STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO ~~OPERATE~~/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Single Absorption Sulfuric Acid with NH_3 Scrubbing [ ] New[1] [X] Existing[1]

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

COMPANY NAME: CF Industries, Inc., Plant City Phosphate Complex COUNTY: Hillsborough

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) "A" & "B" Sulfuric Acid Plants

SOURCE LOCATION: Street SR 39 at Hillsborough/Pasco County Line City Plant City

UTM: East (17) 388.0 km North 3116.0

Latitude 28 ° 09 ' 59 "N Longitude 82 ° 08 ' 27 "W

APPLICANT NAME AND TITLE: J. E. Parsons, General Manager

APPLICANT ADDRESS: Post Office Drawer L, Plant City, Florida 33566

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of CF Industries, Inc.

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

*Attach letter of authorization

Signed: J. E. Parsons

J. E. Parsons, General Manager
Name and Title (Please Type)

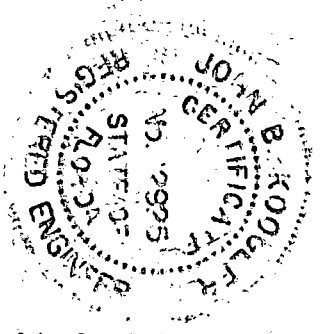
Date: 7/22/91 Telephone No. (813) 782-1591

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

This is to certify that the engineering features of this pollution control project have been ~~designed~~/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

[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, Florida 32609
Mailing Address (Please Type)

Florida Registration No. 12925 Date: 7/17/91 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.

The production rates of each of the existing A and B sulfuric acid plants will be increased from 1050 tpd to 1300 tpd of 100% acid. There will be a decrease in emissions of SO2 from 8 to 6.46 lb/ton and acid mist from 0.2 to 0.162 lb/ton. These reductions will result in no increase in actual permitted emissions. Both plants will continue to operate in full compliance with all applicable regulations.

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 - Existing control systems will be adequate to meet the proposed emission limits at the higher production rate.

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

See Page 2a of 12.

PREVIOUS FDER PERMITS

SULFURIC ACID PLANT A

Permit No.	Issued	Expired
AC29-146176	5/25/88	9/30/89
AO29-167061	9/28/89	9/29/94
PSD-FL-119		

SULFURIC ACID PLANT B

Permit No.	Issued	Expired
AC29-146177	5/25/88	9/30/89
AO29-167062	9/28/89	9/29/94
PSD-FL-119		

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?	Yes (1)
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.	Ozone
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI.	No
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII.	No
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source?	No
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source?	No
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.

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

(1) Area is non-attainment for ozone but the sulfuric acid plants emit no hydrocarbons or other air pollutants that will affect ozone levels.

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

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

EACH PLANT

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Sulfur	Ash	0.005	36,170	

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

1. **Total Process Input Rate (lbs/hr):** 36,170

2. **Product Weight (lbs/hr):** 116,488 as 93% H_2SO_4

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

EACH PLANT

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/hr	T/yr	
SO2	350	1533	17-2.600(2)(a)	542	1571	6881	
NOx	11.7	51.1	NA	NA	11.7	51.1	
Acid Mist	8.8	38.5	17-2.600(2)(a)	16.3	179	784	
VEs	10%	-	17-2.600(2)(a)	10%	-	-	

[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).

EACH 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)
Single absorption tower w/NH3 scrubbing	SO2	77.7	NA	Calculations
High efficiency mist eliminators	Acid Mist	95.1	0 - 10 um	Test on similar plant

E. Fuels NOT APPLICABLE

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.

Annual Average NOT APPLICABLE Maximum _____

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

None

EACH PLANT

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

Stack Height: 110 ft. Stack Diameter: 5.0 ft.

Gas Flow Rate: 103,733 ACFM 92,630 DSCFM Gas Exit Temperature: 110 °F.

Water Vapor Content: 3.6 % Velocity: 88.1 FPS

SECTION IV: INCINERATOR INFORMATION

NOT APPLICABLE

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) _____

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 Pages 7a, 7b and 7c of 12)

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.) NA

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. (Attachment 2A)

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). (Attachment 2B)

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. (Attachment 2C)

SECTION V - SUPPLEMENTAL REQUIREMENTS

1. Product Input/Production Rate For Each Plant

Product: Sulfuric Acid as 93% H_2SO_4

Product Rate: 1300 Short tons per day (STPD) of 100% H_2SO_4 as 93% H_2SO_4

-or-

116,488 lbs/hr (1300/0.93 x 2000/24) of 93% Sulfuric Acid

Process Losses: Recovery is 97.8% equivalent to an uncontrolled emission rate of 29.0 pounds SO_2 per ton of 100% H_2SO_4 produced.

Process Input:

Sulfur: 1300 STPD of 100% H_2SO_4 equivalent to 425 STPD of sulfur (1300 x 32/98) which at an efficiency of 97.8% requires 435 STPD of sulfur (425/0.978)

-or-

36170 lbs/hr (435 x 2000/24)

2. Controlled Emission Rate Calculations

A and B Sulfuric Acid Plants Each

Permitted/Actual: 1050 tons per day 100% acid

SO_2 - 8.0 lb/ton, max

Mist - 0.20 lb/ton

Operating factor - 1.00

Note: Federally enforceable emission limits documented in application for AC29-146176, AC29-146177, and PSD-FL-119; permits issued 5/20/88.

Proposed: 1300 tons per day 100% acid

SO2 - 6.46 lb/ton

Mist - 0.162 lb/ton

Operating factor - 1.0

Emission Rates: (Each plant - as permitted and operated)

SO2: Hourly = 8.0 lb/ton x 1050/24 tons/hr
= 350 lb/hr.

Annual = 350 lb/hr x 8760 hr/yr x 1/2000 lb/ton
= 1533 tpy

MIST: Hourly = 0.2 lb/ton x 1050/24 tons/hr
= 8.8 lb/hr

Annual = 8.8 x 8760/2000
= 38.5 tpy

NOx: Based on 102,606 dscf per ton of acid and
2.1×10^{-6} lb NOx per dscf

Hourly = 102,606 dscf/ton x 1050/24 ton/hr
x (2.1×10^{-6}) lb/ft^3
= 9.4 lb/hr

Annual = 9.4 lb/hr x 8760/2000
= 41.3 tpy

Emission Rates: (Each plant - as proposed)

SO2: Hourly = 6.46 lb/ton x 1300/24 tons/hr
= 350 lb/hr.

Annual = 350 lb/hr x 8760 hr/yr x 1/2000 lb/ton
= 1533 tpy

MIST: Hourly = 0.162 lb/ton x 1300/24 tons/hr
= 8.8 lb/hr

Annual = 8.8 x 8760/2000
= 38.5 tpy

NOx: Hourly = 102,606 dscf/ton x 1300/24 ton/hr
x (2.1×10^{-6}) lb/ft^3
= 11.7 lb/hr

Annual = 11.7 lb/hr x 8760/2000
= 51.1 tpy

NOTE: No other air pollutants are discharged from the A and B sulfuric acid plants.

3/5. Uncontrolled Emissions and Efficiency Calculations

SO2

Uncontrolled:

Hourly: $\frac{29 \text{ lb SO2}}{\text{ton H2SO4}} \times \frac{1300 \text{ ton H2SO4}}{24 \text{ hr}} = 1571 \text{ lb/hr}$

Annual: $\frac{1571 \text{ lb SO2}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 6881 \text{ tpy}$

Controlled: Single adsorption with NH3 Scrubbing

$\frac{6.46 \text{ lb SO2}}{\text{ton H2SO4}}$ (Proposed)

Control Effiency: (29.0 - 6.46) x 100/29.0 = 77.7%

Acid Mist

Uncontrolled:

Hourly: $\frac{3.3 \text{ lb mist}}{\text{ton H2SO4}} \times \frac{1300 \text{ ton H2SO4}}{24 \text{ hr}} = 179 \text{ lb/hr}$

Annual: $\frac{179 \text{ lb mist}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 784 \text{ tpy}$

Controlled: Ammonia scrubber and Brinks mist eliminator

$\frac{0.162 \text{ lb mist}}{\text{ton H2SO4}}$ (Proposed)

Control Efficiency: (3.3 - 0.162) x 100/3.3 = 95.1%

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation. $1000 (similar sources)

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

NOT APPLICABLE

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

NOT APPLICABLE

A. Company Monitored Data

1. _____no. sites _____ TSP _____( ) SO^{2}* _____ Wind spd/dir

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

Other data recorded _____

Attach all data or statistical summaries to this application.

*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.

D. Applicants Maximum Allowable Emission Data

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

E. Emission Data Used in Modeling

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

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

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

ATTACHMENT 1A

PRESENT AND PROPOSED PRODUCTION RATES AND
EMISSION RATES FOR SULFURIC ACID PLANTS

CF INDUSTRIES, INC.,
PLANT CITY PHOSPHATE COMPLEX
HILLSBOROUGH COUNTY, FLORIDA

	Sulfuric Acid Plant A	Sulfuric Acid Plant B
Date Permitted (Originally)	1965	1965
Modified (PSD-FL-119)	1988	1988
Current Permit Conditions		
Rate (tpd)	1050	1050
SO2 (lb/ton)	8.0	8.0
(lb/hr)	350.0	350.0
(tpy)	1533	1533
Mist (lb/ton)	0.2	0.2
(lb/hr)	8.8	8.8
(tpy)	38.5	38.5
Operating Factor	1.0	1.0
Proposed Conditions		
Rate (tpd)	1300	1300
SO2 (lb/ton)	6.46	6.46
(lb/hr)	350.0	350.0
(tpy)	1533	1533
Mist (lb/ton)	0.162	0.162
(lb/hr)	8.8	8.8
(tpy)	38.5	38.5
Operating Factor	1.0	1.0

Check to see final determination

ATTACHMENT 1B

ANNUAL AIR POLLUTANT EMISSION CHANGES RESULTING
FROM THE PROPOSED SULFURIC ACID PLANT RATE INCREASES (1)

CF INDUSTRIES, INC.,
PLANT CITY PHOSPHATE COMPLEX
HILLSBOROUGH COUNTY, FLORIDA

POLLUTANT		Sulfuric Acid Plant A		Sulfuric Acid Plant B	
		(tpy)	(lb/hr)	(tpy)	(lb/hr)
SO2					
	Present	1533	350	1533	350
	Proposed	1533	350	1533	350
	Annual Change	0		0	
	Subtotal			0	
	Significant Increase (2)			40	
Mist					
	Present	38.5	8.8	38.5	8.8
	Proposed	38.5	8.8	38.5	8.8
	Annual Change	0		0	
	Subtotal			0	
	Significant Increase (2)			7	
NOx					
	Present	41.3 37.4	9.4	41.3 37.4	9.4
	Proposed	51.1	11.7	51.1	11.7
	Annual Change	9.8 13.7		9.8 13.7	
	Subtotal			19.6 27.4	
	Significant Increase (2)	2.14		40 ?	

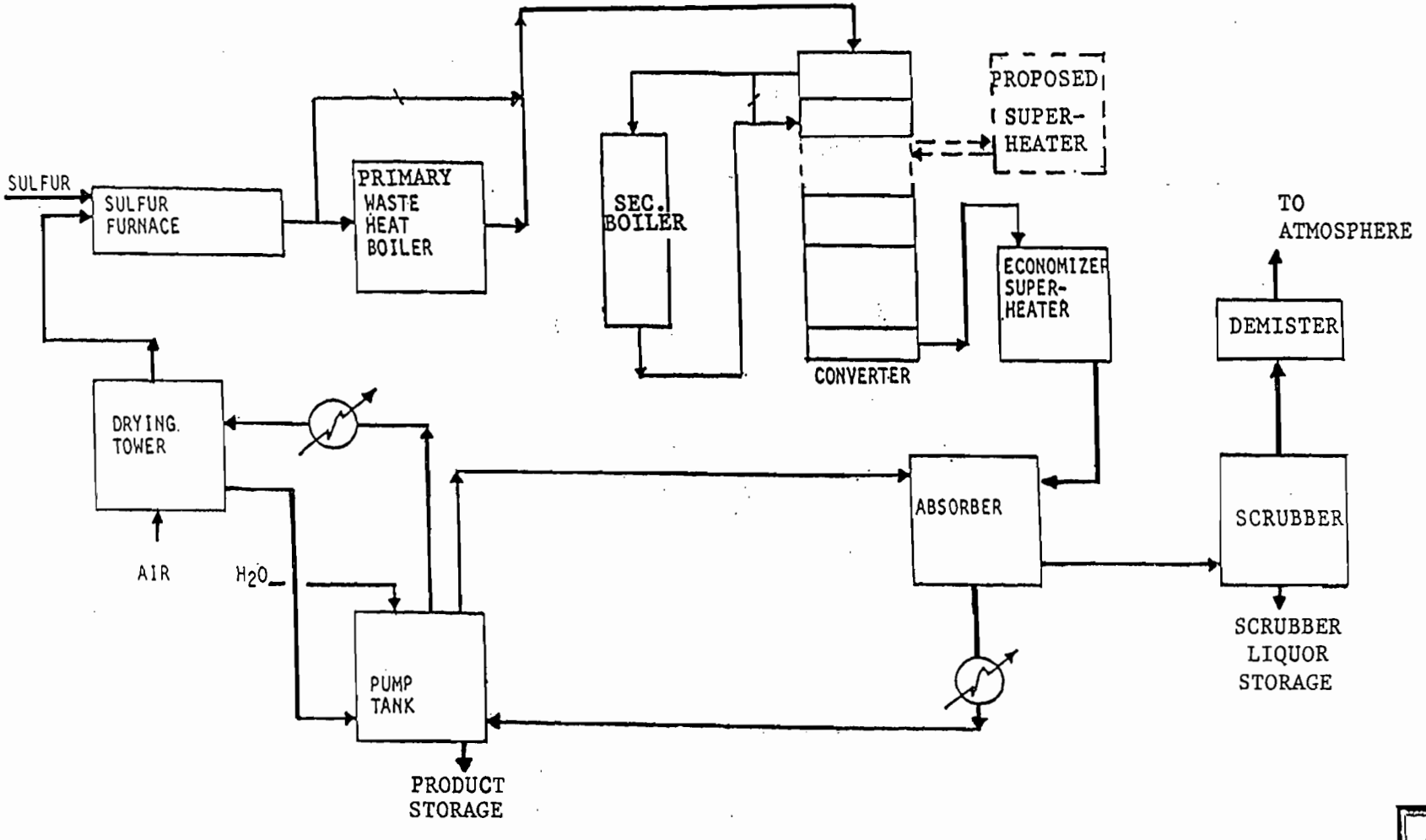
(1) Based on differences between present actual/permitted and proposed operating conditions.

(2) Defined in 17-2.500(2)(e)2,FAC.

ATTACHMENT 2A

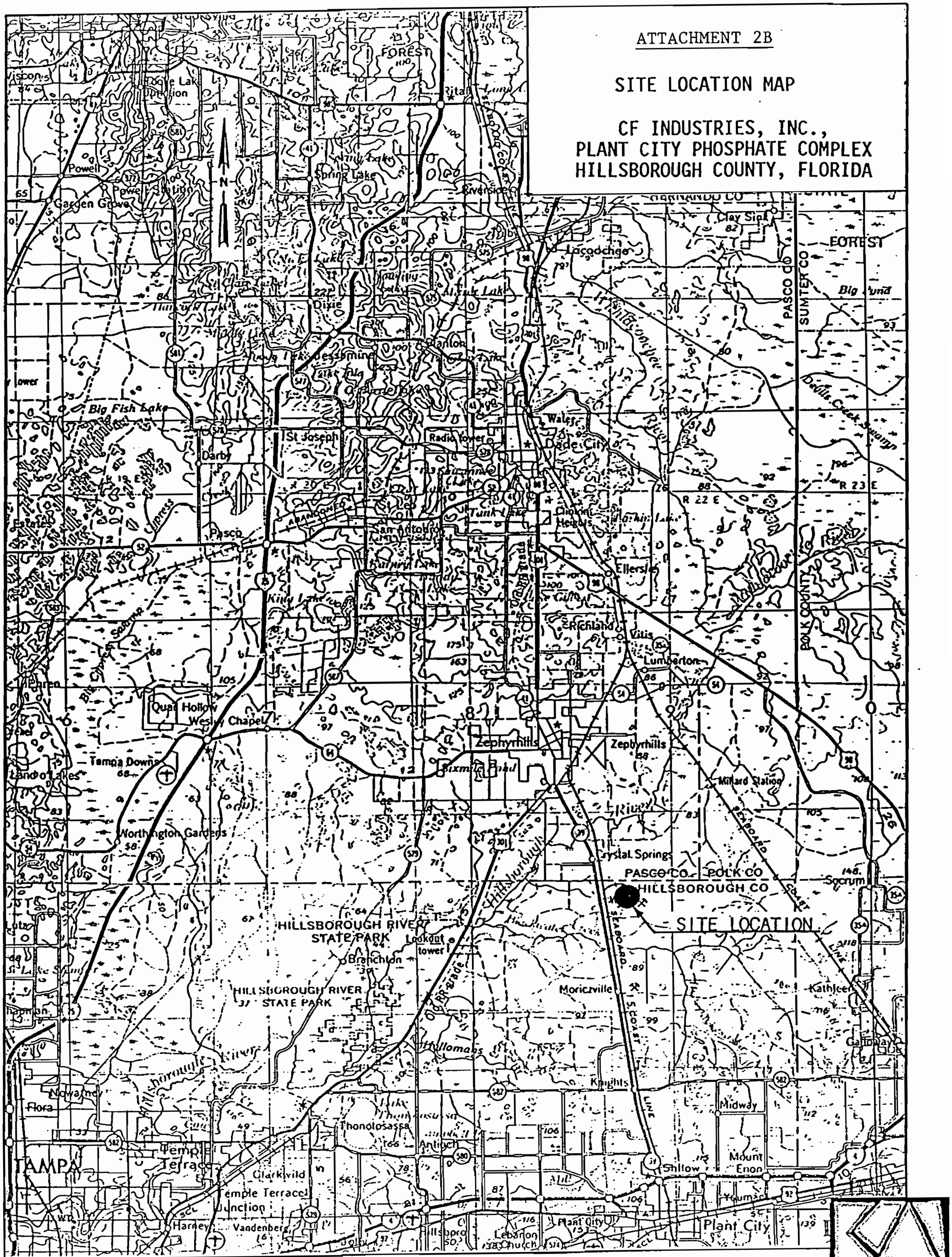
PROCESS FLOW DIAGRAM

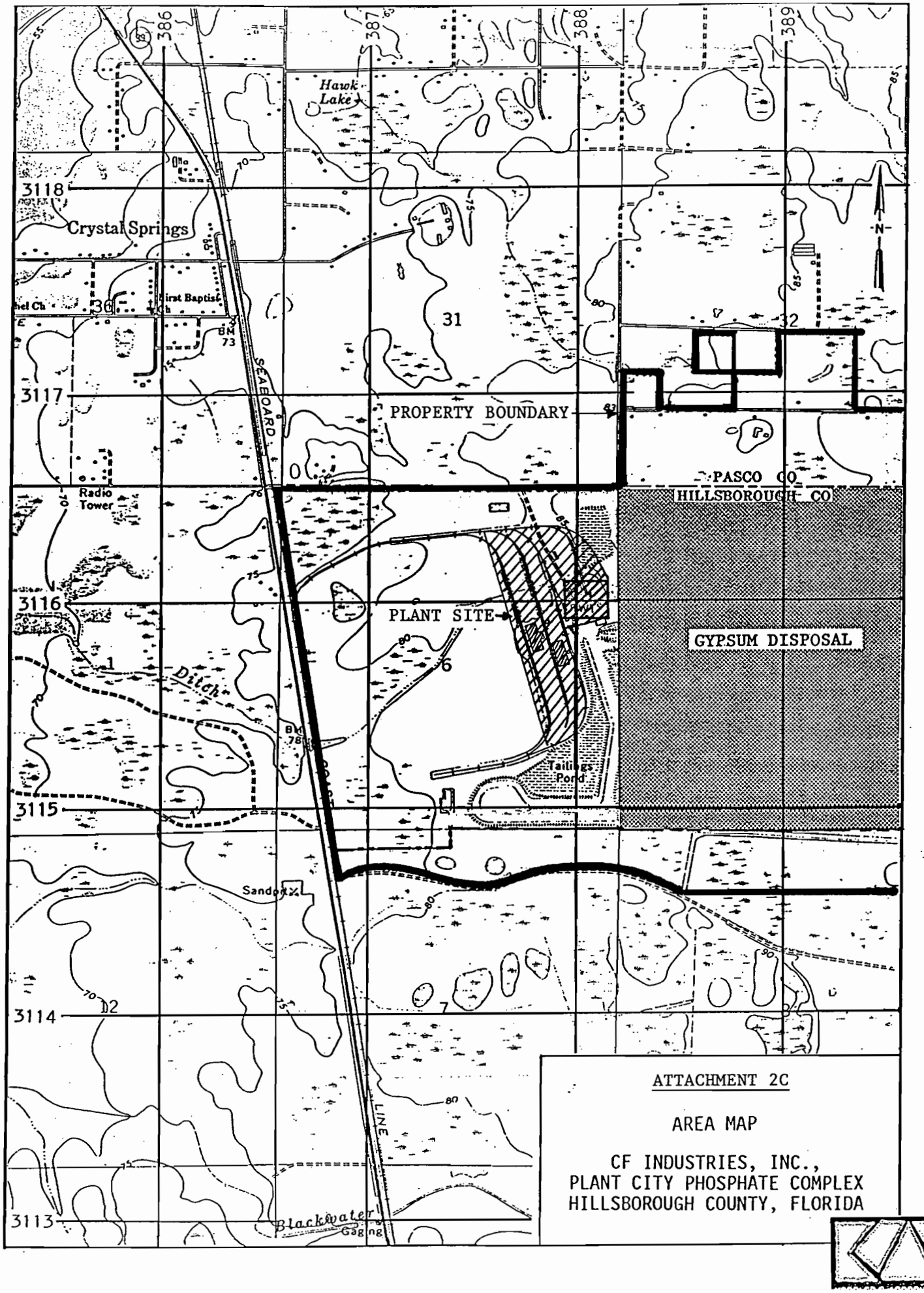
CF INDUSTRIES, INC.
PLANT CITY PHOSPHATE COMPLEX
HILLSBOROUGH COUNTY, FLORIDA



KOOGLER & ASSOCIATES

Best Available Copy




386
387
388
389
Hawk Lake
3118
Crystal Springs
First Baptist
31
32
3117
PROPERTY BOUNDARY
SEABOARD
Radio Tower
PASCO CO
HILLSBOROUGH CO
3116
PLANT SITE
GYPSUM DISPOSAL
Ditch
Tailings Pond
3115
Sandpit
3114
LINE
Blackwater
3113
N
ATTACHMENT 2C
AREA MAP
CF INDUSTRIES, INC.,
PLANT CITY PHOSPHATE COMPLEX
HILLSBOROUGH COUNTY, FLORIDA

SUPPLEMENTARY INFORMATION IN SUPPORT OF APPLICATIONS FOR A CONSTRUCTION/MODIFICATION PERMIT FOR EXISTING A & B SULFURIC ACID PLANTS

CF INDUSTRIES, INC.,
PLANT CITY PHOSPHATE COMPLEX
HILLSBOROUGH COUNTY, FLORIDA

JULY 1991

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LIST OF TABLES

1.0 SYNOPSIS OF APPLICATION

1.1 APPLICANT

CF Industries, Inc.,
Plant City Phosphate Complex

10609 Highway 39 North
Plant City, Florida 33564

Post Office Drawer L
Plant City, Florida 33566

Telephone: 813/782-1591

Contact: Mr. Thomas A. Edwards

1.2 FACILITY LOCATION

CF Industries, Inc., Plant City Phosphate Complex, (CF) operates a phosphate fertilizer complex north of Plant City, Florida in Hillsborough County. The facility is located on approximately 1725 acres of land on the east side of State Road 39 at the Hillsborough/Pasco County line. The UTM coordinates of the site are Zone 17, 388.0 km East and 3116.0 km North.

1.3 PROJECT DESCRIPTION

In May of 1988, CF received Department permits:

A Sulfuric Acid - AC29-146176 ✓
B Sulfuric Acid - AC29-146177 ✓
C Sulfuric Acid - AC29-132155 ✓
D Sulfuric Acid - AC29-132157 ✓
Project - PSD-FL-119 ✓

to install a cogeneration facility and to increase the production rates of the four sulfuric acid plants operated at the site. Specifically, CF increased the production rates of existing sulfuric acid plants A and B

from 1000 tons per day of 100 percent sulfuric acid to 1050 tons per day of 100 percent sulfuric acid and increased the production rates of sulfuric acid plants C and D from 1900 tons per day of 100 percent sulfuric acid to 2400 tons per day of 100 percent sulfuric acid. The rate increases were accomplished through minor changes in piping, changes in pump sizes and increases in the amount of catalyst used for converting the sulfur dioxide to sulfur trioxide.

On September 28, 1989, CF was issued the following operating permits:

A Sulfuric Acid - AO29-167061
B Sulfuric Acid - AO29-167062
C Sulfuric Acid - AO29-167063
D Sulfuric Acid - AO29-167064

Check these

In July of 1991, FDER issued permit AC29-186931 for increases in the sulfuric acid production rate of C and D plants from 2400 tons per day of 100 percent sulfuric acid to 2600 tons per day of 100 percent sulfuric acid for each plant. Despite these increased rates, CF is still not able to produce enough sulfuric acid to satisfy the demands of the chemical complex and, consequently, must import sulfuric acid. To reduce the amount of imported sulfuric acid, CF is now proposing to increase the production rates of the A and B sulfuric acid plants from 1050 tons per day of 100 percent sulfuric acid to 1300 tons per day of 100 percent sulfuric acid, each plant. The requested changes in production rates will be accompanied by decreases in the amount of sulfur dioxide and sulfuric acid mist discharged to the atmosphere per ton of acid produced. The net result will be zero increase in either sulfur dioxide or sulfuric acid mist emissions from the two plants. There will be a slight, but less than significant, projected increase in nitrogen oxide emissions from the two plants as a result of an increased sulfur combustion rate.

Based on allowables

CF is submitting the material herein to support an application to the Department of Environmental Regulation for a construction permit for the

requested modifications. The information contained herein includes a description of the existing facility, and a description of the proposed modification.

2.0 DESCRIPTION OF EXISTING FACILITY

CF Industries, Inc., owns and operates Plant City Phosphate Complex, a phosphate fertilizer complex in Hillsborough County north of Plant City. The facility is located on approximately 1725 acres of land at the Hillsborough/Pasco County line on the east side of State Road 39.

The existing fertilizer complex consists of four sulfuric acid plants, two phosphoric acid plants, four granulated phosphate fertilizer (GTSP/DAP/MAP) plants, an uranium solvent extraction plant, a cogeneration plant, an auxiliary boiler, and storage and shipping facilities for phosphate rock and the fertilizer products. The other plants will not be affected by the rate increases in the sulfuric acid plants since the increased production will replace current sulfuric acid purchases.

2.1 SULFURIC ACID PLANTS

There are four sulfuric acid plants at the CF fertilizer complex. The A and B sulfuric acid plants were originally permitted in 1965 and modified in 1988 to allow the production of 1050 tons per day of 100 percent sulfuric acid each. Air operating permits were issued in September 1989. The plants are single absorption sulfuric acid plants with emissions controlled by ammonia scrubbers. The sulfur dioxide and sulfuric acid mist emission limits for these plants are established by Permits AC29-146176 (A plant), AC29-146177 (B plant) and PSD-FL-119. The emission limits are:

Sulfur dioxide	-	8.0 pounds per ton of 100 percent acid,
Acid mist	-	0.2 pounds per ton of 100 percent acid, and
Visible Emissions	-	10 percent opacity.

The C and D sulfuric acid plants are presently rated at 2600 tons per day of 100 percent sulfuric acid each. These plants were permitted in 1973 and modified in 1988 and 1991. Air construction permit AC29-186931, PSD-

FL-155 was issued in July 1991. Both plants are subject to Federal New Source Performance Standards as set forth in 40CFR60, Subpart H. The C and D plants are double absorption plants with the acid mist being controlled by high efficiency mist eliminators. The emission limiting standards for these plants are:

Sulfur dioxide	-	4.0 pounds per ton of 100 percent acid,
Acid mist	-	0.15 pounds per ton of 100 percent acid, and
Visible Emissions	-	10 percent opacity.

The State of Florida has identical emission limiting standards for new sulfuric acid plants, as set forth in Rule 17-2.600(2)(b),FAC.

The actual emission rates of sulfur dioxide and acid mist from the A and B sulfuric acid plants have been set equal to the federally enforceable emission limits established during the 1988 permitting process. This was done in accordance with Rule 17-2.100(2),FAC, which defines actual emissions as:

> The actual rate of emissions of a pollutant from a source as determined in accordance with the following provisions:
>
> > (b) The Department may presume that source specific federally enforceable allowable emissions for a source are equivalent to the actual emissions of the source.

Nitrogen oxides emissions from the sulfuric acid plants were estimated from an emission factor of 2.1×10^{-6} pounds of nitrogen oxides per cubic foot of stack gas discharged from a sulfuric acid plant and recently measured stack gas flow rates.

from permits

2.2 PHOSPHORIC ACID PLANTS

CF Industries, Inc, Plant City Phosphate Complex, operates two phosphoric acid plants; one with a production rate of 1150 tons per day of P2O5 and the other with a production rate of 1700 tons per day of P2O5. The production rate of neither of these plants will be affected by the production rate increases requested for the sulfuric acid plants.

2.3 AMMONIATED PHOSPHATE FERTILIZER PLANTS

Four ammoniated phosphate (MAP/DAP) plants are operated by CF with a combined production capacity of 8,400 tons per day (one at 1200 tpd and three at 2400 tpd). None of these plants will be affected by the production rate increases requested for the sulfuric acid plants.

2.4 GTSP/MAP/DAP PHOSPHATE PLANTS

Two of the ammoniated phosphate plants can alternatively produce 1320 tons per day each of granular triple superphosphate (GTSP). The combined production capacity of GTSP is 2640 tpd. Neither of these plants will be affected by the production rate increases requested for the sulfuric acid plants.

2.5 OTHER OPERATIONS

The CF fertilizer complex also includes an auxiliary boiler which is used to provide steam during periods when insufficient steam is produced by the sulfuric acid plants, uranium extraction plant, cogeneration plant, and storage and shipping facilities for phosphate rock and fertilizer products. None of these operations will be affected by the production rate increases requested for the A and B sulfuric acid plants.

3.0 PROPOSED PROJECT

To offset purchases of sulfuric acid, CF will increase the production rates of the A and B sulfuric acid plants from 1050 tons per day to 1300 tons per day of 100 percent sulfuric acid, each plant.

The spent pellet-type catalyst previously used in the converter has been replaced with a low-pressure-drop ring-type catalyst for the purpose of improving the efficiency of the process. This catalyst arrangement has been found to accommodate a higher gas flow rate through the converter with equivalent conversion efficiency, and consequently makes the rate increase achievable. The sulfur and combustion air feed rates necessary for the increased production are available with existing equipment.

Further enhancements for thermal efficiency are planned for the next turnaround which will consist of the installation of a steam superheater between the second and third catalyst beds and the elimination of quench air previously introduced at this point. The superheater will provide cooling of the gas stream previously accomplished by the quench air. These changes will not affect the sulfuric acid production rate or stack emissions.

The emission limits for the A and B sulfuric acid plants will be reduced from 8.0 pounds to 6.46 pounds per ton of 100 percent acid and the acid mist emission rate will be reduced from 0.20 pounds to 0.162 pounds per ton of 100 percent acid produced. The present ammonia scrubbers used for controlling sulfur dioxide and acid mist emissions from the sulfuric acid plants will be adequate to control the sulfur dioxide and acid mist to the proposed emission limits. This will be accomplished by adjusting the ammonia flow to the scrubbing system for scrubber liquor pH control.

Table 3-1 summarizes the permitted/actual and proposed conditions under which the A and B sulfuric acid plants presently operate and will operate. In Table 3-2, the annual air pollutant emission rate changes, based on present actual and proposed operating conditions, are summarized. The information tabulated in these tables shows that there will be no increase

in the annual sulfur dioxide and acid mist emissions from the A and B sulfuric acid plants and a less than significant increase in nitrogen oxides emissions from these plants.

There have been no other air pollution sources constructed or modified at the CF fertilizer complex since 1973 that would have to be considered in this permit application. The A, B, C and D sulfuric acid plants were modified in 1988, as addressed in this application, but these modifications were addressed through an appropriate Department permitting process. The C and D sulfuric acid plants were again modified in 1991 and again, the modifications were addressed through an appropriate Department permitting process. Previous contemporaneous emission changes at the CF facility were addressed in PSD-FL-155 issued in July 1991 for the C & D sulfuric acid plants.

3.1 RULE APPLICABILITY

The A and B sulfuric acid plants are "existing source" plants subject only to state regulations. There will be no increase in the hourly or annual sulfur dioxide or acid mist emission rates from these plants and a less than significant increase in nitrogen oxides emissions.

Since the sulfuric acid production rate increases for the A and B sulfuric acid plants will be accompanied by no change in annual sulfur dioxide and acid mist emissions, and a less than significant increase in annual nitrogen oxides emissions, it is suggested that the permitting of these plants be handled under the general air permitting requirements of the State of Florida. The changes in production rates and emission rates of the A and B sulfuric acid plants can be addressed in construction permits issued under the general air permitting requirements to assure that the conditions are federally enforceable.

The attached applications address the modifications requested for the A and B sulfuric acid plants and include all information required for the permit review.

TABLE 3-1

PRESENT AND PROPOSED PRODUCTION RATES AND
EMISSION RATES FOR CF A & B SULFURIC ACID PLANTS

CF INDUSTRIES, INC.,
PLANT CITY PHOSPHATE COMPLEX
HILLSBOROUGH COUNTY, FLORIDA

	Sulfuric Acid Plant	
	A	B
Date Permitted (Originally)	1965	1965
Date Modified (PSD-FL-119)	1988	1988
Actual/Permit Conditions		
Rate (tpd)	1050	1050
SO2 (lb/ton)	8.0	8.0
(lb/hr)	350.0	350.0
(tpy)	1533	1533
Mist (lb/ton)	0.2	0.2
(lb/hr)	8.8	8.8
(tpy)	38.5	38.5
Operating Factor	1.0	1.0
Proposed Conditions		
Rate (tpd)	1300	1300
SO2 (lb/ton)	6.46	6.46
(lb/hr)	350.0	350.0
(tpy)	1533	1533
Mist (lb/ton)	0.162	0.162
(lb/hr)	8.8	8.8
(tpy)	38.5	38.5
Operating Factor	1.0	1.0

TABLE 3-2

ANNUAL AIR POLLUTANT EMISSION CHANGES RESULTING
FROM THE PROPOSED SULFURIC ACID PLANT RATE INCREASES (1)

CF INDUSTRIES, INC.,
PLANT CITY PHOSPHATE COMPLEX
HILLSBOROUGH COUNTY, FLORIDA

POLLUTANT		Sulfuric Acid Plant A (tpy)	A (lb/hr)	B (tpy)	B (lb/hr)
SO2					
	Present	1533	350	1533	350
	Proposed	1533	350	1533	350
	Annual Change	0		0	
	Total		0		
	Significant Increase (2)		40		
Mist					
	Present	38.5	8.8	38.5	8.8
	Proposed	38.5	8.8	38.5	8.8
	Annual Change	0		0	
	Total		0		
	Significant Increase (2)		7		
NOx					
	Present	41.3	9.4	41.3	9.4
	Proposed	51.1	11.7	51.1	11.7
	Annual Change	9.8		9.8	
	Total		19.6		
	Significant Increase (2)		40		

(1) Based on differences between present actual/permitted and proposed operating conditions.
(2) Defined in 17-2.500(2)(e)2,FAC.

4.0 CONCLUSION

The proposed increase in the sulfuric acid production rate of plants A and B from 1050 tons per day 100% H_2SO_4 to 1300 tons per day 100% H_2SO_4, each, will result in no increase in the allowable emissions of sulfur dioxide and acid mist and a less than significant increase in the emissions of nitrogen oxides. Both plants will continue to operate in compliance with all applicable regulations.

APPENDIX 3-A
EMISSION RATE CALCULATIONS

A AND B SULFURIC ACID PLANTS

OPERATING LIMITS EACH PLANT

Permitted/Actual: 1050 tons per day 100% acid

SO_2 - 8.0 lb/ton, max

Mist - 0.20 lb/ton

NOx - 2.1×10^{-6} lb/dscf

Operating factor - 1.0

Note: Federally enforceable emission limits documented in application for AC29-146176, AC29-146177 and PSD-FL-119; permits issued 5/20/88.

Proposed: 1300 tons per day 100% acid

SO_2 - 6.46 lb/ton

Mist - 0.162 lb/ton

NOx - 2.1×10^{-6} lb/dscf

Operating factor - 1.0

EMISSION RATES:

Permitted/Actual: (Each plant)

SO_2: Hourly = 8.0 lb/ton x 1050/24 tons/hr
= 350 lb/hr.

Annual = 350 lb/hr x 8760 hr/yr x 1/2000 lb/ton
= 1533 tpy

MIST: Hourly = 0.2 lb/ton x 1050/24 tons/hr
= 8.8 lb/hr

Annual = 8.8 x 8760/2000
= 38.5 tpy

NOx: Based on 102,606 dscf per ton of acid and 2.1×10^{-6} lb NOx per dscf

Hourly = 102,606 dscf/ton x 1050/24 ton/hr
x (2.1×10^{-6}) lb/ft^3
= 9.4 lb/hr

Annual = 9.4 lb/hr x 8760/2000
= 41.3 tpy

Proposed: (Each plant)

SO_2: Hourly = 6.46 lb/ton x 1300/24 tons/hr
= 350 lb/hr.

Annual = 350 lb/hr x 8760 hr/yr x 1/2000 lb/ton
= 1533 tpy

MIST: Hourly = 0.162 lb/ton x 1300/24 tons/hr
= 8.8 lb/hr

Annual = 8.8 x 8760/2000
= 38.5 tpy

NOx: Hourly = 102,606 dscf/ton x 1300/24 ton/hr
x (2.1×10^{-6}) lb/ft^3
= 11.7 lb/hr

Annual = 11.7 lb/hr x 8760/2000
= 51.1 tpy

NOTE: No other air pollutants are discharged from the A and B sulfuric acid plants.

Net Change: (Each Plant)

SO_2 = 1533 - 1533 = 0 tpy

Mist = 38.5 - 38.5 = 0 tpy

NOx = 51.1 - 41.3 = 9.8 tpy