KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
904/377-5822 ▪ FAX 377-7158

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April 20, 1993

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APR 28 1993
Division of Air
Resources Management

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

Subject: PSD Permit Application
IMC Fertilizer, Inc.
New Wales Operation
Nichols Plant
Polk County, Florida

Dear Mr. Fancy:

Enclosed are seven signed copies of the PSD permit application, one copy of Appendix B, Supporting Documentation, and a check for $7,500 (permit application fee) for the Nichols plant at IMC Fertilizer, Inc. in Mulberry, Polk County, Florida.

If you have any questions concerning this application, please do not hesitate to contact me.

Very truly yours,

KOOGLER & ASSOCIATES

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

JBK:PAR:wa
Enc.

c: Mr. Jerry Girardin, IMC Fertilizer, Inc.

The Citizens & Southern National Bank
Atlanta, Dekalb County, Georgia

IMC FERTILIZER, INC.

NEW WALES OPERATIONS
P.O. BOX 1035 • MULBERRY, FLORIDA 33860

IMC FERTILIZER, INC.

64-1278
611

CHECK NO. 031675

MONTH	DAY	YEAR
04	26	93

OPERATING ACCOUNT

REGISTERED 7500 DOLS 00 CTS

PAY TO THE ORDER OF

AMOUNT
****7500.00****

Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Fl. 32399

AUTHORIZED SIGNATURE

⑈031675⑈ ⑆061112788⑆ 011 38 049⑈

NO. 031675

IMC FERTILIZER, INC.
NEW WALES OPERATIONS • P.O. BOX 1035 • MULBERRY, FLORIDA 33860

IMC FERTILIZER, INC.

INVOICE DATE			INVOICE NUMBER	REFERENCE NUMBER	PURCHASE ORDER NO.	INVOICE AMOUNT	DISCOUNT	NET PAYABLE
MONTH	DAY	YEAR						
04	26	93	C/R	V#638509		$7500.00	-0-	$7500.00

RECEIVED
APR 28 1993
Division of Air Resources Management

AN APPLICATION FOR A PSD CONSTRUCTION PERMIT

PREPARED FOR:

IMC FERTILIZER, INC.
NEW WALES OPERATIONS
NICHOLS PLANT
POLK COUNTY, FLORIDA

APRIL 1993

PREPARED BY:

KOOGLER & ASSOCIATES
4014 N.W. 13TH STREET
GAINESVILLE, FLORIDA 32609
(904) 377-5822

KOOGLER & ASSOCIATES

Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

DER Form #	
Form Title	
Effective Date	
DER Application No	
	(Filled in by DER)

AC53-232641 (DAP)
AC53-230355 (sulfuric acid)
PSD-FL-204

$7,500 pd.
4-29-93
Recpt. 180853

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Fertilizer Manufacturing Plant [ ] New[1] [X] Existing[1]

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

COMPANY NAME: IMC Fertilizer, Inc. New Wales Operation-Nichols Plant COUNTY: Polk

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) See attached report

SOURCE LOCATION: Street County Road 676 City Nichols

UTM: East (17) 398.4 km North 3084.2 km

Latitude 82 ° 01 ' 55 "N Longitude 27 ° 52 ' 51 "W

APPLICANT NAME AND TITLE: John A. Brafford, Vice President and General Manager

APPLICANT ADDRESS: P.O. Box 1035, Mulberry, FL 33860

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of IMC Fertilizer, Inc. New Wales Operation Nichols Plant

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. Furth I agree to maintain and operate the pollution control source and pollution cont facilities in such a manner as to comply with the provision of Chapter 403, Flor Statutes, and all the rules and regulations of the department and revisions thereof. also understand that a permit, if granted by the department, will be non-transfera and I will promptly notify the department upon sale or legal transfer of the permit establishment.

*Attach letter of authorization

Signed: [signature]

John A. Brafford, Vice President & Gen. Mgr.
Name and Title (Please Type)

Date: 04/26/93 Telephone No. (813) 428-2531

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 h been ~~designed~~/examined by me and found to be in conformity with modern engineer principles applicable to the treatment and disposal of pollutants characterized in permit application. There is reasonable assurance, in my professional judgment, t

[1] See Florida Administrative Code Rule 17-2.100(57) and (104)

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 ______________________

John B. Koogler, Ph.D., P.E.
Name (Please Type)

Koogler & Associates, Environmental Services
Company Name (Please Type)

4014 N.W. 13th Street, Gainesville, FL 32609
Mailing Address (Please Type)

Florida Registration No. 12925 Date: 4/19/93 Telephone No. (904) 377-5822

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.

See attached report

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

Start of Construction NA Completion of Construction NA

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.)

NA

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

Sulfuric Acid Plant, A053-146516 : Issued 6/3/88 , Expires 6/1/93

DAP Plant A053-180228,229,230 : Issued 9/6/90 , Expire 8/22/95

Molten Sulfur System, A053-187409 : Issued 12/6/90 , Expires 11/30/95

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;

if power plant, hrs/yr_____ ; if seasonal, describe: ______________________________

F. 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? NA

   b. If yes, has "Lowest Achievable Emission Rate" been applied? NA

   c. If yes, list non-attainment pollutants. NA

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. YES[1]

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. YES[1]

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? YES[1]

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? NO

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? NO

   a. If yes, for what pollutants? NA

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted. NA

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

[1] See attached report

AC53-230355

SULFURIC ACID PLANT

Sulfuric Acid Plant

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	Ash	0.005	83,000 (max)	

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

1. Total Process Input Rate (lbs/hr): 83,000 (max)

2. Product Weight (lbs/hr): 208,340 (as 100% acid)

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

See attached report

Name of Contaminant	Emission[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 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).

Sulfuric Acid Plant

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency %	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
Double Absorption	SO_2	99.4		EST
Process				
Fibre Mist Eliminators	Acid Mist	90+	> 1	EST

E. Fuels NA

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

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--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. NA

Annual Average ______________ Maximum ______________

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

None

Sulfuric Acid Plant

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

Stack Height: 150 ft. Stack Diameter: 7.5 ft.

Gas Flow Rate: 104,000 ACFM 88,000 DSCFM Gas Exit Temperature: 170 °F.

Water Vapor Content: 0 % Velocity: 40 FPS

SECTION IV: INCINERATOR INFORMATION

NA

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Patholog-ical)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Inciner-ated							
Uncon-trolled (lbs/hr)							

Description of Waste ______

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

Approximate Number of Hours of Operation per day ______ day/wk ______ wks/yr. ______

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 Diamter: ______ 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) ______

MOLTEN SULFUR SYSTEM

Molten Sulfur System

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

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

Description	Contaminants Type	Contaminants % Wt	Utilization Rate - lbs/hr	Relate to Flow Diagram
Sulfur	Ash	0.005	230,000	

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

1. Total Process Input Rate (lbs/hr): 230,000 (max handling rate)

2. Product Weight (lbs/hr): ____

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

See attached report

Name of Contaminant	Emission[1] Maximum lbs/hr	Emission[1] Actual T/yr	Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission lbs/yr	Potential[4] Emission T/yr	Relate to Flow Diagram

[1] See Section V, Item 2.

[2] Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 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).

Molten Sulfur System

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

NA

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)

E. Fuels NA

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

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--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. NA

Annual Average ______________ Maximum ______________

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

None

Molten Sulfur System
Representative Stack for Modeling

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

Stack Height: 32 ft. Stack Diameter: 1 ft.

Gas Flow Rate: 470 ACFM 370 DSCFM Gas Exit Temperature: 207 °F.

Water Vapor Content: 0 % Velocity: 10 FPS

SECTION IV: INCINERATOR INFORMATION

NA

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.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste ______

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

Approximate Number of Hours of Operation per day ______ day/wk ______ wks/yr. ______

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 Diamter: ______ 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) ______

AC 53-232681

DAP PLANT

DAP Plant

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

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

Description	Contaminants Type	Contaminants % Wt	Utilization Rate - lbs/hr	Relate to Flow Diagram
Phosphoric Acid	Flouride	2	247000	
Sulfuric Acid	-	-	300	
Nitric Acid	-	-	1500	
Ammonia	-	-	46,000	

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

1. Total Process Input Rate (lbs/hr): ~ 295000

2. Product Weight (lbs/hr): 200000

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

See attached report

Name of Contaminant	Emission[1] Maximum lbs/hr	Emission[1] Actual T/yr	Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission lbs/yr	Potential[4] Emission T/yr	Relate to Flow Diagram

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 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).

DAP Plant

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency %	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
Cyclones	PM	70+	5	EST
Venturi Scrubbers	PM/F/NH3	90+		EST
Cyclonic Mist	Mist	70+	5	EST
Separator				

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Natural Gas	-	0.016 MMCF	16.0
No. 2 Fuel Oil	-	114.3 gals	16.0

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis: Fuel Oil

Percent Sulfur: 0.5 Percent Ash: Trace

Density: 7.2 lbs/gal Typical Percent Nitrogen: 0.2

Heat Capacity: 19,400 BTU/lb 140,000 BTU/gal

Other Fuel Contaminants (which may cause air pollution):

. If applicable, indicate the percent of fuel used for space heating. NA

Annual Average Maximum

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

Liquids are recirculated and solids are recycled.

DAP Plant
Reactor/Granulator Stack

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

Stack Height: 69 ft. Stack Diameter: 6 ft.

Gas Flow Rate: 73000 ACFM 23000 DSCFM Gas Exit Temperature: 190 °F.

Water Vapor Content: ~ 60 % Velocity: ~ 43 FPS

SECTION IV: INCINERATOR INFORMATION

NA

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Patholog-ical)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Inciner-ated							
Uncon-trolled (lbs/hr)							

Description of Waste ______

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

Approximate Number of Hours of Operation per day ______ day/wk ______ wks/yr. ______

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 Diamter: ______ 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) ______

DAP Plant
Dryer Stack

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

Stack Height: 80 ft. Stack Diameter: 3.5 ft.

Gas Flow Rate: 38000 ACFM 28,000 DSCFM Gas Exit Temperature: 135 °F.

Water Vapor Content: ~13 % Velocity: ~65 FPS

SECTION IV: INCINERATOR INFORMATION

NA

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste ______

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

Approximate Number of Hours of Operation per day ______ day/wk ______ wks/yr. ______

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 Diamter: ______ 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) ______

DAP Plant
Cooler Stack

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

Stack Height: 51 ft. Stack Diameter: 2.5 ft.

Gas Flow Rate: 26,000 ACFM 22,000 DSCFM Gas Exit Temperature: 116 °F.

Water Vapor Content: ~ 5 % Velocity: ~ 88 FPS

SECTION IV: INCINERATOR INFORMATION

NA

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Patholog-ical)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Inciner-ated							
Uncon-trolled (lbs/hr)							

Description of Waste ______

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

Approximate Number of Hours of Operation per day ______ day/wk ______ wks/yr. ______

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 Diamter: ______ 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.):

______

______

______

______

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

See attached report

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

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.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

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, design pressure drop, etc.)

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).

6. An 8 1/2" 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.

7. An 8 1/2" 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).

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. 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

See attached report

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[ ] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [ ] No

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration

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

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

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:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

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:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

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:

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

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:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

[1]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

. Company Monitored Data — See attached report

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.

Specify bubbler (B) or continuous (C).

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.

Applicants Maximum Allowable Emission Data

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

Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description of 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.

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.

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.

REPORT IN SUPPORT OF
AN APPLICATION FOR A PSD
CONSTRUCTION PERMIT REVIEW

PREPARED FOR:

IMC FERTILIZER, INC.
NEW WALES OPERATIONS
NICHOLS PLANT
POLK COUNTY, FLORIDA

APRIL 1993

PREPARED BY:

KOOGLER & ASSOCIATES
4014 N.W. 13TH STREET
GAINESVILLE, FLORIDA 32609
(904) 377-5822

KOOGLER & ASSOCIATES

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1.0 SYNOPSIS OF APPLICATION

1.1 APPLICANT

IMC Fertilizer, Inc.
New Wales Operations
Nichols Plant
P.O. Box 1035
Mulberry, Florida 33860

1.2 FACILITY LOCATION

IMC Fertilizer, Inc., New Wales Operations - Nichols Plant (IMC), previously Conserv, Inc., consists of a phosphate chemical fertilizer manufacturing facility located on County Road (CR) 676, Nichols, Polk County, Florida. The UTM coordinates of the IMC Nichols facility are Zone 17, 398.7 km east and 3084.2 km north.

1.3 PROJECT DESCRIPTION

IMC proposes to increase the permitted sulfuric acid production rate of the existing double absorption sulfuric acid plant from 2000 to 2500 tons per day (TPD) of 100% H_2SO_4. The molten sulfur feed rate to the sulfuric acid plant will correspondingly increase from 825 to 1000 TPD. The proposed project also includes an increase in the production rate of the diammonium phosphate (DAP) plant from 80 to 100 tons per hour (TPH).

The proposed project will result in a significant net increase (in accordance with Table 212.400-2 of Chapter 17-212, Florida Administrative Code, FAC) in the emission rates of sulfur dioxide, sulfuric acid mist, particulate matter, and fluorides; and a less than significant increase in the emission rate of nitrogen oxides, carbon monoxide and volatile organic compounds.

IMC is submitting this report in support of the application to the Florida Department of Environmental Regulation for an increase in the molten sulfur handling rate, and an increase in sulfuric acid and DAP production rates at the Nichols facility. The report includes a description of the existing facility and the proposed project, a review of Best Available Control Technology, an ambient air quality analysis and an evaluation of the impact of the proposed project on soils, vegetation, visibility, and the Class I area.

2.0 FACILITY DESCRIPTION

IMC Nichols facility consists of a phosphate chemical fertilizer manufacturing facility located at CR 676, Nichols, Polk County, Florida (See Figures 2-1 and 2-2). The UTM coordinates of the facility are Zone 17, 398.7 km east and 3084.2 km north.

2.1 EXISTING FACILITY

The existing fertilizer complex processes phosphate rock into fertilizer products. This is accomplished by reacting the phosphate rock with sulfuric acid to produce phosphoric acid and then converting the phosphoric acid to DAP. The Plot Plan presented in Figure 2-3 shows the location of the existing plants.

The facility currently purchases additional sulfuric and phosphoric acid to meet the DAP production requirements.

2.1.1 Sulfuric Acid Plant

Molten sulfur is fired into a furnace producing sulfur dioxide. Multiple beds of catalyst convert the sulfur dioxide to sulfur trioxide. Dual absorption towers use sulfuric acid to absorb the sulfur trioxide forming concentrated acid (product). A significant amount of process waste heat is recovered by heat exchangers. The emissions of sulfur dioxide are controlled by the dual absorption towers. The emissions of acid mist are controlled by mist eliminators.

The existing double absorption sulfuric acid plant is permitted to produce 2000 TPD of 100 percent H_2SO_4. The plant is subject to Federal New Source Performance Standards as set forth in 40CFR60, Subpart H. The emission limiting standards for the plant are: 4 pounds per ton of 100 percent acid, for sulfur dioxide; 0.15 pound per ton of 100 percent acid, for acid mist; and 10 percent opacity, for visible emissions. The state of Florida has identical emission limiting standards for new sulfuric acid plants as set forth in Rule 17-296.402, FAC. The current FDER air permit for the sulfuric acid plant is A053-146516 (Issued 6-3-88; Expires 6-1-93).

The actual emission rates of sulfur dioxide and acid mist from the sulfuric acid plant (presented in Table 2-1) are based on 1991 and 1992 compliance tests results. These results have been submitted to FDER's Southwest District Office. In 1991-1992, the maximum measured sulfur dioxide emission rate during a compliance test was 309.9 pounds per hour (allowed 333.4) and the maximum measured acid mist emission rate was 4.80 pounds per hour (allowed 12.5). Higher emission rates do occur and are documented in the Appendix.

Nitrogen oxide emissions from the sulfuric acid plants have been estimated by using an emission factor of 0.12 pound per ton of 100 percent H_2SO_4 produced, an emission factor used by FDER in recent permitting of similar plants.

2.1.2 Molten Sulfur System

Molten sulfur is unloaded from railcars and trucks into pits. The sulfur in the rail and truck pits is pumped to storage tanks. The molten sulfur is supplied to the sulfuric acid plant as needed. There are negligible air emissions from the molten sulfur system and as a result there is no add-on pollution control equipment.

The existing molten sulfur system is permitted to receive/handle up to 2800 TPD and 305,000 TPY of sulfur. The maximum molten sulfur feed rate to the sulfuric acid plant is limited to 825 TPD and 275,000 TPY.

The molten sulfur system is subject to the emission limiting standards as set forth in Rule 17-296.411, FAC. The standards require the use of specific work practices and limit visible emissions to 20 percent opacity. The current FDER air permit for the molten sulfur system is A053-187409 (Issued 12-6-90; Expires 11-30-95).

2.1.3 Diammonium Phosphate Plant

In the basic ammoniated phosphate process, anhydrous ammonia is reacted with phosphoric acid. The slurry produced by the ammoniation is then sprayed onto a bed of solids in the granulator and additional ammonia (if required) is added to complete the acid neutralization and produce the final product grade. The resulting slurry/solids mixture contains excess water which is removed by drying in a fossil fuel fired direct contact rotary dryer. The dried solids are then screened to remove on size product. The product size material is passed through a product cooler and then to storage. The over-sized and under-sized materials are crushed and recirculated through the granulator. Air emissions of fluorides, particulate matter, and ammonia are controlled by the process reactions and add-on wet scrubbers.

The existing DAP plant is permitted to produce 80 TPH of DAP based on 38.4 TPH equivalent P_2O_5 feed. The plant is subject to Federal New Source Performance Standards as set forth in 40CFR60, Subpart V, which limit the fluoride emissions from the plant to 0.06 pound per ton of equivalent P_2O_5 feed.

The state of Florida has an identical emission limiting standard for new DAP plants as set forth in Rule 17-296.403, FAC. The current FDER air permits for the DAP plant are A053-180228 for the reactor/granulator; A053-180230 for the dryer; and A053-180229 for the cooler (All Issued 9-6-90, All Expire 8-22-95).

The actual emission rates of fluorides and particulates from the DAP plant (presented in Table 2-2) are based on 1991 and 1992 compliance test results. These results have been submitted to FDER's Southwest District Office. In 1991-1992, the maximum measured fluoride emission rate during a compliance test was 1.11 pounds per hour (allowed 1.58).

FIGURE 2-1

SITE LOCATION MAP

IMC FERTILIZER INC. - NICHOLS PLANT
POLK COUNTY, FLORIDA

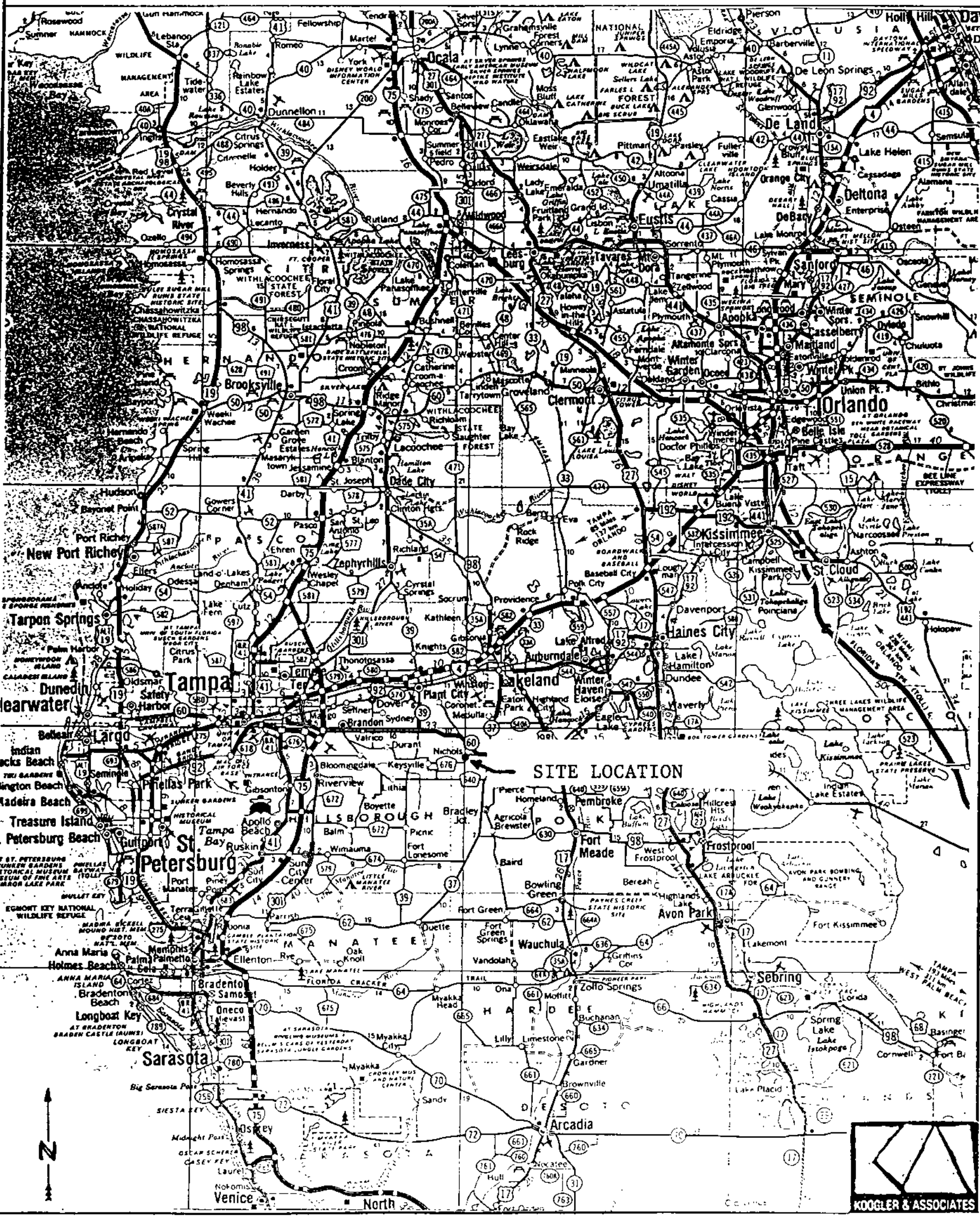

FIGURE 2-2

AREA LOCATION MAP

IMC FERTILIZER INC. - NICHOLS PLANT

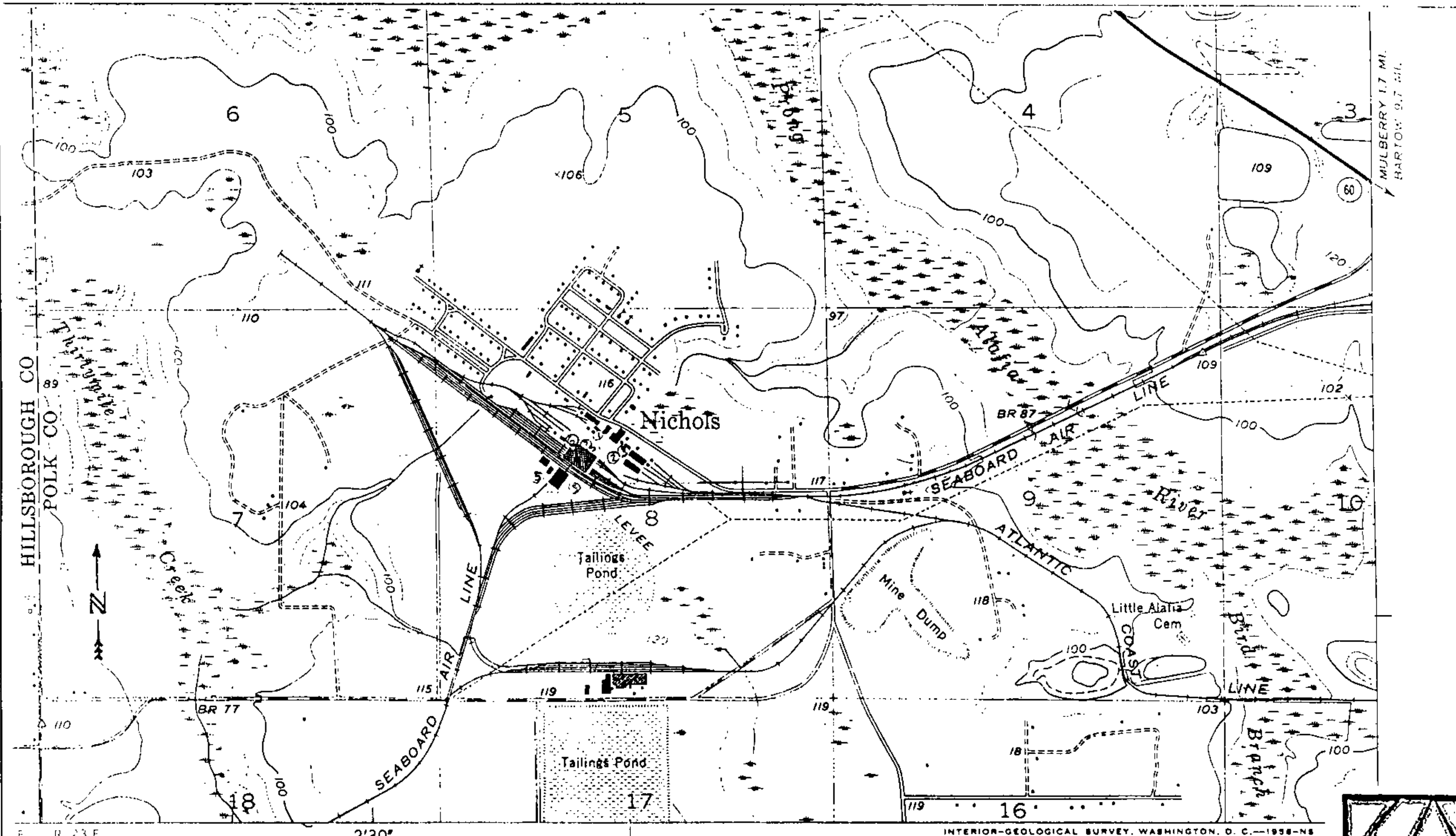

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FIGURE 2-3

PLOT PLAN

IMC FERTILIZER INC. - NICHOLS PLANT

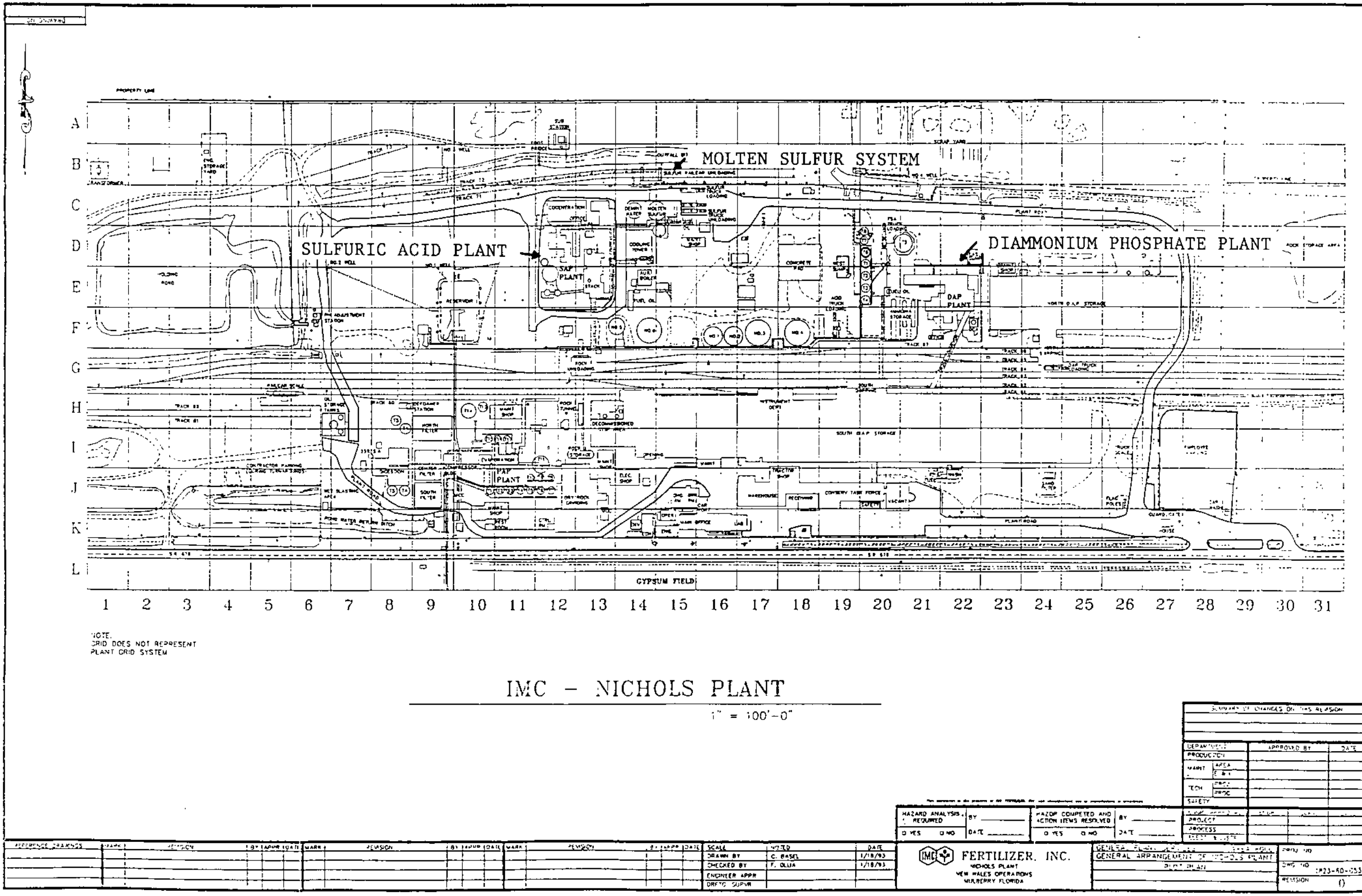


TABLE 2-1

ACTUAL EMISSIONS SUMMARY(1)
SULFURIC ACID PLANT

IMC FERTILIZER, INC.- NICHOLS PLANT
POLK COUNTY, FLORIDA

Date	Sulfur Dioxide lbs/hr	Sulfuric Acid Mist lb/hr
5-16-91	309.9	1.60
5-13-92	277.1	4.80
Average	293.5	3.2
Permit Limits	333.3	12.5

(1) Emissions summary from the 1991 and 1992 compliance tests submitted to FDER.

TABLE 2-2

ACTUAL EMISSIONS SUMMARY(1)
DAP PLANT

IMC FERTILIZER, INC.- NICHOLS PLANT
POLK COUNTY, FLORIDA

Date	Source	Emissions: Fluorides lbs/hr	Emissions: Particulates lbs/hr
4-22-91	Reactor	0.31	3.57
4-24-91	Dryer	0.05	6.15
4-25-91	Cooler	0.02	0.75
	Total	0.38	10.47
11-5-91	Reactor	0.91	6.07
11-8-91	Dryer	0.11	0.99
11-7-91	Cooler	0.07	0.61
	Total	1.09	7.67
4-20-92	Reactor	0.97	4.10
4-22-92	Dryer	0.09	2.86
4-21-92	Cooler	0.05	1.52
	Total	1.11	8.48
10-19-92	Reactor	0.56	2.85
10-21-92	Dryer	0.05	1.97
10-20-92	Cooler	0.04	0.87
	Total	0.65	5.69
Average		0.8	8.08
Permit Limits		1.58	32.9

(1) Emissions summary from the 1991 and 1992 compliance tests submitted to FDER.

3.0 PROPOSED PROJECT

3.1 PROJECT DESCRIPTION

IMC proposes to increase the permitted sulfuric acid production rate of the existing double absorption sulfuric acid plant from 2000 to 2500 TPD of 100% H2SO4. The proposed project will involve an increase in the amount of catalyst utilized in the process without any equipment changes. The emission limits for the sulfuric acid plants will be in accordance with the Federal NSPS and Rule 17-296.402, FAC; i.e., the sulfur dioxide and acid mist emission limits will be 4.0 pounds per ton and 0.15 pounds per ton of 100 percent sulfuric acid, respectively.

The molten sulfur feed rate to the sulfuric acid plant will increase from 825 to 1000 TPD. The proposed project will involve no changes to the molten sulfur system, only an increase in the amount of sulfur supplied to the sulfuric acid plant. The emission limits for the molten sulfur system will be in accordance with Rule 17-296.411, FAC, limiting visible emissions to 20% opacity and maintaining proper operation practices.

The proposed project also includes an increase in the production rate of the DAP plant from 80 to 100 TPH. The production increase will result from better process flow control and operation efficiency. No changes to the process equipment will be necessary. The emission limits for the DAP plant will be in accordance with 40CFR60, Subpart V, and Rule 17-296.403, FAC, which limit the fluoride emissions from the plant to 0.06 pound per ton of equivalent P_2O_5 feed.

The facility currently purchases additional sulfuric and phosphoric acid to meet the DAP production demands. The proposed increase in sulfuric acid production will reduce purchase requirements. Additional phosphoric acid will continue to be purchased as necessary. The proposed project will not affect the operation of the phosphoric acid plant.

Process flow diagrams for the facility, including the sulfuric acid plant, molten sulfur system, and the DAP plant, are presented in Figures 3-1 and 3-2.

Table 3-1 summarize the permitted, actual and proposed operating characteristics of the three systems. The net emission changes as a result of the proposed project are summarized in Table 3-2.

The information presented in Table 3-2 shows there will be a significant net increase in the annual emissions of sulfur dioxide, sulfuric acid mist, fluorides, and particulate matter, and a less than significant increase in the annual emissions of nitrogen oxides, carbon monoxide, and volatile organic compounds (as defined by Table 212.400-2, Chapter 17-212, FAC).

3.2 RULE REVIEW

The following are the state and federal air regulatory requirements that apply to new or modified sources subject to a Prevention of Significant Deterioration (PSD) review.

In accordance with EPA and state of Florida PSD review requirements, all major new or modified sources of air pollutants regulated under the Clean Air Act (CAA) are subject to preconstruction review. Florida's State Implementation Plan (SIP), approved by the EPA, authorizes the Florida Department of Environmental Regulation (FDER) to manage the air pollution program in Florida.

The PSD review determines whether or not significant air quality deterioration will result from a new or modified facility. Federal PSD regulations are contained in 40CFR52.21, Prevention of Significant Deterioration of Air Quality. The state of Florida has adopted PSD regulations which are essentially identical to the federal regulations and are contained in Chapter 17-212 of the Florida Administration Code (FAC). All new major facilities and major modifications to existing facilities are subject to control technology review, source impact analysis, air quality analysis and additional impact analyses for each pollutant subject to a PSD review. A facility must also comply with the Good Engineering Practice (GEP) stack height rule.

A major facility is defined in the PSD rules as any one of the 28 specific source categories (see Table 3-3) which has the potential to emit 100 tons per year (tpy) or more, or any other stationary facility which has the potential to emit 250 tpy or more, of any pollutant regulated under the CAA. A major modification is defined in the PSD rules as a change at an existing major facility which increases the actual emissions by greater than significant amounts (see Table 3-4).

3.2.1 Ambient Air Quality Standards

The EPA and the state of Florida have developed/adopted ambient air quality standards, AAQS (see Table 3-5). Primary AAQS protect the public health while the secondary AAQS protect the public welfare from adverse effects of air pollution. Areas of the country have been designated as attainment or nonattainment for specific pollutants. Areas not meeting the AAQS for a given pollutant are designated as nonattainment areas for that pollutant. Any new source or expansion of existing sources in or near these nonattainment areas are usually subject to more stringent air permitting requirements. Projects proposed in attainment areas are subject to air permit requirements which would ensure continued attainment status.

3.2.2 PSD Increments

In promulgating the 1977 CAA Amendments, Congress quantified concentration increases above an air quality baseline concentration levels for sulfur dioxide (SO_2) and particulate matter (PM/TSP) which would constitute significant deterioration. The size of the allowable increment depends on the classification of the area in which the source would be located or have an impact. Class I areas include specific national parks, wilderness areas and memorial parks. Class II areas are all areas not designated as Class I areas and Class III areas are industrial areas in which greater deterioration than Class II areas would be allowed. There are no designated Class III areas in Florida.

In 1988, EPA promulgated PSD regulations for nitrogen oxides (NOx) and PSD increments for nitrogen dioxide (NO_2) concentrations. FDER adopted the NO_2 increments in July 1990 (see Table 3-6 for PSD increments).

In the PSD regulations, as amended August 7, 1980, baseline concentration is defined as the ambient concentration level for a given pollutant which exists in the baseline area at the time of the applicable baseline date and includes the actual emissions representative of facilities in existence on the applicable baseline date, and the allowable emissions of major stationary facilities which commenced construction before January 6, 1975, but were not in operation by the applicable baseline date.

The emissions not included in the baseline concentration and, therefore, affecting PSD increment consumption are the actual emissions from any major stationary facility on which construction commenced after January 6, 1975, for SO_2 and PM (TSP) and February 8, 1988, for NO_2, and the actual emission increases and decreases at any stationary facility occurring after the baseline date.

3.2.3 Control Technology Evaluation

The PSD control technology review requires that all applicable federal and state emission limiting standards be met and that Best Available Control Technology (BACT) be applied to the source. The BACT requirements are applicable to all regulated pollutants subject to a PSD review.

BACT is defined in Chapter 17-212, FAC as an emission limitation, including a visible emission standard, based on the maximum degree of reduction of each pollutant emitted which the Department, on a case-by-case basis, taking into account energy, environmental, and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques (including fuel cleaning or treatment or innovative fuel combustion techniques) for control of such pollutant. If the Department determines that technological or economic limitations on the application of measurement methodology to a particular part of a source or facility would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard or combination thereof, may be prescribed instead, to satisfy the requirement for the application of BACT. Such standard shall, to the degree possible, set forth the emissions reductions achievable by implementation of such design, equipment, work practice or operation. Each BACT determination shall include applicable test methods or shall provide for determining compliance with the standard(s) by means which achieve equivalent results.

The reason for evaluating the BACT is to minimize as much as possible the consumption of PSD increments and to allow future growth without significantly degrading air quality. The BACT review also analyzes if the most current control systems are incorporated in the design of a proposed facility. The BACT, as a minimum, has to comply with the applicable New Source Performance Standard for the source. The BACT analysis requires the evaluation of the available air pollution control methods including a cost-benefit analysis of the alternatives. The cost-benefit analysis includes consideration of materials, energy, and economic penalties associated with the control systems, as well as environmental benefits derived from the alternatives.

EPA recently determined that the bottom-up approach (starting at NSPS and working up to BACT) was not providing the level of BACT originally intended. As a result, in December 1987, EPA strongly suggested changes in the implementation of the PSD program including the "top-down" approach to BACT. The top-down approach requires an applicant to start with the most stringent control alternative, often Lowest Achievable Emission Rate (LAER), and justify its rejection or acceptance as BACT. Rejection of control alternatives may be based on technical or economical infeasibility, physical differences, locational differences, and environmental or energy impact differences when comparing a proposed project with a project previously subject to that BACT.

3.2.4 Air Quality Monitoring

An application for a PSD permit requires an analysis of ambient air quality in the area affected by the proposed facility or major modification. For a new major facility, the affected pollutants are those that the facility would potentially emit in significant amounts. For a major modification, the pollutants are those for which the net emissions increase exceeds the significant emission rate.

Ambient air monitoring for a period of up to one year, but no less than four months, is required. Existing ambient air data for a location in the vicinity of the proposed project is acceptable if the data meet FDER quality assurance requirements. If not, additional data would need to be gathered. There are guidelines available for designing a PSD air monitoring network in EPA's "Ambient Monitoring Guidelines for Prevention of Significant Deterioration."

FDER may exempt a proposed major stationary facility or major modification from the monitoring requirements with respect to a particular pollutant if the emissions increase of the pollutant from the facility or modification would cause air quality impacts less than the de minimis levels (see Table 3-4).

3.2.5 Ambient Impact Analysis

A source impact analysis is required for a proposed major source subject to PSD for each pollutant for which the increase in emissions exceeds the significant emission rate. Specific atmospheric dispersion models are required in performing the impact analysis. The analysis should demonstrate the project's compliance with AAQS and allowable PSD increments. The impact analysis for criteria pollutants may be limited to only the new or modified source if the net increase in impacts due to the new or modified source is below significant impact levels.

Typically, a five-year period is used for the evaluation of the highest, second-highest short-term concentrations for comparison to AAQS or PSD increments. The term "highest, second-highest" refers to the highest of the second-highest concentrations at all receptors. The second-highest concentration is considered because short-term AAQS specify that the standard should not be exceeded at any location more than once a year. If less than five years of meteorological data are used in the modeling analysis, the highest concentration at each receptor is normally used.

3.2.6 Additional Impact Analysis

The PSD rules also require analyses of the impairment to visibility and the impact on soils and vegetation that would occur as a result of the project. A visibility impairment analysis must be conducted for PSD Class I areas. Impacts due to commercial, residential, industrial, and other growth associated with the source must be addressed.

3.2.7 Good Engineering Practice Stack Height

In accordance with Rule 17-210, FAC, the degree of emission limitation required for control of any pollutant should not be affected by a stack height that exceeds GEP, or any other dispersion technique. GEP stack height is defined as the highest of:

1. 65 meters (m), or
2. A height established by applying the formula:

   $Hg = H + 1.5\,L$

   where:

   Hg - GEP stack height,
   H - Height of the structure or nearby structure, and
   L - Lesser dimension, height or projected width of nearby structure(s)

3. A height demonstrated by a model or field study.

The GEP stack height regulations require that the stack height used in modeling for determining compliance with AAQS and PSD increments not exceed the GEP stack height. The actual stack height may be higher or lower.

3.3 RULE APPLICABILITY

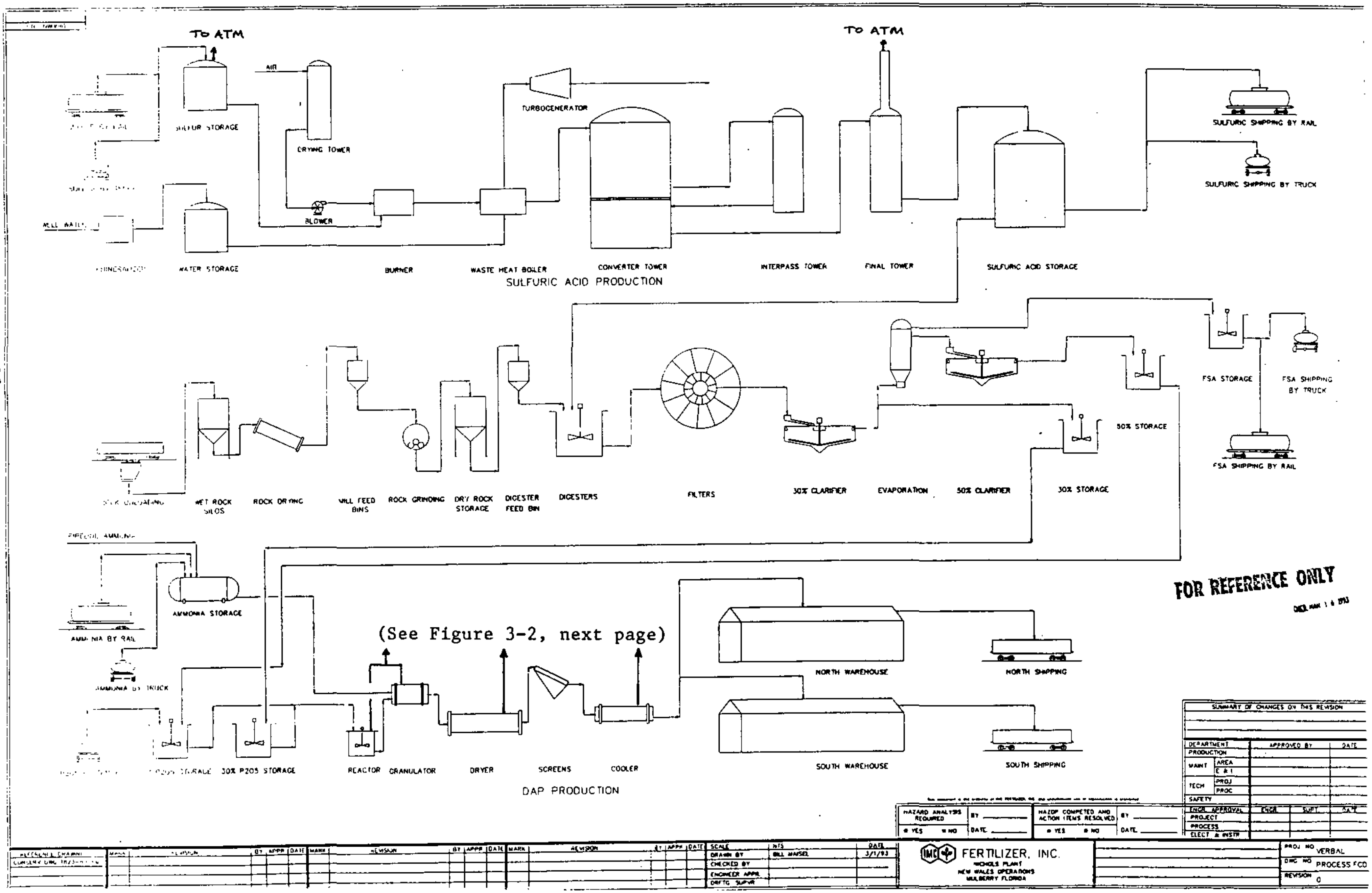
The sulfuric acid and DAP plant production increases at IMC are classified as major modifications to a major facility subject to both state and federal regulations as set forth in Chapter 17-212, FAC. The facility is located in an area classified as attainment for each of the regulated air pollutants. The proposed project will result in significant increases in the emissions of sulfur dioxide, acid mist, fluorides and particulate matter, as defined in Rule 17-212, FAC, and will therefore be subject to PSD preconstruction review requirements (see Table 3-2). This will include a determination of Best Available Control Technology, an air quality review, Good Engineering Practice stack height analysis and an evaluation of impacts on soils, vegetation and visibility.

No PSD preconstruction review is required for the emissions of nitrogen oxides, carbon monoxide or volatile organic compounds as the estimated emissions increase will be less than significant.

FIGURE 3-1

FACILITY PROCESS FLOW DIAGRAM

IMC FERTILIZER INC. - NICHOLS PLANT



(See Figure 3-2, next page)

FIGURE 3-2

DAP PLANT SCRUBBER FLOW DIAGRAM

IMC FERTILIZER INC. - NICHOLS PLANT
POLK COUNTY, FLORIDA

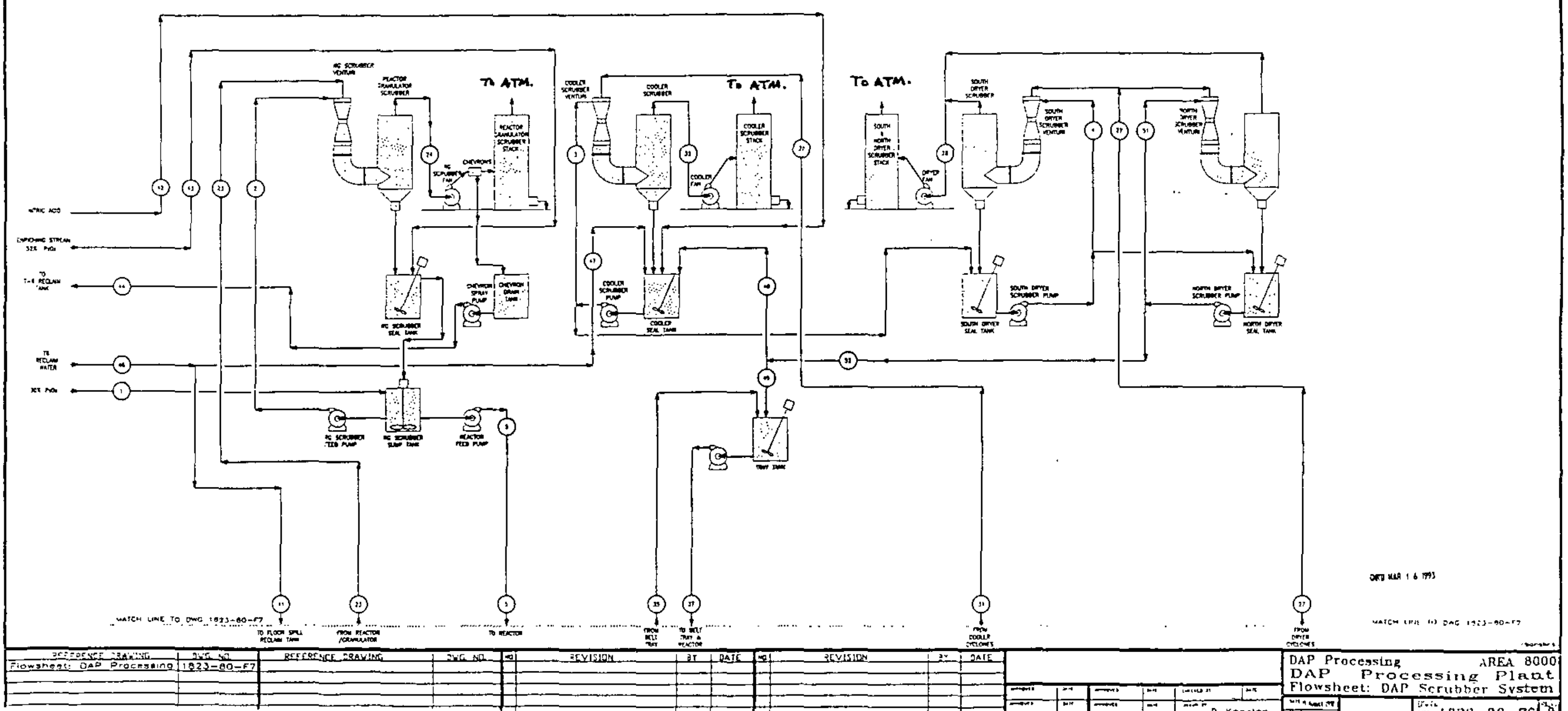


TABLE 3-1
PERMITTED, ACTUAL AND PROPOSED EMISSION RATES

IMC FERTILIZER, INC.- NICHOLS PLANT
POLK COUNTY, FLORIDA

	EMISSIONS					
	PERMITTED		ACTUALS		PROPOSED	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Sulfuric Acid Plant						
Sulfur Dioxide	333.3	1460.3	293.5	1232.9	416.8	1825.6
Acid Mist	12.5	54.7	3.2	13.4	15.6	68.5
Nitrogen Oxides	-	-	10.0	42.0	12.5	54.8
Annual Operating Hours	8760		8402		8760	
Sulfur System						
Sulfur Dioxide	1.0	1.8	1.0	1.8	1.0	2.2
Particulate Matter	0.9	1.8	0.9	1.8	0.9	2.2
Sulfur Particulate	0.4	0.8	0.4	0.8	0.4	1.0
Reduced Sulfur Cpds.	0.4	1.0	0.4	1.0	0.4	1.2
Volatile Organic Cpds.	0.7	1.3	0.7	1.3	0.7	1.6
Average Operating Hours	8760		8760		8760	
Diammonium Phosphate Plant						
Fluorides	1.58	5.9	0.82	3.1	2.9	12.7
Particulate Matter	32.9	122.5	8.1	30.2	32.9	144.1
Ammonia	-	-	873.0	3263.3	1091.3	4779.9
Sulfur Dioxide	-	-	6.4	24.1	8.1	35.6
Nitrogen Oxides	-	-	1.8	6.7	2.3	10.1
Carbon Monoxide	-	-	0.5	1.7	0.6	2.5
Volatile Organic Cpds.	-	-	0.02	0.07	0.02	0.1
Annual Operating Hours	7446		7476		8760	

NOTE: Actual conditions are based on 1991-1992 operations. See Appendix for calculations of emission rates.

TABLE 3-2
NET EMISSION INCREASES(1)

IMC FERTILIZER, INC.- NICHOLS PLANT
POLK COUNTY, FLORIDA

Pollutant	Net Emissions Increase (TPY)	Significant Increase (TPY)	PSD Review
Acid Mist	55.1	7	YES
Ammonia	955.9	NA	NO
Carbon Monoxide	0.8	100	NO
Fluorides	9.6	3	YES
Nitrogen Oxides	16.2	40	NO
Particulate Matter	100.2	25	YES
Reduced Sulfur Cpds.	0.2	10	NO
Sulfur Dioxide	604.6	40	YES
Sulfur Particulate	0.2	15 (PM10)	NO
Volatile Organic Cpds.	0.3	40	NO

NOTE: Calculations are presented in the Appendix.

TABLE 3-3
MAJOR FACILITY CATEGORIES

IMC FERTILIZER, INC.- NICHOLS PLANT
POLK COUNTY, FLORIDA

Fossil fuel fired steam electric plants of more than 250 MMBTU/hr heat input
Coal cleaning plants (with thermal dryers)
Kraft pulp mills
Portland cement plants
Primary zinc smelters
Iron and steel mill plants
Primary aluminum ore reduction plants
Primary copper smelters
Municipal incinerators capable of charging more than 250 tons of refuse per day
Hydrofluoric acid plants
Sulfuric acid plants
Nitric acid plants
Petroleum refineries
Lime plants
Phosphate rock processing plants
Coke oven batteries
Sulfur recovery plants
Carbon black plants (furnace process)
Primary lead smelters
Fuel conversion plants
Sintering plants
Secondary metal production plants
Chemical process plants
Fossil fuel boilers (or combinations thereof) totaling more than 250 million BTU/hr heat input
Petroleum storage and transfer units with total storage capacity exceeding 300,000 barrels
Taconite ore processing plants
Glass fiber processing plants
Charcoal production plants

TABLE 3-4
REGULATED AIR POLLUTANTS - SIGNIFICANT EMISSION RATES

IMC FERTILIZER, INC.- NICHOLS PLANT
POLK COUNTY, FLORIDA

Pollutant	Significant Emission Rate tons/yr	De Minimis Ambient Impacts $\mu g/m^3$
CO	100	575 (8-hour)
NOx	40	14 (NO_2, Annual)
SO_2	40	13 (24-hour)
Ozone	40 (VOC)	-
PM	25	10 (24-hour)
PM10	15	10 (24-hour)
TRS (including H2S)	10	0.2 (1-hour)
H_2SO_4 mist	7	-
Fluorides	3	0.25 (24-hour)
Vinyl Chloride	1	15 (24-hour)
	pounds/yr	
Lead	1200	0.1 (Quarterly avg)
Mercury	200	0.25 (24-hour)
Asbestos	14	-
Beryllium	0.8	0.001 (24-hour)

TABLE 3-5
AMBIENT AIR QUALITY STANDARDS

IMC FERTILIZER, INC.- NICHOLS PLANT
POLK COUNTY, FLORIDA

Pollutant	FDER (State)		USEPA (National) Primary		USEPA (National) Secondary	
	$\mu g/m^3$	PPM	$\mu g/m^3$	PPM	$\mu g/m^3$	PPM
SO_2, 3-hour	1,300	0.5	-	-	1300	0.5
24-hour	260	0.1	365	0.14	-	-
Annual	60	0.02	80	0.03	-	-
PM10, 24-hour	150	-	150	-	150	-
Annual	50	-	50	-	50	-
CO, 1-hour	40,000	35	40,000	35	-	-
8-hour	10,000	9	10,000	9	-	-
Ozone, 1-hour	235	0.12	235	0.12	235	0.12
NO_2, Annual	100	0.053	100	-	100	-
Lead, Quarterly	1.5	-	1.5	-	1.5	-

TABLE 3-6
PSD INCREMENTS

IMC FERTILIZER, INC.- NICHOLS PLANT
POLK COUNTY, FLORIDA

Pollutant	Allowable PSD Increments (State/National) Class I $\mu g/m^3$	Class II $\mu g/m^3$	Class III $\mu g/m^3$
TSP, Annual	5	19	37
24-hour	10	37	75
SO_2, Annual	2	20	40
24-hour	5	91	182
3-hour	25	512	700
NO_2, Annual	2.5	25	50

4.0 BEST AVAILABLE CONTROL TECHNOLOGY

Best Available Control Technology (BACT) is required to control air pollutants emitted from newly constructed major sources or from modification to the major emitting facilities if the modification results in significant increase in the emission rate of regulated pollutants (see Table 3-4 for significant emission levels). The emission rate increases proposed by IMC have been summarized in Table 3-2. A PSD analysis will be required for sulfur dioxide, sulfuric acid mist, fluorides, and particulate matter.

4.1 EMISSION STANDARDS

4.1.1 Sulfuric Acid Plant

Federal New Source Performance Standards (NSPS) for sulfuric acid plants became effective on August 17, 1971. These standards are codified in 40CFR60, Subpart H and require sulfur dioxide emissions to be limited to no more than 4.0 pounds per ton of 100 percent acid produced and require that sulfuric acid mist emissions be limited to no more than 0.15 pounds per ton of 100 percent acid produced. Additionally, the standards limit the opacity of the emissions from new sulfuric acid plants to less than 10 percent. There are no emission standards for nitrogen oxides from sulfuric acid plants.

EPA reviewed the NSPS for sulfuric acid plants in 1985 (EPA-450/3-85-012). At that time, it was concluded that because of the expected variations in sulfur dioxide emissions "... the level of SO_2 emissions as specified in the current NSPS (should) not be changed at this time." Regarding the NSPS for sulfuric acid mist, EPA concluded, "Making the acid mist standard more stringent is not believed to be practical at this time because of the need to provide a margin of safety due to in-plant operating fluctuations, which introduce variable quantities of moisture into the sulfuric acid production line." It is our understanding that there has been no change in EPA philosophy related to sulfuric acid plants since the 1985 review.

A review of BACT/LAER determinations published in the EPA Clearinghouse indicates that no new demonstrated control alternatives have been applied to sulfuric acid plants that would result in a consistent reduction in sulfur dioxide emission below 4.0 pounds per ton of acid nor would result in a consistent reduction of sulfuric acid mist emissions below 0.15 pounds per ton of acid. No control technologies for nitrogen oxides are discussed in either the NSPS review or in BACT/LAER determinations.

4.1.2 <u>Molten Sulfur System</u>

The molten sulfur system is subject to the emission limiting standards as set forth in Rule 17-296.411, FAC. The standards require the use of specific work practices and limit visible emissions to 20 percent opacity. No control technologies for a molten sulfur system are discussed in either the NSPS review or in BACT/LAER determinations.

4.1.3 <u>Diammonium Phosphate Plant</u>

Federal NSPS have been promulgated for DAP plants. These standards became effective on October 22, 1974 and are codified in 40CFR60, Subpart V and require fluoride emissions to be limited to no more than 0.06 pound per ton of P_2O_5. The NSPS under Subpart V do not include emission standards for particulate matter from DAP plants.

EPA revised/amended the NSPS for DAP plants in 1989. At that time, no changes to the emission standard was deemed necessary or justified. There has been no change in EPA philosophy related to DAP plants since the 1989 review.

A review of BACT/LAER determinations published in the EPA Clearinghouse indicates that no new control alternatives have been applied to DAP plants that would result in a consistent reduction in fluoride emission below 0.06 pound per ton of P_2O_5.

4.2 EMISSION CONTROL TECHNOLOGIES

4.2.1 Sulfuric Acid Plant

The control of sulfur dioxide and sulfuric acid mist emissions from sulfuric acid plants can be achieved by various processes. The process of choice for sulfur dioxide control has been dual absorption and the process of choice for controlling sulfuric acid mist emission has been one of the various types of fiber mist eliminators. These processes have been selected based on cost, product recovery, the formation of no undesirable by-products and the fact that neither introduces operating processes that are foreign to plant personnel.

In the March 1985 review (EPA-450/3-85-012), EPA reviewed the control technologies that had been used to control sulfur dioxide and sulfuric acid mist emissions from sulfuric acid plants. The alternatives included the dual absorption process, ammonia scrubbing, sodium sulfite-bisulfite scrubbing, and molecular sieves for sulfur dioxide control and filter type mist eliminators and electrostatic precipitators for sulfuric acid mist control. A review of the EPA BACT/LAER Clearinghouse information indicated that no other control alternatives have been considered for sulfuric acid plants. No control alternatives were addressed for nitrogen oxides control in either the 1985 EPA NSPS review or in the BACT/LAER Clearinghouse.

EPA published a report of the 1985 review of NSPS for sulfuric acid plants. In that report, EPA reviewed 46 sulfuric acid plants built between 1971 and 1985. Of these 46 plants, 40 used the dual absorption process for sulfur dioxide control with the remaining six using some type of acid gas scrubbing. The dual absorption process offers the following advantages over other SO_2 control technologies:

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

2. there are no by-products produced;

3. there are no new operating processes that plant personnel must become familiar with;

4. the process permits higher inlet sulfur dioxide concentrations resulting in a reduction in equipment size;

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

6. there is no increase in manpower requirements.

The dual absorption process is capable of reducing sulfur dioxide emission rates to within 4.0 pounds per ton of acid as required by New Source Performance Standards. Recent BACT determinations (in 1992) also reflect a sulfur dioxide emission limit of 4.0 pounds per ton using the double absorption process.

All of 46 plants reviewed by EPA used the high efficiency mist eliminators which are capable of reducing sulfuric acid mist emission rates to within 0.15 pounds per ton of acid as required by NSPS. The mist eliminators are the control of choice for sulfuric acid mist within the sulfuric acid industry because they require very little operation and maintenance attention and because of the small space requirement associated with these devices. The disadvantage of this type of mist eliminator is that the pressure drop across the elements varies from five to 15 inches of water; resulting in an increase in operating utility costs. Recent BACT determinations (in 1992) reflect an emission limit based on the NSPS.

The control of nitrogen oxides in sulfuric acid plants has not been addressed to date because of the low concentration of nitrogen oxides in the tail gases of sulfuric acid plants. The nitrogen oxide concentration in the tail gas stream of a sulfuric acid plant has been measured in the range of 10 parts per million.

4.2.2 Molten Sulfur System

No add-on control technologies have been required or recommended by EPA or FDER for molten sulfur systems as the emissions of air pollutants are negligible.

4.2.3 Diammonium Phosphate Plant

At all the DAP plants wet scrubbing equipment is conventionally applied for removal of ammonia, fluorides and particulate dusts from effluent gas streams. These scrubbers are designed for a variety of functions which include ammonia recovery, particulate collection, and fluoride removal. These functions require a complex arrangement of the scrubbing equipment often tailored for the requirements of a specific facility.

Wet scrubbers are chosen over other types of pollution control devices because of the flexibility they offer in controlling emissions of ammonia, fluorides, and particulates in gas streams high in moisture content. All the gas streams in the DAP plant originate in wet reactors, driers, or other pieces of process equipment laden with a significant amount of moisture. The high concentration of water in the gas streams poses problems in the use of fabric collectors and, to a lesser extent, in the use of mechanical or electrostatic collectors. Typically the scrubbing mediums are weak acid (from within the process) and pond water (for tail gas scrubbing, if part of design).

The fertilizer manufacturing process design optimizes the control of particulate matter, ammonia recovery and fluorides. The combination of requirements for particulate collection, gas absorption for NH_3 recovery, and fluoride emission control allows the application of a wide variety and combination of scrubber types for DAP plants. Generally, individual plants are designed with a combination of wet scrubbers most suited for its process and emission control requirements. The most common are two-stage wet cyclonic, venturi cyclone scrubbers and cross-flow packed scrubbers.

The Venturi cyclone, operating with a pressure drop in the range of 15 to 30 inches of water, is probably the best particulate collection scrubber of the three. Ammonia absorption is enhanced when a packed section is installed after the primary Venturi cyclone collector. Water sprays used in the entrainment separator also improve the gas absorption characteristics of the scrubber.

The cross-flow packed scrubber is the best of the three devices for gas absorption. It is less effective for particulate matter control. It is therefore most often used as a tail gas scrubber following a Venturi or two-stage cyclonic scrubber (when required to meet emission standards). Packed scrubbers are not recommended as primary scrubbers because of plugging problems due to gelatinous silia or fertilizer product deposits.

In the case of the IMC Nichols plant, the installation of a tail gas scrubber following the venturi scrubbers would enhance emissions reductions. The use of once-through fresh water in a tail gas scrubber would also improve fluoride control. However, such installation cannot be justified for the proposed project given the water use restrictions imposed by the Water Management District. Furthermore, adequate space is not available on-site for the construction of a pond with a water recirculation system associated with such a scrubber. Purchasing a suitable land parcel would be subject to land availability and the acceptance of such development by surrounding residents. The total cost of the land; the site preparation and permitting; the pumps and piping for the water to and from the pond; and the maintenance of such a system would be prohibitive (expected to be several million dollars), especially given the current unfavorable fertilizer market conditions.

4.3 CONCLUSION

Based upon the discussion presented in the previous section for the sulfuric acid plant, the dual absorption process is selected by IMC as the control alternative limiting sulfur dioxide emissions to 4.0 pounds per ton of acid and the fiber type high efficiency mist eliminator for limiting sulfuric acid mist emissions to 0.15 pounds per ton of acid. Lower emission limits are not proposed in order to maintain an operation margin that will allow for the fluctuation in the emission rates (see attached graph of the continuous emissions monitoring data for sulfur dioxide).

The emission limits for the molten sulfur system reflecting BACT will be in accordance with Rule 17-296.411, FAC, limiting visible emissions to 20% opacity and maintaining proper operation practices.

Based upon the analysis presented in previous sections on the DAP plant, the existing venturi scrubber arrangement, limiting the emissions of fluorides from the DAP plant to 0.06 lb/ton P_2O_5 and particulate emissions to within the currently permitted emission limit of 32.9 pounds per hour, represents BACT.

5.0 AIR QUALITY REVIEW

The air quality review required of a PSD construction permit application potentially requires both air quality modeling and air quality monitoring. The air quality monitoring is required when the impact of air pollutant emission increases and decreases associated with a proposed project exceed the de minimis impact levels (see Table 3-4) or in cases where an applicant wishes to define existing ambient air quality by monitoring rather than by air quality modeling. The air quality modeling is required to provide assurance that the increases and decreases in air pollutant emissions associated with the project, combined with all other applicable air pollutant emission rate increases and decreases associated with new sources affecting the project area, will not cause or contribute to an exceedance of the applicable ambient air quality standards.

The air quality review for the proposed project included emission increases associated with the sulfuric acid plant, the molten sulfur system and the DAP plant. The pollutants evaluated include sulfur dioxide, sulfuric acid mist, fluorides, particulate matter, and ammonia.

No modeling is necessary to evaluate the impacts of particulate matter emissions associated with the proposed project as the proposed hourly emission rate is equal to the currently permitted rate.

5.1 AIR QUALITY MODELING FOR SULFUR DIOXIDE

The emission rate of sulfur dioxide used for air quality modeling purposes was the proposed net increase in the emission rate associated with the increased sulfuric acid production rate. It should be noted that the sulfur dioxide emissions from the molten sulfur system were not included as there will be no change in the hourly emissions. The sulfur dioxide emissions from the DAP plant had previously been evaluated at a higher allowable rate than the proposed rate and therefore were not included. Table 5-1 contains modeling input parameters used in the ambient air quality impacts analysis.

5.1.1 Area of Significant Impact

The impact analysis of the net increase in sulfur dioxide emissions was conducted using the Industrial Source Complex-Short Term 2 (ISC-ST2) air quality model, Version 92273. The Area of Significant Impact (ASI) modeling was conducted in accordance with guidelines established by EPA and published in the document, Guideline for Air Quality Modeling, (Revised), July 1986. The meteorological data used with the model were for Tampa, Florida and represented the period 1985-1989.

The currently permitted sulfur dioxide emission rate was represented as a negative input while the proposed sulfur dioxide emission rate was represented as a positive input to the model.

The ASI modeling included receptors established by the polar grid system extending to 4000 meters from the plant. Eight sets of receptor rings were placed at distances ranging from 250 to 4000 meters from the plant with receptors placed at 10 degree intervals from 10° to 360° on each receptor ring. The downwind receptor distances were selected such that the location of significant impacts could be determined.

The results of the ASI modeling, summarized in Table 5-2, demonstrate that the ambient air quality impact of the sulfur dioxide emission increase from the proposed project will be greater than significant for the 24-hour period, and less than significant for the 3-hour and annual period. The ASI modeling also demonstrated that the impacts from the proposed project are less than significant beyond 2000 meters (see Table 5-2 and Appendix).

Also, since the predicted 24-hour sulfur dioxide impacts are less than the de minimis impact level of 13 μg/m3, ambient air monitoring is not required for the proposed project.

As the predicted sulfur dioxide impacts from the proposed project are significant for the 24-hour period, additional modeling for that time period was required to determine compliance with the Class II ambient air quality standards and allowable PSD increments. In accordance with past FDER requests, the additional modeling included an evaluation of the 3-hour period impacts as the highest-high impacts were above the significant impact level.

In the ISC modeling, a discrete receptor representing the location of the nearest Class I area boundary (Chassahowitzka National Wildlife Refuge) indicated a significant impact from the proposed project. Therefore, a separate Class I area PSD increment analysis was performed using the MESOPUFF model to evaluate the sulfur dioxide increment consumption.

5.1.2 Class II Area AAQS and PSD Increment Analysis

The Ambient Air Quality Standards (AAQS) Analysis and the PSD Increment (PSD) Analysis evaluated the cumulative impacts of the proposed project along with the sulfur dioxide emitting sources at nearby facilities. The significant facilities to be included in the analysis were determined based on the "20 D Rule" using the facility emission inventory most recently utilized by FDER.

A list of the significant facilities up to a distance of 66 kilometers from the proposed project is presented in Table 5-3. The corresponding sources at the significant facilities which contribute to the ambient air concentration and the PSD increment consumption/expansion are presented in Tables 5-4 and 5-5, respectively. Although the ISC model is not recommended for modeling sources beyond 50 kilometers, some of the borderline sources were included to be conservative.

The modeling was conducted as an extension of the ASI modeling discussed above. The receptors were placed only up to a distance of 2000 meters, as established in the ASI modeling.

The results of the AAQS and PSD analysis indicate that the maximum predicted 3-hour and 24-hour period impacts are well within the standards, as shown in Table 5-6.

5.1.3 Class I Area PSD Increment Analysis

A Class I area PSD increment analysis was performed using the MESOPUFF and the ISC model. To evaluate the Class I area impact as a result of the proposed project alone, separate MESOPUFF modeling was conducted for the current and proposed sulfur dioxide emission rates (see Table 5-7). The difference between the resulting impacts at the Class I area show that the maximum predicted impacts from the proposed project are expected to exceed the 3-hour and 24-hour significant impact levels recommended by the National Park Service (NPS). The predicted annual impacts are below the NPS significant impact level (see Table 5-8). Therefore, additional modeling was performed to determine the IMC source contribution to the overall 3-hour and 24-hour Class I area PSD increment consumption. It should be noted that the maximum predicted impacts from the proposed project are expected to be below the 3-hour, 24-hour, and annual significant impact levels recommended by the state of Virginia (and accepted by EPA); see Table 5-8.

In recent modeling conducted for the Class I area PSD increment consumption and submitted to FDER, the emission rates of all significant sources identified by FDER as being permitted after the applicable baseline date were input to the model along with emission rate reductions after the baseline date. An extensive sulfur dioxide source inventory (previously approved by FDER) was used for that modeling. The MESOPUFF II long range transport model (recommended by the National Park Service) was used to predict the PSD increment consumption at Chassahowitzka National Wildlife Refuge for sources beyond 50 kilometers from Chassahowitzka. The ISC-ST2 model was used to predict the PSD increment consumption for sources within 50 kilometers from Chassahowitzka. The 1986 meteorological data were used in order to be consistent with all the recent projects evaluated by FDER which included MESOPUFF modeling. As the modeling protocol and emission inventory are essentially the same for that recent project and this project, no remodeling for the combined source impacts were deemed necessary.

The proposed IMC impacts were compared with the maximum predicted impacts for the 3-hour and 24-hour time periods. As the previous MESOPUFF model source inventory did not include the impacts from the proposed project, the maximum predicted impacts from the proposed project were added to the previously modeled impacts for all sources. The resulting impacts included several 3-hour and 24-hour periods when the Class I PSD increments were exceeded. The time periods representing each exceedance were evaluated to determine the contribution of the proposed project to the predicted PSD increment violation. The results of the modeling are presented in Table 5-8. Based on the results of the modeling, the proposed project is not expected to cause or significantly contribute to any violation of the allowable Class I area PSD increment.

A detailed discussion of the MESOPUFF modeling protocol is presented in the Appendix.

5.2 AIR QUALITY MODELING FOR SULFURIC ACID MIST

No ambient air quality standards, PSD increments or significant impact levels have been established for sulfuric acid mist. However, the FDER Air Toxics Draft Policy (Version 3.0) includes a No Threat Level (NTL) ambient guideline for sulfuric acid mist.

The EPA approved SCREEN model was used to evaluate the ambient air impacts of the proposed acid mist emissions. The SCREEN model provides a conservative estimate of the ambient air impact from a single emission point. The SCREEN model predicted a maximum 1-hour impact of 11.77 micrograms per cubic meter at a distance of 772 meters from the source. Using the FDER approved multipliers, the 8-hour, 24-hour, and the annual impacts were calculated from the predicted maximum 1-hour concentration. The calculations show that the estimated maximum 8-hour concentration of 8.2 micrograms per cubic meter is less than the corresponding NTL concentration of 10 micrograms per cubic meter, but the estimated maximum

24-hour concentration of 4.7 micrograms per cubic meter is higher than the corresponding NTL concentration of 2.4 micrograms per cubic meter (see Table 5-9).

The maximum sulfuric acid mist impacts from the proposed project are predicted to occur at locations which are both remote and far from the population centers. Also, the sulfuric acid mist will be controlled by the Best Available Control Technology. As a result, the sulfuric acid mist emissions are not expected to be of concern.

5.3 AIR QUALITY MODELING FOR FLUORIDES AND AMMONIA

The air quality impact analysis for fluorides and ammonia was conducted using the ISC-ST2 model with the same approach as in the ASI modeling for sulfur dioxide. Six receptor rings were placed on a polar grid at downwind distances ranging from 120 to 1500 meters. The receptor ring at 120 meters corresponds to the nearest property boundary.

The sources modeled include the DAP reactor/granulator, the DAP dryer, and the DAP cooler. The currently permitted fluoride emission rates were represented as a negative input while the proposed emission rates were represented as a positive input to the model. In the case of ammonia, current hourly emissions were based on limited source information, and the proposed emission rate was based simply on a ratio of the current and proposed production rates.

The results of the modeling are presented in Table 5-10. Although the modeling predicts that the net impact of fluoride emissions increases addressed in this application exceed the de minimis impact level, no ambient air quality monitoring should be required as there are no ambient air quality standards for fluorides, there is no generally accepted monitoring method and fluorides are not a health related air pollutant. Similarly, EPA has not promulgated ambient air quality standards or PSD increments for ammonia. The FDER NTL guidelines may be used for the sake of comparison (see Table 5-10). The maximum predicted impacts for both pollutants exceed the corresponding NTLs. However, the maximum predicted impacts for both pollutants from the proposed project are predicted to occur at locations which are both remote and far from the population centers. Also, the fluoride emissions will be controlled by the Best Available Control Technology. As a result, the fluoride and ammonia emissions are not expected to be of concern.

TABLE 5-1

AIR QUALITY MODELING PARAMETERS
FOR SULFUR DIOXIDE AND ACID MIST

IMC FERTILIZER, INC.- NICHOLS PLANT
POLK COUNTY, FLORIDA

H_2SO_4 Plant	SO_2 (g/s)	Acid Mist (g/s)	Ht (m)	Dia (m)	Vel (mps)	Temp (^oK)
1 Existing	-42.0	-1.58	45.7	2.3	10.3	352
2 Proposed	52.5	1.97	45.7	2.3	12.0	352

TABLE 5-2

SUMMARY OF SULFUR DIOXIDE SIGNIFICANT IMPACT ANALYSIS

IMC FERTILIZER, INC.- NICHOLS PLANT
POLK COUNTY, FLORIDA

METEOROLOGICAL DATA		SULFUR DIOXIDE IMPACT ($\mu g/m^3$)* ANNUAL	3-HOUR	24-HOUR
1985	HH	0.62 (1000m, 70°)	27.61 (750m, 80°)	7.18 (2000m, 120°)
	HSH	0.60 (1000m, 80°)	23.41 (1000m, 80°)	5.17 (750m, 80°)
1986	HH	0.76 (1000m, 90°)	25.97 (750m, 10°)	7.20 (1000m, 90°)
	HSH	0.72 (1000m, 80°)	22.61 (750m, 80°)	6.14 (1000m, 90°)
1987	HH	0.62 (1000m, 90°)	23.60 (1000m, 80°)	5.99 (1500m, 240°)
	HSH	0.56 (1500m, 90°)	21.16 (1000m, 20°)	5.34 (750m, 80°)
1988	HH	0.41 (2000m,220°)	24.75 (750m, 200°)	5.36 (1000m, 10°)
	HSH	0.40 (1500m,220°)	22.90 (750m, 200°)	5.21 (1000m, 10°)
1989	HH	0.58 (1000m, 10°)	25.57 (500m, 330°)	8.04 (1000m, 200°)
	HSH	0.57 (1000m, 20°)	23.52 (750m, 330°)	5.69 (1000m, 170°)
Significant Impact (17-2.100(171)(a),FAC		1.0	25.0	5.0
De minimis Impact 17-2.500(3)(e)1,FAC		NA	NA	13.0

NOTE: HH is the highest-high impact; HSH is the highest second-high impact. The impacts are based on the increase in sulfur dioxide emissions from the proposed project of 83.4 lbs/hr (10.5 g/s).

TABLE 5-3
Class II SO_2 Emitting
Significant Facillities (20 D Table)
IMC Fertilizer Inc., Nichols Plant
Polk County, Florida

SO2 "20 D" SOURCE INVENTORY FOR IMC NICHOLS PLANT				Source Location	398.400	3084.200
	UTM Coordinates (km)		SO2	Distance	20-D Emission	
SOURCE DESCRIPTION	EAST	NORTH	TPY	(Km)	(TPY)	Significant?
AGRICO PIERCE	404.100	3078.950	-1646	8	155	YES
AGRICO SO. PIERCE H2SO4	407.500	3071.300	4679	16	316	YES
AUBURNDALE	420.800	3103.300	221	29	589	NO
BORDEN DRYER	394.800	3069.600	-225	15	301	NO
BORDEN DRYER	414.500	3109.000	-184	30	591	NO
BREWSTER/IMPERIAL	404.800	3069.500	-670	16	321	YES
CF BARTOW	408.500	3082.500	5519	10	205	YES
CF PLANT CITY	388.000	3116.000	9048	33	669	YES
CITRUS WORLD	441.000	3087.300	1604	43	854	YES
CLM CHLORIDE	361.800	3088.300	1183	37	737	YES
CONSERVE NICHOLS	398.400	3084.200	1612	0	0	YES
CONSOLIDATED MINERALS	393.800	3096.300	943	13	259	YES
COUCH CONST-ZEPHYRHILLS (ASPH)	390.300	3129.400	123	46	918	NO
DOLIME DRYER	404.813	3069.548	-355	16	320	YES
ESTECH/SWIFT SAP	411.500	3074.200	-4856	16	330	YES
EVANS PACKING	383.300	3135.800	2188	54	1075	YES
FARMLAND	409.500	3079.500	4184	12	241	YES
FPC BARTOW	342.400	3082.600	65955	56	1120	YES
FPC BAYBORO	338.800	3071.300	6881	61	1220	YES
FPC HIGGINS	336.500	3098.400	12081	64	1270	YES
FPC INT. CITY	446.300	3126.000	8168	64	1271	YES
FPC OSCEOLA	446.300	3126.000	4380	64	1271	YES
FPC POLK	414.400	3073.910	1720	19	380	YES
FPL MANATEE	367.200	3054.100	55225	43	867	YES
GARDINIER MINE	415.300	3063.300	612	27	538	YES
GARDINIER/CARGILL	363.400	3082.400	5816	35	701	YES
GEN. PORT. CEMENT	358.000	3090.600	-4602	41	818	YES
GOLD BOND	347.300	3082.700	320	51	1022	NO
GULF COAST LEAD	364.000	3093.500	1711	36	713	YES
HARDEE	404.800	3057.400	9656	28	551	YES
HILLS. CO. RESOURCE RECOVERY	368.200	3092.700	744	31	627	YES
IMC NEW WALES	396.600	3078.900	11773	6	112	YES
IMC NORALYN	414.700	3080.300	504	17	335	YES
KISSIMMEE KANE IS.	447.680	3127.920	1023	66	1318	NO
LAKELAND LARSEN	409.300	3102.800	4944	22	431	YES
LAKELAND MCINTOSH	409.200	3106.200	30563	25	490	YES
MOBIL BIG-4	394.850	3069.770	87	15	297	NO
MOBIL NICHOLS	398.300	3084.300	971	0	3	YES
MOBILE ELECTROPHOS ROCK DRY	405.600	3079.400	-3337	9	173	YES
NITRAM	363.100	3089.000	108	36	712	NO
PASCO CO. COGEN. FACLITY PROP	385.600	3139.000	175	56	1126	NO
PINELLAS RRF	335.300	3084.400	2165	63	1262	YES
RIDGE COGENERATION	416.700	3100.400	480	24	489	NO
ROYSTER MULBERRY	406.700	3085.200	1280	8	167	YES
ROYSTER PINEY POINT	348.700	3057.300	1719	57	1130	YES
SULFUR TERMINALS	358.000	3090.000	104	41	816	NO
TAMPA GENERAL HOSP BOILERS	356.400	3091.000	59	43	851	NO
TAMPA MCKAY BAY	360.000	3091.000	744	39	780	NO
TECO BIG BEND	361.900	3075.000	372290	38	753	YES
TECO GANNON	360.000	3087.500	127127	39	771	YES
TECO HOOKERS POINT	358.000	3091.000	13535	41	819	YES
TECO POLK POWER	402.298	3067.297	4033	17	347	YES
THATCHER GLASS	361.800	3088.300	177	37	737	NO
USS AGRI-CHEM BARTOW	413.200	3086.300	-1580	15	299	YES
USSAC FT MEADE	416.120	3068.620	4383	24	472	YES
W.R. GRACE/SEMINOLE	409.770	3086.990	5012	12	234	YES

Note: (1) Conserv is now IMC Fertilizer Inc. - Nichols Plant.
(2) Facilities with negative emissions represent shutdown facilities.

TABLE 5-4
SO_2 Class II AAQS Inventory
IMC Fertilizer Inc., Nichols Plant
Polk County, Florida

SO2 SOURCE INVENTORY FOR IMC NICHOLS PLANT		AAQS					
	Emissions	UTM COORDINATES (km		Height	Temp.	Velocity	Diameter
SOURCE DESCRIPTION	(g/s)	EAST	NORTH	(m)	(K)	(m/s)	(m)
AGRICO SO. PIERCE DAP PLANT	4.41	407.500	3071.330	38.10	328.0	14.60	3.10
AGRICO SO. PIERCE GTSP PLANT	16.60	407.500	3071.300	42.70	305.0	10.40	2.70
AGRICO SO. PIERCE H2SO4 (2 @ 2700 TPD)	113.50	407.500	3071.300	45.73	350.0	39.06	1.60
CF BARTOW DAP 1-3	11.90	408.500	3082.500	36.40	339.0	16.11	2.13
CF BARTOW H2SO4 5 (2400 TPD)	50.40	408.500	3082.500	63.41	361.0	10.88	2.13
CF BARTOW H2SO4 6 (2400 TPD)	50.40	408.500	3082.500	63.41	370.0	7.28	2.13
CF BARTOW H2SO4 7 (2000 TPD)	42.00	408.500	3082.500	67.10	351.0	9.80	2.40
CF PLANT CITY DAP A	3.00	388.000	3116.000	28.70	326.0	7.90	3.00
CF PLANT CITY DAP X	13.20	388.000	3116.000	54.90	325.0	9.80	2.80
CF PLANT CITY DAP Z	13.20	388.000	3116.000	54.90	331.0	13.10	2.80
CF PLANT CITY GTSP X	13.20	388.000	3116.000	54.90	314.0	7.90	2.80
CF PLANT CITY H2SO4 A&B	88.20	388.000	3116.000	33.50	316.0	19.50	1.52
CF PLANT CITY PROPOSED C & D	109.20	388.000	3116.000	60.35	353.0	17.77	2.44
CF PLANT CITY	19.98	388.000	3116.000	7.62	560.8	17.74	1.07
CF PLANT CITY	0.12	388.000	3116.000	2.44	373.0	0.33	0.61
CITRUS WORLD DRYER 1	8.10	441.000	3087.300	22.90	323.0	10.70	1.00
CITRUS WORLD DRYER 2	19.00	441.000	3087.300	22.90	325.0	12.20	0.80
CITRUS WORLD DRYER 3	19.00	441.000	3087.300	24.40	313.0	21.90	0.80
CLM CHLORIDE METALS	21.02	361.800	3088.300	30.00	375.0	20.00	0.61
CONSERV NICHOLS DAP DRYER	1.01	398.400	3084.200	24.40	333.0	23.10	1.07
CONSERV NICHOLS DRYER	3.34	398.400	3084.200	24.69	327.4	3.77	2.29
CONSERV NICHOLS (2500 TPD @ 4 LB/TON)	52.50	398.400	3084.200	45.70	352.0	12.00	2.30
CONSERV NICHOLS (SULFUR SYSTEM)	0.13	398.400	3084.200	10.00	370.0	3.00	0.30
CONSOLIDATED MINERALS FLUID BED REACTOR	11.57	393.800	3096.300	46.33	299.7	12.14	1.77
CONSOLIDATED MINERALS KILNS 3, 4 & 5	15.43	393.800	3096.300	46.33	298.0	13.17	1.77
CONSOLIDATED MINERALS	0.12	393.800	3096.300	6.10	605.2	20.21	0.37
EVANS BOILER	28.70	383.300	3135.800	12.20	505.0	11.90	1.00
EVANS DRYER	34.00	383.300	3135.800	25.90	346.0	17.30	1.00
FARMLAND	2.33	409.500	3079.500	28.96	605.2	3.58	1.68
FARMLAND	0.39	409.500	3079.500	12.19	366.3	2.67	0.61
FARMLAND 3,4 H2SO4	67.16	409.500	3079.500	30.48	355.0	9.27	2.29
FARMLAND 5 H2SO4	50.40	409.500	3079.500	45.72	355.0	11.55	2.44
FPC BARTOW PEAKING 1-4	286.90	342.400	3082.600	13.70	772.0	22.30	5.30
FPC BARTOW PIPELINE HEATER	1.80	342.400	3082.600	9.10	541.0	5.20	0.90
FPC BARTOW UNIT 1	448.40	342.400	3082.600	91.40	429.0	36.30	2.70
FPC BARTOW UNIT 2	448.40	342.400	3082.600	91.40	425.0	31.10	2.70
FPC BARTOW UNIT 3	710.54	342.400	3082.600	91.40	408.0	34.40	3.40
FPC BAYBORO PEAKING 1-4	197.60	338.600	3071.300	12.20	755.0	6.40	7.00
FPC HIGGINS UNIT 3	129.90	336.500	3098.400	53.00	423.0	7.30	3.80
FPC HIGGINS UNITS 1&2	192.20	336.500	3098.400	53.00	429.0	8.20	3.80
FPC HIGGINS OTHER UNITS	25.21	336.500	3098.400	16.76	727.4	113.47	4.60
FPC INT. CITY PROP TURBINES/7EA AT 20 DEG F	124.40	446.300	3126.000	15.24	819.8	56.21	4.21
FPC INT. CITY PROP TURBINES/7FA AT 20 DEG F	110.40	446.300	3126.000	15.24	880.8	32.07	7.04
FPC OSCEOLA PEAKING 1,2,4-6	104.90	446.300	3126.000	7.90	704.0	18.00	4.20
FPC OSCEOLA PEAKING 3	21.00	446.300	3126.000	4.60	505.0	18.00	4.20
FPC POLK	49.44	414.400	3073.910	34.40	400.0	40.50	4.10
FPL MANATEE UNIT 1	1047.90	367.200	3054.100	152.10	425.8	23.61	7.99
FPL MANATEE UNIT 2	539.67	367.200	3054.100	152.10	425.8	23.89	7.92
GARDINIER MINE ROCK DRYER	17.60	415.300	3063.300	19.20	290.0	7.00	2.90
GARDINIER/CARGILL DAP	4.29	363.400	3082.400	60.40	320.0	13.40	2.13
GARDINIER/CARGILL GTSP	9.60	363.400	3082.400	38.40	328.0	11.56	2.44
GARDINIER/CARGILL SAP #7	46.20	363.400	3082.400	45.72	355.0	9.20	2.29
GARDINIER/CARGILL SAP #8	52.50	363.400	3082.400	45.72	355.0	8.63	2.44

TABLE 5-4
SO_2 Class II AAQS Inventory
IMC Fertilizer Inc., Nichols Plant
Polk County, Florida
(Continued)

SO2 SOURCE INVENTORY FOR IMC NICHOLS PLANT		AAQS					
SOURCE DESCRIPTION	Emissions (g/s)	UTM COORDINATES (km EAST	NORTH	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
GARDINIER/CARGILL SAP #9	54.60	363.400	3082.400	45.72	344.0	12.50	2.74
GULF COAST LEAD	48.45	364.000	3093.500	29.57	344.1	37.59	0.61
GULF COAST LEAD	0.75	364.000	3093.500	8.84	309.1	20.85	0.34
HARDEE	277.60	404.800	3057.400	22.90	389.0	23.90	4.88
HILLS. CO. RESOURCE RECOVERY	21.40	368.200	3092.700	50.00	491.0	18.30	1.80
IMC NEW WALES AFI PLANT	0.20	396.600	3078.900	52.40	322.0	13.10	2.40
IMC NEW WALES DAP	5.54	396.600	3078.900	36.60	319.1	20.15	1.83
IMC NEW WALES DAP 1	3.70	396.700	3079.400	40.50	314.0	14.90	2.10
IMC NEW WALES GTSP	9.20	396.700	3079.400	40.50	316.0	20.40	1.80
IMC NEW WALES MULTIPHOS	4.80	396.600	3078.900	52.40	314.0	15.80	1.40
IMC NEW WALES SAP #1,2,3 (3 AT 3000 TPD)	189.00	396.600	3078.900	61.00	350.0	15.31	2.60
IMC NEW WALES SAP #4,5 (2 AT 3000 TPD)	126.00	396.600	3078.900	60.70	350.0	15.31	2.60
IMC NORALYN	13.30	414.700	3080.300	18.30	341.0	8.50	2.80
IMC NORALYN	1.20	414.700	3080.300	23.20	394.0	17.10	2.00
LAKELAND LARSEN 4	93.37	409.300	3102.800	50.29	433.0	5.64	3.05
LAKELAND LARSEN 5	0.40	409.300	3102.800	50.29	444.1	6.47	3.05
LAKELAND LARSEN 6	0.35	409.300	3102.800	50.29	444.1	6.47	3.05
LAKELAND LARSEN 7	18.71	409.300	3102.800	50.29	444.1	6.86	3.05
LAKELAND LARSEN	0.20	409.300	3102.800	9.75	699.7	171.38	1.52
LAKELAND LARSEN CT	29.11	409.300	3102.800	30.48	783.2	28.22	5.79
LAKELAND MCINTOSH 1	341.56	409.300	3106.200	45.72	419.1	23.96	2.74
LAKELAND MCINTOSH 2	25.68	409.200	3106.200	47.55	402.4	21.29	3.17
LAKELAND MCINTOSH 3	500.10	409.200	3106.200	76.20	350.0	19.70	4.88
LAKELAND MCINTOSH	2.94	409.200	3106.200	6.10	652.4	23.54	0.79
LAKELAND MCINTOSH	8.32	409.200	3106.200	10.97	791.3	0.39	2.80
MOBIL NICHOLS DRYER 1	12.73	398.300	3084.300	25.90	342.0	14.10	2.29
MOBIL NICHOLS DRYER 2	12.73	398.300	3084.300	25.90	342.0	14.10	2.29
MOBIL NICHOLS DRYER 4	2.44	398.300	3084.300	25.90	339.0	16.05	2.29
PINELLAS RRF	62.24	335.300	3084.400	49.10	522.0	27.72	2.74
ROYSTER MULBERRY DAP	1.10	406.700	3085.200	31.10	316.0	7.90	2.70
ROYSTER MULBERRY (1700 TPD @ 4 LB/TON)	35.70	406.700	3085.200	61.00	360.0	12.20	2.13
ROYSTER PINEY POINT SAP	42.02	348.700	3057.300	60.98	350.0	8.08	2.36
ROYSTER PINEY POINT DAP	7.40	348.700	3057.300	61.00	328.0	15.50	3.00
TECO BIG BEND TURBINE 1	11.30	361.900	3075.000	10.70	816.0	136.20	1.50
TECO BIG BEND TURBINE 2&3	79.18	361.900	3075.000	22.86	770.8	18.74	4.27
TECO BIG BEND UNIT 1	3309.00	361.900	3075.000	149.35	404.7	13.74	7.32
TECO BIG BEND UNIT 2	3275.32	361.900	3075.000	149.35	404.7	13.02	7.32
TECO BIG BEND UNIT 3	3372.92	361.900	3075.000	149.35	410.2	14.47	7.32
TECO BIG BEND UNIT 4	654.70	361.900	3075.000	149.40	342.2	19.81	7.32
TECO GANNON 1	380.43	360.000	3087.500	93.27	415.8	28.90	3.05
TECO GANNON 2	380.43	360.000	3087.500	93.27	420.8	30.85	3.05
TECO GANNON 3	483.96	360.000	3087.500	93.27	419.7	38.64	3.23
TECO GANNON 4	567.71	360.000	3087.500	93.27	426.9	22.97	3.05
TECO GANNON 5	691.28	360.000	3087.500	93.27	423.6	23.18	4.45
TECO GANNON 6	1149.41	360.000	3087.500	93.27	433.0	24.74	5.36
TECO GANNON TURBINE	1.38	360.000	3087.500	10.67	816.3	136.61	1.52
TECO HOOKERS POINT 1	41.30	358.000	3091.000	85.30	419.0	6.10	3.40
TECO HOOKERS POINT 2	41.30	358.000	3091.000	85.30	438.0	5.50	3.40
TECO HOOKERS POINT 3	57.00	358.000	3091.000	85.30	434.0	7.90	3.70
TECO HOOKERS POINT 4	57.00	358.000	3091.000	85.30	422.0	7.30	3.70
TECO HOOKERS POINT 5	84.60	358.000	3091.000	85.30	448.0	11.00	3.40
TECO HOOKERS POINT 6	107.90	358.000	3091.000	85.30	434.0	22.30	2.90
TECO POLK POWER	49.68	402.450	3067.350	45.72	400.0	16.76	5.79

TABLE 5-4
SO_2 Class II AAQS Inventory
IMC Fertilizer Inc., Nichols Plant
Polk County, Florida
(Concluded)

SO2 SOURCE INVENTORY FOR IMC NICHOLS PLANT		AAQS					
SOURCE DESCRIPTION	Emissions (g/s)	UTM COORDINATES (km EAST	NORTH	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
TECO POLK POWER	4.41	402.450	3067.216	45.72	389.0	16.15	4.42
TECO POLK POWER	4.41	402.450	3067.212	45.72	389.0	16.15	4.42
TECO POLK POWER	4.41	402.450	3067.070	45.72	389.0	16.15	4.42
TECO POLK POWER	4.41	402.450	3067.030	45.72	389.0	16.15	4.42
TECO POLK POWER	5.42	402.488	3066.954	22.86	812.0	27.43	5.49
TECO POLK POWER	6.68	402.488	3066.914	22.86	785.0	31.39	5.49
TECO POLK POWER	6.68	402.488	3066.807	22.86	785.0	31.39	5.49
TECO POLK POWER	6.68	402.488	3066.768	22.86	785.0	31.39	5.49
TECO POLK POWER	6.68	402.488	3066.692	22.86	785.0	31.39	5.49
TECO POLK POWER	6.68	402.488	3066.652	22.86	785.0	31.39	5.49
TECO POLK POWER	0.30	402.420	3067.320	6.10	533.0	13.10	0.91
TECO POLK POWER	8.20	402.328	3067.472	60.70	1033.0	10.70	1.40
TECO POLK POWER	0.016	402.016	3067.640	22.90	1000.0	20.00	1.20
TECO POLK POWER	1.27	402.298	3067.297	60.70	1033.0	9.10	1.10
USSAC FT MEADE H2SO4 1 & 2	126.00	416.120	3068.620	53.40	355.0	15.91	2.59
W.R. GRACE/SEMINOLE DAP 4	0.30	409.770	3086.990	40.20	316.0	26.20	2.10
W.R. GRACE/SEMINOLE SAP 4, 5 & 6	143.77	409.770	3086.990	60.96	347.0	34.00	1.52

NOTE: CONSERV IS NOW IMC FERTILIZER INC. - NICHOLS PLANT

TABLE 5-5
SO_2 Class II PSD Source Inventory
IMC Fertilizer Inc., Nichols Plant
Polk County, Florida

SO2 SOURCE INVENTORY FOR IMC NICHOLS PLANT		PSD					
	Emissions	UTM COORDINATES (km		Height	Temp.	Velocity	Diameter
SOURCE DESCRIPTION	(g/s)	EAST	NORTH	(m)	(K)	(m/s)	(m)
AGRICO PIERCE DRYERS 1,2	-24.32	404.100	3078.950	24.38	339.0	12.94	1.52
AGRICO PIERCE DRYERS 3,4	-23.00	404.100	3078.950	24.38	339.0	18.82	2.43
AGRICO SO. PIERCE DAP PLANT	4.41	407.500	3071.330	38.10	328.0	14.60	3.10
AGRICO SO. PIERCE H2SO4 (2 @ 2700 TPD)	113.50	407.500	3071.300	45.73	350.0	39.06	1.60
AGRICO SO. PIERCE H2SO4 (2 @1800 TPD)	-75.60	407.500	3071.300	45.73	350.0	26.40	1.60
BREWSTER/IMPERIAL DRYER	-19.26	404.800	3069.500	27.44	339.0	15.25	2.29
CF BARTOW DAP 1-3	3.97	408.500	3082.500	36.40	339.0	16.11	2.13
CF BARTOW H2SO4 1 (400 TPD)	-60.90	408.500	3082.500	30.49	350.0	12.20	1.37
CF BARTOW H2SO4 2 (500 TPD)	-110.25	408.500	3082.500	30.49	350.0	10.37	1.68
CF BARTOW H2SO4 3 (600 TPD)	-107.10	408.500	3082.500	30.49	364.0	4.27	2.74
CF BARTOW H2SO4 4 (900 TPD)	-174.83	408.500	3082.500	30.49	358.0	7.93	2.13
CF BARTOW H2SO4 5 (2400 TPD)	50.40	408.500	3082.500	63.41	361.0	10.88	2.13
CF BARTOW H2SO4 5 (900 TPD)	-226.80	408.500	3082.500	63.41	358.0	10.67	2.13
CF BARTOW H2SO4 6 (2400 TPD)	50.40	408.500	3082.500	63.41	370.0	7.28	2.13
CF BARTOW H2SO4 6 (900 TPD)	-170.10	408.500	3082.500	63.41	359.0	10.37	2.13
CF BARTOW H2SO4 7 (2000 TPD)	42.00	408.500	3082.500	67.10	351.0	9.80	2.40
CF PLANT CITY BASELINE C & D	-100.80	388.000	3116.000	60.35	353.0	16.40	2.44
CF PLANT CITY BASELINE A & B	-105.00	388.000	3116.000	23.80	316.0	18.80	1.52
CF PLANT CITY H2SO4 A&B	88.20	388.000	3116.000	33.50	316.0	19.50	1.52
CF PLANT CITY PROPOSED C & D	109.20	388.000	3116.000	60.35	353.0	17.77	2.44
CLM CHLORIDE METALS	13.00	361.800	3088.300	30.00	375.0	20.10	0.61
CONSERV NICHOLS ROCK DRYER	-3.88	398.400	3084.200	24.40	339.0	12.90	1.52
CONSERV NICHOLS (2 @ 1300 TPD & 4 LB/TON)	-54.60	398.400	3084.200	30.50	308.0	18.90	1.80
CONSERV NICHOLS (2500 TPD @ 4 LB/TON)	52.50	398.400	3084.200	45.70	352.0	12.00	2.30
CONSERV NICHOLS (SULFUR SYSTEM)	0.13	398.400	3084.200	10.00	370.0	3.00	0.30
DOLIME BOILER	-4.52	404.813	3069.548	27.43	494.1	7.25	0.61
DOLIME DRYER	-5.68	404.813	3069.548	27.43	333.0	20.67	1.52
MOBILE ELECTROPHOS 400HP BOILER	-6.53	405.600	3079.400	7.32	464.0	3.23	0.91
MOBILE ELECTROPHOS 600HP BOILER	-10.05	405.600	3079.400	6.10	464.0	7.71	0.91
MOBILE ELECTROPHOS CALCINER	-7.11	405.600	3079.400	25.61	306.0	6.97	2.13
MOBILE ELECTROPHOS COKE DRYER	-3.17	405.600	3079.400	18.29	322.0	22.87	0.70
MOBILE ELECTROPHOS FURNACE (31.25 TPH @0.3% S)	-47.25	405.600	3079.400	29.27	314.0	8.52	2.13
MOBILE ELECTROPHOS ROCK DRYER	-21.81	405.600	3079.400	18.29	350.0	6.79	1.83
ESTECH/SWIFT DRYER	-22.80	411.500	3074.200	18.75	340.0	5.06	2.95
ESTECH/SWIFT DRYER	-23.94	411.500	3074.200	18.29	339.0	8.47	2.95
ESTECH/SWIFT SAP (610 TPD & 29 LB/TON)	-92.87	411.500	3074.200	30.79	358.0	3.90	2.13
EVANS PACKING	0.20	383.300	3135.800	12.30	466.2	9.20	0.40
FARMLAND 1,2 H2SO4	-83.98	409.500	3079.500	30.48	311.0	20.18	1.37
FARMLAND 3,4 H2SO4	67.16	409.500	3079.500	30.48	355.0	9.27	2.29
FARMLAND 5 H2SO4	50.40	409.500	3079.500	45.72	355.0	11.55	2.44
FPC INT. CITY PROP TURBINES/7EA AT 20 DEG F	124.40	446.300	3126.000	15.24	819.8	56.21	4.21
FPC INT. CITY PROP TURBINES/7FA AT 20 DEG F	110.40	446.300	3126.000	15.24	880.8	32.07	7.04
FPC POLK	49.44	414.400	3073.910	34.40	400.0	40.50	4.10
GARDINIER/CARGILL DRYER	-28.89	363.400	3082.400	20.73	310.0	13.12	1.07
GARDINIER/CARGILL SAP #4,5,6	-196.30	363.400	3082.400	22.60	322.0	19.51	1.52
GARDINIER/CARGILL SAP #7	46.20	363.400	3082.400	45.72	355.0	9.20	2.29
GARDINIER/CARGILL SAP #7	-50.71	363.400	3082.400	45.72	355.0	9.20	2.29
GARDINIER/CARGILL SAP #8	52.50	363.400	3082.400	45.72	355.0	8.63	2.44
GARDINIER/CARGILL SAP #9	54.60	363.400	3082.400	45.72	344.0	12.50	2.74
GEN. PORT. CEMENT KILN 4	-62.99	358.000	3090.600	35.97	505.2	17.61	2.74
GEN. PORT. CEMENT KILN 5	-69.30	358.000	3090.600	45.42	494.1	5.80	3.81
HARDEE	277.60	404.800	3057.400	22.90	389.0	23.90	4.88
HILLS. CO. RESOURCE RECOVERY	21.40	368.200	3092.700	50.00	491.0	18.30	1.80

TABLE 5-5
SO_2 Class II PSD Source Inventory
IMC Fertilizer Inc., Nichols Plant
Polk County, Florida
(Concluded)

SO2 SOURCE INVENTORY FOR IMC NICHOLS PLANT		PSD					
SOURCE DESCRIPTION	Emissions (g/s)	UTM COORDINATES (km EAST	NORTH	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
IMC NEW WALES AFI PLANT	0.20	396.600	3078.900	52.40	322.0	13.10	2.40
IMC NEW WALES DAP	5.54	396.600	3078.900	36.60	319.1	20.15	1.83
IMC NEW WALES MULTIPHOS	4.80	396.600	3078.900	52.40	314.0	15.80	1.40
IMC NEW WALES ROCK DRYER	-34.27	396.600	3078.900	21.00	347.0	18.60	2.13
IMC NEW WALES SAP #1,2,3 BASELINE	-146.00	396.600	3078.900	61.00	350.0	14.28	2.60
IMC NEW WALES SAP #1,2,3 (3 AT 3000 TPD)	189.00	396.600	3078.900	61.00	350.0	15.31	2.60
IMC NEW WALES SAP #4,5 (2 AT 3000 TPD)	126.00	396.600	3078.900	60.70	350.0	15.31	2.60
LAKELAND LARSEN CT	29.11	409.300	3102.800	30.48	783.2	28.22	5.79
LAKELAND MCINTOSH 3	500.10	409.200	3106.200	76.20	350.0	19.70	4.88
MOBIL NICHOLS CALCINER	-13.89	398.300	3084.300	28.40	340.0	19.24	1.09
MOBIL NICHOLS 75 HP BOILER	-0.87	398.300	3084.300	4.00	522.0	1.80	0.80
MOBIL NICHOLS DRYER 4	2.44	398.300	3084.300	25.90	339.0	16.05	2.29
PINELLAS RRF	62.24	335.300	3084.400	49.10	522.0	27.72	2.74
ROYSTER MULBERRY (1003 TPD @ 29 LB/TON)	-152.71	406.700	3085.200	51.00	356.0	9.90	2.13
ROYSTER MULBERRY (1700 TPD @ 4 LB/TON)	35.70	406.700	3085.200	61.00	360.0	12.20	2.13
TECO BIG BEND UNIT 3 (24-HR)	-1218.00	361.900	3075.000	149.40	418.0	14.33	7.32
TECO BIG BEND UNIT 4	654.70	361.900	3075.000	149.40	342.2	19.81	7.32
TECO BIG BEND UNITS 1&2 (24-HR)	-2436.00	361.900	3075.000	149.40	422.0	28.65	7.32
TECO POLK POWER	49.68	402.450	3067.350	45.72	400.0	16.76	5.79
TECO POLK POWER	4.41	402.450	3067.216	45.72	389.0	16.15	4.42
TECO POLK POWER	4.41	402.450	3067.212	45.72	389.0	16.15	4.42
TECO POLK POWER	4.41	402.450	3067.070	45.72	389.0	16.15	4.42
TECO POLK POWER	4.41	402.450	3067.030	45.72	389.0	16.15	4.42
TECO POLK POWER	5.42	402.488	3066.954	22.86	812.0	27.43	5.49
TECO POLK POWER	6.68	402.488	3066.914	22.86	785.0	31.39	5.49
TECO POLK POWER	6.68	402.488	3066.807	22.86	785.0	31.39	5.49
TECO POLK POWER	6.68	402.488	3066.768	22.86	785.0	31.39	5.49
TECO POLK POWER	6.68	402.488	3066.692	22.86	785.0	31.39	5.49
TECO POLK POWER	6.68	402.488	3066.652	22.86	785.0	31.39	5.49
TECO POLK POWER	0.30	402.420	3067.320	6.10	533.0	13.10	0.91
TECO POLK POWER	8.20	402.328	3067.472	60.70	1033.0	10.70	1.40
TECO POLK POWER	0.016	402.016	3067.640	22.90	1000.0	20.00	1.20
TECO POLK POWER	1.27	402.298	3067.297	60.70	1033.0	9.10	1.10
USS AGRI-CHEM BARTOW DRYER	-3.41	413.200	3086.300	15.80	332.0	10.01	1.83
USS AGRI-CHEM BARTOW SAP (800 TPD & 10 LB/TON)	-42.00	413.200	3086.300	28.96	305.0	7.50	2.12
USSAC FT MEADE GTSP	-18.27	416.000	3069.000	28.35	330.0	17.60	1.52
USSAC FT MEADE H2SO4 1 & 2	126.00	416.120	3068.620	53.40	355.0	15.91	2.59
USSAC FT MEADE H2SO4 (1500 TPD @ 10 LB/TON)	-78.80	416.210	3068.740	29.00	314.0	6.77	3.02
W.R. GRACE/SEMINOLE DRYER	-39.66	409.770	3086.990	15.24	327.0	17.32	2.04
W.R. GRACE/SEMINOLE SAP #1 & #2	-216.00	409.770	3086.990	45.72	352.0	16.50	1.37
W.R. GRACE/SEMINOLE SAP #3	-52.50	409.770	3086.990	45.72	311.0	16.70	1.52
W.R. GRACE/SEMINOLE SAP 4, 5 & 6	-121.07	409.770	3086.990	60.96	347.0	25.10	1.52
W.R. GRACE/SEMINOLE SAP 4, 5 & 6	143.77	409.770	3086.990	60.96	347.0	34.00	1.52

NOTE: CONSERV IS NOW IMC FERTILIZER INC. - NICHOLS PLANT

TABLE 5-6
SUMMARY OF CLASS II AREA SULFUR DIOXIDE IMPACTS ANALYSIS

IMC FERTILIZER, INC.- NICHOLS PLANT
POLK COUNTY, FLORIDA

METEOROLOGICAL DATA	SULFUR DIOXIDE IMPACT ($\mu g/m^3$)*			
	AAQS		PSD	
DATA	3-HOUR	24-HOUR	3-HOUR	24-HOUR
1985	502.31	191.61	79.69	21.43
1986	440.92	162.24	99.79	20.36
1987	465.68	167.16	83.76	15.05
1988	396.54	126.67	91.24	22.28
1989	399.52	134.03	94.03	25.62
STANDARD/INCREMENT (FAC RULE 17-272)	1300	260	512	91

NOTE: The tabulated impacts represent the highest second-high impacts.

TABLE 5-7
SO_2 Class I PSD Inventory
IMC Fertilizer Inc., Nichols Plant
Polk County, Florida

SO2 SOURCE INVENTORY FOR IMC NICHOLS PLANT

Run	Source No.	Source Description	Emission (g/s)	Grid Coordinates (k EAST	NORTH	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
3A1	1	TECO POLK POWER	49.68	7.62	7.37	45.7	400	16.8	5.79
3A1	2	TECO POLK POWER	4.41	7.62	7.36	45.7	389	16.2	4.42
3A1	3	TECO POLK POWER	4.41	7.62	7.36	45.7	389	16.2	4.42
3A1	4	TECO POLK POWER	4.41	7.62	7.35	45.7	389	16.2	4.42
3A1	5	TECO POLK POWER	4.41	7.62	7.35	45.7	389	16.2	4.42
3A1	6	TECO POLK POWER	5.42	7.62	7.35	22.9	812	27.4	5.49
3A1	7	TECO POLK POWER	6.68	7.62	7.35	22.9	785	31.4	5.49
3A1	8	TECO POLK POWER	6.68	7.62	7.34	22.9	785	31.4	5.49
3A1	9	TECO POLK POWER	6.68	7.62	7.34	22.9	785	31.4	5.49
3A1	10	TECO POLK POWER	6.68	7.62	7.34	22.9	785	31.4	5.49
3A1	11	TECO POLK POWER	6.68	7.62	7.33	22.9	785	31.4	5.49
3A1	12	TECO POLK POWER	0.33	7.62	7.37	6.1	533	13.1	0.91
3A1	13	TECO POLK POWER	8.2	7.62	7.37	60.7	1033	10.7	1.4
3A1	14	TECO POLK POWER	0.01	7.6	7.38	22.9	1000	20	1.2
3A1	15	TECO POLK POWER	1.27	7.62	7.37	60.7	1033	9.1	1.1
3A1	16	AGRICO SO. PIERCE GTSP PLANT	4.41	7.88	7.57	38.1	328	14.6	3.1
3A1	17	AGRICO SO. PIERCE GTSP PLANT	113.5	7.88	7.57	45.7	350	39.1	1.6
3A1	18	ASPHALT PAVERS 3 (0700-1800)	2.25	5.5	12.1	12.2	377	10.6	1.37
3A1	19	ASPHALT PAVERS 4 (0700-1800)	2.25	5.57	12.4	8.5	357	11	1.08
3A1	20	CF BARTOW DAP 1-3	3.97	7.93	8.13	36.4	339	16.1	2.13
3A2	1	CF BARTOW H2SO4 5 (2400 TPD)	50.4	7.93	8.13	63.4	361	10.9	2.13
3A2	2	CF BARTOW H2SO4 6 (2400 TPD)	50.4	7.93	8.13	63.4	370	7.3	2.13
3A2	3	CF BARTOW H2SO4 7 (2000 TPD)	42	7.93	8.13	67.1	351	9.8	2.4
3A2	4	CF PLANT CITY H2SO4 A&B	88.2	6.9	9.8	33.5	316	19.5	1.5
3A2	5	CF PLANT CITY PROPOSED C & D	54.6	6.9	9.8	60.4	353	17.8	2.44
3A2	6	CF PLANT CITY PROPOSED C & D	54.6	6.9	9.8	60.4	353	17.8	2.44
3A2	7	CLM CHLORIDE METALS	13	5.59	8.42	30	375	20.1	0.61
3A2	8	CONSERVE NICHOLS (2000 TPD @ 4 LB/T	42	7.42	8.21	45.7	352	10.3	2.3
3A2	9	COUCH CONST-ODESSA (ASPHALT)	7.25	4.54	9.98	9.1	436	22.3	1.4
3A2	10	COUCH CONST-ZEPHYRHILLS (ASPHALT)	3.54	7.02	10.5	6.1	422	21	1.38
3A2	11	DRIS PAVING (ASPHALT)	0.23	4.53	9.96	12.2	339	6.5	3.05
3A2	12	ER JAHNA (LIME DRYER)	0.82	6.84	11.8	10.7	327	9	1.83
3A2	13	EVANS PACKING	0.2	6.67	10.8	12.3	466	9.2	0.4
3A2	14	FARMLAND 3,4 H2SO4	67.16	7.98	7.98	30.5	355	9.3	2.29
3A2	15	FARMLAND 5 H2SO4	41.96	7.98	7.98	45.7	355	9.7	2.44
3A2	16	FDOC BOILER #3	2.99	6.61	12.3	9.1	478	4.6	0.61
3A2	17	FLA MINING & MATERIALS KILN 2	1.45	5.31	12.5	32	394	9.9	4.27
3A2	18	FLORIDA CRUSHED STONE KILN 1	98.4	5.5	12.1	97.6	442	23.2	4.88
3A2	19	FPC CRYSTAL RIVER 4	1008.8	4.21	14.2	182.9	398	21	6.9
3A2	20	FPC CRYSTAL RIVER 5	1008	4.21	14.2	182.9	398	21	6.9
4A1	1	FPC DEBARY PROP TURBINES AT 20 oF	466.4	10.9	13.9	15.2	820	56.2	4.21
4A1	2	FPC INT. CITY PROP TURBINES/7EA AT 20	310.9	9.82	10.3	15.2	820	56.2	4.21
4A1	3	FPC INT. CITY PROP TURBINES/7FA AT 20	279.1	9.82	10.3	15.2	881	32.1	7.04
4A1	4	GARDINIER/CARGILL SAP #7	46.2	5.67	8.12	45.7	355	9.2	2.29
4A1	5	GARDINIER/CARGILL SAP #8	52.5	5.67	8.12	45.7	355	8.6	2.44
4A1	6	GARDINIER/CARGILL SAP #9	54.6	5.67	8.12	45.7	344	12.5	2.74
4A1	7	HARDEE	277.6	7.74	6.87	22.9	389	23.9	4.88
4A1	8	HILLS. CO. RESOURCE RECOVERY	21.4	5.91	8.64	50	491	18.3	1.8
4A1	9	HOSP CORP OF AM BOILER #1	0.08	4.17	11.1	11	533	4	0.31
4A1	10	HOSP CORP OF AM BOILER #2	0.08	4.17	11.1	11	533	4	0.31

TABLE 5-7
SO_2 Class I PSD Inventory
IMC Fertilizer Inc., Nichols Plant
Polk County, Florida
(Continued)

SO2 SOURCE INVENTORY FOR IMC NICHOLS PLANT

Run	Source No.	Source Description	Emission (g/s)	Grid Coordinates (k EAST	NORTH	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
4A1	11	IMC NEW WALES AFI PLANT	0.2	7.33	7.95	52.4	322	13.1	2.4
4A1	12	IMC NEW WALES DAP	5.54	7.33	7.95	36.6	319	20.2	1.83
4A1	13	IMC NEW WALES MULTIPHOS	4.8	7.33	7.95	52.4	314	15.8	1.4
4A1	14	IMC NEW WALES SAP #1,2,3 (3 AT 3000 TP	189	7.33	7.95	61	350	15.3	2.6
4A1	15	IMC NEW WALES SAP #4,5 (2 AT 3000 TPD	126	7.33	7.95	60.7	350	15.3	2.6
4A1	16	KISSIMMEE UTIL (EXISTING)	32.1	10.5	10.5	18.3	422	38	3.66
4A1	17	LAKE CO. COGEN. FACILITY PROPOSED	5.04	9.2	13.9	30.5	384	17.1	3.35
4A1	18	LAKELAND MCINTOSH 3	500.1	7.93	9.29	76.2	350	19.7	4.88
4A1	19	LAKELAND LARSEN CT	29.11	7.96	9.14	30.5	783	28.2	5.79
4A1	20	MOBIL BIG-4 BOILER	0.6	7.24	7.49	8.2	505	7.6	0.41
4A2	1	MOBIL BIG-4 DRYER	1.9	7.24	7.49	30.5	334	7.3	1.82
4A2	2	MOBIL NICHOLS DRYER 4	2.44	7.42	8.22	25.9	328	10.1	1.83
4A2	3	NEW PORT RICHEY HOSP BLR#1	0.06	4.06	10.2	11	544	3.9	0.31
4A2	4	NEW PORT RICHEY HOSP BLR#2	0.03	4.06	10.2	11	544	3.9	0.31
4A2	5	NITRAM	2.09	5.49	12.2	7.6	347	6.3	1.83
4A2	6	ORLANDO UTIL STANTON 1	105.4	11.7	11.5	167.6	326	21.6	5.8
4A2	7	ORLANDO UTIL STANTON 2 (24-HR)	242.4	11.7	11.5	167.6	324	23.5	5.8
4A2	8	OVERSTREET PAV. (ASPHALT)	3.67	5.3	11.2	9.1	408	16	1.3
4A2	9	PASCO COUNTY RRF	14.1	4.86	11	83.8	394	15.7	3.05
4A2	10	PASCO CO. COGEN. FACLITY PROPOSED	5.04	6.78	11	30.5	384	17.1	3.35
4A2	11	PINELLAS RRF	62.24	4.27	8.22	49.1	522	27.7	2.74
4A2	12	ROYSTER MULBERRY (1700 TPD @ 4 LB/T	35.7	7.84	8.26	61	360	12.2	2.13
4A2	13	SEBRING UTIL 1 & 2	111.2	10.7	5.77	45.7	446	24.1	1.8
4A2	14	TECO BIG BEND UNIT 4	654.7	5.6	7.75	149.4	342	19.8	7.32
4A2	15	USSAC FT MEADE H2SO4 1 & 2	63	8.31	7.43	53.4	355	15.9	2.59
4A2	16	USSAC FT MEADE H2SO4 1 & 2	63	8.31	7.43	53.4	355	15.9	2.59
4A2	17	W.R. GRACE/SEMINOLE SAP 4, 5 & 6	42.87	8	8.35	45.7	311	16.7	1.52
4A2	18	W.R. GRACE/SEMINOLE DAP 4	120.96	8	8.35	61	347	25.1	1.52
4A2	19	RIDGE COGENERATION	13.8	8.34	9.02	99.1	350	14.5	3.05
4A2	20	AUBURNDALE @ 0.5% SULFUR	6.35	8.54	9.17	48.8	411	14.3	5.49
1A1	1	AGRICO PIERCE DRYERS 1,2	-24.32	7.71	7.95	24.4	339	12.9	1.52
1A1	2	AGRICO PIERCE DRYERS 3,4	-23	7.71	7.95	24.4	339	18.8	2.43
1A1	3	AGRICO SO. PIERCE H2SO4 (2 @1800 TPD	-75.6	7.86	7.57	45.7	350	26.4	1.6
1A1	4	BORDEN DRYER	-6.48	7.24	7.48	30.5	344	14.8	1.82
1A1	5	BORDEN DRYER	-5.29	8.23	9.45	17.1	333	8.3	2.34
1A1	6	BREWSTER/IMPERIAL DRYER	-19.6	7.74	7.48	27.4	339	15.3	2.29
1A1	7	CF BARTOW H2SO4 1 (400 TPD)	-60.9	7.93	8.13	30.5	350	12.2	1.37
1A1	8	CF BARTOW H2SO4 2 (500 TPD)	-110.25	7.93	8.13	30.5	350	10.4	1.68
1A1	9	CF BARTOW H2SO4 3 (600 TPD)	-107.1	7.93	8.13	30.5	364	4.3	2.74
1A1	10	CF BARTOW H2SO4 4 (900 TPD)	-174.83	7.93	8.13	30.5	358	7.9	2.13
1A1	11	CF BARTOW H2SO4 5 (900 TPD)	-226.8	7.93	8.13	63.4	358	10.7	2.13
1A1	12	CF BARTOW H2SO4 6 (900 TPD)	-170.1	7.93	8.13	63.4	359	10.4	2.13
1A1	13	CF PLANT CITY BASELINE C & D	-50.4	6.9	9.8	60.4	353	16.4	2.44
1A1	14	CF PLANT CITY BASELINE C & D	-50.4	6.9	9.8	60.4	353	16.4	2.44
1A1	15	CF PLANT CITY BASELINE A & B	-105	6.9	9.8	18.8	316	18.8	1.52
1A1	16	CONSERVE NICHOLS ROCK DRYER	-3.88	7.42	8.21	24.4	339	12.9	1.52
1A1	17	CONSERVE NICHOLS (2 @ 1300 TPD,4 lb/t	-54.6	7.42	8.21	30.5	308	18.9	1.8
1A1	18	DOLIME DRYER	-5.68	7.74	7.48	27.4	333	20.7	1.52
1A1	19	DOLIME BOILER	-4.52	7.74	7.48	27.4	494	7.3	0.61

TABLE 5-7
SO_2 Class I PSD Inventory
IMC Fertilizer Inc., Nichols Plant
Polk County, Florida
(Concluded)

SO2 SOURCE INVENTORY FOR IMC NICHOLS PLANT

Run	Source No.	Source Description	Emission (g/s)	Grid Coordinates (k EAST	NORTH	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
1A1	20	MOBILE ELECTROPHOS 400HP BOILER	-6.53	7.78	7.97	7.3	464	3.2	0.91
1A2	1	MOBILE ELECTROPHOS 600HP BOILER	-10	7.78	7.97	6.1	464	7.7	0.91
1A2	2	MOBILE ELECTROPHOS CALCINER	-7.11	7.78	7.97	25.6	306	7	2.13
1A2	3	MOBILE ELECTROPHOS COKE DRYER	-2.97	7.78	7.97	18.3	322	22.9	0.7
1A2	4	MOBILE ELECTROPHOS FURNACE (31.25 T	-47.25	7.78	7.97	29.3	314	8.5	2.13
1A2	5	MOBILE ELECTROPHOS ROCK DRYER	-20.9	7.78	7.97	18.3	350	6.8	1.83
1A2	6	ESTECH/SWIFT DRYER	-23.94	8.08	7.71	18.3	339	8.5	2.95
1A2	7	ESTECH/SWIFT DRYER	-22.8	8.08	7.71	18.8	340	5.1	2.95
1A2	8	ESTECH/SWIFT SAP (610 TPD & 29 LB/TON	-92.87	8.08	7.71	30.8	358	3.9	2.13
1A2	9	FARMLAND 1,2 H2SO4	-83.98	7.98	7.98	30.5	311	20.2	1.37
1A2	10	FPC CRYSTAL RIVER 1	-314	4.21	14.2	152	422	42.1	4.57
1A2	11	FPC CRYSTAL RIVER 2	-1859	4.21	14.2	153	422	42.1	4.88
1A2	12	GARDINIER/CARGILL DRYER	-28.89	5.67	8.12	20.7	310	13.1	1.07
1A2	13	GARDINIER/CARGILL SAP #4,5,6	-196.3	5.67	8.12	22.6	322	19.5	1.52
1A2	14	GARDINIER/CARGILL SAP #7	-50.71	5.67	8.12	45.7	355	9.2	2.29
1A2	15	GEN. PORT. CEMENT KILN 4	-62.99	5.4	8.53	36	505	17.6	2.74
1A2	16	GEN. PORT. CEMENT KILN 5	-69.3	5.4	8.53	45.4	494	5.8	3.81
1A2	17	IMC NEW WALES ROCK DRYER	-34.27	7.33	7.95	21	347	18.6	2.13
1A2	18	IMC NEW WALES SAP #1,2,3 BASELINE	-146	7.33	7.95	61	350	14.3	2.6
1A2	19	MOBIL NICHOLS CALCINER	-13.89	7.42	8.23	28.4	340	19.2	1.09
1A2	20	ROYSTER MULBERRY (1003 TPD @ 29 lb/to	-152.71	7.84	8.26	51	356	9.9	2.13
2A1	1	STAUFFER BOILER	-4.86	3.78	9.84	7.3	464	3.2	0.91
2A1	2	STAUFFER DRYER	-1.5	3.78	9.84	18.3	322	22.9	0.7
2A1	3	STAUFFER FURNACE	-50.93	3.78	9.84	49	335	3.6	1.2
2A1	4	STAUFFER KILN	-7.36	3.78	9.84	25.6	306	7	2.13
2A1	5	STAUFFER ROASTER	-0.45	3.78	9.84	25.6	322	7	0.91
2A1	6	TECO BIG BEND UNIT 3 (24-HR)	-1218	5.6	7.75	149.4	418	14.3	7.32
2A1	7	TECO BIG BEND UNITS 1&2 (24-HR)	-2436	5.6	7.75	149.4	422	28.7	7.32
2A1	8	USS AGRI-CHEM BARTOW DRYER	-4.99	8.16	8.32	15.8	332	10	1.83
2A1	9	USS AGRI-CHEM Bartow SAP 800TPD & 10l	-41.9	8.16	8.32	29	305	7.5	2.12
2A1	10	USSAC FT MEADE GTSP	-18.27	8.31	7.43	28.4	330	17.6	1.52
2A1	11	USSAC FT Meade H2SO4 1500TPD @10lb/t	-78.8	8.31	7.43	29	314	6.8	3.02
2A1	12	USSAC FT Meade H2SO4 1500TPD @10lb/t	-15.79	8.31	7.43	25.6	332	16.3	1.52
2A1	13	W.R. GRACE/SEMINOLE DRYER	-39.41	7.99	8.35	15.2	327	17.3	2.04
2A1	14	W.R. GRACE/SEMINOLE SAP #1 & #2	-108	7.99	8.35	45.7	352	16.5	1.37
2A1	15	W.R. GRACE/SEMINOLE SAP #1 & #2	-108	7.99	8.35	45.7	352	16.5	1.37
2A1	16	W.R. GRACE/SEMINOLE SAP #3	-52.5	7.89	8.35	45.7	311	16.7	1.52

TABLE 5-8
SUMMARY OF CLASS I AREA SULFUR DIOXIDE IMPACTS ANALYSIS

IMC FERTILIZER, INC.- NICHOLS PLANT
POLK COUNTY, FLORIDA

	SULFUR DIOXIDE IMPACT ($\mu g/m^3$)*		
	3-HOUR	24-HOUR	ANNUAL
MAXIMUM IMC NICHOLS ALONE	0.623	0.108	0.005
ALL SOURCES IMPACT (Range of impacts exceeding allowable PSD increment)	46.98 to 23.72	7.13 to 4.89	NA
MAXIMUM IMC CONTRIBUTION TO PSD INCREMENT EXCEEDANCES	0	0.035	NA
ALLOWABLE PSD INCREMENT (FAC RULE 17-275)	25	5	2
NPS SIGNIFICANT IMPACT	0.48	0.07	0.025
VA/EPA SIGNIFICANT IMPACT	1.22	0.27	0.1

NOTES:

1. The MESOPUFF modeling included Gaussian Dispersion and Dry Deposition modeling options.
2. The impacts range for all sources includes only the impacts equal to or greater than the allowable PSD increment (accounting for the maximum IMC impact).
3. The 1986 meteorological data were used for the Class I area modeling.

TABLE 5-9

SUMMARY OF ACID MIST IMPACT ANALYSIS

IMC FERTILIZER, INC.- NICHOLS PLANT
POLK COUNTY, FLORIDA

	ACID MIST IMPACT ($\mu g/m^3$)		
	8-HOUR	24-HOUR	ANNUAL
Max. Predicted Impact	8.2	4.7	1.2
FDER NTL	10	2.4	NA

NOTE: Predicted acid mist ambient air quality impacts are based on SCREEN modeling results.

TABLE 5-10

SUMMARY OF FLUORIDES AND AMMONIA IMPACT ANALYSES

IMC FERTILIZER, INC.- NICHOLS PLANT
POLK COUNTY, FLORIDA

MODELING INPUT

DAP Plant	Fluorides (g/s)	Ammonia (g/s)	Ht (m)	Dia (m)	Vel (mps)	Temp (°K)	X (m)	Y (m)
Existing								
R/G	0.09	69.3	21.0	1.83	10.67	362	0	0
Dryer	0.01	36.3	24.4	1.07	15.87	330	39	17
Cooler	0.01	4.41	15.5	0.76	21.70	320	13	13
Proposed								
R/G	0.32	86.6	21.0	1.83	13.34	362	0	0
Dryer	0.04	45.4	24.4	1.07	19.84	330	39	17
Cooler	0.03	5.52	15.5	0.76	27.13	320	13	13

NOTE : Building dimensions were included in the model : Height = 26 meters ; Width = 46 meters.

MODELING RESULTS

	FLUORIDES IMPACT ($\mu g/m^3$)			AMMONIA IMPACT ($\mu g/m^3$)		
	8-HOUR	24-HOUR	ANNUAL	8-HOUR	24-HOUR	ANNUAL
Max. Predicted Impact	36.58	19.05	2.29	5888.3	2185.5	125.2
FDER NTL	25	6	NA	170	40.8	100

NOTE : The highest-high impacts tabulated above are based on 1986 meteorological data and reflect the net emissions increase from the proposed project.

6.0 GOOD ENGINEERING PRACTICE STACK HEIGHT

The criteria for good engineering practice stack height in Rule 17-210 states that the height of a stack should not exceed the greater of 65 meters (213) feet or the height of nearby structures plus the lesser of 1.5 times the height or cross-wind width of the nearby structure. This stack height policy is designed to prevent achieving ambient air quality goals solely through the use of excessive stack heights and air dispersion.

Based on this policy, the limiting height for sources addressed in this application is 213 feet. The stacks at the IMC Nichols Plant for the sulfuric acid plant, DAP plant and the molten sulfur system are all less than 213 feet in height above-grade. This will satisfy the good engineering practice (GEP) stack height criteria.

7.0 IMPACTS ON SOILS, VEGETATION AND VISIBILITY

7.1 IMPACT ON SOILS AND VEGETATION

The U. S. Environmental Protection Agency was directed by Congress to develop primary and secondary ambient air quality standards. The primary standards were to protect human health and the secondary standards were to:

> "... protect the public welfare from any known or anticipated adverse effects of a pollutant."

The public welfare was to include soils, vegetation and visibility.

As a basis for promulgating the air quality standards, EPA undertook studies related to the effects of all major air pollutants and published criteria documents summarizing the results of the studies. The studies included in the criteria documents were related to both acute and chronic effects of air pollutants. Based on the results of these studies, the criteria documents recommended air pollutant concentration limits for various periods of time that would protect against both chronic and acute effects of air pollutants with a reasonable margin of safety.

The air quality modeling that has been conducted as a requirement for the PSD application demonstrates that the levels of sulfur dioxide expected in the vicinity of the proposed project are well below the ambient air quality standards. As a result, it is reasonable to conclude that there will be no adverse effect to the soils, vegetation or visibility of the area.

The air quality modeling demonstrates that the levels of fluoride expected at the IMC Nichols plant, as a result of the proposed project, will be close to the de minimis impact level established by FDER. Furthermore, the fluoride monitoring conducted by several fertilizer companies in the area in accordance with past FDER requirements had shown little or no effect on vegetation from airborne fluorides at even higher concentrations than those evaluated for this project. In the case of particulate matter, there will be no change in the permitted hourly emission rate and correspondingly no net increase in impacts as a result of the proposed project.

The IMC Nichols plant property and the surrounding areas are comprised of mining lands (phosphate), flatwoods, marshes, and sloughs. The soils of the area are primarily sandy and are typically low in both clay and silt content. These characteristics and the semi-tropic climatic factors of high temperature and rainfall are the natural factors which determine the terrestrial communities of the region.

The land in the vicinity of IMC Nichols plant supports various plant communities. Much of the natural vegetation on the site and the surrounding areas has been altered due to mining and industrial use; primarily the phosphate fertilizer industry. As a result of mining and industrial activity, there is very little undisturbed land in existence in the vicinity of the plant. As a result, no adverse impacts from the proposed project are expected on the soils and vegetation in the vicinity of the facility.

7.2 GROWTH RELATED IMPACTS

The proposed modification will require no increase in personnel to operate the facility. Also, the increase in fertilizer production may cause a slight increase in delivery truck tanker traffic but will have a negligible impact on traffic in the area as compared with traffic levels that presently exist. Therefore, no additional growth impacts are expected as a result of the proposed project.

7.3 VISIBILITY IMPACTS

The proposed project will result in an increase in air emissions and therefore has the potential for adverse impacts on visibility.

A screening approach suggested by EPA (Workbook for Plume Visual Impact Screening and Analysis, 1988) and computerized in a model referred to as VISCREEN was used for the analysis. The emissions of particulate matter, acid mist, and nitrogen oxides were input to the model. In the case of sulfur dioxide however, EPA has noted in discussions on visibility models that the sulfates formation resulting from sulfur dioxide emissions becomes a factor beyond 200 kilometers and so the sulfur dioxide emissions were not included in the analysis. The VISCREEN - Level 1 modeling results, presented in Table 7-1, indicate that there will be no adverse visibility impacts from the proposed project.

7.4 IMPACTS ON AIR QUALITY RELATED VALUES FOR CLASS I AREA

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

7.4.1 Impact on Vegetation

The response of vegetation to air pollutants is influenced by the concentration of the pollutant, the duration of the exposure and the frequency of the exposure. The pattern of exposure expected from a single facility is that of a few episodes of relatively high concentrations interdispersed with long periods of no exposure or extremely low concentrations. This is the pattern of exposure that would be expected from sulfur dioxide, acid mist, fluorides and particulate matter emissions from the proposed project at Chassahowitzka.

Vegetation responds to a dose of an air pollutant with a dose being defined as the product of the concentration of the pollutant and the duration of the exposure. The impact of the sulfur dioxide emissions on Chassahowitzka regional vegetation was assessed by comparing pollutant doses that have been projected with air quality modeling to threshold doses reported in the literature.

Sulfur dioxide damage to vegetation can be grouped into two general categories: acute and chronic. Acute damage is caused by short-term exposure to relatively high concentrations of sulfur dioxide. This damage is usually characterized by a yellowing of leaf tips with a sharp, well defined separation between the damaged and healthy areas of a leaf. In pine trees, injury usually first occurs at the base of the youngest needles (the newest tissue on the plant).

Damaged plants typically show decreased growth and yield. These effects vary widely between species but studies have shown a rough correlation between the loss and yield and the exposure dose. These studies showed approximately a 10 percent yield loss for each 10-fold increase in sulfur dioxide dose beyond 260 micrograms per cubic meter-hour.

Susceptibility to acute damage varies widely with plant species and also with the time of exposure. For example, alfalfa can tolerate 3250 micrograms per cubic meter for one hour (3250 micrograms per cubic meter-hour dose), but only 1850 micrograms per cubic meter for two hours (3700 micrograms per cubic meter-hour dose). Table 7-2 shows the sulfur dioxide concentration/time thresholds for several plant species common to Florida.

The vegetation in the Chassahowitzka area is characterized by flatwoods, brackish-water, marine and halothytic terrestrial species. Predominant tree species are slash pine, laurel oak, sweet gum and palm. Other plants in the area include needlegrass rush, seashore saltgrass, marsh hay and red mangrove.

A study of the tolerance of native Florida species to sulfur dioxide (Woltz and Howe, 1981) demonstrated that cypress, slash pine, live oak and mangrove exposed to 1300 micrograms per cubic meter of sulfur dioxide for 8-hours were not visibly damaged. This is consistent with the results reported in Table 7-2. Another study (McLaughlin and Lee, 1974) demonstrated that approximately 20 percent of a broad range of plants ranging from sensitive to tolerant were visibly injured when exposed to a sulfur dioxide concentration of 920 micrograms per cubic meter for a 3-hour period.

Acute injury results from a plants inability to quickly convert absorbed sulfur dioxide into the sulfate ion; an essential nutrient to plants. Chronic injury, on the other hand, results from a build-up of sulfate in tissue to the point where it becomes toxic. This sulfate build-up occurs over a relatively long period of time. Symptoms include a reduction in chlorophyll production resulting in decreased photosynthesis and yellow or reddish areas on leaves in a mottled pattern. In pines, sulfate injury is typically shown first at tips of older needles (the oldest tissue in the needle).

Chronic injury can result from sulfur dioxide exposures that are much lower than is required for acute injury. Unfortunately, there is a lack of quantitative experimental data for long term effects of sulfur dioxide exposure. The lowest average concentration for which chronic injury has been shown is 80 micrograms per cubic meter. The Environmental Protection Agency has therefore established an ambient air quality standard of 80 micrograms per cubic meter, annual average. The Florida Department of Environmental Regulation adopted a more conservative standard of 60 micrograms per cubic meter, annual average. The sulfur dioxide impacts from the proposed project are expected to be well below the ambient air quality standards (see Table 5-8).

The maximum expected concentrations of acid mist in the Chassahowitzka area resulting from the increased emissions from IMC will be less than four percent of the expected sulfur dioxide impacts. Furthermore, it would be expected that by the time acid mist droplets have traveled over 100 kilometers from IMC to the Chassahowitzka area, the droplets would have reacted with particles in the atmosphere to produce a sulfate salt.

Salt deposition concentrations in coastal areas are in the range of 25-300 pounds per acre per year and may be as high as 4000 pounds per acre per year on exposed shorelines. Sulfates can account for 5 - 6 percent of the total salt; resulting in a deposition rate in the range of 1-200 pounds per acre per year.

One study (Mulchi Armbruster, 1975) demonstrated leaf damage in reduced yields in corn and soybeans with a salt deposition of 169 - 339 pounds per acre per year. Another study (Curtis, 1975) reported that broad leaf plants absorbed greater amounts of salt than do pines, probably due to leaf shape. It has been found that deciduous trees begin to exhibit adverse effects to salt exposure concentrations in the range of 100 micrograms per cubic meter (DeVine, 1975). The same study reported no observed injury to plants with long-term exposures to salt spray of 40 micrograms per cubic meter.

The sulfate concentrations resulting from acid mist emissions from IMC are well below concentrations which have been reported to produce vegetation damage.

As in the case of Class II area impacts, the fluoride emissions from the proposed project are not expected to have any adverse impacts on vegetation because the impacts are close to de minimis levels in the vicinity of the IMC Nichols plant and correspondingly insignificant at the Class I area located over 100 kilometers away.

7.4.2 Impact on Soils

The major soil classification in the Chassahowitzka area is Weeki Wachee-Durbin muck. This is an euic, hyderthermic typic sufihemist that is characterized by high levels of sulfur and organic matter. This soil is flooded daily with the advent of high tide and the pH ranges between 6.1 and 7.8. The upper level of this soil may contain as much as four percent sulfur (USDA, 1991).

Based upon the expected sulfur dioxide, sulfate, and fluoride concentrations in the Chassahowitzka area resulting from the increased emissions from the IMC Nichols plant, it is not expected that there will be any adverse impact on the native soils.

7.4.3 Impact on Wildlife

As the predicted sulfur dioxide, sulfate, and fluoride levels are below those known to affect vegetation, the proposed project is not expected to have any impact on the wildlife in the Chassahowitzka area.

7.4.4. Visibility Impairment Analysis

Visibility impairment analysis was performed to determine potential visibility effects of the proposed project in the Chassahowitzka area. The VISCREEN - Level 1 modeling results, presented in Table 7-1, indicate that no adverse visibility impacts are expected within the Class I area as a result of the proposed project.

TABLE 7-1

Visual Effects Screening Analysis for
Source: IMC NICHOLS
Class I Area: CHASSAHOWITZKA

*** Level-1 Screening ***

Input Emissions for

Particulates	4.15	G /S
NOx (as NO_2)	1.86	G /S
Primary NO_2	.00	G /S
Soot	.00	G /S
Primary SO_4	1.97	G /S

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	.04 ppm
Background Visual Range:	25.00 km
Source-Observer Distance:	100.00 km
Min. Source-Class I Distance:	93.00 km
Max. Source-Class I Distance:	107.00 km
Plume-Source-Observer Angle:	11.25 degrees
Stability:	6
Wind Speed:	1.00 m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	70.	95.1	99.	2.00	.035	.05	.000
SKY	140.	70.	95.1	99.	2.00	.008	.05	-.000
TERRAIN	10.	64.	93.0	105.	2.00	.008	.05	.000
TERRAIN	140.	64.	93.0	105.	2.00	.002	.05	.000

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	60.	91.5	109.	2.00	.034	.05	.000
SKY	140.	60.	91.5	109.	2.00	.008	.05	-.000
TERRAIN	10.	60.	91.5	109.	2.00	.008	.05	.000
TERRAIN	140.	60.	91.5	109.	2.00	.002	.05	.000

TABLE 7-2

SENSITIVITY OF VEGETATION TO SULFUR DIOXIDE

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

<u>Sensitive Plants</u>		
Poplar	Radish	Cabbage
Lombardy Popular	Cucumber	Broccoli
Black Willow	Squash	Spinach
Elm	Bean	Wheat
American Elm	Pea	Begonia
Southern pines	Soybean	Zinnia
Red Oak	Cotton	Rubber plant
Black Oak	Eggplant	Bluegrass
Sumac	Celery	Ryegrass
<u>Intermediate Plants</u>		
Basswood	Yellow Popular	Virginia creeper
Red Oxier Dogwood	Sweetgum	Rose
Maples	Locust	Hibiscus
Red Maple	Eastern Cottonwood	Gladiolus
Elm	Saltgrass	Honeysuckle
Pine	Cucumber	Wisteria
White Oak	Tobacco	Chrysanthemum
Pin Oak	Potato	
<u>Tolerant Plants</u>		
Juniper	Pine	Gardenia
Ginkgo	Sumac	Citrus
Dogwood	Cantaloupe	Celery
Oak	Corn	
Live Oak	Lily	

(Continued)

TABLE 7-2 (CONTINUED)

Exposure Time, Hours	Concentration Needed to Produce Injury ($\mu g/m^3$)		
	Sensitive	Intermediate	Tolerant
0.5	2,620 - 10,480	9,170 - 31,440	>26,200
1.0	1,310 - 7,860	6,550 - 26,200	>20,960
2.0	655 - 5,240	3,930 - 19,650	>15,720
4.0	262 - 2,620	1,310 - 13,100	>10,480
8.0	131 - 1,310	524 - 6,550	> 5,240

8.0 CONCLUSION

It can be concluded from the information in this report that the proposed increase in production rates of IMC Nichols plant's sulfuric acid and DAP plants, and the increase in the molten sulfur system throughput, as described in this report, will not cause or contribute to a violation of any air quality standard, PSD increment, or any other provision of Chapter 17, FAC.

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APPENDIX A

EMISSION RATE CALCULATIONS

1.0 PERMITTED EMISSION RATES

1.1 SULFURIC ACID PLANT

SO_2 = 333.4 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 1460.3 TPY

MIST = 12.5 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 54.7 TPY

1.2 MOLTEN SULFUR SYSTEM

PM/PM10 = 0.9 lb/hr, 1.8 TPY

SP = 0.4 lb/hr, 0.8 TPY

SO2 = 1.0 lb/hr, 1.8 TPY

H2S = 0.4 lb/hr, 1.0 TPY

VOC = 0.7 lb/hr, 1.3 TPY

1.3 DAP PLANT

The DAP reactor/granulator, dryer and cooler have a combined emission limitation:

F = 1.58 lbs/hr
x 7446 hrs/yr x ton/2000 lbs
= 5.88 TPY

PM = 32.9 lbs/hr
x 7446 hrs/yr x ton/2000 lbs
= 122.5 TPY

2.0 ACTUAL EMISSION RATE CALCULATIONS

(Based on 1991-1992 operation data)

2.1 SULFURIC ACID PLANT

SO_2 = (309.9 + 277.1)/2 lbs/hr
x (8190 + 8613)/2 hrs/yr x ton/2000 lbs
= 1232.9 TPY

MIST = (1.6 + 4.8)/2 lbs/hr
x (8190 + 8613)/2 hrs/yr x ton/2000 lbs
= 13.4 TPY

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

NOx = 83.3 tons/hr x 0.12 lb/ton
x (8190 + 8613)/2 hrs/yr x ton/2000 lbs
= 42.0 TPY

2.2 MOLTEN SULFUR SYSTEM

(Same as permitted emissions)

PM/PM10 = 0.9 lb/hr, 1.8 TPY

SP = 0.4 lb/hr, 0.8 TPY

SO2 = 1.0 lb/hr, 1.8 TPY

H2S = 0.4 lb/hr, 1.0 TPY

VOC = 0.7 lb/hr, 1.3 TPY

2.3 DAP PLANT

Based on average annual operating hours of 7476 for 1991 and 1992.

R/G F = (0.31 + 0.91 + 0.97 + 0.56)/4 lb/hr
= 0.69 lb/hr

DRYER F = (0.05 + 0.11 + 0.09 + 0.05)/4 lb/hr
= 0.08 lb/hr

COOLER F = (0.02 + 0.07 + 0.05 + 0.04)/4 lb/hr
= 0.05 lb/hr

TOTAL F = (0.69 + 0.08 + 0.05) lb/hr
= 0.82 lb/hr
x 7476 hrs/yr x ton/2000 lbs
= 3.07 TPY

R/G PM = (3.57 + 6.07 + 4.10 + 2.85)/4 lbs/hr
= 4.15 lbs/hr

DRYER PM = (6.15 + 0.99 + 2.86 + 1.97)/4 lbs/hr
= 2.99 lbs/hr

COOLER PM = (0.75 + 0.61 + 1.52 + 0.87)/4 lbs/hr
= 0.94 lbs/hr

TOTAL PM = (4.15 + 2.99 + 0.94) lbs/hr
= 8.08 lbs/hr
x 7476 hrs/yr x ton/2000 lbs
= 30.2 TPY

Ammonia emissions estimated based on old one-time test,

TOTAL NH_3 = (550 + 288 + 35) lbs/hr
= 873 lbs/hr
x 7476 hrs/yr x ton/2000 lbs
= 3263.3 TPY

The products of combustion can be estimated based on the fuel input as follows:

Heat Input = 12.7 MMBtu/hr
x gal / 0.14 MMBtu
= 90.7 gals/hr

Based on AP-42, Table 1.3-1,

SO_2 = 90.7 gals/hr x (142 x 0.5) lb/1000 gals
= 6.4 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 24.1 TPY

NO_x = 90.7 gals/hr x 20 lb/1000 gals
= 1.8 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 6.7 TPY

CO	=	90.7 gals/hr x 5 lb/1000 gals
	=	0.45 lbs/hr
		x 8760 hrs/yr x ton/2000 lbs
	=	1.7 TPY

VOC	=	90.7 gals/hr x 0.2 lb/1000 gals
	=	0.02 lbs/hr
		x 8760 hrs/yr x ton/2000 lbs
	=	0.07 TPY

3.0 PROPOSED EMISSION RATE CALCULATIONS:

3.1 SULFURIC ACID PLANT

SO_2	=	104.2 tons/hr x 4.0 lbs/ton
	=	416.8 lbs/hr
		x 8760 hrs/yr x ton/2000 lbs
	=	1825.6 TPY

MIST	=	104.2 tons/hr x 0.15 lb/ton
	=	15.6 lbs/hr
		x 8760 hrs/yr x ton/2000 lbs
	=	68.5 TPY

NOx	=	104.2 tons/hr x 0.12 lb/ton
	=	12.5 lbs/hr
		x 8760 hrs/yr x ton/2000 lbs
	=	54.8 TPY

3.2 MOLTEN SULFUR SYSTEM

Based on the increase in TPD sulfur throughput = (1000/825) = 1.21

PM/PM10	=	0.9 lb/hr;	1.8 TPY x 1.21	=	2.18 TPY
SP	=	0.4 lb/hr;	0.8 TPY x 1.21	=	0.97 TPY
SO2	=	1.0 lb/hr;	1.8 TPY x 1.21	=	2.18 TPY
H2S	=	0.4 lb/hr;	1.0 TPY x 1.21	=	1.21 TPY
VOC	=	0.7 lb/hr;	1.3 TPY x 1.21	=	1.58 TPY

3.3 DAP PLANT

TOTAL F = 48.4 tons/hr (equivalent P_2O_5) x 0.06 lb/ton
= 2.9 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 12.7 TPY

This amount can be distributed between the three sources based on a ratio of their current emissions as follows:

R/G F = 2.5 lbs/hr, 11.0 TPY

DRYER F = 0.3 lb/hr, 1.3 TPY

COOLER F = 0.1 lb/hr, 0.4 TPY

Proposed hourly PM emissions will be the same as current permitted :

TOTAL PM = 32.9 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 144.1 TPY

This amount can be distributed between the three sources based on a ratio of their current emissions as follows:

R/G PM = 16.8 lbs/hr, 73.5 TPY

DRYER PM = 12.2 lbs/hr, 53.3 TPY

COOLER PM = 3.9 lbs/hr, 17.3 TPY

Ammonia emissions are estimated based on the 25% production increase:

TOTAL NH3 = 873 lbs/hr x 1.25
= 1091.3 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 4779.9 TPY

This amount can be distributed between the three sources based on a ratio of their current emissions as follows:

R/G NH3 = 687.5 lbs/hr, 3011.3 TPY

DRYER NH3 = 360.0 lbs/hr, 1576.8 TPY

COOLER NH3 = 43.8 lbs/hr, 191.6 TPY

The products of combustion can be estimated based on the 25% production increase as follows:

Heat Input	=	12.7 MMBtu/hr x 1.25
	=	16 MMBtu/hr
		x gal / 0.14 MMBtu
	=	114.3 gals/hr

Based on AP-42, Table 1.3-1,

SO_2	=	114.3 gals/hr x (142 x 0.5) lb/1000 gals
	=	8.12 lbs/hr
		x 8760 hrs/yr x ton/2000 lbs
	=	35.6 TPY
NO_x	=	114.3 gals/hr x 20 lb/1000 gals
	=	2.3 lbs/hr
		x 8760 hrs/yr x ton/2000 lbs
	=	10.1 TPY
CO	=	114.3 gals/hr x 5 lb/1000 gals
	=	0.57 lbs/hr
		x 8760 hrs/yr x ton/2000 lbs
	=	2.5 TPY
VOC	=	114.3 gals/hr x 0.2 lb/1000 gals
	=	0.02 lbs/hr
		x 8760 hrs/yr x ton/2000 lbs
	=	0.1 TPY

4.0 NET ANNUAL EMISSION CHANGES

Net Emission Change = Proposed Emissions - Actual Emissions

4.1 SULFURIC ACID PLANT

SO_2	=	(1825.6 - 1232.9) TPY	=	592.7 TPY
MIST	=	(68.5 - 13.4) TPY	=	55.1 TPY
NO_x	=	(54.8 - 42.0) TPY	=	12.8 TPY

4.2 MOLTEN SULFUR SYSTEM

Based on the increase in TPD sulfur throughput = (1000/825) = 1.21

PM/PM10	=	(2.18 - 1.8) TPY	=	0.38 TPY
SP	=	(0.97 - 0.8) TPY	=	0.17 TPY
SO2	=	(2.18 - 1.8) TPY	=	0.38 TPY
H2S	=	(1.21 - 1.0) TPY	=	0.21 TPY
VOC	=	(1.58 - 1.3) TPY	=	0.28 TPY

4.3 DAP PLANT

F	=	(12.7 - 3.07) TPY	=	9.63 TPY
PM	=	(144.1 - 44.3) TPY	=	99.8 TPY
NH3	=	(4779.7 - 3823.8) TPY	=	955.9 TPY
SO2	=	(35.6 - 24.1) TPY	=	11.5 TPY
NOx	=	(10.1 - 6.7) TPY	=	3.4 TPY
CO	=	(2.5 - 1.7) TPY	=	0.8 TPY
VOC	=	(0.1 - 0.07) TPY	=	0.03 TPY

TOTAL NET CHANGES

SO2	=	(592.7 + 0.38 + 11.5) TPY	=	604.6 TPY
MIST	=	55.1 TPY		
F	=	9.63 TPY		
PM	=	(0.38 + 99.8) TPY	=	100.2 TPY
NH3	=	955.9 TPY		
NOx	=	(12.8 + 3.4) TPY	=	16.2 TPY
CO	=	0.8 TPY		
VOC	=	(0.28 + 0.03) TPY	=	0.31 TPY
SP	=	0.17 TPY		
H2S	=	0.21 TPY		

SULFURIC ACID PLANT
TYPICAL SO_2 CEM DATA - 1993

IMC FERTILIZER INC - NICHOLS PLANT
POLK COUNTY, FLORIDA