potential Emission[4] T/yr	Relate to Flow Diagram
Fluorides	0.71 ~.10	2.7*	0.02 lb F/ton P_2O_5	0.71	48	181*	Pts. 20 &
	17.04		input				21 Atch E
Particulates -	See Attachment G						
*Based on expected maximum P_2O_5 input of 265,900 T/yr. ~ 730 STPD P2O5							

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5])
Venturi Cyclone	F	99%	N/A	*
Venturi Cyclone	F	95%	N/A	*
*Vendor guarantee; see Attachment A.				

[1] See Section V, Item 2.

[2] Reference applicable emission standards and units (e.g., Section 17-2.05(6) Table II, E. (1), F.A.C. – 0.1 pounds per million BTU heat input)

[3] Calculated from operating rate and applicable standard

[4] Emission, if source operated without control (See Section V, Item 3)

[5] If Applicable

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
None			

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis:

Percent Sulfur: ______ Percent Ash: ______

Density: ______ lbs/gal Typical Percent Nitrogen: ______

Heat Capacity: ______ BTU/lb ______ BTU/gal

Other Fuel Contaminants (which may cause air pollution): ______

F. If applicable, indicate the percent of fuel used for space heating. Annual Average ______ Maximum ______

G. Indicate liquid or solid wastes generated and method of disposal.

Gypsum slurry is sent to on-site gypsum disposal area. Water is recycled.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):*

Stack Height: 75 ft. Stack Diameter: 3.4 ft.

Gas Flow Rate: 18000 ACFM Gas Exit Temperature: 100 °F.

Water Vapor Content: Saturated % Velocity: 33.3 FPS

*For Point 20 on Attachment E. (Note: Characteristics for the single clarification and storage area scrubber stack are given in Train A application.)

SECTION IV: INCINERATOR INFORMATION

NOT APPLICABLE

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated							

Description of Waste ______

Total Weight Incinerated (lbs/hr) ______ Design Capacity (lbs/hr) ______

Approximate Number of Hours of Operation per day ______ days/week ______

Manufacturer ______

Date Constructed ______ Model No. ______

	Volume (ft)^3	Heat Release (BTU/hr)	Fuel		Temperature (^oF)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: ______________ ft. Stack Diameter ______________ Stack Temp. ______________

Gas Flow Rate: ______________ ACFM ______________ DSCFM* Velocity ______________ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [ ] Other (specify) ______________

Brief description of operating characteristics of control devices: ______________

____

____

____

____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

____

____

____

____

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight — show derivation. (See Attachment B)
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.,) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made. (See Attachment B)
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test). (See Attachment B)
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.). (See Attachment B)
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency). (See Attachment A)
6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained. (See Attachment E)
7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map). (See Attachment D)
8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram. (See Attachment F)

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?
[X] Yes [ ] No

Contaminant	Rate or Concentration
Total Fluorides	0.02 lbs fluorides per ton of equivalent P_2O_5 feed.

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy) [ ] Yes [X] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration
Total Fluorides	0.02 lbs fluorides per ton of equivalent P_2O_5 feed.

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:
5. Useful Life:
6. Operating Costs:
7. Energy:
8. Maintenance Cost:
9. Emissions:

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy*: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy**: h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

*Explain method of determining efficiency.

**Energy to be reported in units of electrical power – KWH design rate.

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space and operate within proposed levels:

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device: Two Venturi Cyclone Scrubbers and Fluorine Recovery System
2. Efficiency*: 99% and 95%
3. Capital Cost: $2,600,000
4. Life: 20 years
5. Operating Cost: $200,000 per year
6. Energy:
7. Maintenance Cost: $130,000 per year
8. Manufacturer: Badger America, Inc.
9. Other locations where employed on similar processes:

a.

(1) Company: Farmland Industries

(2) Mailing Address: P.O. Box 960

(3) City: Bartow

(4) State: Florida 33830

(5) Environmental Manager: Jack Harwell

(6) Telephone No.: (813) 425-4981

*Explain method of determining efficiency above. Based on manufacturer performance guarantees.

(7) Emissions*:

Contaminant	Rate or Concentration
Total Fluorides	0.02 lbs F/ton P_2O_5 feed

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

(See Attachment C)

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

See Attachment H

A. Company Monitored Data

1. ________ no sites ________ TSP ________ ( ) SO^2* ________ Wind spd/dir

Period of monitoring ___/___/___ to ___/___/___ (month day year to month day year)

Other data recorded ________________________

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

a) Was instrumentation EPA referenced or its equivalent? ____ Yes ____ No

b) Was instrumentation calibrated in accordance with Department procedures? ____ Yes ____ No ____ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. ____ Year(s) of data from ___/___/___ to ___/___/___ (month day year to month day year)

2. Surface data obtained from (location) ________________________

3. Upper air (mixing height) data obtained from (location) ________________________

4. Stability wind rose (STAR) data obtained from (location) ________________________

C. Computer Models Used

1. ________________________ Modified? If yes, attach description.

2. ________________________ Modified? If yes, attach description.

3. ________________________ Modified? If yes, attach description.

4. ________________________ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	________ grams/sec
SO^2	________ grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description on point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

*Specify bubbler (B) or continuous (C).

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

ATTACHMENT A

TEL. (813) 879-0715
TELEX 52-853

BADGER AMERICA, INC.

SUBSIDIARY OF THE BADGER COMPANY, INC.

Designers • Engineers • Constructors

BADGER BUILDING
1401 NORTH WESTSHORE BLVD.
P.O. BOX 22317, TAMPA, FLORIDA 33622

April 16, 1980
Letter No. GD/USSAC-002L

United States Steel Corporation
600 Grant Street, Room 1010
Pittsburgh, Pa. 15230

Attention: RT Lindsay,
Project Manager

Subject: USS Agri-Chemicals
Phosphate Complex Replacement
Ft. Meade, Florida
Badger Project No. E-7551
Overall Plant Material Balance

Dear Mr. Lindsay:

As you requested, we have enclosed ten copies of Drawing No. E-7541-106-0 which is a simplified process schematic diagram indicating plant raw material requirements and effluents.

In regards to pollution abatement, Badger's Gulf Design Division will employ tried and proven technology in minimizing contaminants in plant emissions. Gulf Design will guarantee that when the facilities are operated at the nominal capacity of 1400 short tons of P_2O_5 per day, the total emissions from the fluorine scrubber stacks will not exceed 0.02 pounds of fluorine per ton P_2O_5 input to the system.

Very truly yours,

BADGER AMERICA, INC.

J. W. Salter
Project Manager

JWS/rh

enclosure

ATTACHMENT B

(For Section V of Application)

1. Total Process Input Rate and Product Weight

P_2O_5 Input	=	70510	lb/h
P_2O_5 in Product	=	64165	lb/h
P_2O_5 Loss to Gypsum Storage	=	6345	lb/h

2. Emission Estimate and Test Methods

(a) Basis of Emission Estimate - performance guarantee from Badger America Inc. (Attachment A) which equates to meeting Federal NSPS and Florida Emission Limiting Standards.

(b) Compliance Test Methods - in accordance with 40 CFR 60, or DER/EPA approved alternate methods.

3. Basis of Potential Discharge

(Refer to Flow Diagram, Attachment E)

Based on guarantees from Bader America, fluoride emissions from the reactor area fume scrubber will be 10.8 pounds per day (lb/d) at a scrubber efficiency of 99%. Fluoride emissions from the storage tank area fume scrubber will be 3.8 lb/d at a scrubber efficiency of 95%. Total potential (uncontrolled) emission rates will be as follows:

Reactor Area	=	$\frac{10.8 \text{ lb/d}}{0.01 \text{ (effic. factor)}}$	=	2090 lb/d	Input
Storage Tank Area	=	$\frac{7.8 \text{ lb/d}}{0.05 \text{ (effic. factor)}}$	=	156 lb/d	Input
TOTAL		×6	=	2246 lb/d	Total Input
			=	94 lb/h	Total Input

4. Design Details of Pollution Control Equipment

Design details are not yet available. Refer to flow diagram in Attachment E for additional information.

5. Efficiency of Control Devices

Badger America design efficiencies for fluoride removal are as follows:

Reactor Area Fume Scrubber = 99% Efficiency

Storage Tank Fume Scrubber = 95% Efficiency

ATTACHMENT C

(For Section VI.F.10 of Application)

REASON FOR SELECTION

The existing phosphoric acid facility began production in 1961 and is nearing the end of its useful life. To meet the needs for greater efficiency and growth in demand for product, a new and larger plant is required to replace the old facility. At the same time environmental improvements will result. Federal and State new source emission standards are more stringent than standards for the existing plant. The new plant will take advantage of a number of technological advancements made since the existing plant was built. The new plant will use wet rock grinding which is more environmentally favorable and energy conservative than dry rock grinding. Fume scrubber designs have been improved and a better system of fume collection will be employed.

DESCRIPTION OF SYSTEM

(Starts on next page.)

DESCRIPTION OF PHOSPHORIC ACID AND
FLUOCILICIC ACID PRODUCTION

PHOSPHORIC ACID PRODUCTION

Phosphoric acid is produced by reacting ground phosphate rock with sulfuric acid (produced as described above). This reaction produces phosphoric acid and gypsum. The details of the rock grinding, reaction, filtration, evaporation, storage and clarification processes necessary to produce the desired product are described in the following sections.

WET ROCK GRINDING

The proposed wet rock grinding system is designed with the capability of grinding phosphate rock and producing a ground phosphate rock slurry containing no less than 65 percent solids (by weight). The wet rock grinding system is an open circuit system. Open circuit grinding is a method of reducing particle size by a single passage of the material through a mill.

The wet grinding mill is designed to process a feed material having an approximate size analysis of 100 percent minus 1/2 inch and 60 percent plus 35 mesh to a product material of 98 percent minus 35 mesh Tyler.

The unground rock is received from offsite storage via a belt conveyor and/or elevator and stored in the unground rock silo. A bin activator at the discharge cone of this silo provides a steady flow of rock from the silo to the weigh belt feed conveyor that transfers the unground rock to the ball mill. The unground rock feed rate is controlled by varying the speed of the belt.

Fresh water makeup from the mill water supply tank is introduced at two points within the system. A small quantity of this water is used to wash the weigh belt feed conveyor after it discharges rock to the mill. This waste water then enters the rock ball mill feed chute via the belt wash trough. The remainder of the water is used to slurry the rock being fed to the ball mill. The total quantity of water fed to the mill is flow-recorded and is controlled by a ratio-controller

which receives its signal from the weigh belt feed conveyor. This rock-to-water ratio-controller system, together with a density recorder, is used to control the concentration of solids in the product slurry.

The ground phosphate rock slurry from the ball mill discharges through a trommel screen into the agitated rock slurry pump tank. This trommel screen is used to remove ball chips and any other oversize material from the phosphate rock slurry. These materials are discharged from the screen to a solids container for removal to the battery limits. The slurry is then pumped from the rock slurry pump tank to the rock slurry storage tank (or, alternatively, to the reactor) using a variable-speed controlled horizontal centrifugal pump. The rock slurry pump tank is equipped with a level control used to vary the speed of this pump. The rock slurry storage tank is an agitated vessel with four hours of surge capacity at design flow.

A varible-speed controlled horizontal centrifugal pump is used to pump the phosphate rock slurry from the rock slurry storage tank to the isothermal reactor. Installed spare pumps are included to ensure a continuous feed from either the rock slurry pump tank or the rock slurry storage tank. The flow of the phosphate rock slurry is recorded and controlled by a flow recorder-controller. The density of the slurry is also recorded and the combination of flow and density is then used to obtain a flow measurement in tons per hour of phosphate rock, dry basis.

REACTION PROCESS

The reactor is specifically designed as a crystallizer to promote controlled growth of the dihydrate gypsum crystals. Adequate crystal growth of the by-product gypsum in the slurry is essential to obtain maximum efficiencies and recoveries in a phosphoric acid plant. Process control is the major factor affecting uniform crystal growth. The internal design and the process control of the reactor are such as to provide the operator with optimum control of the production of phosphoric acid. Vacuum flash evaporation is the most economical and

efficient method of removing the heat of reaction and dilution from the reactor. System response to temperature is kept to a minimum by this method of cooling and by high circulation within the reactor. High circulation also allows accurate control of free sulfates, solids, and acid concentration.

Because of the enclosed environment in which the reaction of phosphate rock and sulfuric acid takes place, gaseous fluoride emissions are minimized.

The phosphoric acid reactor is furnished with a draft tube-type agitator-circulator and a vacuum system for vapor removal from the reactor.

The reactor dimensions provide for ample vapor/liquid disengaging space so as to eliminate entrainment.

A propeller-type, top-mounted, agitator-circulator with an electric motor drive is used in the reactor. The impeller is located within the draft tube to achieve proper circulation of the slurry.

The reactor is sufficient to provide a total system retention time (reactor plus filter feed tank) of four hours and allow ample vapor disengaging area.

The agitator-circulator is located in a draft tube to circulate the slurry at a rate to insure the proper conditions are maintained at all points.

Raw material feed is designed for rapid dispersion into the circulating mass of the reactor slurry. The ground rock slurry is fed into the reactor bottom, entering the upward flow into the draft tube. Sulfuric acid is distributed just above the propeller in the draft tube at the point of highest turbulence in the reactor. Recycle acid is fed to the slurry surface in the annular area of the reactor.

The reaction of concentrated sulfuric acid and phosphate rock yields phosphoric acid and gypsum. With the vessel operating under a vacuum of 9 inches Hg absolute and a temperature of 174°F, continuous

flash evaporation at the slurry surface removes the exothermic heat of reaction.

Fluorine and carbon dioxide gases are also evolved due to the acidic decomposition of the phosphate rock.

The vapors from the top of the reactor enter the barometric condenser where condensable vapors are removed by direct contact with pond water. The non-condensable vapors containing carbon dioxide and air are removed by the steam jet ejector. As an alternate, vacuum pumps the same size as the filter vacuum pump may be utlized.

Slurry containing phosphoric acid and gypsum overflows the reactor to the filter feed tank which serves both as a seal tank and a surge tank. The overflow piping configuration is vented and provides smooth flow of the slurry from the reactor to the filter feed tank. The vent gases from the filter feed tank are piped to the fume scrubber for the removal of residual fluoride vapors before discharge to the atmosphere. An Auto-Analyzer pulls a sample from the filter feed tank to continuously monitor the free sulfate concentration in the filtrate.

FILTRATION PROCESS

In the filtration section, the phosphoric acid and by-product gypsum are separated on a horizontal, rotary vacuum filter with wet cake discharge and three counter-current washes.

The filter feed slurry is pumped to a splitter box, then flows by gravity to the slurry distributor which evenly distributes the slurry. A pre-cut, or cloudy port, section separates the first portion of filtrate coming through the cloth before the cake is formed. This removes fine solids and insures against the possibility of product dilution by carryover from the cloth wash section.

A conveyor removes most of the dry cake and discharges it into a hopper where it is slurried with pond water and pumped to battery limits. The remaining layer of gypsum is removed by washing with water. The cloth is also thoroughly cleaned by the high pressure

water. This water and small amount of gypsum is recirculated to the wash box for the final wash.

EVAPORATION PROCESS

Clarified and aged 29 percent P_2O_5 phosphoric acid is concentrated in two stages to produce 1440 TPD P_2O_5 as 54 percent P_2O_5 phosphoric acid. The 40 percent P_2O_5 phosphoric acid produced by the first stage evaporators is clarified and aged before evaporation to 54 percent P_2O_5 phosphoric acid in the second stage evaporators. Evaporation is carried out in two 40 percent and two 54 percent evaporators. Provision is made for the recovery of fluorine.

The 40 percent evaporation circuit receives 29 percent P_2O_5 clarified and aged acid. The 40 percent P_2O_5 acid product is returned from each evaporator to the 40 percent P_2O_5 acid clarifier tank in the tank farm for further clarification and aging. This includes recycle acid required for 40 percent clarification.

The 54 percent evaporation circuit receives clarified and aged 40 percent acid. The 54 percent P_2O_5 acid product is pumped from each evaporator to the 54 percent P_2O_5 accumulator tank in the tank farm for further clarification, aging, and shipment.

The 29 percent P_2O_5 acid feed contains 1 percent or less solids. Concentration and precipitation in the evaporator raises the solids concentration in the 40 percent P_2O_5 product returned to the tank farm to a value of 4.4 percent. The 40 percent P_2O_5 acid feed contains 0.75 percent or less solids. Concentration and precipitation in the evaporator will raise the solids concentration in the 54 percent P_2O_5 product returned to the tank farm to a design value of 5 percent.

Heater condensate is collected in a condensate flash tank and then transferred to two condensate storage tanks located in the clarification tank farm area. Condensate is monitored for conductivity contamination at three locations.

Each of the two 40 percent evaporators has a single barometric condenser and a single steam ejector which maintain an operating vacuum of 6.8 inches Hg absolute at the outlet of the entrainment separator. Each of the 54 percent evaporators has a barometric condenser and a two stage steam ejector system with intercondenser, which maintains an operating vacuum of 2.5 inches Hg absolute at the outlet of the entrainment separator.

The constant liquid level in the body is designed to provide sufficient submergence to suppress flashing in the heat exchanger tubes. Provision is made for 98 percent H_2SO_4 addition at 20 GPM for evaporator washing and boilouts.

STORAGE AND CLARIFICATION PROCESS

The storage and clarification area comprises the tank farm for 29 percent, 40 percent and 54 percent P_2O_5 storage and clarification. Clarification for 29 percent and 40 percent P_2O_5 is via rake clarifier. Clarification of 54 percent P_2O_5 acid incorporates rake clarifiers or centrifuges, depending on the final quality of the acid required. In addition, two 8 hour condensate storage tanks are located in this tank farm.

Filtrate acid from the filtration area containing 29 percent P_2O_5 and approximately 2 percent solids is added to the feedwell of a conventional rake clarifier for initial clarification. The overflow from this tank, containing less than 1 percent solids, is pumped to an agitated storage tank. Sludge acid raked off the bottom of the clarifier is returned to the filter feed tank at a nominal 20 percent solids loading. Clarified 29 percent P_2O_5 acid from the agitated tank is pumped to the 40 percent evaporators for concentration to 40 percent P_2O_5.

The 40 percent phosphoric acid containing 4.4 percent solids is pumped from the evaporators to the feedwell of a conventional rake clarifier for initial clarification. Overflow product containing less than 0.75 percent solids is pumped to a storage tank. A third agitated storage tank is used as a swing tank for either clarified 29 percent or

40 percent acid. Sludge raked off the bottom of the 40 percent P_2O_5 acid clarifier is returned to the 29 percent P_2O_5 clarifie at a nominal 20 percent solids loading. Clarified 40 percent P_2O_5 acid from the agitated storage tank is pumped to the 54 percent evaporators for concentration to 54 percent P_2O_5.

The 54 percent P_2O_5 phosphoric acid containing 5 percent solids is pumped from the evaporators to an agitated tank.

FLUOSILICIC ACID PRODUCTION

A fluosilicic acid recovery system consists essentially of a spray tower located between the phosphoric acid evaporator and the barometric condenser. This spray tower receives vapors from the phosphoric acid evaporator. Fluorine (as HF and SiF_4), water vapor, and minor amounts of air and entrained P_2O_5 (as H_3PO_4), are the major constituents of this stream.

An aqueous solution of H_2SiF_6 is sprayed into the tower to scrub the fluorine compounds in the vapor stream. The H_2SiF_6 solution absorbs the fluorine compounds as the vapor stream and solution approach chemical equilibrium. A small portion of this solution is taken as product and the remainder is recycled back to the scrubber. Water is added to the recycled solution to maintain the desired volume and concentration.

The flow of fluosilicic acid is counter-current to the flow of phosphoric acid in the evaporation system. Phosphoric acid is fed to the first stage evaporator at approximately 30 percent P_2O_5 and concentrated to 42 percent. During this step of concentration, fluorine in the form of SiF_4 is evolved. During the second stage of P_2O_5 concentration (42 percent to 54 percent P_2O_5) the fluorine evolution is in the form of both HF and SiF_4.

In the production of fluosilicic acid, the fluorine compounds from the second stage evaporator are scrubbed first with a solution containing 10 to 11 percent H_2SiF_6. This solution also contains the HF evolved from this evaporator. The primary reaction that occurs in this scrubber is as follows:

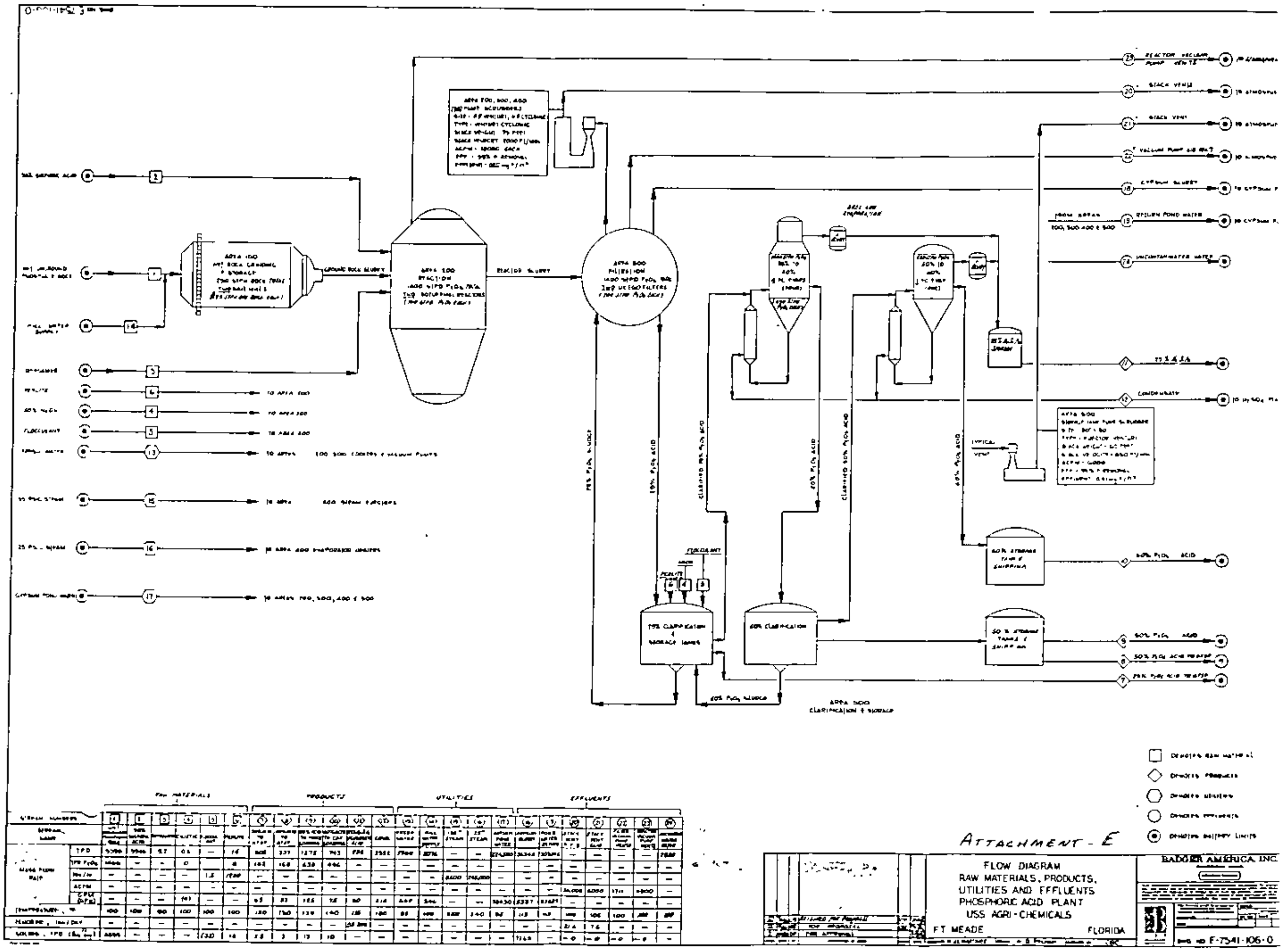
$$3SiF_4 + 4H_2O = SiO_2 \quad 2H_2O + 2H_2SiF_6$$

However, a second reaction takes place because of the dissolved HF in the solution. It is as follows:

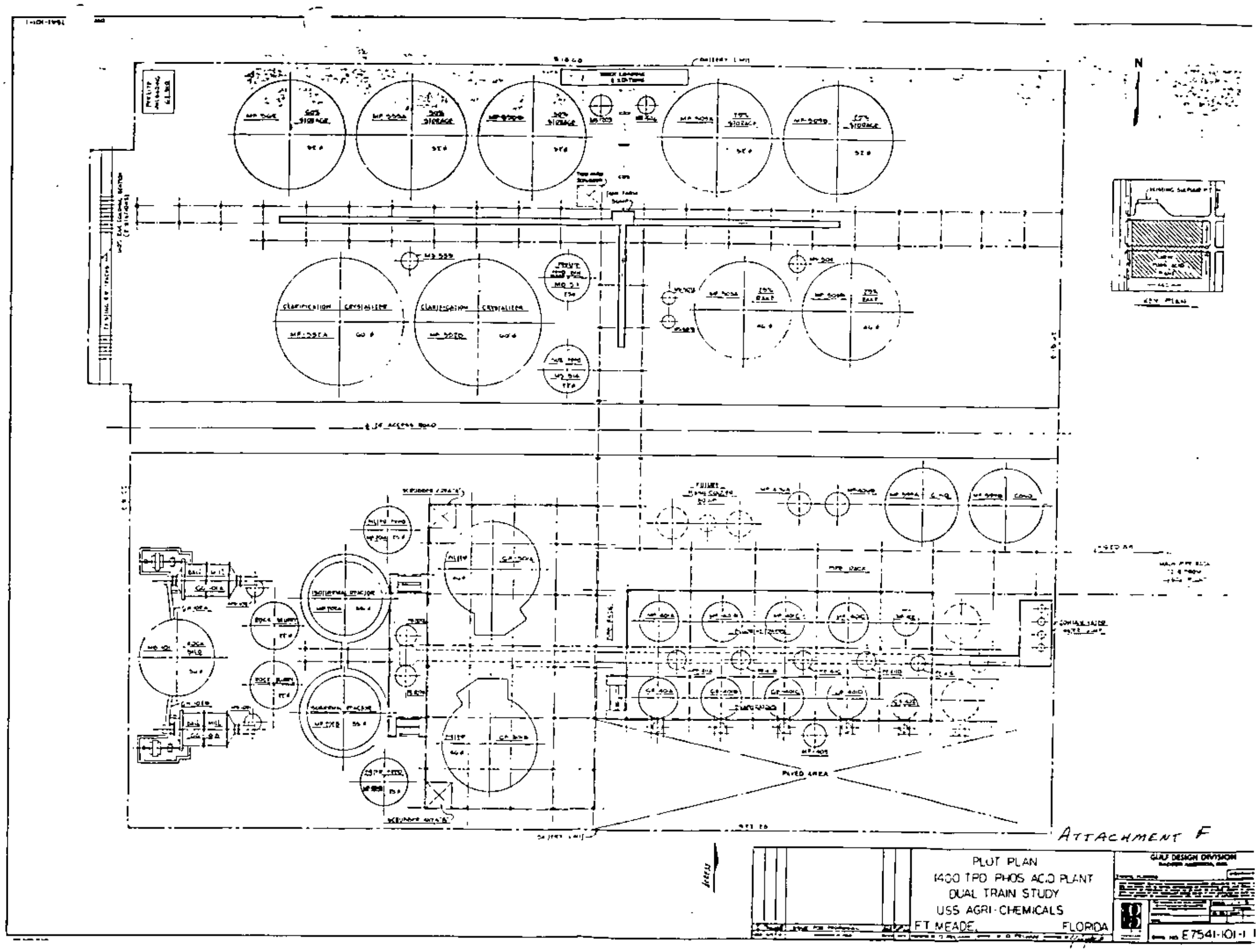
$$6HF + SiO_2 \quad 2H_2O = H_2SiF_6 + 4H_2O$$

All of the dissolved HF is not reacted in this stage of the scrubbing process, and it is carried in solution to the scrubber on the first stage evaporator. Additional fluoride compounds are absorbed in this scrubber. The chemical reactions are the same as those previously shown. The concentration of the H_2SiF_6 solution is raised to 25 percent by the absorption step and a side stream is taken as product. The concentration is maintained at this level by adding the scrubber liquor from the second stage evaporator. P_2O_5 entrainment in the scrubber liquor is kept to a minimum by use of an entrainment separator installed in the inlet of the scrubber.

Attachment D - Location of USS Agri-Chemicals
Fort Meade Phosphate Chemical Complex



ATTACHMENT - E
FLOW DIAGRAM
RAW MATERIALS, PRODUCTS,
UTILITIES AND EFFLUENTS
PHOSPHORIC ACID PLANT
USS AGRI-CHEMICALS
FT MEADE
FLORIDA
BADGER AMERICA, INC.
E-7541-106-0



ATTACHMENT F

ATTACHMENT G

PARTICULATE EMISSIONS
(For Section III.C. of Application)

Primarily and most importantly the phosphoric acid plant scrubbers must control fluoride emissions to the low levels required by New Source Performance Standards. The control system includes fans and ducts which draw ambient air into the process and storage equipment where it mixes with contaminated fumes and conveys the contaminants to the scrubbers for removal. The system must have sufficient air capacity to prevent fugitive fluoride emissions by assurance of an ingress of air at all openings.

It is expected that the concentration of particulate emissions from the scrubbers will be not more than 0.03 grains per cubic foot of stack gas. In conjunction with the quantity of air flow determined by the designers to be necessary to meet fluoride emission standards, this amounts to 0.185 pounds per ton of P_2O_5 production or 20 tons per year for an average annual production of 220,000 tons P_2O_5. (Refer to Attachment E. See sample calculation below.)

Although it is expected that particulate emissions from the scrubbers will be 0.03 grains per cubic foot or less, there is no history of performance to substantiate this. USS Agri-Chemicals requests that final emission limits be deferred pending actual performance testing.

Sample Calculations

1. Particulate emission rate per ton of P_2O_5 produced:

a) Volumetric flow through reaction and filtration area scrubber for each train @ 700 tons P_2O_5 produced per day $= \frac{36{,}000\ ft^3/min}{2} = 18{,}000\ ft^3/min$

b) Volumetric flow through clarification and storage area scrubber for each train @ 700 tons P_2O_5 produced per day $= \frac{6{,}000\ ft^3/min}{2} = 3{,}000\ ft^3/min$

c) Particulate emission rate:

$$= 21{,}000 \frac{ft^3}{min} \times 0.03 \frac{gr\ part.}{ft^3} \times 1440 \frac{min}{d} \times \frac{1}{7000} \frac{lb}{gr} \times \frac{1}{700} \frac{d}{ton\ P_2O_5}$$

= 0.185 lb/ton

2. <u>Maximum particulate emission rate per hour</u>:

= 0.185 lb/ton x 32.1 ton/h

= 5.9 lb/h

3. <u>Average particulate emission rate per year</u>:

$$= \frac{0.185\ lb/ton \times 220{,}000\ ton/yr}{2000\ lb/ton}$$

= 20 ton/yr

ATTACHMENT H

PREVENTION OF SIGNIFICANT DETERIORATION
(For Section II.G.3 and Section VII. of Application)

The new phosphoric acid plant will not be a source of sulfur dioxide (SO_2). Therefore, PSD provisions in FAC 17-2.04 related to SO_2 do not apply.

Emissions of particulate matter are difficult to estimate as discussed in Attachment G, but average annual emissions are expected to be no greater than 20 tons per year per train, or 40 tons per year for both trains combined. However, this figure must be evaluated in light of the fact that the new phosphoric plant will replace an existing phosphoric acid plant. If point source particulate emissions from the existing plant (which are not regulated) are calculated on the same basis as that for the new plant (0.185 lb/ton P_2O_5), existing particulate emissions are on the order of 18 tons per year. The net difference is therefore an increase of about 22 tons per year.

This change must be further qualified, however, by noting that the existing plant processes dry rock whereas the new plant will process only wet rock. As a result of the switch to a wet rock process, fugitive particulate emissions will decrease substantially. The actual increase (if any) in overall particulate emissions should therefore be less than 20 tons per year, and a detailed PSD analysis does not seem warranted for this relatively minor change in emissions.

State of Florida

Department of State

I certify from the records of this office that UNITED STATES STEEL CORPORATION, is a corporation organized under the laws of the State of Delaware, and is authorized to transact business within the State of Florida.

The charter number for this corporation is 819214.

I further certify that said corporation has filed all annual reports and has paid all annual report filing fees due this office through December 31, 1979, and its status is active.

Given under my hand and the Great Seal of the State of Florida, at Tallahassee, the Capital, this the 3rd day of March, 1980.

GREAT SEAL OF THE STATE OF FLORIDA
IN GOD WE TRUST

CER 101 Rev. 5-79

George Firestone
Secretary of State

AC 53-33821
AC 53-33868

2 EMISSION POINTS.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Air Pollution [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [X] Construction [ ] Operation [ ] Modification

COMPANY NAME: USS Agri-Chemicals COUNTY: Polk

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) Phosphoric Acid Plant - Train A

SOURCE LOCATION: Street Highway 630 West City Ft. Meade

UTM: East 416.07 (Zone 17) North 3068.78

Latitude ___ ° ___ ' ___ "N Longitude ___ ° ___ ' ___ "W

APPLICANT NAME AND TITLE: G. W. Beck, Manager, Florida Phosphate Operations

APPLICANT ADDRESS: P.O. Box 150, Bartow, Florida 33830

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of USS Agri-Chemicals

I certify that the statements made in this application for a Construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: George W Beck

George W. Beck, Manager, Fla Phosphate Operations
Name and Title (Please Type)

Date: Aug. 5, 1980 Telephone No. 813-5330471

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed: James H Carroll

James H. Carroll
Name (Please Type)

(Affix Seal)

USS Agri-Chemicals
Company Name (Please Type)

P. O. Box 150, Bartow, Fl 33830
Mailing Address (Please Type)

Florida Registration No. 19407

Date: Aug. 5, 1980 Telephone No. 813-533-0471

[1]See Section 17-2.02(15) and (22), Florida Administrative Code, (F.A.C.)

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

This phosphoric acid plant uses wet rock grinding to save energy and reduce particulate emissions, and includes a processing section for recovery of fluorine. Emissions will be in full compliance with Federal New Source Performance Standards and Florida Emission Limiting Standards. (Also see attachments.)

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction March 1981 Completion of Construction March 1983

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

1 - Scrubber System for Reaction and Filtration Area	$1,375,000
*1/2 - Scrubber System for Clarification and Storage Area	425,000
*1/2 - Fluorine Recovery System	1,800,000
*Note: These systems common to Train A and Train B	$2,600,000

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Existing plant to be replaced by the new plant has operating permit A053-4563, issued 11/15/77, expiring 11/10/82. The permitted capacity of the existing plant is 321 tons/day P_2O_5. The existing plant will be shut down as soon as the new plant is tested for service.

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes X No

F. Normal equipment operating time: *hrs/day 24 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr ____ ;

if seasonal, describe:

*Plant will be shut down only when required for repairs.

G. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? No
   a. If yes, has "offset" been applied? ____
   b. If yes, has "Lowest Achievable Emission Rate" been applied? ____
   c. If yes, list non-attainment pollutants. ____
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. Yes
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. No (see Attachment H)
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? Yes
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Sulfuric Acid	N/A			Pt. 2 on Atch E
Wet Phosphate Rock	Fluorine	3.5	233,510	Pt. 1 on Atch E
		(dry basis)	(dry basis)	

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): 233,510 lbs/hr phosphate rock; 70,510 lbs/hr P_2O_5
2. Product Weight (lbs/hr): 64,165 lbs/hr P_2O_5

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	
Fluorides	0.71	2.7*	0.02 lb F/ton P_2O_5	0.71	48	181*	Pts. 20 &
			input				21 Atch E
Particulates -	See Attachment G						
*Based on expected maximum P_2O_5 input of 265,900 T/yr.							

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]
Venturi Cyclone	F	99%	N/A	*
Venturi Cyclone	F	95%	N/A	*
*Vendor guarantee, see Attachment A.				

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g., Section 17-2.05(6) Table II, E. (1), F.A.C. – 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard

[4]Emission, if source operated without control (See Section V, Item 3)

[5]If Applicable

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
None			

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis:

Percent Sulfur: ______ Percent Ash: ______

Density: ______ lbs/gal Typical Percent Nitrogen: ______

Heat Capacity: ______ BTU/lb ______ BTU/gal

Other Fuel Contaminants (which may cause air pollution): ______

F. If applicable, indicate the percent of fuel used for space heating. Annual Average ______ Maximum ______

G. Indicate liquid or solid wastes generated and method of disposal.

Gypsum slurry is sent to on-site gypsum disposal area. Water is recycled.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):*

Stack Height: 75; 62 ft. Stack Diameter: 3.4; 3.0 ft.

Gas Flow Rate: 18000; 6000 ACFM Gas Exit Temperature: 100; 105 °F.

Water Vapor Content: Saturated % Velocity: 33.3; 14.2 FPS

*First number is for Point 20 on Attachment E. Second number is for Point 21 on Attachment E.

SECTION IV: INCINERATOR INFORMATION

NOT APPLICABLE

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated							

Description of Waste ______

Total Weight Incinerated (lbs/hr) ______ Design Capacity (lbs/hr) ______

Approximate Number of Hours of Operation per day ______ days/week ______

Manufacturer ______

Date Constructed ______ Model No. ______

	Volume (ft)^3	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: ____________ ft. Stack Diameter ____________ Stack Temp. ____________

Gas Flow Rate: ____________ ACFM ____________ DSCFM* Velocity ____________ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [ ] Other (specify) ____________

Brief description of operating characteristics of control devices: ____________

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight — show derivation. (See Attachment B)
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.,) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made. (See Attachment B)
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test). (See Attachment B)
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.). (See Attachment B)
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency). (See Attachment A)
6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained. (See Attachment E)
7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map). (See Attachment D)
8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram. (See Attachment F)

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?
[X] Yes [ ] No

Contaminant	Rate or Concentration
Total Fluorides	0.02 lbs fluorides per ton of
	equivalent P_2O_5 feed.

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy) [ ] Yes [X] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration
Total Fluorides	0.02 lbs fluorides per ton of equivalent
	P_2O_5 feed.

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:
5. Useful Life:
6. Operating Costs:
7. Energy:
8. Maintenance Cost:
9. Emissions:

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy*: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy**: h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

*Explain method of determining efficiency.

**Energy to be reported in units of electrical power — KWH design rate.

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space and operate within proposed levels:

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device: Two Venturi Cyclone Scrubbers and Fluorine Recovery System

2. Efficiency*: 99% and 95%

3. Capital Cost: $2,600,000

4. Life: 20 years

5. Operating Cost: $200,000 per year

6. Energy:

7. Maintenance Cost: $130,000 per year

8. Manufacturer: Badger America, Inc.

9. Other locations where employed on similar processes:

a.

(1) Company: Farmland Industries

(2) Mailing Address: P.O. Box 960

(3) City: Bartow

(4) State: Florida 33830

(5) Environmental Manager: Jack Harwell

(6) Telephone No.: (813) 425-4981

*Explain method of determining efficiency above. Based on manufacturer performance guarantees.

(7) Emissions*:

Contaminant	Rate or Concentration
Total Fluorides	0.02 lbs F/ton P_2O_5 feed

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

(See Attachment C)

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII — PREVENTION OF SIGNIFICANT DETERIORATION

See Attachment H

A. Company Monitored Data

1. ________ no sites ________ TSP ________ ( ) SO^2* ________ Wind spd/dir

Period of monitoring ____/____/____ to ____/____/____
month day year month day year

Other data recorded ________________________________

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

a) Was instrumentation EPA referenced or its equivalent? ____ Yes ____ No

b) Was instrumentation calibrated in accordance with Department procedures? ____ Yes ____ No ____ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. ____ Year(s) of data from ____/____/____ to ____/____/____
month day year month day year

2. Surface data obtained from (location) ________________________________

3. Upper air (mixing height) data obtained from (location) ________________________________

4. Stability wind rose (STAR) data obtained from (location) ________________________________

C. Computer Models Used

1. ________________________________ Modified? If yes, attach description.

2. ________________________________ Modified? If yes, attach description.

3. ________________________________ Modified? If yes, attach description.

4. ________________________________ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	________ grams/sec
SO^2	________ grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description on point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

*Specify bubbler (B) or continuous (C).

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

ATTACHMENT A

BADGER AMERICA, INC.
SUBSIDIARY OF THE BADGER COMPANY, INC.
Designers • Engineers • Constructors
BADGER BUILDING
1401 NORTH WESTSHORE BLVD.
P.O. BOX 22317, TAMPA, FLORIDA 33622

TEL. (813) 879-0715
TELEX 52-863

April 16, 1980
Letter No. GD/USSAC-002L

United States Steel Corporation
600 Grant Street, Room 1010
Pittsburgh, Pa. 15230

Attention: RT Lindsay,
Project Manager

Subject: USS Agri-Chemicals
Phosphate Complex Replacement
Ft. Meade, Florida
Badger Project No. E-7551
Overall Plant Material Balance

Dear Mr. Lindsay:

As you requested, we have enclosed ten copies of Drawing No. E-7541-106-0 which is a simplified process schematic diagram indicating plant raw material requirements and effluents.

In regards to pollution abatement, Badger's Gulf Design Division will employ tried and proven technology in minimizing contaminants in plant emissions. Gulf Design will guarantee that when the facilities are operated at the nominal capacity of 1400 short tons of P_2O_5 per day, the total emissions from the fluorine scrubber stacks will not exceed 0.02 pounds of fluorine per ton P_2O_5 input to the system.

Very truly yours,

BADGER AMERICA, INC.

J. W. Salter
J. W. Salter
Project Manager

JWS/rh

enclosure

A Raytheon Company

MAIN OFFICE AT CAMBRIDGE, MASSACHUSETTS OFFICE IN HOUSTON, TEXAS
AFFILIATES IN THE HAGUE LONDON PARIS TAIPEI TOKYO AND OTHER PRINCIPAL CITIES OF THE WORLD

ATTACHMENT B

(For Section V of Application)

1. Total Process Input Rate and Product Weight

P_2O_5 Input	=	70510	lb/h
P_2O_5 in Product	=	64165	lb/h
P_2O_5 Loss to Gypsum Storage	=	6345	lb/h.

2. Emission Estimate and Test Methods

(a) Basis of Emission Estimate - performance guarantee from Badger America Inc. (Attachment A) which equates to meeting Federal NSPS and Florida Emission Limiting Standards.

(b) Compliance Test Methods - in accordance with 40 CFR 60, or DER/EPA approved alternate methods.

3. Basis of Potential Discharge

(Refer to Flow Diagram, Attachment E)

Based on guarantees from Bader America, fluoride emissions from the reactor area fume scrubber will be 10.8 pounds per day (lb/d) at a scrubber efficiency of 99%. Fluoride emissions from the storage tank area fume scrubber will be 3.8 lb/d at a scrubber efficiency of 95%. Total potential (uncontrolled) emission rates will be as follows:

Reactor Area = $\frac{10.8 \text{ lb/d}}{0.01 \text{ (effic. factor)}}$ = 2090 lb/d

Storage Tank Area = $\frac{7.8 \text{ lb/d}}{0.05 \text{ (effic. factor)}}$ = 156 lb/d

TOTAL = 2246 lb/d

18.6

1400 x.02 25

= 94 lb/h

4. Design Details of Pollution Control Equipment

Design details are not yet available. Refer to flow diagram in Attachment E for additional information.

5. Efficiency of Control Devices

Badger America design efficiencies for fluoride removal are as follows:

Reactor Area Fume Scrubber	=	99% Efficiency
Storage Tank Fume Scrubber	=	95% Efficiency

ATTACHMENT C

(For Section VI.F.10 of Application)

REASON FOR SELECTION

The existing phosphoric acid facility began production in 1961 and is nearing the end of its useful life. To meet the needs for greater efficiency and growth in demand for product, a new and larger plant is required to replace the old facility. At the same time environmental improvements will result. Federal and State new source emission standards are more stringent than standards for the existing plant. The new plant will take advantage of a number of technological advancements made since the existing plant was built. The new plant will use wet rock grinding which is more environmentally favorable and energy conservative than dry rock grinding. Fume scrubber designs have been improved and a better system of fume collection will be employed.

DESCRIPTION OF SYSTEM

(Starts on next page.)

DESCRIPTION OF PHOSPHORIC ACID AND FLUOCILICIC ACID PRODUCTION

PHOSPHORIC ACID PRODUCTION

Phosphoric acid is produced by reacting ground phosphate rock with sulfuric acid (produced as described above). This reaction produces phosphoric acid and gypsum. The details of the rock grinding, reaction, filtration, evaporation, storage and clarification processes necessary to produce the desired product are described in the following sections.

WET ROCK GRINDING

The proposed wet rock grinding system is designed with the capability of grinding phosphate rock and producing a ground phosphate rock slurry containing no less than 65 percent solids (by weight). The wet rock grinding system is an open circuit system. Open circuit grinding is a method of reducing particle size by a single passage of the material through a mill.

The wet grinding mill is designed to process a feed material having an approximate size analysis of 100 percent minus 1/2 inch and 60 percent plus 35 mesh to a product material of 98 percent minus 35 mesh Tyler.

The unground rock is received from offsite storage via a belt conveyor and/or elevator and stored in the unground rock silo. A bin activator at the discharge cone of this silo provides a steady flow of rock from the silo to the weigh belt feed conveyor that transfers the unground rock to the ball mill. The unground rock feed rate is controlled by varying the speed of the belt.

Fresh water makeup from the mill water supply tank is introduced at two points within the system. A small quantity of this water is used to wash the weigh belt feed conveyor after it discharges rock to the mill. This waste water then enters the rock ball mill feed chute via the belt wash trough. The remainder of the water is used to slurry the rock being fed to the ball mill. The total quantity of water fed to the mill is flow-recorded and is controlled by a ratio-controller

which receives its signal from the weigh belt feed conveyor. This rock-to-water ratio-controller system, together with a density recorder, is used to control the concentration of solids in the product slurry.

The ground phosphate rock slurry from the ball mill discharges through a trommel screen into the agitated rock slurry pump tank. This trommel screen is used to remove ball chips and any other oversize material from the phosphate rock slurry. These materials are discharged from the screen to a solids container for removal to the battery limits. The slurry is then pumped from the rock slurry pump tank to the rock slurry storage tank (or, alternatively, to the reactor) using a variable-speed controlled horizontal centrifugal pump. The rock slurry pump tank is equipped with a level control used to vary the speed of this pump. The rock slurry storage tank is an agitated vessel with four hours of surge capacity at design flow.

A varible-speed controlled horizontal centrifugal pump is used to pump the phosphate rock slurry from the rock slurry storage tank to the isothermal reactor. Installed spare pumps are included to ensure a continuous feed from either the rock slurry pump tank or the rock slurry storage tank. The flow of the phosphate rock slurry is recorded and controlled by a flow recorder-controller. The density of the slurry is also recorded and the combination of flow and density is then used to obtain a flow measurement in tons per hour of phosphate rock, dry basis.

REACTION PROCESS

The reactor is specifically designed as a crystallizer to promote controlled growth of the dihydrate gypsum crystals. Adequate crystal growth of the by-product gypsum in the slurry is essential to obtain maximum efficiencies and recoveries in a phosphoric acid plant. Process control is the major factor affecting uniform crystal growth. The internal design and the process control of the reactor are such as to provide the operator with optimum control of the production of phosphoric acid. Vacuum flash evaporation is the most economical and

efficient method of removing the heat of reaction and dilution from the reactor. System response to temperature is kept to a minimum by this method of cooling and by high circulation within the reactor. High circulation also allows accurate control of free sulfates, solids, and acid concentration.

Because of the enclosed environment in which the reaction of phosphate rock and sulfuric acid takes place, gaseous fluoride emissions are minimized.

The phosphoric acid reactor is furnished with a draft tube-type agitator-circulator and a vacuum system for vapor removal from the reactor.

The reactor dimensions provide for ample vapor/liquid disengaging space so as to eliminate entrainment.

A propeller-type, top-mounted, agitator-circulator with an electric motor drive is used in the reactor. The impeller is located within the draft tube to achieve proper circulation of the slurry.

The reactor is sufficient to provide a total system retention time (reactor plus filter feed tank) of four hours and allow ample vapor disengaging area.

The agitator-circulator is located in a draft tube to circulate the slurry at a rate to insure the proper conditions are maintained at all points.

Raw material feed is designed for rapid dispersion into the circulating mass of the reactor slurry. The ground rock slurry is fed into the reactor bottom, entering the upward flow into the draft tube. Sulfuric acid is distributed just above the propeller in the draft tube at the point of highest turbulence in the reactor. Recycle acid is fed to the slurry surface in the annular area of the reactor.

The reaction of concentrated sulfuric acid and phosphate rock yields phosphoric acid and gypsum. With the vessel operating under a vacuum of 9 inches Hg absolute and a temperature of 174°F, continuous

flash evaporation at the slurry surface removes the exothermic heat of reaction.

Fluorine and carbon dioxide gases are also evolved due to the acidic decomposition of the phosphate rock.

The vapors from the top of the reactor enter the barometric condenser where condensable vapors are removed by direct contact with pond water. The non-condensable vapors containing carbon dioxide and air are removed by the steam jet ejector. As an alternate, vacuum pumps the same size as the filter vacuum pump may be utlized.

Slurry containing phosphoric acid and gypsum overflows the reactor to the filter feed tank which serves both as a seal tank and a surge tank. The overflow piping configuration is vented and provides smooth flow of the slurry from the reactor to the filter feed tank. The vent gases from the filter feed tank are piped to the fume scrubber for the removal of residual fluoride vapors before discharge to the atmosphere. An Auto-Analyzer pulls a sample from the filter feed tank to continuously monitor the free sulfate concentration in the filtrate.

FILTRATION PROCESS

In the filtration section, the phosphoric acid and by-product gypsum are separated on a horizontal, rotary vacuum filter with wet cake discharge and three counter-current washes.

The filter feed slurry is pumped to a splitter box, then flows by gravity to the slurry distributor which evenly distributes the slurry. A pre-cut, or cloudy port, section separates the first portion of filtrate coming through the cloth before the cake is formed. This removes fine solids and insures against the possibility of product dilution by carryover from the cloth wash section.

A conveyor removes most of the dry cake and discharges it into a hopper where it is slurried with pond water and pumped to battery limits. The remaining layer of gypsum is removed by washing with water. The cloth is also thoroughly cleaned by the high pressure

water. This water and small amount of gypsum is recirculated to the wash box for the final wash.

EVAPORATION PROCESS

Clarified and aged 29 percent P_2O_5 phosphoric acid is concentrated in two stages to produce 1440 TPD P_2O_5 as 54 percent P_2O_5 phosphoric acid. The 40 percent P_2O_5 phosphoric acid produced by the first stage evaporators is clarified and aged before evaporation to 54 percent P_2O_5 phosphoric acid in the second stage evaporators. Evaporation is carried out in two 40 percent and two 54 percent evaporators. Provision is made for the recovery of fluorine.

The 40 percent evaporation circuit receives 29 percent P_2O_5 clarified and aged acid. The 40 percent P_2O_5 acid product is returned from each evaporator to the 40 percent P_2O_5 acid clarifier tank in the tank farm for further clarification and aging. This includes recycle acid required for 40 percent clarification.

The 54 percent evaporation circuit receives clarified and aged 40 percent acid. The 54 percent P_2O_5 acid product is pumped from each evaporator to the 54 percent P_2O_5 accumulator tank in the tank farm for further clarification, aging, and shipment.

The 29 percent P_2O_5 acid feed contains 1 percent or less solids. Concentration and precipitation in the evaporator raises the solids concentration in the 40 percent P_2O_5 product returned to the tank farm to a value of 4.4 percent. The 40 percent P_2O_5 acid feed contains 0.75 percent or less solids. Concentration and precipitation in the evaporator will raise the solids concentration in the 54 percent P_2O_5 product returned to the tank farm to a design value of 5 percent.

Heater condensate is collected in a condensate flash tank and then transferred to two condensate storage tanks located in the clarification tank farm area. Condensate is monitored for conductivity contamination at three locations.

Each of the two 40 percent evaporators has a single barometric condenser and a single steam ejector which maintain an operating vacuum of 6.8 inches Hg absolute at the outlet of the entrainment separator. Each of the 54 percent evaporators has a barometric condenser and a two stage steam ejector system with intercondenser, which maintains an operating vacuum of 2.5 inches Hg absolute at the outlet of the entrainment separator.

The constant liquid level in the body is designed to provide sufficient submergence to suppress flashing in the heat exchanger tubes. Provision is made for 98 percent H_2SO_4 addition at 20 GPM for evaporator washing and boilouts.

STORAGE AND CLARIFICATION PROCESS

The storage and clarification area comprises the tank farm for 29 percent, 40 percent and 54 percent P_2O_5 storage and clarification. Clarification for 29 percent and 40 percent P_2O_5 is via rake clarifier. Clarification of 54 percent P_2O_5 acid incorporates rake clarifiers or centrifuges, depending on the final quality of the acid required. In addition, two 8 hour condensate storage tanks are located in this tank farm.

Filtrate acid from the filtration area containing 29 percent P_2O_5 and approximately 2 percent solids is added to the feedwell of a conventional rake clarifier for initial clarification. The overflow from this tank, containing less than 1 percent solids, is pumped to an agitated storage tank. Sludge acid raked off the bottom of the clarifier is returned to the filter feed tank at a nominal 20 percent solids loading. Clarified 29 percent P_2O_5 acid from the agitated tank is pumped to the 40 percent evaporators for concentration to 40 percent P_2O_5.

The 40 percent phosphoric acid containing 4.4 percent solids is pumped from the evaporators to the feedwell of a conventional rake clarifier for initial clarification. Overflow product containing less than 0.75 percent solids is pumped to a storage tank. A third agitated storage tank is used as a swing tank for either clarified 29 percent or

40 percent acid. Sludge raked off the bottom of the 40 percent P_2O_5 acid clarifier is returned to the 29 percent P_2O_5 clarifie at a nominal 20 percent solids loading. Clarified 40 percent P_2O_5 acid from the agitated storage tank is pumped to the 54 percent evaporators for concentration to 54 percent P_2O_5.

The 54 percent P_2O_5 phosphoric acid containing 5 percent solids is pumped from the evaporators to an agitated tank.

FLUOSILICIC ACID PRODUCTION

A fluosilicic acid recovery system consists essentially of a spray tower located between the phosphoric acid evaporator and the barometric condenser. This spray tower receives vapors from the phosphoric acid evaporator. Fluorine (as HF and SiF_4), water vapor, and minor amounts of air and entrained P_2O_5 (as H_3PO_4), are the major constituents of this stream.

An aqueous solution of H_2SiF_6 is sprayed into the tower to scrub the fluorine compounds in the vapor stream. The H_2SiF_6 solution absorbs the fluorine compounds as the vapor stream and solution approach chemical equilibrium. A small portion of this solution is taken as product and the remainder is recycled back to the scrubber. Water is added to the recycled solution to maintain the desired volume and concentration.

The flow of fluosilicic acid is counter-current to the flow of phosphoric acid in the evaporation system. Phosphoric acid is fed to the first stage evaporator at approximately 30 percent P_2O_5 and concentrated to 42 percent. During this step of concentration, fluorine in the form of SiF_4 is evolved. During the second stage of P_2O_5 concentration (42 percent to 54 percent P_2O_5) the fluorine evolution is in the form of both HF and SiF_4.

In the production of fluosilicic acid, the fluorine compounds from the second stage evaporator are scrubbed first with a solution containing 10 to 11 percent H_2SiF_6. This solution also contains the HF evolved from this evaporator. The primary reaction that occurs in this scrubber is as follows:

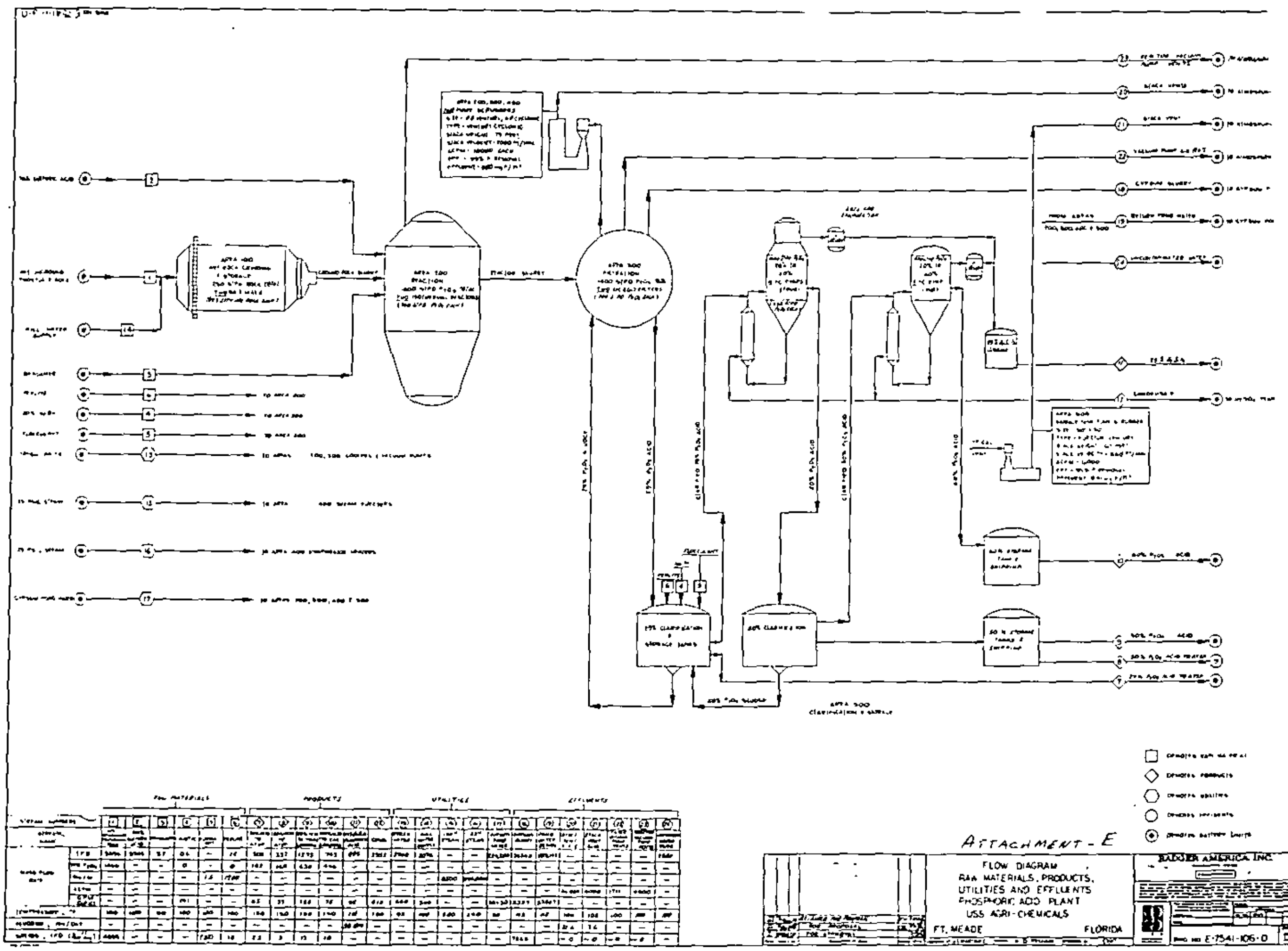
$$3SiF_4 + 4H_2O = SiO_2 \quad 2H_2O + 2H_2SiF_6$$

However, a second reaction takes place because of the dissolved HF in the solution. It is as follows:

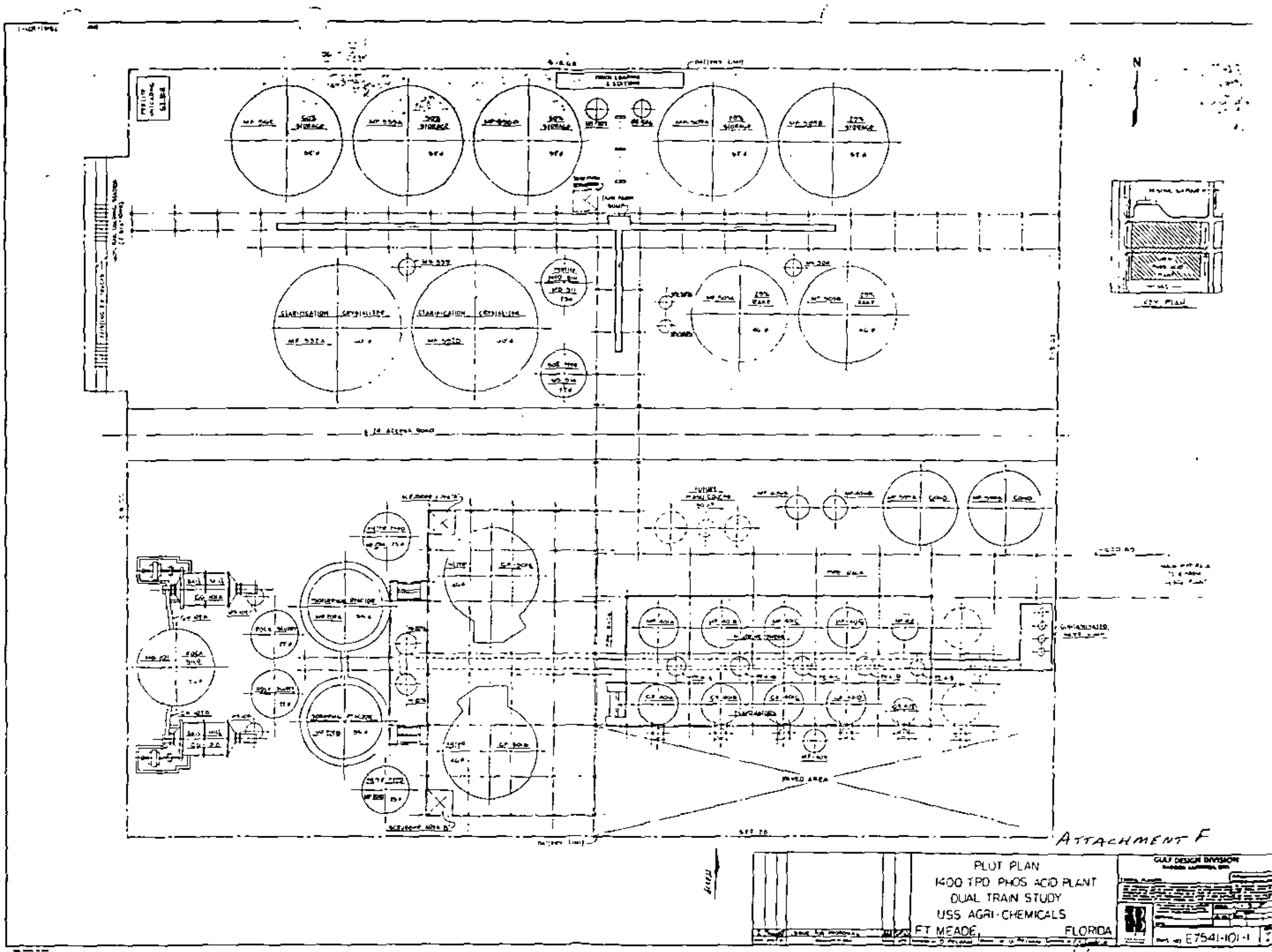
$$6HF + SiO_2 \quad 2H_2O = H_2SiF_6 + 4H_2O$$

All of the dissolved HF is not reacted in this stage of the scrubbing process, and it is carried in solution to the scrubber on the first stage evaporator. Additional fluoride compounds are absorbed in this scrubber. The chemical reactions are the same as those previously shown. The concentration of the H_2SiF_6 solution is raised to 25 percent by the absorption step and a side stream is taken as product. The concentration is maintained at this level by adding the scrubber liquor from the second stage evaporator. P_2O_5 entrainment in the scrubber liquor is kept to a minimum by use of an entrainment separator installed in the inlet of the scrubber.

Attachment D - Location of USS Agri-Chemicals
Fort Meade Phosphate Chemical Complex



ATTACHMENT - E
FLOW DIAGRAM
RAW MATERIALS, PRODUCTS, UTILITIES AND EFFLUENTS
PHOSPHORIC ACID PLANT
USS AGRI-CHEMICALS
FT. MEADE
FLORIDA
BADGER AMERICA INC.
E-7541-106-0


ATTACHMENT F
PLOT PLAN
1400 TPD PHOS ACID PLANT
DUAL TRAIN STUDY
USS AGRI-CHEMICALS
FT MEADE, FLORIDA
E7541-101-1
GULF DESIGN DIVISION
PAVED AREA
KEY PLAN
N

ATTACHMENT G

PARTICULATE EMISSIONS
(For Section III.C. of Application)

Primarily and most importantly the phosphoric acid plant scrubbers must control fluoride emissions to the low levels required by New Source Performance Standards. The control system includes fans and ducts which draw ambient air into the process and storage equipment where it mixes with contaminated fumes and conveys the contaminants to the scrubbers for removal. The system must have sufficient air capacity to prevent fugitive fluoride emissions by assurance of an ingress of air at all openings.

It is expected that the concentration of particulate emissions from the scrubbers will be not more than 0.03 grains per cubic foot of stack gas. In conjunction with the quantity of air flow determined by the designers to be necessary to meet fluoride emission standards, this amounts to 0.185 pounds per ton of P_2O_5 production or 20 tons per year for an average annual production of 220,000 tons P_2O_5. (Refer to Attachment E. See sample calculation below.)

Although it is expected that particulate emissions from the scrubbers will be 0.03 grains per cubic foot or less, there is no history of performance to substantiate this. USS Agri-Chemicals requests that final emission limits be deferred pending actual performance testing.

<u>Sample Calculations</u>

1. <u>Particulate emission rate per ton of P_2O_5 produced</u>:

   a) Volumetric flow through reaction and filtration area scrubber for each train @ 700 tons P_2O_5 produced per day $= \frac{36{,}000\ ft^3/min}{2} = 18{,}000\ ft^3/min$

   b) Volumetric flow through clarification and storage area scrubber for each train @ 700 tons P_2O_5 produced per day $= \frac{6{,}000\ ft^3/min}{2} = 3{,}000\ ft^3/min$

c) Particulate emission rate:

$$= 21{,}000\ \frac{ft^3}{min} \times 0.03\ \frac{gr\ part.}{ft^3} \times 1440\ \frac{min}{d} \times \frac{1}{7000}\ \frac{lb}{gr} \times \frac{1}{700}\ \frac{d}{ton\ P_2O_5}$$

= 0.185 lb/ton

2. <u>Maximum particulate emission rate per hour</u>:

= 0.185 lb/ton x 32.1 ton/h

= 5.9 lb/h

3. <u>Average particulate emission rate per year</u>:

$$= \frac{0.185\ lb/ton \times 220{,}000\ ton/yr}{2000\ lb/ton}$$

= 20 ton/yr

ATTACHMENT H

PREVENTION OF SIGNIFICANT DETERIORATION
(For Section II.G.3 and Section VII. of Application)

The new phosphoric acid plant will not be a source of sulfur dioxide (SO_2). Therefore, PSD provisions in FAC 17-2.04 related to SO_2 do not apply.

Emissions of particulate matter are difficult to estimate as discussed in Attachment G, but average annual emissions are expected to be no greater than 20 tons per year per train, or 40 tons per year for both trains combined. However, this figure must be evaluated in light of the fact that the new phosphoric plant will replace an existing phosphoric acid plant. If point source particulate emissions from the existing plant (which are not regulated) are calculated on the same basis as that for the new plant (0.185 lb/ton P_2O_5), existing particulate emissions are on the order of 18 tons per year. The net difference is therefore an increase of about 22 tons per year.

This change must be further qualified, however, by noting that the existing plant processes dry rock whereas the new plant will process only wet rock. As a result of the switch to a wet rock process, fugitive particulate emissions will decrease substantially. The actual increase (if any) in overall particulate emissions should therefore be less than 20 tons per year, and a detailed PSD analysis does not seem warranted for this relatively minor change in emissions.

State of Florida

Department of State

I certify from the records of this office that UNITED STATES STEEL CORPORATION, is a corporation organized under the laws of the State of Delaware, and is authorized to transact business within the State of Florida.

The charter number for this corporation is 819214.

I further certify that said corporation has filed all annual reports and has paid all annual report filing fees due this office through December 31, 1979, and its status is active.

Given under my hand and the Great Seal of the State of Florida, at Tallahassee, the Capital, this the 3rd day of March, 1980.

George Firestone
Secretary of State

CER 101 Rev. 5-79

AC 53-33822

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Air Pollution [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [X] Construction [ ] Operation [ ] Modification

COMPANY NAME: USS Agri-Chemicals COUNTY: Polk

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) Auxiliary Boiler

SOURCE LOCATION: Street Highway 630 West City Ft. Meade

UTM: East 416.19 (Zone 17) North 3068.65

Latitude ____ ° ____ ' ____ "N Longitude ____ ° ____ ' ____ "W

APPLICANT NAME AND TITLE: G. W. Beck, Manager, Florida Phosphate Operations

APPLICANT ADDRESS: P.O. Box 150, Bartow, Florida 33830

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of ____________

I certify that the statements made in this application for a ____________ permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: [signature]

George W. Beck, Manager, Fl Phosphate Operations
Name and Title (Please Type)

Date: 8/5/80 Telephone No. 813-533-0471

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed: [signature]

James H. Carroll
Name (Please Type)

(Affix Seal)

USS Agri-Chemicals
Company Name (Please Type)

P. O. Box 150, Bartow, Fl 33830
Mailing Address (Please Type)

Florida Registration No. 19407 Date: 8/5/80 Telephone No. 813-533-0471

[1]See Section 17-2.02(15) and (22), Florida Administrative Code, (F.A.C.)

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Construction of a package boiler. See Attachment A for additional details.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction March 1981 Completion of Construction March 1983

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

None

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes __X__ No

F. Normal equipment operating time: hrs/day __24__; days/wk ____; wks/yr __5__; if power plant, hrs/yr ____;

if seasonal, describe: ____

G. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant?	No
a. If yes, has "offset" been applied?	
b. If yes, has "Lowest Achievable Emission Rate" been applied?	
c. If yes, list non-attainment pollutants.	
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI.	Yes
3. Does the State "Prevention of Significant Deteriortiation" (PSD) requirements apply to this source? If yes, see Sections VI and VII.	No (See Atch B)
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source?	No
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source?	No

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
NOT APPLICABLE				

B. Process Rate, if applicable: (See Section V, Item 1) NOT APPLICABLE

1. Total Process Input Rate (lbs/hr): ____________________

2. Product Weight (lbs/hr): ____________________

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	
SO_2	51	11	None	51	51	22	Pt. B03
NO_x (as NO_2)	30	11	None	30	30	13	on Atch F
(CO, hydrocarbons, and particulates ≤ 1 ton/year)							

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]
Low-sulfur fuel will be used.				

[1] See Section V, Item 2.

[2] Reference applicable emission standards and units (e.g., Section 17-2.05(6) Table II, E. (1), F.A.C. – 0.1 pounds per million BTU heat input)

[3] Calculated from operating rate and applicable standard

[4] Emission, if source operated without control (See Section V, Item 3)

[5] If Applicable

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Natural Gas	-	0.105	100
or, No. 2 Fuel Oil	-	16.9	100
(Natural gas used whenever available. See Attachment C.)			

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis: (for No. 2 Fuel Oil)

Percent Sulfur: 0.5 Percent Ash: Trace

Density: 7.2 @ 60°F lbs/gal Typical Percent Nitrogen: + O_2 = 0.2

Heat Capacity: ______ BTU/lb 141000 BTU/gal

Other Fuel Contaminants (which may cause air pollution): ______

F. If applicable, indicate the percent of fuel used for space heating. Annual Average ______ Maximum ______

G. Indicate liquid or solid wastes generated and method of disposal.

Boiler blowdown is combined with cooling tower blowdown and discharged to plant outfall.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 70 ft. Stack Diameter: 3.67 ft.

Gas Flow Rate: 31700 ACFM Gas Exit Temperature: 400 °F.

Water Vapor Content: 18 % Velocity: 50 FPS

SECTION IV: INCINERATOR INFORMATION

NOT APPLICABLE

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated							

Description of Waste ______

Total Weight Incinerated (lbs/hr) ______ Design Capacity (lbs/hr) ______

Approximate Number of Hours of Operation per day ______ days/week ______

Manufacturer ______

Date Constructed ______ Model No. ______

	Volume (ft)^3	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: ______ ft. Stack Diameter ______ Stack Temp. ______

Gas Flow Rate: ______ ACFM ______ DSCFM* Velocity ______ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [ ] Other (specify) ______

Brief description of operating characteristics of control devices: ______

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight — show derivation. NOT APPLICABLE
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.,) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made. (See Attachment C)
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test). (See Attachment C)
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.). NOT APPLICABLE
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency). NOT APPLICABLE
6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained. (See Attachment D)
7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map). (See Attachment E)
8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram. (See Attachment F)

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?
[ ] Yes [X] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy) [ ] Yes [X] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration
SO_2 - fuel oil	51 lb/h (0.51 lb/10^6 Btu)
NO_x (as NO_2) - fuel oil	30 lb/h (0.3 lb/10^6 Btu)
NO_x (as NO_2) - natural gas	20 lb/h (0.2 lb/10^6 Btu)

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:
5. Useful Life:
6. Operating Costs:
7. Energy:
8. Maintenance Cost:
9. Emissions:

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy*: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy**: h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

*Explain method of determining efficiency.

**Energy to be reported in units of electrical power — KWH design rate.

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space and operate within proposed levels:

4\.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1\. Control Device: Low-sulfur fuel oil when natural gas not available.

2\. Efficiency*:

3\. Capital Cost:

4\. Life:

5\. Operating Cost: $132,800/year**

6\. Energy:

7\. Maintenance Cost:

8\. Manufacturer:

**Premium paid for low-sulfur fuel compared with No. 6 fuel oil @ 2.5% sulfur.

9\. Other locations where employed on similar processes:

a.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

Low-sulfur fuel oil is to be used when natural gas not available in order to reduce SO_2 emissions.

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

(See Attachment B)

A. Company Monitored Data

1. ________ no sites ________ TSP ______( ) SO^2* ________ Wind spd/dir

   Period of monitoring ____/____/____ to ____/____/____
   (month day year) (month day year)

   Other data recorded ______________________________

   Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

   a) Was instrumentation EPA referenced or its equivalent? ____ Yes ____ No

   b) Was instrumentation calibrated in accordance with Department procedures? ____ Yes ____ No ____ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. ____ Year(s) of data from ____/____/____ to ____/____/____
   (month day year) (month day year)

2. Surface data obtained from (location) ______________________________

3. Upper air (mixing height) data obtained from (location) ______________________________

4. Stability wind rose (STAR) data obtained from (location) ______________________________

C. Computer Models Used

1. ______________________________ Modified? If yes, attach description.
2. ______________________________ Modified? If yes, attach description.
3. ______________________________ Modified? If yes, attach description.
4. ______________________________ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	______________ grams/sec
SO^2	______________ grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description on point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

*Specify bubbler (B) or continuous (C).

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

ATTACHMENT A

(For Section II.A. of Permit Application)

This unit will be a conventional dual fired, water tube, package boiler, with a maximum input rating of 100 x 10^6 Btu per hour, generating saturated steam at 250 PSIG pressure.

The boiler is a necessity to provide an independent supply of steam to start up the sulfuric acid plants which are part of the overall project. Additionally, it may be used as an auxiliary steam supply in event of an unscheduled shut down of one or both of the sulfuric acid plants.

The boiler is designed to use natural gas or No. 2 fuel oil. Natural gas will be used whenever available which is expected to be about 50 percent of the time. These premium grade (low-sulfur fuels) are used to minimize SO_2 emissions. The added annual cost of low-sulfur fuels is shown elsewhere in the application.

ATTACHMENT B

PREVENTION OF SIGNIFICANT DETERIORATION

(For Section II.G.3. and Section VII. of Application)

The new sulfuric acid plant auxiliary boiler is a replacement for an existing auxiliary boiler and does not represent a net change in emissions. In addition, the boiler will operate on a very intermittent basis and will use natural gas rather than No. 2 fuel oil whenever possible. As a result, annual emissions of sulfur dioxide are expected to be less than 15 tons per year. Therefore, a PSD analysis is not considered necessary.

ATTACHMENT C

(For Section V.2. and Section V.3. of Application)

1. Emission Estimate

Estimates are based on expected operation of the boiler 5 weeks per year (840 hours) - 420 hours per year on natural gas and 420 hours per year on No. 2 fuel oil - and a heat input of 100×10^6 Btu per hour.

Natural Gas:

(a) SO_2 Emissions = negligible

(b) Hourly NO_x Emissions $= 0.2 \frac{\text{lb } NO_2}{10^6 \text{ Btu}} \times 100 \times 10^6 \frac{\text{Btu}}{\text{h}}$

$= 20$ lb/h

(c) Annual NO_x Emissions $= \frac{20 \text{ lb/hr} \times 420 \text{ h/yr}}{2000 \text{ lb/ton}}$

$= 4$ ton/yr

No. 2 Fuel Oil

(a) Hourly SO_2 Emissions $= 16.9 \frac{\text{bbl}}{\text{h}} \times 42 \frac{\text{gal}}{\text{bbl}} \times 7.2 \frac{\text{lb}}{\text{gal}} \times 0.005 \frac{\text{lb S}}{\text{lb oil}} \times 2 \frac{\text{lb } SO_2}{\text{lb S}}$

$= 51$ lb/h

(b) Annual SO_2 Emissions $= \frac{51 \text{ lb/h} \times 420 \text{ h/yr}}{2000 \text{ lb/ton}}$

$= 11$ ton/yr

(c) Hourly NO_x Emissions $= 0.3 \frac{\text{lb } NO_2}{10^6 \text{ Btu}} \times 100 \times 10^6 \frac{\text{Btu}}{\text{h}}$

$= 30$ lb/h

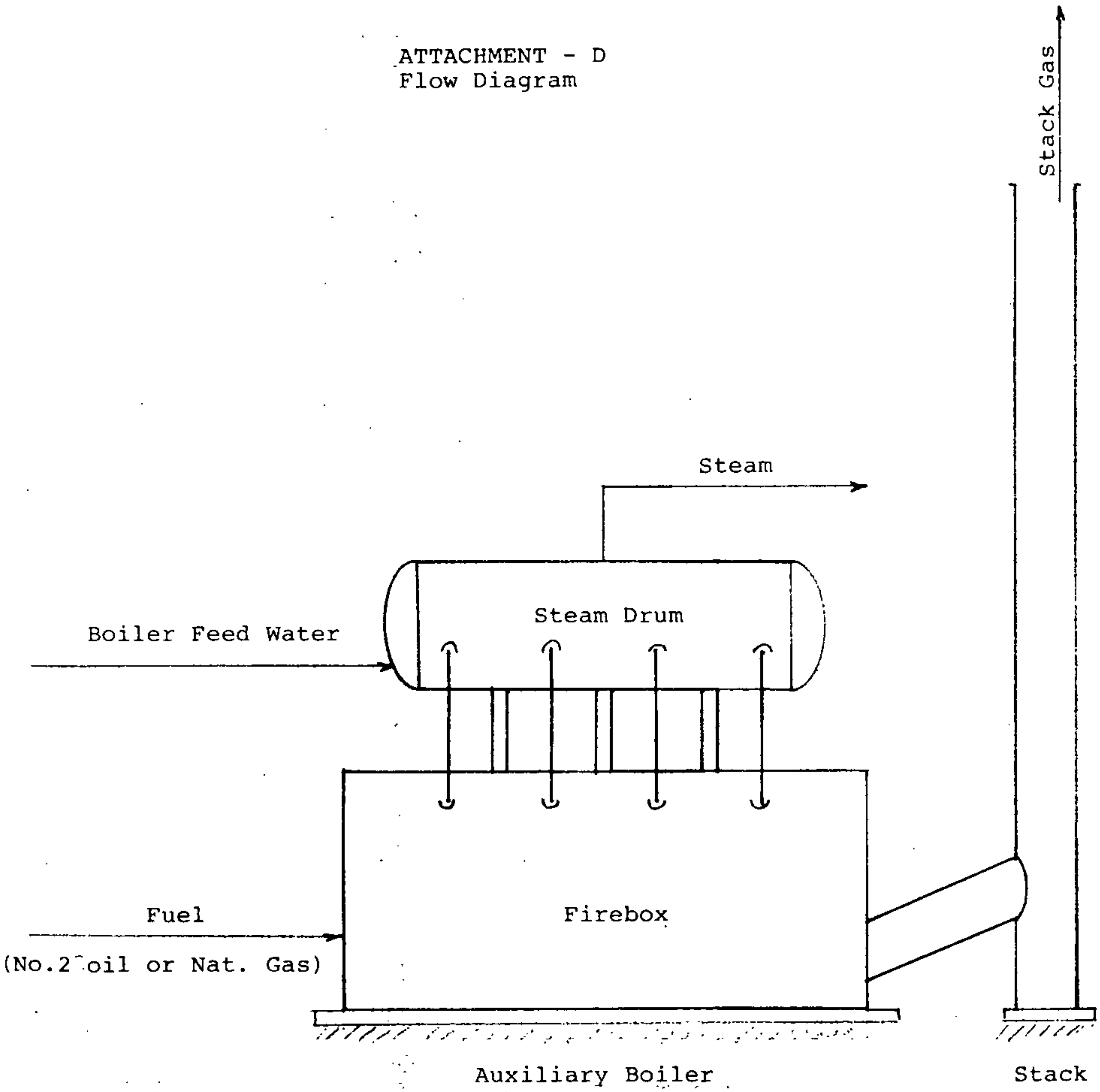
(d) Annual NO_x Emissions $= \frac{30 \text{ lb/h} \times 420 \text{ h/yr}}{2000 \text{ lb/ton}}$

$= 6$ ton/yr

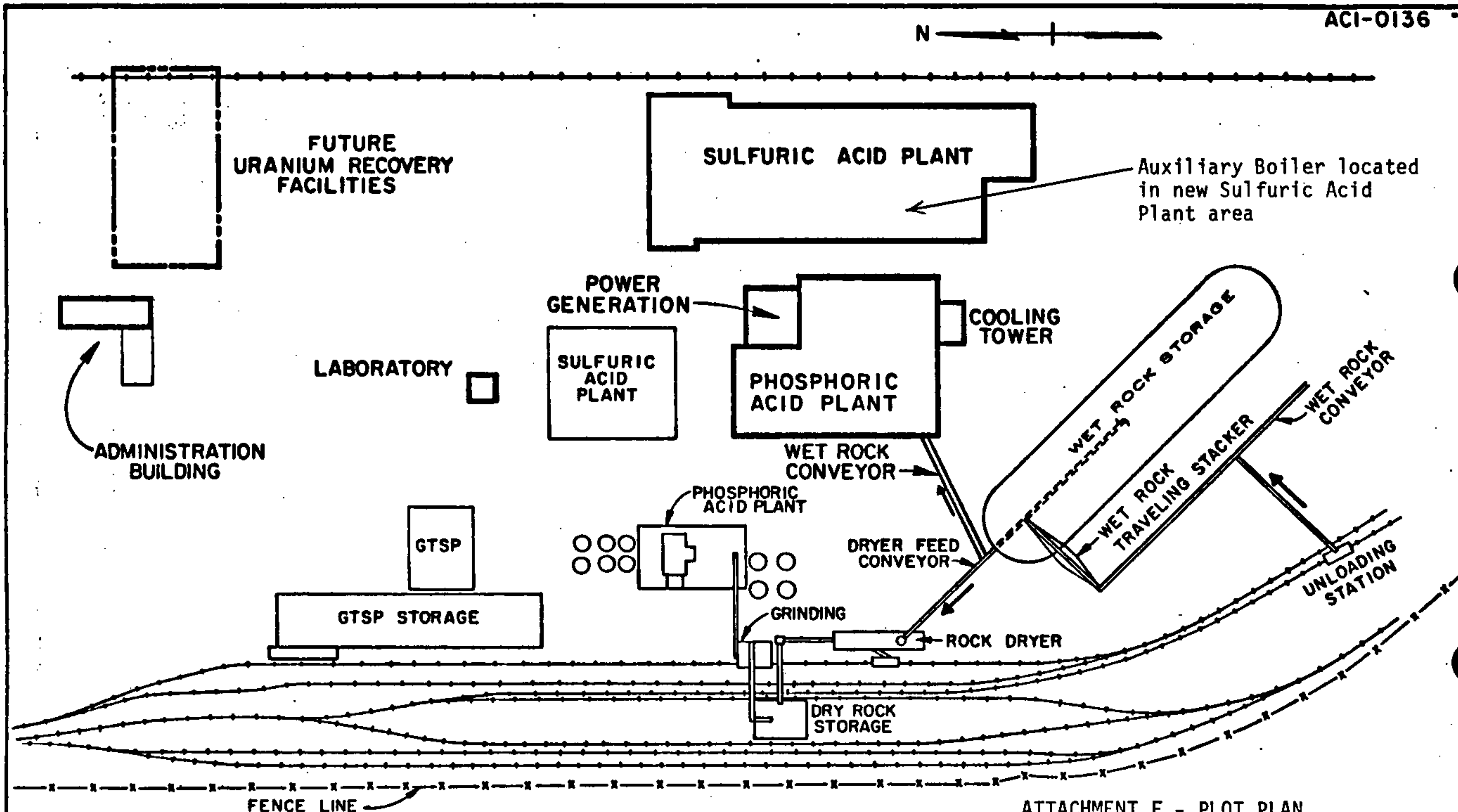
2. Basis of Potential Discharge

Potential and actual hourly emissions are equivalent in this case since there are no flue gas emission controls. Potential annual emissions are based on use of fuel oil alone during the 840 hours per year when the boiler is expected to be in operation.

ATTACHMENT - D
Flow Diagram



Attachment E - Location of USS Agri-Chemicals
Fort Meade Phosphate Chemical Complex



ATTACHMENT F - PLOT PLAN

FT. MEADE PHOSPHATE COMPLEX
JOINT VENTURE-PLAN
U.S. STEEL AGRI-CHEMICALS
FT. MEADE, FLORIDA

GRAPHIC SERVICES-ENGINEERING-PITTSBURGH
UNITED STATES STEEL CORPORATION

7925/7926 DF3705-2	ALTIERI	PRICHARD STORY	5-12-80	PD1083

State of Florida

Department of State

I certify from the records of this office that UNITED STATES STEEL CORPORATION, is a corporation organized under the laws of the State of Delaware, and is authorized to transact business within the State of Florida.

The charter number for this corporation is 819214.

I further certify that said corporation has filed all annual reports and has paid all annual report filing fees due this office through December 31, 1979, and its status is active.

Given under my hand and the Great Seal of the State of Florida, at Tallahassee, the Capital, this the 3rd day of March, 1980.

George Firestone
Secretary of State

CER 101 Rev. 5-79

Copy Tampa 1-5-83

USS
Agri-Chemicals
Division of United States Steel Corporation

MAIL: P. O. BOX 150
BARTOW, FLORIDA 33830
813-533-0471

July 11, 1980

RECEIVED JUL 1980 BUREAU AQM

Mr. Tommie A. Gibbs
Air Facilities Branch
U. S. Environmental Protection Agency
345 Courtland Street
Atlanta, Georgia 30308

Dear Mr. Gibbs:

Re: Phosphate Chemical Complex
PSD-FL-064

Herein is information requested by your letter of June 19, 1980 as needed for continuation of the permit application review.

1. Proposed Allowable Capacities and Emission Rates

Phosphoric Acid Plant

Capacity:- 64.2 Tons/Hr. P_2O_5, 24 hour average basis.
Fluoride Emissions:
Daily Maximum Basis - 1.41 Pounds/Hr.
Daily Avg., 365 day Basis - 1.21 Pounds/Hr.

Sulfuric Acid Plant

Capacity:- 183.3 Tons/Hr. H_2SO_4, 24 Hour average basis.
SO_2 Emissions:
Daily Maximum Basis - 733 Pounds/Hr.
Daily Avg., 365 Day Basis - 619 Pounds/Hr.

Note: USS Agri-Chemicals is willing to accept an annual SO_2 emission limit of 2710 tons. This is equivalent to 619 pounds per hour average on a 365 day basis. The emission will be verified in USSAC's annual report to Florida DER.

Acid Mist Emissions:
Daily Maximum Basis - 27.5 Pounds/Hr.
Daily Avg., 365 Day Basis - 23.2 Pounds/Hr.

2. Actual SO_2 Emissions Compared to Proposed Emissions

As shown in the attached table, maximum production rates for the new sulfuric acid plant on a daily and hourly basis are expected to be 4400 tons/day and 183.3 tons/hour. (These rates are based on production at 10 percent avove the manufacturer's guaranteed capacity and of course cannot be sustained continuously as is pointed out in the attached table.) Corresponding SO_2 emissions rates at the maximum allowable limit of 4 lb. SO_2 per ton of acid are 17,600 lb./day and 733 lb./hour. Actual SO_2 emissions from the existing sulfuric acid plant are frequently at a level of 625 lb./hour (15,000 lb./day), which is the maximum allowable rate. Therefore, maximum allowable emissions for the new plant on an hourly and daily basis exceed maximum actual emissions from the existing plant. The significance of this difference on ambient concentrations is assessed in the attached report by Dames & Moore dated July 9, 1980.

Comparison of actual emissions from the existing plant with emissions from the new plant on an annual basis is more difficult to do in a realistic fashion because of variations in production from year to year and variations in SO_2 emission rates (on a pound per ton basis) during any given year. We feel that the most meaningful procedure is to compare maximum allowable annual emissions for the existing plant with maximum allowable annual emissions for the new plant. This was done in the original PSD permit application, and the resulting comparison shows a decrease in SO_2 emission of 28 tons/year.

To illustrate the complexities involved in comparing annual emissions, emissions from the existing plant during the most recent annual period (1979) can be cited as an example. We have reported total SO_2 emissions during 1979 from the existing plant of 2338 tons, or 534 lb./hour on an annual average basis. Comparable annual average basis emissions from the new plant would be no more than 2464 tons/year or 563 lb./hour, allowing for necessary maintenance and emergency outages but assuming that guaranteed production capacity will be achieved (1,232,000 tons/year; see attached table) and that emissions are always at the maximum allowable rate of 4 lb./ton. Moreover, even this type of comparison must be made with caution since 1979 is not necessarily a representative year for the existing plant. Therefore, since the existing plant frequently operates at its allowable hourly production and emission rates, we feel that the better comparison is between allowable rates as previously stated.

3. GTSP Plant

Since a new GTSP plant has been deleted from the project item 3 is no longer relevant. As you have already been advised by Dames & Moore, in early June it was found necessary to change plans for the Ft. Meade Chemical Plant expansion. USS Agri-Chemicals now plans to continue operation of the existing GTSP plant and storage facilities. Other units of the project remain unchanged. Our consultants, Dames & Moore, have evaluated environmental ramifications of the changes. Enclosed is a report of the findings.

Your letter requests evidence of consistency between hourly and annual values. A set of tables and brief calculations, Exhibit "A" is enclosed to illustrate this relationship.

We trust this information will enable you to conclude your review of our application and that it will be satisfactory for issue of the permit for which we have applied.

Very truly yours,

USS AGRI-CHEMICALS

G. W. Beck, General Manager,
Florida Phosphate Operations

GWB:cbr

Enclosures:
Dames & Moore report of June 19
Dames & Moore report of July 9
Table of Production Rates
Revised Table 4-1

cc: Mr. Jeffrey Shumaker, TRW, Inc.
Mr. Steve Smallwood, FDER

EXHIBIT "A"

COMPARATIVE PRODUCTION RATES

BASIS	*TONS PER DAY	(TONS) (PER HOUR)	TONS PER YEAR	TONS DAILY AVG.,365 DAYS
Guarantee, P_2O_5	1400		440,000	1205
Maximum, P_2O_5	1540	(64.2)	484,000	1326
Guarantee, H_2SO_4	4000		1,232,000	3375
Maximum, H_2SO_4	4400	(183.3	1,355,000	3712

ALLOWABLE EMISSIONS

Daily Maximum Basis

Fluoride: 1540 x 0.02/0.91** x 24 = 1.41 pounds/hr.
SO_2: 4400 x 4/24 = 733 pounds/hr.
Acid Mist: 4400 x 0.15/24 = 27.5 pounds/hr.

Daily Average, 365 Day Basis

Fluoride: 1326 x 0.02/0.91** x 24 = 1.21 pounds/hr.
SO_2: 3712 x 4/24 = 619 pounds/hr.
Acid Mist: 3712 x 0.15/24 = 23.2 pounds/ hr.

* Chemical plants must have a daily (hourly) operating capacity in excess of the annual average daily (hourly) rate in order to allow downtime for necessary maintenance and emergency outages. The table illustrates expected production rates based on the guaranteed daily rate, and potential production rates based on optimum conditions.

** P_2O_5 in product is 91% of P_2O_5 in feed rock.

TABLE 4-1 (REVISED)

CHARACTERISTICS OF AFFECTED EMISSION SOURCES

Existing Facilities Which Will be Replaced or Continued	Allowable Sulfur Dioxide Emissions (ton/yr)	Allowable Sulfuric Acid Mist Emissions (ton/yr)	Allowable Flouride Emissions (ton/yr)	Stack Height (ft)	Stack Diameter (ft)	Exit Temperature (°F)	Exit Velocity (ft/s)	Exit Volumetric Flow (act.ft^3/min)
Sulfuric Acid Plant (replaced)	2738	82	--	95	9.9	87	22.2	102400
Phosphoric Acid Plant (replaced)	--	--	↑	73	3.3	99	35.9	18400
				76	6.0	105	7.5	12800
				76	6.0	112	7.4	12500
Granular Triple Super Phosphate Plant (continued)	--	--	45[a]	80	2.5	95	11.9	3500
				93	5.0	119	53.2	62700
				93	5.0	125	41.1	48400
				89	15.0	69	4.4	47000
Granular Triple Super Phosphate Storage (continued)	--	--	↓	c	c	c	c	c
Existing Complex Total	2738	82	45					
New and Continued Facilities								
Sulfuric Acid Plant (new)	2710	102	--	175	8.5	180	31	106500[d]
Phosphoric Acid Plant (new)	--	--	5[b]	75	3.4	100	33	18000[d]
				62	3.0	105	14	6000
Granular Triple Super Phosphate Plant (continued)	--	--	↑ 43	e	e	e	e	e
Granular Triple Super Phosphate Storage (continued)	--		↓	e	e	e	e	e
Modified Complex Total	2710	102	48					
Net Change in Allowable Emissions	-28	+20	+3					

[a] The allowable fluoride emission rate for the existing plant complex is a total rate for all fluoride emission sources combined.
[b] The fluoride emission rate shown is the total for all stacks combined.
[c] No stack.
[d] Volumetric flow through each of two identical stacks.
[e] Same as above.

DAMES & MOORE

CONSULTANTS IN THE ENVIRONMENTAL AND APPLIED EARTH SCIENCES

SUITE M-4 • 1935 EAST EDGEWOOD DRIVE • LAKELAND, FLORIDA 33803 • (813) 682-8141

June 19, 1980

USS Agri-Chemicals
P.O. Box 150
Bartow, Florida 33830

Attention: Mr. R.T. Lindsay

Gentlemen:

Environmental Permitting Studies
Fort Meade Phosphate Chemical Complex
Fort Meade, Florida

As you have requested, we have reviewed the changes in the proposed plan for the Fort Meade Phosphate Chemical Complex expansion and have assessed the effects of these changes on the project impacts identified in earlier studies. Dames & Moore's evaluation of these changes is described in the following sections.

INTRODUCTION

The USS Agri-Chemicals Ft. Meade Phosphate Chemical Complex expansion project has been modified from that submitted to the U.S. EPA on October 25, 1979 and supplemented on March 11, 1980. USSAC now plans not to add a monammonium phosphate unit to the plant and will not replace the existing granular triple super phosphate unit or modify the existing GTSP storage area. Other units and aspects of the project remain unchanged.

The following discussion explains these changes in greater detail and their effect on previously identified project impacts.

REVISED PROJECT DESCRIPTION

The modified plant expansion project includes:

- Addition of new wet rock grinding mills.

- Extension of the present cooling water pond area and addition of cooling water towers.

- Extension of the present gypsum disposal area.

- Replacement of the present sulfuric acid plant with a new sulfuric acid plant.

- Replacement of the present phosphoric acid plant, including the fluorine recovery system, with a new phosphoric acid plant and fluorine recovery system.

These modifications will provide increased sulfuric and phosphoric acid production capabilities and will also add the capability for wet rock grinding. Uranium extraction from the phosphoric acid produced by USSAC will be accomplished off-site by an independent operation.

Deleted from the original plant expansion project are the following:

- Construction of a monammonium phosphate (MAP) fertilizer production plant.

- Replacement of the present GTSP plant with a new GTSP plant.

- Addition of a scrubbing system to the granular triple super phosphate (GTSP) storage building.

Neither plant or individual unit planned production capacities are affected by these changes in the proposed project.

CHANGES IN IMPACTS

The elimination of these portions of the project will reduce many of the project impacts, and will not affect the magnitude of many others. In only one area, air pollutant emissions, is an increase noted, as described in this section.

The reduced scope of the construction effort results in a reduction in the magnitude of many of the construction induced impacts, including traffic, dust and noise, and secondary impacts related to construction force size.

In addition to affecting these short term impacts, a reduction in many of the long term impacts is expected. These impacts will include those related to resource utilization, permanent labor force and area required for the expansion (see Figure 1-2 (revised)).

As a result of these changes in the project, allowable air pollutant emissions of fluoride will increase from the current 45 tons/year to 48.1 tons/year. This increase will have a negligible impact on the air quality of the surrounding area and will be within state and federal air pollutant emission standards.

Since this change in the proposed plan will not affect the waste gypsum disposal or cooling water requirements, no effects are anticipated on water quality, the biological environment, aesthetics or land use.

-oOo-

Should you wish to discuss the preceeding information, please contact us at your convenience.

Yours very truly,

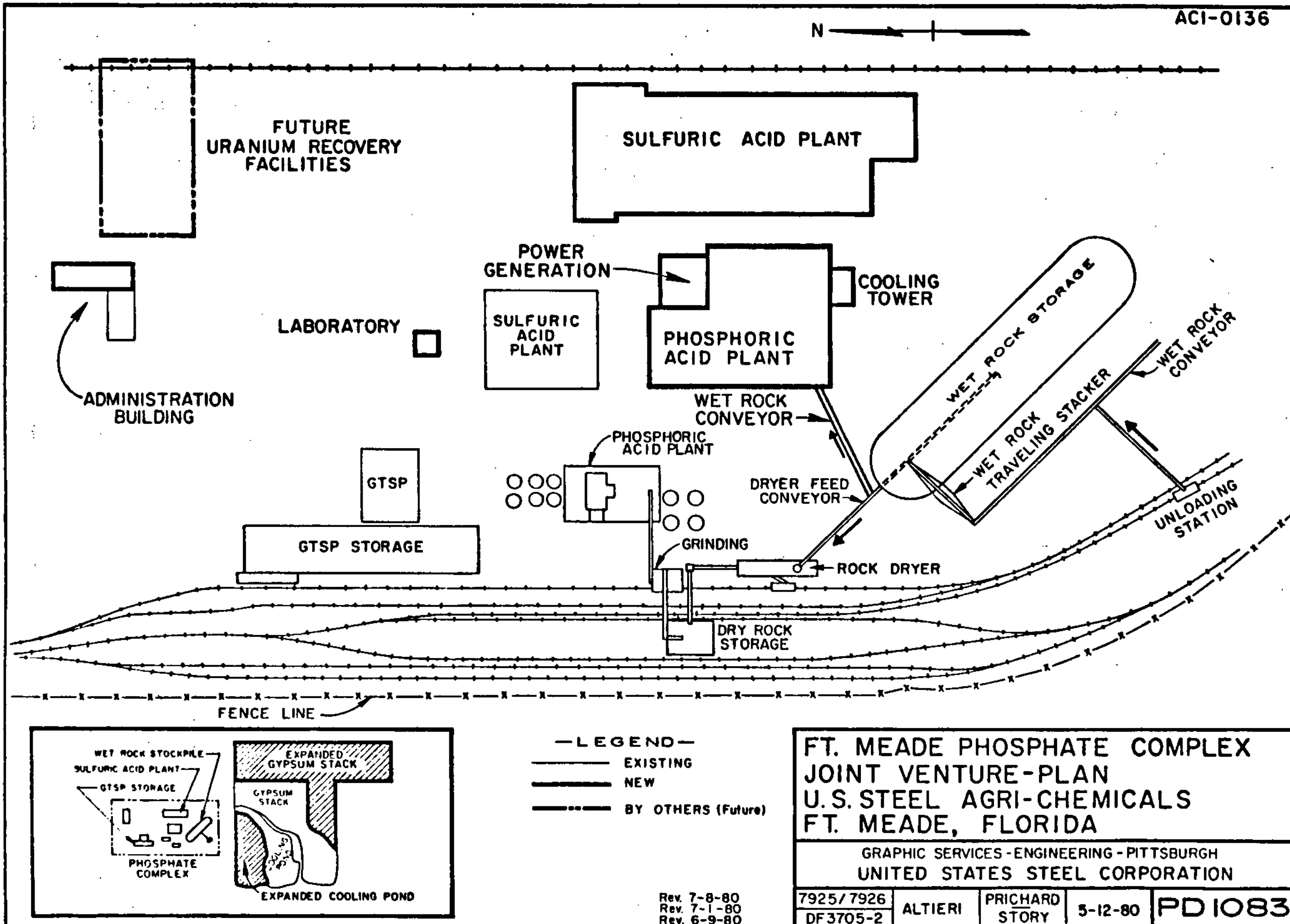
DAMES & MOORE

T.M. Gurr by SFT
Principal-in-Charge

S.F. Tarlton
Project Manager

TMG/SFT:arm

cc: Mr. William C. Thomas - USSAC
Mr. B. Powell - USSAC


ACI-0136
N
FUTURE URANIUM RECOVERY FACILITIES
SULFURIC ACID PLANT
POWER GENERATION
COOLING TOWER
LABORATORY
SULFURIC ACID PLANT
PHOSPHORIC ACID PLANT
ADMINISTRATION BUILDING
WET ROCK STORAGE
WET ROCK CONVEYOR
WET ROCK CONVEYOR
WET ROCK TRAVELING STACKER
PHOSPHORIC ACID PLANT
GTSP
DRYER FEED CONVEYOR
UNLOADING STATION
GTSP STORAGE
GRINDING
ROCK DRYER
DRY ROCK STORAGE
FENCE LINE
WET ROCK STOCKPILE
SULFURIC ACID PLANT
GTSP STORAGE
PHOSPHATE COMPLEX
EXPANDED GYPSUM STACK
GYPSUM STACK
EXPANDED COOLING POND
—LEGEND—
EXISTING
NEW
BY OTHERS (Future)
Rev. 7-8-80
Rev. 7-1-80
Rev. 6-9-80
FT. MEADE PHOSPHATE COMPLEX
JOINT VENTURE-PLAN
U.S. STEEL AGRI-CHEMICALS
FT. MEADE, FLORIDA
GRAPHIC SERVICES-ENGINEERING-PITTSBURGH
UNITED STATES STEEL CORPORATION
7925/7926
DF3705-2
ALTIERI
PRICHARD
STORY
5-12-80
PD1083

USS Agri-Chemicals
Division of United States Steel Corporation

MAIL: P. O. BOX 150
BARTOW, FLORIDA 33830
813-533-0471

May 21, 1980

U. S. Environmental Protection Agency, Region IV
Air and Hazardous Materials Division
Air Facilities Branch
345 Courtland Street, N.E.,
Atlanta, Ga. 30308

Attn: Mr. Tommie A. Gibbs, Branch Chief

Gentlemen:

Re: Prevention of Significant
Deterioration Permit Application
for Proposed Modifications
at the USS Agri-Chemicals'
Fort Meade Phosphate Chemical Complex

Attached is a Prevention of Significant Deterioration (PSD) permit application for proposed modifications at USS Agri-Chemicals' Fort Meade (Florida) Phosphate Chemical Complex. It is our understanding that our consultants, Dames & Moore, have discussed this project with members of your staff and representatives of EPA's contractor, TRW, Inc. We trust you will find the application suitable in form and content to satisfy your requirements.

USS Agri-Chemicals will be pleased to meet with EPA representatives or otherwise provide additional information relevant to the project at any time if this will assist in your review.

Your timely response will be appreciated.

Very truly yours,

USS AGRI-CHEMICALS

G. W. Beck, General Manager,
Florida Phosphate Operations

GWB:cbr

cc: Mr. Jack Preece, TRW, Inc.
Mr. Steve Smallwood, Florida DER

DAMES & MOORE

from the desk of

Jim Little

May 21, 1980

ATTN: WILLARD HANKS

Please route this to Steve Smallwood and the USSAC file after you have reviewed.

Jim Little

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT APPLICATION

USS AGRI-CHEMICALS
FORT MEADE (FLORIDA) PHOSPHATE CHEMICAL COMPLEX

SUBMITTED TO

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION IV

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT APPLICATION FOR PROPOSED MODIFICATIONS AT USS AGRI-CHEMICALS FORT MEADE PHOSPHATE CHEMICAL COMPLEX

Submitted by:

Dames & Moore
Atlanta, Georgia

Submitted to:

USS Agri-Chemicals
P.O. Box 150
Bartow, Florida 33830

DAMES & MOORE

10746-014-26
May 1980

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DAMES & MOORE

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SUITE 200, 455 EAST PACES FERRY ROAD · ATLANTA, GEORGIA 30305 · (404) 262-2915
CABLE: DAMEMORE TWX: 810-751-8218

May 21, 1980

USS Agri-Chemicals
Post Office Box 150
Bartow, Florida 33830

Attention: Mr. Basil Powell

Re: Prevention of Significant Deterioration Permit Application for Proposed Modifications at the USS Agri-Chemicals Fort Meade Phosphate Chemical Complex

Gentlemen:

Attached is a Prevention of Significant Deterioration (PSD) permit application for proposed modifications at USS Agri-Chemicals' Fort Meade (Florida) Phosphate Chemical Complex. The application is based on our understanding that the proposed project will be reviewed under existing PSD regulations (adopted in June 1978). We further understand from our reading of the regulations and from discussions with EPA and TRW that the project requires a PSD permit and is subject to certain Best Available Control Technology requirements, but that a detailed impact analysis is not required based on the exemption allowed under Section 52.21(k)(1)(iv) of the regulations as further described in the preamble to the regulations found on p. 26394 of the 6/19/78 Federal Register.

Please call if there are any questions.

Yours truly,

DAMES & MOORE

James W. Little, for

T. M. Gurr
Associate

James W. Little

James W. Little
Senior Air Quality Analyst

TMG:JWL:ht

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1.0 APPLICANT INFORMATION

1.1 GENERAL INFORMATION

Company Name: USS Agri-Chemicals

Address: Post Office Box 150
Bartow, Florida 33830

Telephone: 813/533-0471

Facility Requiring Permit: Fort Meade Phosphate Chemical Complex

Responsible Official: G.W. Beck, Manager
Florida Phosphate Operations

Person to Contact
For Additional Information: Basil Powell

Source Location: The Fort Meade Phosphate Chemical Complex is located in Polk County on Highway 630 West approximately 4 km west of Fort Meade, Florida, at UTM coordinates 416.0 E, 3069.0 N (Zone 17).

Nature of the
Proposed Project: USS Agri-Chemicals (USSAC) plans to replace and overhaul equipment at its existing Fort Meade Phosphate Chemical Complex as a part of a modification program which will result in a production capacity increase.

1.2 PROJECT SCHEDULE OBJECTIVES

Start Construction: January 1981

Start Operation: July 1982

2.0 SITE INFORMATION

A regional scale map showing the location of USSAC's Fort Meade Phosphate Chemical Complex is provided in Figure 2-1. Site boundaries and the location of proposed facility modifications are shown in Figure 2-2.

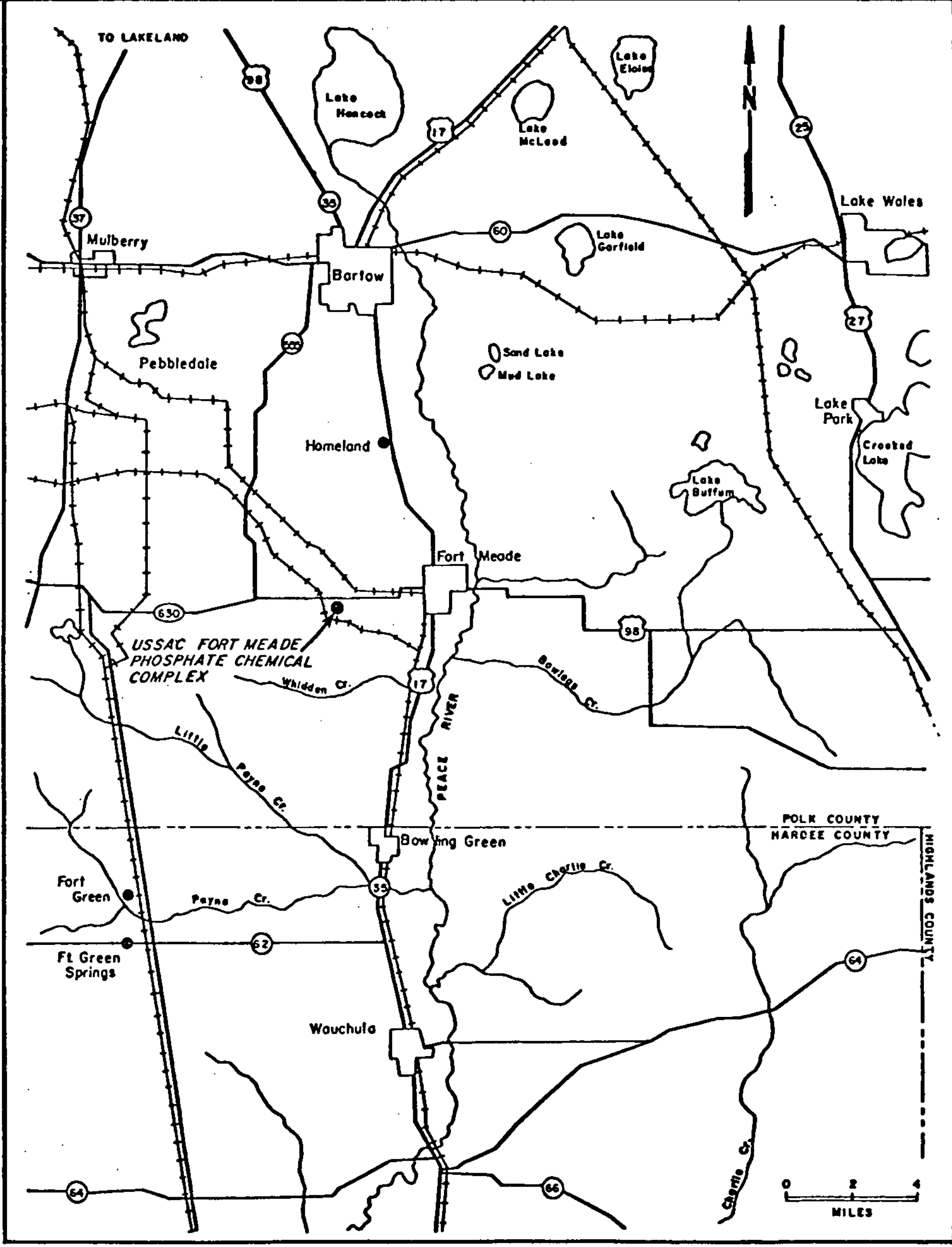


Figure 2-1. Location of USS Agri-Chemicals Fort Meade Phosphate Chemical Complex.

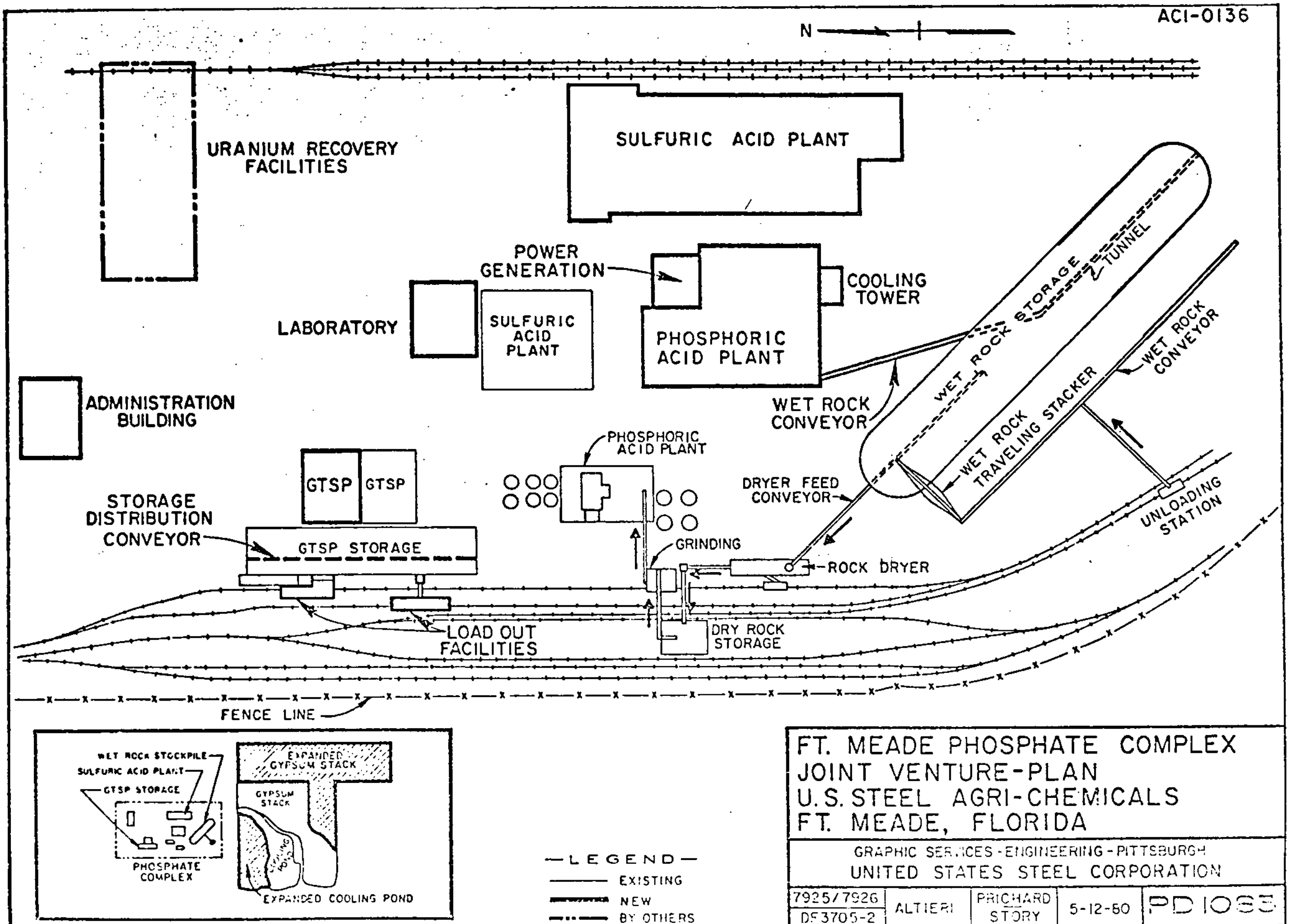


Figure 2-2. Location of New and Modified Facilities.

3.0 DESCRIPTION OF MODIFICATIONS AND NEW FACILITIES

3.1 GENERAL DESCRIPTION

USSAC presently operates a phosphate chemical complex near Fort Meade, Florida. Some of the facilities at the complex are old and need replacement or major overhauls. Modifications to these facilities will result in the replacement of some equipment, renovation of other equipment, and construction of some new facilities. These modifications will be undertaken by USSAC as managing partner of a joint venture between United States Steel Corporation and W. R. Grace & Company.

The present complex covers about 560 acres of land and consists of: a sulfuric acid plant, a phosphoric acid plant, a granular triple superphosphate (GTSP) plant, a GTSP storage building, a system for the recovery of fluosilicic acid from the phosphoric acid plant, and supporting facilities and buildings such as office and maintenance. These facilities were constructed and began operation in 1961. Sulfur dioxide abatement equipment was added to the sulfuric acid plant in 1975. Current plant sections (excluding the sulfur dioxide abatement facility) occupy about 20 acres of land.

A number of waste disposal and water storage areas required for fertilizer chemical production are also located on the USSAC site. Gypsum, a by-product resulting from the processing of phosphoric acid, is stored in a disposal area to the south of the chemical complex. Process water is cooled in a recirculating cooling water pond adjacent to the gypsum disposal area. The existing gypsum disposal area and cooling water ponds occupy about 178 acres of land. Sulfur dioxide limestone scrubber water is held in a retention pond located southwest of the plant area and north of the existing gypsum disposal area. This retention pond, together with the sulfur dioxide abatement facility, occupy about 33 acres of land.

Many facilities at the USSAC plant are nearing the end of their useful life. In addition, a number of technological advancements have been made within the phosphate industry since construction of the Fort Meade complex. In order to update the existing complex, it will be necessary to add some new facilities and overhaul or replace some existing facilities. Planned modifications to the USSAC plant include:

- Addition of new wet rock grinding mills.
- Addition of a scrubbing system to the GTSP storage building. (?)
- Extension of the present cooling water pond area and addition of cooling water towers.
- Extension of the present gypsum disposal area.
- Replacement of the present sulfuric acid plant with a new sulfuric acid plant.
- Replacement of the present GTSP plant with a new GTSP plant.
- Replacement of the present phosphoric acid plant, including the fluorine recovery system, with a new phosphoric acid plant and fluorine recovery system.

(Addition of a monammonium phosphate plant which had been part of original design plans is no longer considered necessary. Uranium extraction from the phosphoric acid produced by USSAC will be accomplished off-site by an independent operation.)

These modifications will provide increased sulfuric and phosphoric acid production capabilities and will also add the capability for wet rock grinding. Present and proposed permitted annual production capacities for the Fort Meade complex can be compared quantitatively as follows:

	Permitted Production Level (short tons/year)	
Activity	Present	Proposed
Wet Rock Grinding	None	1,600,000
Sulfuric Acid Production	547,500	1,355,000
Phosphoric Acid Production	200,000	484,000
Fluosilicic Acid Production	8,100	15,000
GTSP Production	365,000	365,000
GTSP to Storage	365,000	365,000

DRY ROCK PROCESSING?

Construction of these facilities is planned to begin early in 1981. Existing facilities to be dismantled once the proposed plant modifications are fully operational include the sulfuric acid plant, phosphoric acid plant, and GTSP plant. Modification of production facilities will require approximately 8 additional acres of land. Expansion of the gypsum disposal area will require the largest amount of land, approximately 165 acres. The water surface area of ponds used for cooling purposes will increase from the present area of about 60 acres to a total of as much as 123 acres, an increase of up to 63 acres.

3.2 FUEL CONSUMPTION

There will be no increase in fuel consumption as a result of the proposed project. The only new facility which requires fuel routinely is the GTSP plant where natural gas (or fuel oil when gas is not available) is used in the product dryer. Since there will be no increase in GTSP production capacity, the same amount of fuel will be needed for the new plant as is now used in the existing plant which will be replaced.

3.3 PROCESS FLOW DIAGRAMS

As stated above, new process facilities to be constructed as part of the proposed project are a wet process phosphoric acid plant, a sulfuric acid plant, and a GTSP plant. Flow diagrams are provided for these facilities as follows:

- sulfuric acid plant -- Appendix A
- phosphoric acid plant -- Appendix B
- granular triple superphosphate plant -- Appendix C

The other emission source affected by this project is the existing GTSP storage building which will be modified by addition of a scrubbing system. Since this is strictly an add-on to an existing facility and one which will lower air emissions, no flow diagram is included.

4.0 EMISSIONS SOURCE INFORMATION

4.1 IDENTIFICATION OF EMISSION SOURCES

4.1.1 Point Sources

Table 4-1 lists characteristics of existing emission sources which will be replaced or modified, in comparison with characteristics of new and modified sources. The emission rates shown are allowable rates on a tons per year (ton/yr) basis. Derivation of emission rates is explained in Section 4.2.

As can be seen, the only new or modified source with allowable emissions in excess of 100 ton/yr is the new sulfuric acid plant. Allowable emissions of both sulfur dioxide and sulfuric acid mist from this plant will exceed 100 ton/yr. Allowable emissions of fluorides from all new and modified plants combined will be less than 50 ton/yr. Potential emissions of fluorides in the absence of control equipment would be approximately 2200 ton/yr for all sources combined.

An important aspect of the proposed project is the net change in emissions after existing plants are replaced or modified. As shown in Table 4-1, there will be a decrease in allowable emissions of sulfur dioxide and fluorides and an increase in allowable emissions of sulfuric acid mist. The increase in allowable emissions of sulfuric acid mist, however, will be well below 50 ton/yr.

Although there are no specific particulate emission standards applicable to the sources in question, two of the sources - the GTSP plant and GTSP storage building - are minor particulate sources. The key point here is that there will be no increase in GTSP production, and therefore no increase in particulate emissions. It is more probable that there will be a decrease in emissions because of design features such as the baghouse which will be used to collect rock dust in the new GTSP plant and the scrubber which will be added to the GTSP storage building.

The only continuous fuel burning source involved in the project is the GTSP plant dryer. Natural gas is the fuel used when available.

No. 6 fuel oil is burned when gas supplies are interrupted. There is a potential for emissions of nitrogen oxides (NO_x) when fossil fuels are burned, but there will be no increase in emissions as a result of the proposed project because the product amount dried in the new plant will be equal to that now dried and the amount of fuel used will therefore be the same. NO_x emissions from existing and new GTSP plants are not regulated by State or Federal emission standards, and it is difficult to estimate what these emissions are or will be when the new plant begins operation. NO_x emission factors for oil- and gas-fired boilers are not directly applicable to rotary dryers because there can be some retention of combustion gases (including NO_x) in materials being dried and because the considerable moisture present can reduce flame temperatures, thereby inhibiting NO_x formation. Furthermore, some removal of NO_x can occur in the wet scrubbers which are used in the GTSP plant for control of fluoride and particulate emissions. Formation of NO_x is also dependent on the type of fuel used, and in this case would vary depending on whether or not natural gas or fuel oil is burned.

Operation of the GTSP dryer requires a heat input of approximately 2.7×10^{11} Btu per year. Typically about 54 percent of this energy requirement is supplied by natural gas and 46 percent by fuel oil. This is equivalent to about 1.53×10^8 cubic feet of natural gas and 8.33×10^5 gallons of No. 6 fuel oil per year. Using AP-42 boiler emission factors (EPA, 1977a) as an upper limit on emission rates, annual NO_x emissions (as NO_2) should be no higher than 39 tons. As discussed above, there will be no increase in this rate when the new GTSP dryer begins operation.

4.1.2 Fugitive Fluoride Emissions

For several years there has been an interest in possible fugitive fluoride emissions from cooling ponds used in phosphate chemical production plants. Despite this interest, there is no clearcut means of estimating the quantity of emissions which might be released from a specific cooling pond area. One proposed method of estimating these emissions is on the basis of cooling pond water surface area. This approach seems overly simplistic in that it does not take into direct account such factors as cooling water fluoride concentration and heat load. Moreover, the few empirical studies available indicate emission factors using the surface area approach which can vary by two orders of magnitude, suggesting considerable uncertainty in this methodology. For example, a review of research studies made for EPA (Linero and Baker, 1978) contains the conclusion that an appropriate emission factor "appears" to lie in a range from 0.1 to 10 pounds per acre per day.

USSAC presently plans to expand the existing cooling ponds at the Fort Meade Phosphate Chemical Complex from the present water surface area of about 60 acres to a new total of as much as 123 acres, an increase of up to 63 acres. The size required is based primarily on two factors: the size required for cooling purposes and the size required for storage purposes. Surface area (as well as pond depth) plays a key role in storage capacity because there must be sufficient evaporation to compensate for the abundant rainfall experienced in central Florida. The storage capacity and associated evaporation potential must be sufficiently large if discharge of contaminated cooling water is to be avoided as is USSAC's intention. It is, of course, to USSAC's advantage - both from an economic and a space availablitiy standpoint - to provide for no greater area than is needed, and therefore the final size of the cooling pond expansion will be kept to a minimum consistent with cooling and storage needs. (It should also be noted that the cooling towers listed in Section 3.1 will circulate uncontaminated water and will not be a source of fugitive fluoride emissions.)

USSAC feels that EPA's decision on this PSD permit application should not be contingent on considerations of fugitive fluoride emissions from cooling pond areas for the following reasons: (1) there is extreme uncertainty in estimating what specific change in fugitive fluoride emissions might occur as a result of this project; (2) there are no Federal or State emission standards limiting fluoride emissions from cooling ponds; (3) there are no Federal or Florida ambient standards for fluorides; (4) there are no hazardous emission standards for fluorides; and (5) there is no agreement on what would constitute a control technology to reduce fluoride emissions from cooling ponds other than possibly minimizing the size of cooling ponds which is USSAC's intention. (With regard to this last point, EPA's Areawide Environmental Impact Statement for the central Florida phosphate industry recommends fluosilicic acid byproduct recovery as a means of reducing fluoride emissions from cooling ponds, although there is disagreement as to whether or not this is actually an effective approach. USSAC plans to follow the EIS recommendation by increasing fluosilicic acid production.

4.1.3 Fugitive Dust Emissions

USSAC's plan to increase phosphoric acid production suggests at first glance that there might be an increase in fugitive dust emissions associated with the increased amount of phosphate rock which must be fed into the process. However, the new phosphoric acid plant will use wet rock rather than dry rock, thereby virtually eliminating any fugitive dust emissions from rock storage, conveying, and grinding. Increased production of sulfuric acid will not result in fugitive dust emissions because there is no dry materials handling in sulfuric acid plants. Any fugitive dust emissions associated with the GTSP plant and GTSP storage area will not change from existing levels because there will be no increase in production of GTSP. The conclusion is, therefore, that fugitive dust emissions will not increase as a result of the proposed project. In fact, although the amount cannot be quantified, it is expected that fugitive dust emissions will be reduced because of improved layout and product handling in the new and modified facilities.

4.1.4 Sulfuric Acid Plant Startup Boiler

The new sulfuric acid plant requires a startup boiler as does the existing plant which it replaces. This boiler will be strictly in standby service and will be used only to start the plant back up after a shutdown. Emissions, therefore, will be inconsequential and no greater than those which originate from the existing startup boiler.

The new boiler will be fueled with natural gas when available, and with No. 2 fuel oil otherwise.

4.2 DERIVATION OF EMISSION RATE ESTIMATES

Emission rates for sulfur dioxide and sulfuric acid mist from the sulfuric acid plant and fluoride emissions from the phosphoric acid plant, GTSP plant, and GTSP storage area were derived by applying State and Federal emission limits to the permitted production capacities of existing units and proposed production capacity of new units. Applicable emission limits and production capacities are listed in Table 4-2.

The fluoride emission limit shown for GTSP storage is the Florida limit of 0.05 lb flouride per ton P_2O_5. The Federal New Source Performance Standard (NSPS) for this source is 0.0005 lb per hour per ton of equivalent P_2O_5 stored, a limit which is awkward to use in estimating annual emissions. In practice, emissions from the storage area will have to conform to the most stringent of these standards.

4.3 SCHEDULE FOR EMISSION SOURCE CHANGES

The new sulfuric acid, phosphoric acid, and GTSP plants are designed for complete replacement of the existing plants. After construction of the new plants is finished, there will be a brief overlapping period of operation until the new plants are operating satisfactorily, then the old plants will be removed from service. The shakedown period for the new plants is expected to last about 3 months.

Since the GTSP storage area will be modified and not replaced, the question of overlapping period of operation is not applicable. When the new scrubber system has been constructed and tested, it will be placed into full-time service.

TABLE 4-1

CHARACTERISTICS OF AFFECTED EMISSION SOURCES

Existing Facilities Which Will be Replaced or Modified	Allowable Sulfur Dioxide Emissions (ton/yr)	Allowable Sulfuric Acid Mist Emissions (ton/yr)	Allowable Flouride Emissions (ton/yr)	Stack Height (ft)	Stack Diameter (ft)	Exit Temperature (°F)	Exit Velocity (ft/s)	Exit Volumetric Flow (act.ft^3/min)
Sulfuric Acid Plant (replaced)	2738	82	--	95	9.9	87	22.2	102400
Phosphoric Acid Plant (replaced)	--	--		73	3.3	99	35.9	18400
				76	6.0	105	7.5	12800
				76	6.0	112	7.4	12500
Granular Triple Super Phosphate Plant (replaced)	[e]	--	45[a]	80	2.5	95	11.9	3500
				93	5.0	119	53.2	62700
				93	5.0	125	41.1	48400
				89	15.0	69	4.4	47000
Granular Triple Super Phosphate Storage (modified)	--	--		c	c	c	c	c
	2937	82	45					
New or Modified Facilities								
Sulfuric Acid Plant (new)	2710	102	--	175	8.5	180	31	106500[d]
Phosphoric Acid Plant (new)	--	--	5[b]	75	4.0	100	33	24400
				62	3.0	105	14	6000
Granular Triple Super Phosphate Plant (new)	[e]	--	14	190	6.0	105	40	67000
Granular Triple Super Phosphate Storage (modified)	--	--	5	120	7.5	100	42	108000
	2909	102	24					
Net Change in Allowable Emissions	-28	+20	-21					

[a]The allowable fluoride emission rate for the existing plant complex is a total rate for all fluoride emission sources combined.

[b]The new phosphoric acid plant will be equipped with two emission vent stacks. The fluoride emission rate shown is the total for both stacks combined.

[c]No stack.

[d]Volumetric flow through each of two identical stacks.

[e]The GTSP plant dryer when burning fuel oil will be a source of SO_2. However, fuel consumption in the new plant will equal that in the existing plant, and there should be no net change in emissions.

TABLE 4-2

PRODUCTION CAPACITIES AND EMISSION LIMITS

A. Production Capacities

	Present Sulfuric Acid Production and P_2O_5 Input Rates (tons/year)	Proposed Sulfuric Acid Production and P_2O_5 Input Rates (tons/year)
Sulfuric Acid (100% H_2SO_4)	547,500	1,355,000
Phosphoric Acid (as P_2O_5 input)	223,000	532,000
GTSP (as P_2O_5 input)	n/a	182,500
GTSP to Storage (as P_2O_5 input)	n/a	182,500

B. Emission Limits

	Existing Units	New Units
Sulfuric Acid Plant		
Sulfur Dioxide	10 lb/ton 100% H_2SO_4	4 lb/ton 100% H_2SO_4
Sulfur Acid Mist	0.3 lb/ton 100% H_2SO_4	0.15 lb/ton 100% H_2SO_4
Phosphoric Acid Plant		
Fluorides	[a]	0.02 lb/ton P_2O_5
GTSP Plant		
Fluorides	[a]	0.15 lb/ton P_2O_5[b]
GTSP Storage		
Fluorides	[a]	0.05 lb/ton P_2O_5[b]

[a] Fluoride emission limit for existing units is a total emission rate for the entire complex of 0.4 lb/ton P_2O_5 input to wet-process phosphoric acid section.

[b] Florida emission limiting standard.

5.0 REGULATORY CONSIDERATIONS

5.1 PREVENTION OF SIGNIFICANT DETERIORATION REGULATIONS

Existing PSD regulations require that when a major facility (one with allowable emissions of a regulated pollutant greater than 50 ton/yr and potential emissions greater than 100 ton/yr) is added to or reconstructed at an emission source, whether the addition is to replace previous production capacity or for increased capacity, a PSD permit is needed and the facility must undergo a Best Available Control Technology (BACT) review. At the same time, so long as there is no net increase for the source as a whole in emissions of pollutants subject to national ambient air quality standards and no adverse air quality impact would occur, then an exemption from a formal impact analysis can be obtained (40 CFR 52.21(k)(1)(iv)). Under such an exemption, an applicant need not (1) perform a detailed analysis to show compliance with ambient air quality standards and PSD increments, (2) conduct pre-construction or post-construction ambient air quality monitoring, or (3) provide an additional impact analysis of the impairment to visibility, soils, or vegetation, or an analysis of the air quality impact projected for the area as a result of general commercial, residential, industrial, and other growth associated with the applicant's project. If potential emissions (emissions in the absence of control equipment) are greater than 100 ton/yr but allowable emissions are less than 50 ton/yr, it is necessary to demonstrate that the applicant will meet all emission limitations which are part of an applicable State Implementation Plan and all applicable Federal emission standards and standards of performance.

Based on these regulatory considerations and on the nature of the emission source changes described in Section 4.0, it is USSAC's understanding that a PSD permit will be required for the Fort Meade Phosphate Chemical Complex project, that a BACT analysis for the new sulfuric acid plant is needed as is a discussion to show that other process facilities will meet applicable emission standards, but that a detailed impact analysis is not necessary. The remainder of this application is organized accordingly. Section 6.0 presents a BACT analysis for the new sulfuric acid plant and an emissions control analysis for the new phosphoric acid plant, the new GTSP plant, and the modified GTSP storage building. Information is also provided on the proposed cooling pond expansion. Section 7.0 contains a brief ambient impact analysis to show that emission source changes should not result in an adverse air quality impact offsetting the effect of decreased emissions, and to show that nearest PSD Class I and nonattainment areas will not be significantly affected by the project.

5.2 FLORIDA PERMIT APPLICATIONS

In addition to PSD permitting requirements, USSAC must also satisfy Florida permitting requirements. Applications for construction permits will be submitted to the Florida Department of Environmental Regulation. Four separate permit applications will be filed - one each for the new sulfuric acid plant, the new phosphoric acid plant, the new GTSP plant, and the modified GTSP storage building.

5.3 OTHER PERMITTING ACTIONS

Because of the need to obtain a National Pollutant Discharge Elimination System permit from EPA, USSAC has submitted an Environmental Information Document to Region IV's Environmental Impact Statement Branch. This document should be reviewed if additional information on the project is needed.

6.0 BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS

As discussed in Section 5.0, it is USSAC's understanding that the only new facility technically requiring a BACT analysis is the new sulfuric acid plant. However, for information purposes, a description of fluoride emission controls for the new phosphoric acid plant, the new GTSP plant, and the modified GTSP storage area is also presented below. Comments on cooling pond design are given as well.

6.1 SULFURIC ACID PLANT

USSAC proposes to construct a two-unit, contact-type double absorption process, Monsanto design sulfuric acid plant with a nominal production capacity of 4000 short tons per day (100 percent H_2SO_4 basis). Control of sulfur dioxide emissions will be achieved as an integral feature of the double absorption process, contrasted with the existing sulfuric acid plant which requires an add-on scrubber to achieve desired emission levels. Sulfuric acid mist control will be achieved through the use of mist eliminators to reduce mist levels in gases leaving the interpass and final absorption tower. A description of the sulfuric acid production process, a copy of the contractor performance quarantee, a process material flow diagram, and a plot plan are attached in Appendix A.

The maximum emission rates which USSAC intends to achieve in satisfaction of BACT requirements are 4 lb SO_2 and 0.15 lb H_2SO_4 mist per ton of 100 percent H_2SO_4 produced. USSAC considers these limits to be representative of BACT for the following reasons:

1. The emission rates proposed are in compliance with Federal NSPS for new sulfuric acid plants (40 CFR 60.82 and 60.83) and with Florida emission limiting standards for new sulfuric acid plants (Florida Administrative Code 17-2.05(6)).

2. Compliance with Federal NSPS and use of the contact-type double absorption system with mist eliminator has previously been judged by EPA to constitute BACT for at least one other phosphate chemical plant in Florida (EPA, 1979).

3. By complying with new source emission standards, operation of the new plant will result in a decrease in allowable SO_2 emissions. Coincident with the decrease in allowable emissions there will be "no adverse air quality impact" (using the language of PSD regulations) - as discussed in Section 7.0. Acid mist emissions will increase slightly, but there is no ambient standard or PSD increment for sulfuric acid mist and no adverse impact is expected to result.

It is theoretically conceivable that additional control of SO_2 emissions could be achieved using some sort of add-on stack flue gas desulfurization (FGD) system. However, USSAC is not aware of any other installations where the double-absorption process has had to be supplemented by FGD equipment, and such an approach certainly does not seem necessary in this case for the reasons cited above.

6.2 PHOSPHORIC ACID PLANT

The new phosphoric acid plant will use wet rock, thereby eliminating incidental dust emissions connected with dry rock handling. Fluoride emissions will be controlled through the use of two fume scrubbers. A venturi cyclonic fume scrubber with a design fluoride collection efficiency of 99 percent will be used to control emissions from the reaction and filtration area, and an ejector venturi fume scrubber with a design fluoride collection efficiency of 95 percent will be used to control emissions from the storage tank area. A description of the phosphoric acid production process (including fluocilicic acid production), a copy of the contractor performance guarantee, and a process flow diagram are attached in Appendix B.

The proposed maximum fluoride emission rate from the new phosphoric acid plant is 0.02 lb per ton of equivalent P_2O_5 feed. This rate conforms with the Federal NSPS for new wet-process phosphoric acid plants (40 CFR 60.202) and with the Florida emission limiting standard for new wet-process phosphoric acid plants (Florida Administrative Code 17-2.05(6)). Compliance with this standard will result in a decrease in fluoride emissions from process facilities when combined with proposed changes in GTSP production and storage.

6.3 GRANULAR TRIPLE SUPERPHOSPHATE PLANT AND STORAGE

The new GTSP plant will have the same production rate as the existing plant which will be taken out of service. Control of particulate and fluoride emissions will be achieved through the use of two scrubbers, a reactor-granulator scrubber and a dryer scrubber. (Exhaust gases from these scrubbers will go to a common stack for discharge to the atmosphere.) Fluoride control efficiencies achieved in reactor-granulator and dryer scrubbers will be at least 99 percent. A description of the GTSP production process and a process flow diagram are attached in Appendix C. Modifications to the existing GTSP storage building will include addition of a scrubber system to achieve emission control which does not now exist.

The proposed maximum fluoride emission rate from the new GTSP plant is 0.15 lb per ton of equivalent P_2O_5 feed. This rate conforms with the Florida emission limiting standard for new plants producing GTSP from phosphoric acid and phosphate rock slurry (Florida Administrative Code 17-2.05(6)), and is better than the 0.2 lb per ton allowed by Federal NSPS for new triple superphosphate plants (40 CFR 60.232).

The maximum fluoride emission rate from the modified GTSP storage building will conform with the Federal NSPS for new GTSP storage facilities (0.0005 lb fluoride per ton equivalent P_2O_5 stored; 40 CFR 60.242). Compliance with the Florida emission limiting standard of 0.05 lb per ton P_2O_5 (Florida Administrative Code 17-2.05(6)) will also be achieved.

The fluoride emission controls planned for the GTSP plant and storage building, in combination with new phosphoric acid plant emission controls, will result in a decrease in fluoride emissions from process facilities compared with the existing phosphate chemical complex. After the proposed changes are in operation, the minor particulate emissions associated with GTSP production and storage will be at least as low as and probably lower than at present.

6.4 COOLING POND EXPANSION

As discussed previously, USSAC does not think it is possible to accurately estimate fugitive fluoride emissions from cooling ponds, and consequently does not think it justifiable for process or pond design requirements to be imposed because of possible cooling pond fluoride emissions. Nevertheless, to allay any concerns about such emissions, the following points are noted:

1. Fluosilicic acid production rates will increase. Although not all authorities agree that fluosilicic acid recovery helps reduce fluoride emissions from cooling ponds, USSAC's proposed action in this regard is consistent with the recommendation of EPA's areawide EIS for the central Florida phosphate industry.

2. USSAC is designing the cooling pond expansion to be large enough for cooling and storage needs but is not overdesigning to the point that water surface area will be much larger than required. Cooling water surface area will increase from the present size of about 60 acres to an expanded total area of up to 123 acres.

7.0 AMBIENT AIR QUALITY

As discussed in Section 5.0, exemption from a detailed impact analysis is permitted if a source is modified but there is no increase in the net amount of emissions for any pollutant subject to a national ambient air quality standard (a criteria pollutant), provided that no adverse air quality impact would occur as a result of the modification. The purpose of the following discussion is to show that no adverse air quality effects will result from USSAC's planned modifications.

In typical PSD air quality impact evaluation studies, ambient ground-level concentrations are predicted using Gaussian modeling concepts. As an example, reference can be made to EPA's CRSTER Model (EPA, 1977b). In this model, as in similar models, ground-level concentrations are inversely proportional to the effective stack height of emission sources. The proportionality is not linear, but if two emission sources have the same emission rate, the one with the higher effective stack height will produce lower ground-level concentrations under all atmospheric stability conditions. Or stated another way more appropriate to the USSAC project, if the emissions from a given source decrease while at the same time the effective stack height remains the same or increases, predicted ground-level concentrations will also decrease. If it can be shown that the proposed decrease in allowable emissions at the Fort Meade Chemical Complex will be accompanied by an increase or no change in effective stack heights, then it is reasonable to conclude that no adverse impact will occur.

(There is one exception to this calculation procedure, but one which does not change the sense of the argument. In situtations when the atmospheric mixing height and dispersion conditions are such as to cause uniform concentrations between the ground and the top of the mixing layer, ground-level concentrations are not a function of effective stack height but are directly dependent on emission rates. In this situation a decrease in emissions will also result in a predicted decrease in ground-level concentrations.)

Effective stack height is defined as the sum of physical stack height plus plume rise. In the standard EPA Gaussian models, plume rise for buoyant sources is calculated using the Briggs plume rise formulas. (See, for example, EPA 1977b). Using these formulas, a different plume rise is calculated for each of three major atmospheric stability conditions (unstable/neutral, stable, and very stable). Regardless of stability, however, plume rise is proportional to what is called the buoyancy flux parameter, F, defined by the equation:

$$F = \frac{gV}{\pi} \left(\frac{T_s - T}{T_s}\right)$$

Where,

g = gravitational acceleration [m/s^2]

T = ambient air temperature [K]

T_s = stack gas temperature [K]

V = stack gas volumetric flow [m^3/s]

The greater the value of F, the higher the plume rise.

These concepts can now be applied to the USSAC project. The only new source with allowable emissions of a criteria pollutant exceeding 50 ton/yr is the sulfuric acid plant. Using the stack characteristics shown in Table 4-1, the value of F for each of the two stacks in the new sulfuric acid plant is 26.5 (using an ambient temperature of 295 K). By comparison, the F value for the existing sulfuric acid plant is 4.3. The new plant will therefore have a higher plume rise. Also, as can be seen from Table 4-1, the physical stack heights of the new plant are nearly twice as high as the existing sulfuric acid plant stack. Therefore, the effective stack height of the new plant will be considerably higher than the effective stack height of the existing plant, and the conclusion is reached that the proposed decrease in allowable SO_2 emissions will result in a decrease in predicted SO_2 ground-level concentrations. In addition, although sulfuric acid mist is not a criteria pollutant requiring an impact analysis, the increase in effective stack height should largely offset the ambient effects of the small increase in sulfuric acid mist emissions.

It is recognized that the Briggs plume rise formulas for buoyant plumes are not strictly applicable to the existing sulfuric acid plant because of the low exit temperature involved. If anything, however, the Briggs buoyant plume rise formulas probably overpredict plume rise from this plant, and the argument above would be further strengthened if a cold plume calculation method were used.

It is not necessary to evaluate the air quality effect of flouride emission sources because fluorides are not designated as a criteria pollutant and because fluoride emissions from new and modified sources (that is, process sources) will not exceed 50 ton/yr. The same approach can be taken with these sources as with the sulfuric plants, however. The effective stack heights of new and modified sources will be higher than or approximately equal to those of the existing plants. (Actual calculations show that the plume rise of the new GTSP plant stack will be less than that from two of the four stacks in the existing plant, but the difference in physical stack heights will make up for the difference in plume rise.) Therefore, the decrease in allowable fluoride emissions will result in a decrease in predicted ambient fluoride concentrations attributable to process sources.

As a final note on ambient air quality, some comments on PSD Class I areas and nonattainment areas are appropriate. The nearest PSD Class I area is the Chassahowitzka National Wilderness Area located 125 km to the northwest on the Gulf coast. The next nearest Class I is 200 km away. The proposed project will not have an adverse effect on either area.

The nearest sulfur dioxide nonattainment area is in Pinellas County, approximately 80 km from the Fort Meade Phosphate Chemical Complex. Closer nonattainment areas are located in Hillsborough County for ozone and particulate matter. None of these areas will be adversely affected by the proposed project.

8.0 REFERENCES

Linero, A.A. and Baker, R.A., 1978, Evaluation of emissions and control techniques for reducing fluoride emissions from gypsum ponds in the phosphoric acid industry. Prepared for U.S. Environmental Protection Agency, Industrial Environmental Research Laboratory, Publication No. EPA-600/2-78-124.

U.S. Environmental Protection Agency, 1977a, Compilation of air pollutant emission factors. Office of Air Quality Planning and Standards, Publication No. AP-42 (updated through supplement 9, October 1979).

__________, 1977b, User's manual for single-source (CRSTER) model. Office of Air Quality Planning and Standards, Publication No. EPA-450/2-77-013.

__________, 1979, Compilation of BACT/LAER determinations. Office of Air Quality Planning and Standards, Publication No. EPA-450/2-79-003.

APPENDIX A

SULFURIC ACID PLANT INFORMATION

DESCRIPTION OF SULFURIC ACID PRODUCTION

The principal steps in the process consist of burning sulfur (S) in air to form sulfur dioxide (SO_2), combining the sulfur dioxide with oxygen (O_2) to form sulfur trioxide (SO_3), and combining the sulfur trioxide with water (H_2O) to form a solution containing sulfuric acid (H_2SO_4). The chemical reactions are:

$$S + O_2 = SO_2$$

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

$$SO_3 + H_2O = H_2SO_4$$

The sulfur is burned with air in a horizontal spray-type sulfur burner. Before the air is admitted to the sulfur burner, it is dried by contact with 98 percent sulfuric acid.

The temperature of the SO_2 gas from the sulfur burner is higher than is required for inlet to the conversion system; therefore, the gas is cooled in a waste heat boiler, which recovers the surplus heat as by-product steam.

From the waste heat boiler, the gas flows to the first pass of the converter system where it is partially converted to sulfur trioxide gas in the presence of vanadium catalyst. The conversion reaction produces heat. Gases leaving the first converter pass flow to the superheater where they are cooled. Temperature of the gas stream downstream of the superheater is controlled in the proper range by by-passing a portion of the gas flow around the superheater. The cool gas stream flows from the superheater to the second converter pass where additional conversion of sulfur dioxide to sulfur trioxide takes place, accompanied by the generation of additional heat. Hot gases leaving the second converter pass are cooled by sending them through the tube side of the hot interpass exchanger.

Cooled gases leaving the heat exchanger flow to the third converter pass where additional conversion of sulfur dioxide to sulfur trioxide takes place. Hot gases leaving the third converter pass are cooled by sending them through the tube side of two gas heat ex-

changers, called cold interpass heat exchangers, connected in series, and the economizer.

Gas leaving the economizer flows to the interpass absorbing tower where the SO_3 in the gas stream is removed. In the interpass absorbing tower, the SO_3 does not combine directly with water, but must be combined indirectly by absorbing it in sulfuric acid where the SO_3 reacts with water in the acid. The temperature of the 98 to 99 percent H_2SO_4 circulated over the interpass absorbing tower increases due to the heat of formation and the sensible heat of the gas stream entering the tower. Acid from the bottom of the interpass absorbing tower is circulated through coolers and returned to the top of the tower. Sufficient water is added to the interpass absorption tower system to control the strength of acid circulated over the interpass tower between 98 and 99 percent. Cool gas leaving the interpass absorbing tower, containing unreacted SO_2, flows to the shell side of the cold interpass gas heat exchangers where it is heated by gases leaving the third converter pass.

From the shell side of the cold interpass heat exchangers, the gas stream flows to the hot interpass heat exchanger where it is further heated by gases flowing from the second converter pass.

The temperature downstream of the interpass heat exchanger is controlled in the proper range by by-passing a portion of gas around the shell side of the heat exchanger. From the hot interpass heat exchanger, the gas stream flows to the fourth converter pass where final conversion of SO_2 in the gas stream to SO_3 is accomplished.

The gas stream from the fourth converter pass flows to the economizer where it is cooled by boiler feedwater and then flows to the final absorbing tower. In the final absorbing tower, SO_3 in the gas stream reacts with water in the 98 to 99 percent circulating acid. The temperature of the strong acid circulated over the final absorbing tower increases due to the heat of formation and the sensible heat of the gas stream entering the tower. Acid from the bottom of the final absorbing tower is circulated through coolers and returned to the top

of the tower. Sufficient water is admitted to the final absorbing tower system to control the strength of acid circulated over the final acid tower between 98 and 99 percent. That acid produced in the final absorbing tower underflows to the drying/interpass acid pump tank.

Gas leaving the final absorbing tower flows to the atmosphere through a stack.

The 98 percent product acid from the drying acid system is pumped directly through a product cooler to storage.

SECTION V

GUARANTEES

A. PERFORMANCE GUARANTEES

1. Contractor guarantees that the plants shall be capable of operating at their rated capacity of 4,000 short tons (100% H_2SO_4) per twenty-four (24) hour day, with all product as 98% sulfuric acid (2000 short tons per plant).

2. Contractor guarantees that the plants shall be capable of operating at 50% of rate capacity of 2,000 short tons (100% H_2SO_4) per twenty-four (24) hour day, with all product as 98% sulfuric acid (1,000 short tons per plant).

3. Contractor guarantees when each plant is operated at its capacity of 2,000 short tons (100% H_2SO_4) per twenty-four (24) hour day, that the SO_2 content in the process gas leaving the final absorption tower shall average over a two (2) hour period not to exceed 4 lbs. per ton of acid produced, and that the H_2SO_4 mist content in the process gas leaving the inter-pass and final absorption tower shall average not to exceed 0.15 lb. per ton of acid produced.

4. Contractor guarantees that the combined cooling tower blowdown and boiler blowdown will average not to exceed 500 GPM when both cooling tower and boiler are operated per vendor recommendations and with inlet well water quality as specified in Section II.

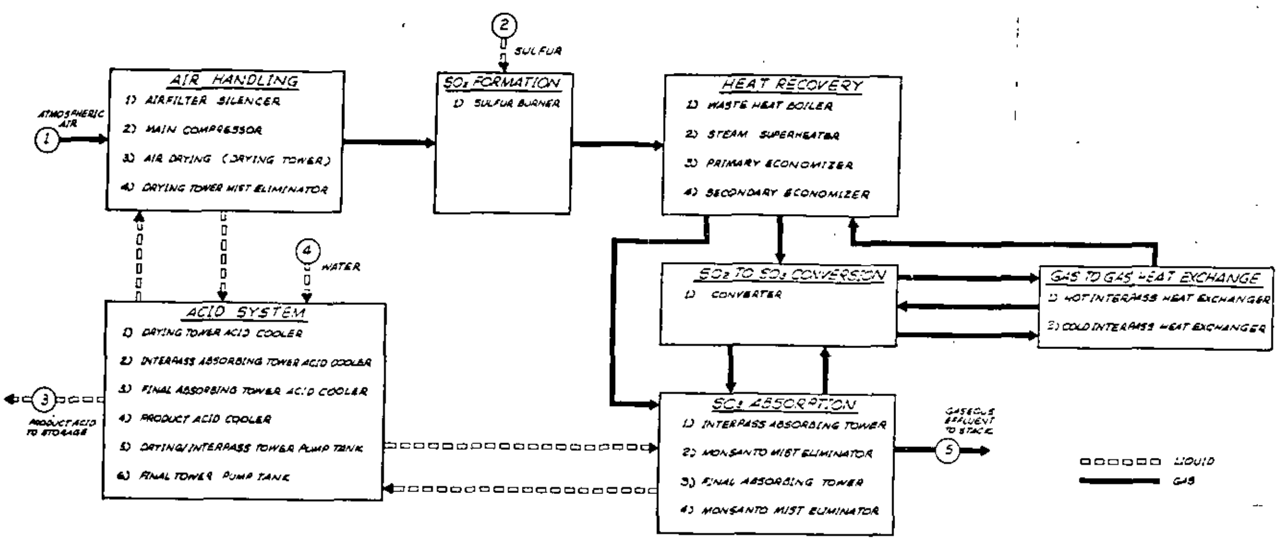
5. Contractor guarantees that the demineralizer neutralized effluent will have a pH between 6.-9.5 as measured at battery limits.

6. Contractor guarantees that the product acid concentration will be between 98.0% and 99.0% as sampled from acid plants.

Performance Tests

The demonstration of performance guarantees A-1, A-2, A-4 and A-6 require the operation of both sulfuric acid plants. These guarantees shall be demonstrated after start-up of the second plant over an operating period of three (3) substantially consecutive days.

Performance guarantees A-3 and A-6 will be demonstrated sequentially as each plant is started up.



STREAM / COMPONENT	UNIT	1	5				
SO_2	SCFM		51				
SO_3	SCFM		0				
O_2	SCFM	20294	5016				
N_2	SCFM	76506	76834				
H_2O	SCFM	3360					
TOTAL	SCFM	100450	81853				
TOTAL	ACFM	113525	106475				
TEMPERATURE	°F	95	180				
STREAM / COMPONENT	**UNIT**	**2**	**3**	**4**			
LIQUID		SULFUR	98%	WATER			
	LBS/MIN	915	3535	395			
	GPM	41	190	47			
TEMPERATURE	°F	270	100	45			

CLIENT: USS AGRICHEM
LOCATION: FORT MEADE, FLORIDA
PRODUCTION. 2000 STPD AS 98% ACID (100% H_2SO_4 BASIS)
NUMBER OF UNITS: TWO PLANTS
CONVERSION: 99.7 CONVERSION OF SO_2 TO SO_3 WITH
10.5% SO_2 TO CONVERTER.
STANDARD CONDITIONS: 0°C AND 760 MM Hg.
EMISSIONS:
SO_2: 4LBS SO_2/TON 100% H_2SO_4 PRODUCED
ACID MIST. LESS THAN OR EQUIVALENT TO
0.15 LBS H_2SO_4/TON 100% H_2SO_4 PRODUCED.

STACK: 175' HIGH, 8'-6" I.D.

FIG. A-1

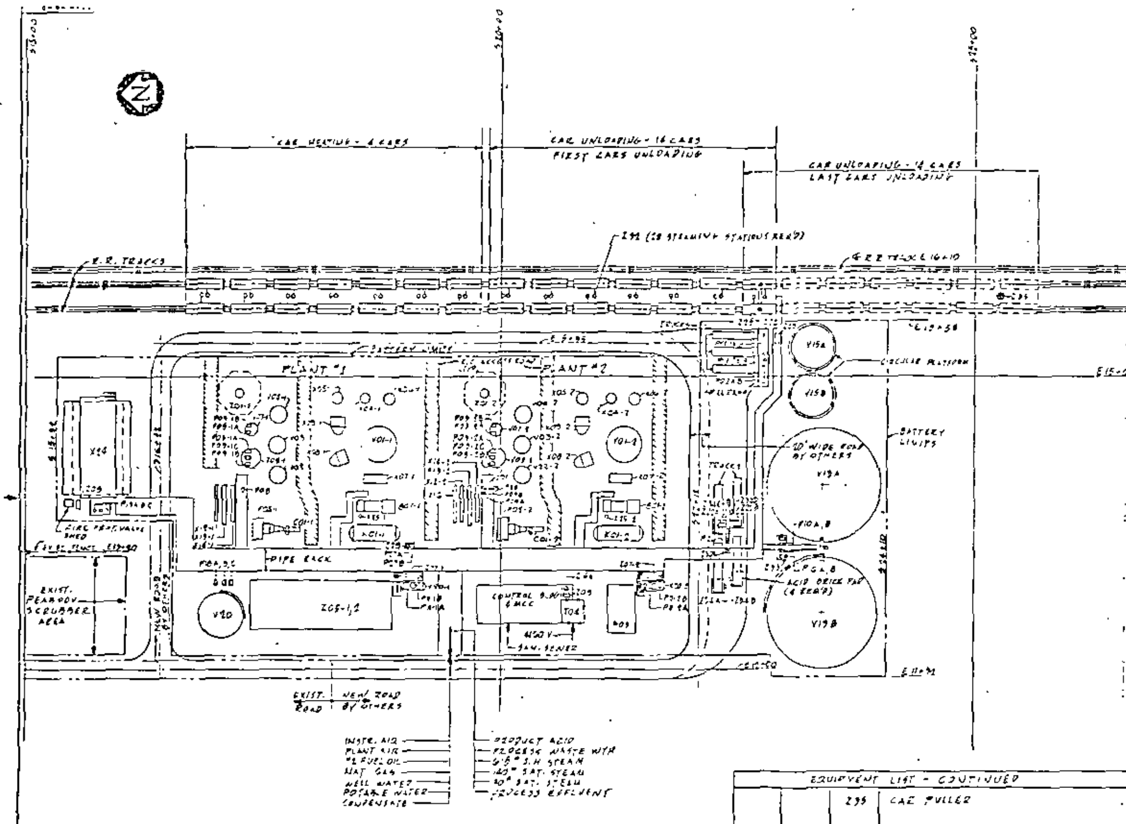
MONSANTO ENVIRO CHEM SYSTEMS, INC.
ST. LOUIS, MISSOURI

ENVIRONMENTAL
PROCESS MATERIAL FLOW DIAGRAM
SULFUR BURNING PLANT

321-121

REVISIONS | NO. | DATE | DESCRIPTION | BY | BY | BY

REFERENCES | DESCRIPTION



EQUIPMENT LIST - CONTINUED

	Z95	CAR PULLER

NOTES

1. * DENOTES ONE IS AN INST. SPARE.
2. FOR DETAILED PLANT LAYOUT SEE DWG. 301-102

EQUIPMENT LIST - MAJOR EQUIPMENT ONLY

PLANT NO. 1	PLANT NO. 2	EQUIPMENT COMMON TO BOTH PLANTS	DESCRIPTION
B01-1	B01-2		WASTE HEAT BOILER
		B03	AUX BOILER SYSTEM
C01-1	C01-2		MAIN COMPRESSOR
F02-1	F02-2		DRYING TOWER MIST ELIMINATOR
F03-1	F03-2		INTERPASS TOWER MIST ELIMINATO
F04-1	F04-2		FINAL TOWER MIST ELIMINATOR
F05-1	F05-2		INLET AIR FILTER WITH SILENCE
K01-1	K01-2		SULFUR BURNER
*P01-1A,B	*P01-2A,B		SULFUR BURNER FEED PUMPS
		*P02A,B	SULFUR TRANSFER PUMPS
*P03-1A,B,C	*P03-2A,B,C		DRYING/INTERPASS TOWER ACID PUMPS
*P05-1A,B	*P05-2A,B		FINAL TOWER ACID PUMPS
P09			ACID COOLER DRAIN PUMP
		*P09A,B	PRODUCT ACID BOOSTER PUMP [illegible]
		*P10A,B	PRODUCT ACID TRANSFER PUMP
*P11-1A,B	*P11-2A,B		BOILER FEED WATER PUMPS
		*P12A,B,C	COOLING TOWER WTR. SUPPLY PUMPS
		*P14A,B	PRODUCT ACID LOADING PUMPS
		*P15A,B,C	DEAERATOR FEED WATER PUMPS
		P16	TRUCK LOADING SUMP PUMP
		*P27A,B	PROCESS WATER SUMP PUMP
		P70	PRODUCT ACID BOOSTER SUMP PUMP
		T04	4160/480 VOLT TRANSFORMER
V01-1	V01-2		CONVERTER
V02-1	V02-2		DRYING TOWER
V03-1	V03-2		INTERPASS TOWER
V06-1	V06-2		FINAL TOWER
V07-1	V07-2		FINAL TOWER PUMP TANK
V08-1	V08-2		DRYING/INTERPASS TOWER PUMP T
		V15A,B	SULFURIC ACID STORAGE TANKS
		V19	MOLTEN SULFUR STORAGE TANK
		V20	TREATED WATER STORAGE TANK
X04-1	X04-2		COLD INTERPASS HEAT EXCHANGER, HOT
X05-1	X05-2		COLD INTERPASS HEAT EXCHANGER, COLD
X06-1	X06-2		HOT INTERPASS HEAT EXCHANGER
X07-1	X07-2		SUPERHEATER
X08-1	X08-2		SECONDARY ECONOMIZER
X09-1	X09-2		PRIMARY ECONOMIZER
X12-1	X12-2		DRYING TOWER ACID COOLER
X13-1	X13-2		INTERPASS TOWER ACID COOLER
X14-1	X14-2		FINAL TOWER ACID COOLER
		X16	PRODUCT ACID COOLER
X20-1	X20-2		BOILER FEEDWATER HEATER
		X24	WATER COOLING TOWER
X25-1	X25-2		BOILER S.B. HEAT RECOVERY SYSTEM
Z01-1	Z01-2		PLANT STACK
		Z02	MOLTEN SULFUR PIT
Z05-1	Z05-2		DEMINERALIZER SYSTEM
Z07-1	Z07-2		BOILER CHEMICAL FEED SYSTEM
		Z08	COOLING WATER TREATMENT SYSTE
		Z09	AUXILIARY GENERATOR
		Z16A	HVAC UNIT FOR CONTROL ROOM
		Z33A,B	ACID TRUCK LOADING STATIONS
		Z35	SULFUR TANK CAR UNLOADING TROUGH
		Z36	PROCESS WASTE WTR. SUMP
		Z37	CONDENSATE RECEIVER SYSTEM
		Z40	TRUCK LOADING SPILL SUMP
		Z91	PRODUCT ACID BOOSTER PUMP BASIN & SUM
		Z92	TANK CAR STEAMING SYSTEM
		Z93	ACID LOADING & TRANSFER PUMP SPILL
		[illegible]	[illegible] HEATING STATIONS

MONSANTO ENVIRO CHEM SYSTEMS, IN

ST. LOUIS MISSOURI

FIG. A-2

PLOT PLAN

SULFURIC ACID PLANT

APPENDIX B

PHOSPHORIC ACID PLANT INFORMATION

DESCRIPTION OF PHOSPHORIC ACID AND FLUOCILICIC ACID PRODUCTION

PHOSPHORIC ACID PRODUCTION

Phosphoric acid is produced by reacting ground phosphate rock with sulfuric acid (produced as described above). This reaction produces phosphoric acid and gypsum. The details of the rock grinding, reaction, filtration, evaporation, storage and clarification processes necessary to produce the desired product are described in the following sections.

WET ROCK GRINDING

The proposed wet rock grinding system is designed with the capability of grinding phosphate rock and producing a ground phosphate rock slurry containing no less than 65 percent solids (by weight). The wet rock grinding system is an open circuit system. Open circuit grinding is a method of reducing particle size by a single passage of the material through a mill.

The wet grinding mill is designed to process a feed material having an approximate size analysis of 100 percent minus 1/2 inch and 60 percent plus 35 mesh to a product material of 98 percent minus 35 mesh Tyler.

The unground rock is received from offsite storage via a belt conveyor and/or elevator and stored in the unground rock silo. A bin activator at the discharge cone of this silo provides a steady flow of rock from the silo to the weigh belt feed conveyor that transfers the unground rock to the ball mill. The unground rock feed rate is controlled by varying the speed of the belt.

Fresh water makeup from the mill water supply tank is introduced at two points within the system. A small quantity of this water is used to wash the weigh belt feed conveyor after it discharges rock to the mill. This waste water then enters the rock ball mill feed chute via the belt wash trough. The remainder of the water is used to slurry the rock being fed to the ball mill. The total quantity of water fed to the mill is flow-recorded and is controlled by a ratio-controller

which receives its signal from the weigh belt feed conveyor. This rock-to-water ratio-controller system, together with a density recorder, is used to control the concentration of solids in the product slurry.

The ground phosphate rock slurry from the ball mill discharges through a trommel screen into the agitated rock slurry pump tank. This trommel screen is used to remove ball chips and any other oversize material from the phosphate rock slurry. These materials are discharged from the screen to a solids container for removal to the battery limits. The slurry is then pumped from the rock slurry pump tank to the rock slurry storage tank (or, alternatively, to the reactor) using a variable-speed controlled horizontal centrifugal pump. The rock slurry pump tank is equipped with a level control used to vary the speed of this pump. The rock slurry storage tank is an agitated vessel with four hours of surge capacity at design flow.

A varible-speed controlled horizontal centrifugal pump is used to pump the phosphate rock slurry from the rock slurry storage tank to the isothermal reactor. Installed spare pumps are included to ensure a continuous feed from either the rock slurry pump tank or the rock slurry storage tank. The flow of the phosphate rock slurry is recorded and controlled by a flow recorder-controller. The density of the slurry is also recorded and the combination of flow and density is then used to obtain a flow measurement in tons per hour of phosphate rock, dry basis.

REACTION PROCESS

The reactor is specifically designed as a crystallizer to promote controlled growth of the dihydrate gypsum crystals. Adequate crystal growth of the by-product gypsum in the slurry is essential to obtain maximum efficiencies and recoveries in a phosphoric acid plant. Process control is the major factor affecting uniform crystal growth. The internal design and the process control of the reactor are such as to provide the operator with optimum control of the production of phosphoric acid. Vacuum flash evaporation is the most economical and

efficient method of removing the heat of reaction and dilution from the reactor. System response to temperature is kept to a minimum by this method of cooling and by high circulation within the reactor. High circulation also allows accurate control of free sulfates, solids, and acid concentration.

Because of the enclosed environment in which the reaction of phosphate rock and sulfuric acid takes place, gaseous fluoride emissions are minimized.

The phosphoric acid reactor is furnished with a draft tube-type agitator-circulator and a vacuum system for vapor removal from the reactor.

The reactor dimensions provide for ample vapor/liquid disengaging space so as to eliminate entrainment.

A propeller-type, top-mounted, agitator-circulator with an electric motor drive is used in the reactor. The impeller is located within the draft tube to achieve proper circulation of the slurry.

The reactor is sufficient to provide a total system retention time (reactor plus filter feed tank) of four hours and allow ample vapor disengaging area.

The agitator-circulator is located in a draft tube to circulate the slurry at a rate to insure the proper conditions are maintained at all points.

Raw material feed is designed for rapid dispersion into the circulating mass of the reactor slurry. The ground rock slurry is fed into the reactor bottom, entering the upward flow into the draft tube. Sulfuric acid is distributed just above the propeller in the draft tube at the point of highest turbulence in the reactor. Recycle acid is fed to the slurry surface in the annular area of the reactor.

The reaction of concentrated sulfuric acid and phosphate rock yields phosphoric acid and gypsum. With the vessel operating under a vacuum of 9 inches Hg absolute and a temperature of 174°F, continuous

flash evaporation at the slurry surface removes the exothermic heat of reaction.

Fluorine and carbon dioxide gases are also evolved due to the acidic decomposition of the phosphate rock.

The vapors from the top of the reactor enter the barometric condenser where condensable vapors are removed by direct contact with pond water. The non-condensable vapors containing carbon dioxide and air are removed by the steam jet ejector. As an alternate, vacuum pumps the same size as the filter vacuum pump may be utlized.

Slurry containing phosphoric acid and gypsum overflows the reactor to the filter feed tank which serves both as a seal tank and a surge tank. The overflow piping configuration is vented and provides smooth flow of the slurry from the reactor to the filter feed tank. The vent gases from the filter feed tank are piped to the fume scrubber for the removal of residual fluoride vapors before discharge to the atmosphere. An Auto-Analyzer pulls a sample from the filter feed tank to continuously monitor the free sulfate concentration in the filtrate.

FILTRATION PROCESS

In the filtration section, the phosphoric acid and by-product gypsum are separated on a horizontal, rotary vacuum filter with wet cake discharge and three counter-current washes.

The filter feed slurry is pumped to a splitter box, then flows by gravity to the slurry distributor which evenly distributes the slurry. A pre-cut, or cloudy port, section separates the first portion of filtrate coming through the cloth before the cake is formed. This removes fine solids and insures against the possibility of product dilution by carryover from the cloth wash section.

A conveyor removes most of the dry cake and discharges it into a hopper where it is slurried with pond water and pumped to battery limits. The remaining layer of gypsum is removed by washing with water. The cloth is also thoroughly cleaned by the high pressure

water. This water and small amount of gypsum is recirculated to the wash box for the final wash.

EVAPORATION PROCESS

Clarified and aged 29 percent P_2O_5 phosphoric acid is concentrated in two stages to produce 1440 TPD P_2O_5 as 54 percent P_2O_5 phosphoric acid. The 40 percent P_2O_5 phosphoric acid produced by the first stage evaporators is clarified and aged before evaporation to 54 percent P_2O_5 phosphoric acid in the second stage evaporators. Evaporation is carried out in two 40 percent and two 54 percent evaporators. Provision is made for the recovery of fluorine.

The 40 percent evaporation circuit receives 29 percent P_2O_5 clarified and aged acid. The 40 percent P_2O_5 acid product is returned from each evaporator to the 40 percent P_2O_5 acid clarifier tank in the tank farm for further clarification and aging. This includes recycle acid required for 40 percent clarification.

The 54 percent evaporation circuit receives clarified and aged 40 percent acid. The 54 percent P_2O_5 acid product is pumped from each evaporator to the 54 percent P_2O_5 accumulator tank in the tank farm for further clarification, aging, and shipment.

The 29 percent P_2O_5 acid feed contains 1 percent or less solids. Concentration and precipitation in the evaporator raises the solids concentration in the 40 percent P_2O_5 product returned to the tank farm to a value of 4.4 percent. The 40 percent P_2O_5 acid feed contains 0.75 percent or less solids. Concentration and precipitation in the evaporator will raise the solids concentration in the 54 percent P_2O_5 product returned to the tank farm to a design value of 5 percent.

Heater condensate is collected in a condensate flash tank and then transferred to two condensate storage tanks located in the clarification tank farm area. Condensate is monitored for conductivity contamination at three locations.

Each of the two 40 percent evaporators has a single barometric condenser and a single steam ejector which maintain an operating vacuum of 6.8 inches Hg absolute at the outlet of the entrainment separator. Each of the 54 percent evaporators has a barometric condenser and a two stage steam ejector system with intercondenser, which maintains an operating vacuum of 2.5 inches Hg absolute at the outlet of the entrainment separator.

The constant liquid level in the body is designed to provide sufficient submergence to suppress flashing in the heat exchanger tubes. Provision is made for 98 percent H_2SO_4 addition at 20 GPM for evaporator washing and boilouts.

STORAGE AND CLARIFICATION PROCESS

The storage and clarification area comprises the tank farm for 29 percent, 40 percent and 54 percent P_2O_5 storage and clarification. Clarification for 29 percent and 40 percent P_2O_5 is via rake clarifier. Clarification of 54 percent P_2O_5 acid incorporates rake clarifiers or centrifuges, depending on the final quality of the acid required. In addition, two 8 hour condensate storage tanks are located in this tank farm.

Filtrate acid from the filtration area containing 29 percent P_2O_5 and approximately 2 percent solids is added to the feedwell of a conventional rake clarifier for initial clarification. The overflow from this tank, containing less than 1 percent solids, is pumped to an agitated storage tank. Sludge acid raked off the bottom of the clarifier is returned to the filter feed tank at a nominal 20 percent solids loading. Clarified 29 percent P_2O_5 acid from the agitated tank is pumped to the 40 percent evaporators for concentration to 40 percent P_2O_5.

The 40 percent phosphoric acid containing 4.4 percent solids is pumped from the evaporators to the feedwell of a conventional rake clarifier for initial clarification. Overflow product containing less than 0.75 percent solids is pumped to a storage tank. A third agitated storage tank is used as a swing tank for either clarified 29 percent or

40 percent acid. Sludge raked off the bottom of the 40 percent P_2O_5 acid clarifier is returned to the 29 percent P_2O_5 clarifie at a nominal 20 percent solids loading. Clarified 40 percent P_2O_5 acid from the agitated storage tank is pumped to the 54 percent evaporators for concentration to 54 percent P_2O_5.

The 54 percent P_2O_5 phosphoric acid containing 5 percent solids is pumped from the evaporators to an agitated tank.

FLUOSILICIC ACID PRODUCTION

A fluosilicic acid recovery system consists essentially of a spray tower located between the phosphoric acid evaporator and the barometric condenser. This spray tower receives vapors from the phosphoric acid evaporator. Fluorine (as HF and SiF_4), water vapor, and minor amounts of air and entrained P_2O_5 (as H_3PO_4), are the major constituents of this stream.

An aqueous solution of H_2SiF_6 is sprayed into the tower to scrub the fluorine compounds in the vapor stream. The H_2SiF_6 solution absorbs the fluorine compounds as the vapor stream and solution approach chemical equilibrium. A small portion of this solution is taken as product and the remainder is recycled back to the scrubber. Water is added to the recycled solution to maintain the desired volume and concentration.

The flow of fluosilicic acid is counter-current to the flow of phosphoric acid in the evaporation system. Phosphoric acid is fed to the first stage evaporator at approximately 30 percent P_2O_5 and concentrated to 42 percent. During this step of concentration, fluorine in the form of SiF_4 is evolved. During the second stage of P_2O_5 concentration (42 percent to 54 percent P_2O_5) the fluorine evolution is in the form of both HF and SiF_4.

In the production of fluosilicic acid, the fluorine compounds from the second stage evaporator are scrubbed first with a solution containing 10 to 11 percent H_2SiF_6. This solution also contains the HF evolved from this evaporator. The primary reaction that occurs in this scrubber is as follows:

$$3SiF_4 + 4H_2O = SiO_2 \quad 2H_2O + 2H_2SiF_6$$

However, a second reaction takes place because of the dissolved HF in the solution. It is as follows:

$$6HF + SiO_2 \quad 2H_2O = H_2SiF_6 + 4H_2O$$

All of the dissolved HF is not reacted in this stage of the scrubbing process, and it is carried in solution to the scrubber on the first stage evaporator. Additional fluoride compounds are absorbed in this scrubber. The chemical reactions are the same as those previously shown. The concentration of the H_2SiF_6 solution is raised to 25 percent by the absorption step and a side stream is taken as product. The concentration is maintained at this level by adding the scrubber liquor from the second stage evaporator. P_2O_5 entrainment in the scrubber liquor is kept to a minimum by use of an entrainment separator installed in the inlet of the scrubber.

PHOSPHORIC ACID PLANT

BADGER AMERICA, INC.

SUBSIDIARY OF THE BADGER COMPANY, INC.

Designers • Engineers • Constructors

TEL. (813) 879-0716
TELEX 52-863

BADGER BUILDING
1401 NORTH WESTSHORE BLVD.
P.O. BOX 22317, TAMPA, FLORIDA 33622

April 16, 1980
Letter No. GD/USSAC-002L

United States Steel Corporation
600 Grant Street, Room 1010
Pittsburgh, Pa. 15230

Attention: RT Lindsay,
Project Manager

Subject: USS Agri-Chemicals
Phosphate Complex Replacement
Ft. Meade, Florida
Badger Project No. E-7551
Overall Plant Material Balance

Dear Mr. Lindsay:

As you requested, we have enclosed ten copies of Drawing No. E-7541-106-0 which is a simplified process schematic diagram indicating plant raw material requirements and effluents.

In regards to pollution abatement, Badger's Gulf Design Division will employ tried and proven technology in minimizing contaminants in plant emissions. Gulf Design will guarantee that when the facilities are operated at the nominal capacity of 1400 short tons of P_2O_5 per day, the total emissions from the fluorine scrubber stacks will not exceed 0.02 pounds of fluorine per ton P_2O_5 input to the system.

Very truly yours,

BADGER AMERICA, INC.

J. W. Salter
Project Manager

JWS/rh

enclosure

A Raytheon Company

MAIN OFFICE AT CAMBRIDGE, MASSACHUSETTS OFFICE IN HOUSTON, TEXAS
AFFILIATES IN THE HAGUE, LONDON, PARIS, TAIPEI, TOKYO AND OTHER PRINCIPAL CITIES OF THE WORLD

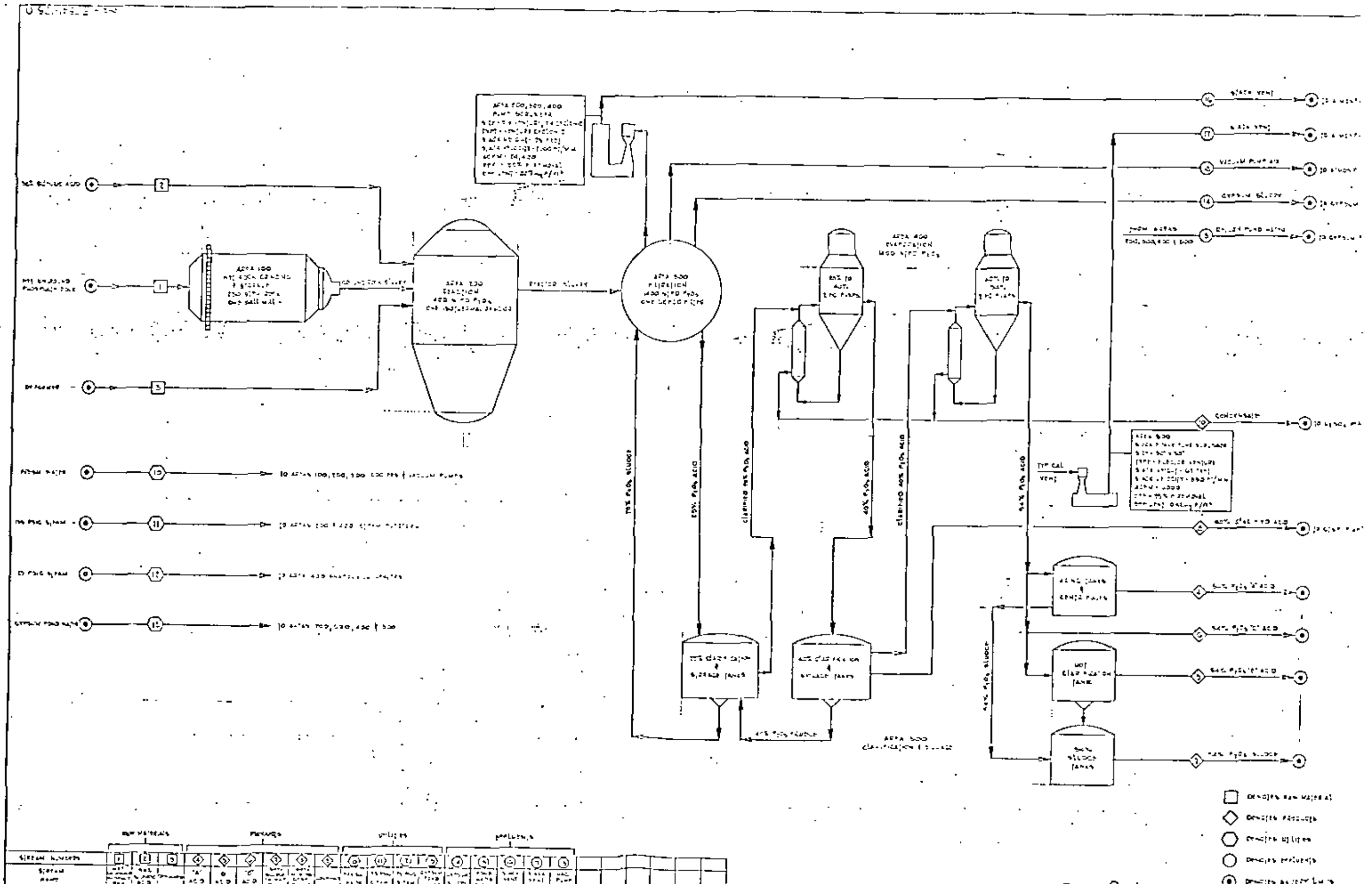


FIG. B-1

FLOW DIAGRAM
RAW MATERIALS, PRODUCTS,
UTILITIES AND EFFLUENTS
PHOSPHORIC ACID PLANT
USS AGRI-CHEMICALS
FT MEADE FLORIDA

BADGER AMERICA INC.

APPENDIX C

GRANULAR TRIPLE SUPERPHOSPHATE PLANT INFORMATION

DESCRIPTION OF GRANULAR TRIPLE SUPERPHOSPHATE PRODUCTION

Triple superphosphate is a high analysis product resulting from the reaction between ground phosphate rock and phosphoric acid. The GTSP process is the only process in the modified plant that will require dry grinding of phosphate rock.

The GTSP plant is designed to produce granular triple superphosphate. In triple superphosphate manufacture, the principal result desired is the formation of monocalcium phosphate monohydrate from phosphate rock and phosphoric acid, as indicated by the following chemical reaction:

$$2Ca_5\ (PO_4)\quad F + 12H_3PO_4 + 9H_2O = 9Ca\ (H_2PO_4)\quad H_2O + CaF_2$$

The triple superphosphate consists largely of water-soluble monocalcium phosphate. There is also a small percentage of citrate-soluble material, consisting mainly of unreacted rock. The remainder of the phosphate (approximately 10 percent) is a combination of citrate-soluble compounds made up largely of iron, aluminum and dicalcium phosphates.

The purpose of the GTSP plant is to convert ground phosphate rock and wet process phosphoric acid into a dry granular material that meets a minimum commercial fertilizer grade of 0-46-0 (percent total nitrogen-percent available phosphoric acid-percent soluble potash) at a rate of 40 tons per hour, after five days storage.

Ground rock from the offsite rock bin is conveyed pneumatically to a rock feed hopper. From the hopper, the rock flows into the weigh scale and is then conveyed to a mixing cone in a quantity which will result in a P_2O_5:Ca (weight basis) ratio of about 2.3 in the final product. The phosphoric acid stream is 41 percent P_2O_5 phosphoric acid.

The rock and acid are vigorously agitated in both the No. 1 and No. 2 reactor vessels. The No. 1 reactor serves to wet and mix the rock and acid to yield the reaction slurry. The No. 2 reactor acts primarily as a surge tank which adds retention time and enables the chemical reaction to proceed further toward completion. The primary reactor overflows into the secondary reactor. Live steam is introduced into the reactors as required to maintain the temperature in the No. 1 reactor at 200 to 220°F and in the No. 2 reactor at 190 to 210°F. This steam condenses, causing some dilution.

Slurry from the No. 2 reactor is pumped to a granulator where the slurry is distributed on a rolling bed of recycle material to form moist triple superphoshate granules. The recycle material is a composite of cyclone discharge dust, undersize granules from the screen, ground oversize granules from the mills, and some product size granules. Triple superphosphate particles recycle through the system until the small particles become coated wiht a sufficient number of slurry layers to become spherical, hard product size granules.

The material leaves the granulator as a damp mass, containing approximately 5 percent free moisture and falls down a chute into the rotary dryer. In the dryer, the moisture is reduced to 3 to 3.4 percent. Co-current hot dryer gases evaporate the excess moisture and heat the granules to approximately 220°F. The remainder of the phosphoric acid and rock reaction started in the reactor is essentially completed in the dryer. This phase of the reaction, together with the heat, liberates fluorine as well as moisture from the granules.

The dryer is equipped with a bar grizzley that reduces the size of the larger lumps before discharging them from the dryer. From the dryer, the dried granules are elevated by two elevators in series and are distributed to four scalping screens. On these screens, the oversize material is separated and flows to the double opposed chain mills for size reduction.

The stream of material from the scalping screen is sent to the product screens at a controlled rate tht will result in screening only the quantity of product size material required to meet the production rate. The analysis of the product sent to storage will be approximately 0-45.5-0. After three to five days, the material will cure to 0-46-0.

The reduced oversize, fines from product screen, material by-passing the product screen, cyclone dust, and fines from shipping are collected in the recycle bin and flow by gravity to the granulator.

Dusty air from the rotary dryer, the screening stations, elevators, recycle conveyor, and the miscellaneous transfer take-off points flows to the dry cyclonic dust collectors for first stage dust removal. The discharge point of the cyclone is equipped with a trickle valve to prevent air leakage. Exhaust gases vent from the top of the cyclones to the wet scrubber system.

The discharge of the dryer cyclone is sprayed with pond water for further dust recovery. The discharge air stream from the granulator is also sprayed with pond water for dust recovery. The water and dust from this spray system are collected in a recovery tank clarifier. The clarifier overflow is pumped to the duct sprays. The underflow at 25 percent solids is pumped to the No. 1 reactor to reclaim the recovered triple superphosphate. Pond water is metered into the recovery tank to maintain a constant level.

The dryer gases are scrubbed in a Venturi cross flow scrubber for final dust removal and fluorine scrubbing. The reactor and granulator gases are scrubbed in a similar system.

STREAM No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DESCRIPTION	BPL PHOSPHATE ROCK	[illegible]% P2O5 ACID	HP STEAM TO EACH REACTOR	HP STEAM TO GRANULATOR	GTSP SLURRY TO GRANULATOR	GRANULATOR DISCHARGE	DRYER DISCHARGE	OVERS TO MILL	ON SIZE MATERIAL TO RECYCLE	FINES	PRODUCT TO STORAGE	RECLAIM FROM SHIPPING	TOTAL RECYCLE	REACTOR OFF GASES	GRANULATOR OFF GASES
TOTAL (TPH)	19.72	54.63	0.64	–	56.15	172.44	154.61	44.40	115.21	49.80	[illegible]	9.78	[illegible]	1.50	5.31
P_2O_5 (TPH)	5.16	14.67	–	–	20.71	173.15	170.05	46.51	[illegible]	49.02	23.60	9.42	155.60	–	0.80
H_2O (TPH)	0.19	12.56	0.64	–	13.05	23.19	16.17	3.78	4.24	9.79	0.40	0.00	7.00	1.44	2.29
SPECIFIC GRAVITY	[illegible]	1.56	–	–	1.69	65 PCF	65 PCF	65 PCF	65 PCF	65 PCF	65 PCF	65 PCF	[illegible] PCF	–	–
TEMP °F	100°F	150°F	340°F	360°F	220°F	176°F	210°F	200°F	195°F	190°F	190°F	140°F	[illegible]	[illegible]	[illegible]
PRESSURE	GRAVITY	5 PSIG	100 PSIG	100 PSIG	10 PSIG	GRAVITY	GRAVITY	GRAVITY	GRAVITY	GRAVITY	GRAVITY	GRAVITY	GRAVITY	[illegible]	[illegible]
GPM (ACFM)	–	76	3760 LBS/HR	200 LBS/HR	134	–	–	–	–	–	–	–	–	(2,200)	(2,200)

STREAM No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
DESCRIPTION	COMBINED R & G OFF GASES TO SCRUBBER	R.S. GASES TO STACK	DUST SYSTEM GASES TO DRYER INLET	DRYER FURNACE [illegible] TO DRYER	DRYER OFF GASES TO SCRUBBER	DRYER GASES TO STACK	[illegible] FUEL OIL TO DRYER FURNACE	TOTAL INCOMING POND WATER	POND WATER TO SCRUBBER SPRAYS	POND WATER TO [illegible]	POND WATER MAKE UP TO [illegible] SYSTEM	RETURN WATER TO [illegible] SPRAY DUCT	[illegible] WATER TO DRYER SPRAY DUCT	[illegible] TO REACTOR	TOTAL DUST RETURN FROM CYCLONES
TOTAL (TPH)	8.14	–	0.12	–	10.11	–	–	.022	5.0	5.0	1.7[illegible]	25.15	40.15	2.6	7.5[illegible]
P_2O_5 (TPH)	0.10	–	–	–	[illegible]	–	–	6	5	5	0.01	[illegible]	25.0[illegible]	0.60	5.05
H_2O (TPH)	4.0	–	–	–	[illegible]	–	–	[illegible]	[illegible]	[illegible]	1.4	[illegible]	[illegible]	1.75	0.51
SPECIFIC GRAVITY	–	–	–	–	–	–	0.96	1.02	1.02	1.02	1.02	1.25	1.25	1.25	0.9 PCF
TEMP °F	167°F	[illegible]	[illegible]	1100°F	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	90°F
PRESSURE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	50 PSIG	50 PSIG	50 PSIG	50 PSIG	[illegible] PSIG	50 PSIG	50 PSIG	[illegible] PSIG	GRAVITY
GPM (ACFM)	(20,800)	(20,000)	([illegible])	([illegible])	(21,000)	([illegible])	[illegible]	4000	2000	2000	[illegible]	40	450	[illegible]	–

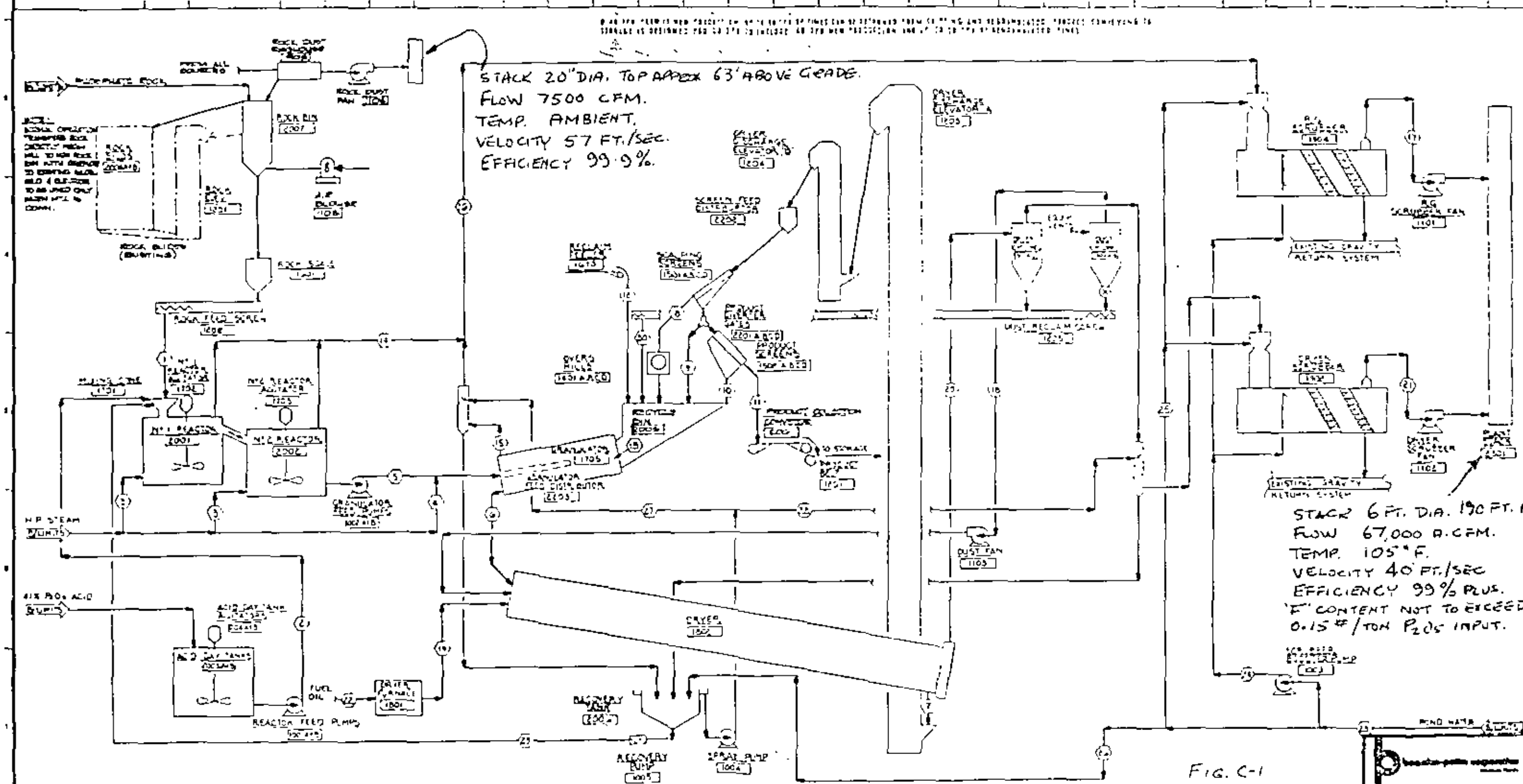


FIG. C-1

USS Agri-Chemicals

GTSP EXPANSION STUDY
GTSP PROCESS PLANT
PROCESS FLOW SHEET

NO. 851Q-P-001

REVISIONS

DRAWING HISTORY

USS Agri-Chemicals
Division of United States Steel Corporation

MAIL: P. O. BOX 150
BARTOW, FLORIDA 33830
813-533-0471

PROCESS RATE STATEMENT FOR EMISSION TEST

Date: MARCH 5, 1980

Process: PHOSPHORIC ACID, STACK 7X

Location: FT. MEADE, FLORIDA

Permit Number: A053-4563

Start of Test	End of Test	Production Rate
		TON P_2O_5/DAY Input
2:00 P.M.	4:10 P.M.	
4:25 P.M.	6:35 P.M.	324

I certify that the above statement is true to the best of my knowledge.

DER NOTIFIED TO WITNESS THIS TEST. DID NOT SHOW UP.

Signature: Eugene Williams

Title: Environmental Tech.

Date: 3/5/80

DATE – 3/5/80
ANALYSIS – PARTICULATE
LOCATION – FT. MEADE PAD
WEST STACK, X-TRAIN

RUN 1	ACETONE BLANK	PROBE WASHED	FILTER PAPER
GROSS	101.5972	102.2784	0.5872
TARE	101.5972	102.2780	0.5681
TOTAL	.0000	.0004	.0191
			.0004
			.0195

RUN 2	ACETONE BLANK	PROBE WASHED	FILTER PAPER
GROSS		102.5984	0.5900
TARE		102.5978	0.5684
TOTAL		.0006	.0216
			.0006
			.0222

RUN-1

GRAINS $= \frac{19.5}{64.8} = 0.3009$

$\frac{GRS.}{Ft^3} = \frac{0.3009}{22.74} = 0.0132$

$\frac{LB.}{HR.} = \frac{0.0132 \times 7343 \times 60}{7{,}000} = 0.8308$

RUN-2

GRAINS $= \frac{22.2}{64.8} = 0.3426$

$\frac{GRS.}{FT^3} = \frac{0.3426}{22.03} = 0.0156$

$\frac{LB.}{HR.} = \frac{0.0156 \times 7069 \times 60}{7{,}000} = 0.9452$ $\frac{LB.}{HR.}$

$\frac{0.8308 \times 24}{324 \frac{T-P_2O_5}{DAY}} = 0.0062$ $\frac{LB.\ PARTICULATE}{TON\ P_2O_5}$

$\frac{0.9452 \times 24}{324} = .0070$ $\frac{LB.\ PART}{TON\ P_2O_5}$

.07

USS Agri-Chemicals
Division of United States Steel Corporation

MAIL: P. O. BOX 150
BARTOW, FLORIDA 33830
813-533-0471

PROCESS RATE STATEMENT FOR EMISSION TEST

Date: April 15, 1980

Process: Granular Triplesuperphosphate Drier 11-X

Location: Ft. Meade Chemical plant

Permit Number: A053-4561 Wet Scrubber

Start of Test	End of Test	Production Rate
12:55 PM	1:50 PM	8.33 T-P_2O_5/HR Input
2:30	3:20	8.33
		200 T-P_2O_5/DAY

I certify that the above statement is true to the best of my knowledge.

Signature: James H Carroll

Title: Environmental Engineer

Date: April 16, 1980

E.W. EW-4/15/

DRIER FUEL - #6 OIL

DATE- 4-15-80

ANALYSIS - PARTICULATE

LOCATION - Ft. MEADE - TSP

STACK 11X

PARTICULATE COLLECTION FILTER WAS BLACK

RUN 1	ACETONE BLANK	PROBE WASHED	FILTER PAPER
GROSS	102.8058	102.5198	0.5955
TARE	102.8058	102.5176	0.5600
TOTAL	.0000	.0022	.0355
			.0022
			.0377

RUN 2	ACETONE BLANK	PROBE WASHED	FILTER PAPER
GROSS		103.2749	0.5940
TARE		103.2722	0.5553
TOTAL		.0027	.0387
			.0027
			.0414

RUN-1

GRAINS = $\frac{37.7}{64.8}$ = 0.5818

$\frac{GRS.}{Ft^3}$ = $\frac{0.5818}{34.54}$ = 0.0168

$\frac{LB.}{HR.}$ = $\frac{0.0168 \times 58369 \times 60}{7,000}$ = 8.4051

RUN-2

GRAINS = $\frac{41.4}{64.8}$ = 0.6389

$\frac{GRS.}{FT^3}$ = $\frac{0.6389}{36.39}$ = 0.0176

$\frac{LB.}{HR.}$ = $\frac{0.0176 \times 58424 \times 60}{7000}$ = 8.8137

$\frac{8.4051}{8}$ = 1.0506 $\frac{LBS}{TON-Rock}$

$\frac{8.8137}{8}$ = 1.1017 $\frac{LBS.}{TON-Rock}$

$\frac{8.4051 \times .47}{8.33 \text{ ~~x .47~~}}$ = ~~2.15~~ 0.47

.47% P₂O₅ in GTSP

$\frac{8.8137 \times .47}{8.33 \text{ ~~x .47~~}}$ ~~2.25~~ 0.50

0.485 ~~2.2~~ LB Particulate / T - GTSP

JJC 5-8-8