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P.O. Drawer L.
Plant City, Florida 33564-9007
Telephone: 813/782-1591

CF Industries, Inc.
Plant City Phosphate Complex

September 21, 1990

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Mr. C.H. Fancy
Chief, Bureau of Air Regulations
Florida Department of
Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Fancy:

CF Industries, Inc., Plant City Phosphate Complex (CFI), modified its sulfuric acid plants and permits in 1988 in conjunction with the addition of an electrical power cogeneration unit. Subsequent re-packing of the sulfuric acid absorption towers has made possible the operation of the plants at rates above the production rate limits in the permits. The additional capacity of sulfuric acid is needed to supply the existing capacity of CFI's phosphoric acid plants, and is currently being provided by the trucking of sulfuric acid into the complex from outside sources. CFI wishes to modify its operating permits to allow the use of the full capacity of these sulfuric acid plants.

Enclosed are four (4) copies of PSD permit modification applications for the "C" and "D" double absorption sulfuric acid plants, prepared by our consulting engineer, Dr. John Koogler. Dr. Koogler has previously communicated by telephone with Mr. Barry Andrews of your Bureau concerning these applications.

Also enclosed is a check payable to FDER in the amount of $5,000 to cover the PSD review permitting fee for both plants, as provided in rules 17-4.050(4)(a)1.a. and 17-4.050 (4)(a)3 F.A.C.

Please direct any questions or requests for additional information to Mr. Thomas A. Edwards at (813) 782-1591.

Sincerely,

J. E. Parsons
General Manager

JEP/TAE/tjj
Enclosures

cc: Mr. Bill Thomas, DER Southwest District (memo only)
Mr. Jerry Campbell, Hillsborough County EPC (memo only)
C. Phillips
B. Andrews
C. Holladay
G. Harper, EP
B. Thomas SW Dist
J. Campbell, EPCHC
E. Shaver, NPS

PLANT CITY PHOSPHATE COMPLEX
CF Industries, Inc.

P.O. Drawer L, Plant City, Florida 33564

VENDOR INVOICE DATE	VENDOR INVOICE NUMBER	VOUCHER NUMBER	INVOICE GROSS AMOUNT	CASH DISCOUNT	INVOICE NET AMOUNT
09-21-90	PERMIT	91187	5,000.00		5,000.00

CHECK DATE	CHECK NUMBER	VENDOR NUMBER	CHECK GROSS AMOUNT	CASH DISCOUNT	CHECK NET AMOUNT
09-24-90	M9711	106452	5,000.00		5,000.00

PLANT CITY PHOSPHATE COMPLEX

70-1558/719

CF Industries, Inc.
P.O. Drawer L
Plant City, Florida 33564

M 009711

PAY TO THE ORDER OF

OPERATING ACCOUNT

FLORIDA DEPT OF ENVIRONMENTAL
REGULATION
2600 BLAIR STONE ROAD
TALLAHASSEE, FL 32399-2400

DATE	AMOUNT
09-24-90	$****5,000.00*****

AUTHORIZED SIGNATURE

AUTHORIZED SIGNATURE

HARRIS BANK ROSELLE -
ROSELLE, ILLINOIS

[redacted]

$5,000 pd.
9-26-90
Recpt.#151178

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

AC29-186931
PSD-FL-156

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

SOURCE TYPE: Double Absorption Sulfuric Acid [X] New[1] [ ] 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) "C" Sulfuric Acid

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, FL 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: 9/21/90 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: 9/18/90 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 the existing C and D sulfuric acid plants will be increased from 2400 tpd to 2600 tpd of 100% acid (@ 4.0 lb/ton SO_2 and 0.15 lb/ton mist). The plants will continue to operate in full compliance with applicable regulations.

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

Start of Construction NA* Completion of Construction NA*

*No Construction Required.

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 rates.

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

Permits: A029-65040; issued 4/18/83; expired 3/30/88

PSD-FL-119; - -

AC29-132155; issued 5/25/88; expired 9/30/89

A029-167063; issued 9/28/89; expires 9/29/94

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. YES

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

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

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

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. (2)

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

(2) A separate report addresses all issues required for a PSD review of this construction permit application.

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	71,000	1

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

1. Total Process Input Rate (lbs/hr): 71,000 as sulfur
2. Product Weight (lbs/hr): 232,975 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)

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~~ hr	T/yr	
SO_2	433.3	1898	17-2.600(2)(b)	433.3	433.3	1898	2
NOx	15.4	67.3	17-2.630	15.4	15.4	67.3	2
Acid Mist	16.2	71.2	17-2.600(2)(b)	16.2	405	1774	2
VE	10%	-	17-2.600(2)(b)	10%	-	-	2

[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).

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)
Dual absorption towers	SO2	99.7	NA	Design & test
High efficiency mist	Acid mist	94	0-10 um	Test on
eliminators				similar plant

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Not applicable			

*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

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

Stack Height: 198.5 ft. Stack Diameter: 8.0 ft.

Gas Flow Rate: 175,782 ACFM 146,162 DSCFM Gas Exit Temperature: 175 °F.

Water Vapor Content: 0 % Velocity: 58.3 FPS

SECTION IV: INCINERATOR INFORMATION

NOT APPLICABLE

Type of Waste	Type 0 (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 Type	Fuel BTU/hr	Temperature (°F)
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 - 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.) Attachment 2

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.

SECTION V - SUPPLEMENTAL REQUIREMENTS

1. Product Input/Production Rate

<u>Product</u>: Sulfuric Acid as 93% H_2SO_4

<u>Product Rate</u>: 2600 Short tons per day (STPD) of 100% H_2SO_4 as 93% H_2SO_4

-or-

232,975 lbs/hr (2600/0.93 x 2000/24) of 93% Sulfuric Acid

<u>Process Losses</u>: Sulfur recovery is 99.7%; equivalent to an emission rate of 4.0 pounds SO_2 per ton of 100% H_2SO_4 produced.

<u>Process Input</u>:

Sulfur: 2600 STPD of 100% H_2SO_4 equivalent to 849 STPD of sulfur (2600 x 32/98) which at an efficiency of 99.7% requires 852 STPD of sulfur (849/0.997)

-or-

71000 lbs/hr (852 x 2000/24)

2. Controlled Emission Rate Calculations

<u>Operating Conditions</u>:

<u>Permitted/Actual</u>: 2400 tons per day 100% acid

SO_2 - 4.0 lb/ton, max

Mist - 0.15 lb/ton

Operating factor - 1.0

Note: Federally enforceable emission limits documented in Permits AC29-132155 (C Plant), AC29-132157 (D Plant), and PSD-FL-119.

Proposed:	2600 tons per day 100% acid
	SO_2 - 4.0 lb/ton
	Mist - 0.15 lb/ton
	Operating factor - 1.0

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

SO_2: Hourly = 4.0 lb/ton x 2400/24 tons/hr
= 400 lb/hr.

Annual = 400 lb/hr x 8760 hr/yr x 1/2000 lb/ton
= 1752 tpy

MIST: Hourly = 0.15 lb/ton x 2400/24 tons/hr
= 15.0 lb/hr

Annual = 15.0 x 8760/2000
= 65.7 tpy

NOx: Based on 67500 dscf per ton of acid and 2.1×10^{-6} lb NOx per dscf (18 ppm, v/v)

Hourly = 67500 dscf/ton x 2400/24 ton/hr
x (2.1×10^{-6}) lb/ft^3
= 14.2 lb/hr

Annual = 14.2 lb/hr x 8760/2000
= 62.2 tpy

Emission Rates: (Each plant - as proposed)

SO_2: Hourly = 4.0 lb/ton x 2600/24 tons/hr
= 433.3 lb/hr.

Annual = 433.3 lb/hr x 8760 hr/yr x 1/2000 lb/ton
= 1898 tpy

MIST: Hourly = 0.15 lb/ton x 2600/24 tons/hr
= 16.2 lb/hr

Annual = 16.2 x 8760/2000
= 71.2 tpy

NOx: Hourly = 67500 dscf/ton x 2600/24 ton/hr
x (2.1×10^{-6}) lb/ft^3
= 15.4 lb/hr

Annual = 15.4 lb/hr x 8760/2000
= 67.3 tpy

NOTE: No other air pollutants are discharged from the C and D sulfuric acid plants.

3. Uncontrolled Emissions

SO2 - Controlled and uncontrolled emissions of SO2 are identical for a double absorption sulfuric acid plant.

Mist - The control efficiency of high efficiency mist eliminators is estimated to be 94 percent based on measurements at similar plants.

Hourly = 16.2 lb/hr controlled/(1-0.94)
= 405 lb/hr

Annual = 405 lb/hr x 8760 hr/yr x 1/2000 lb/ton
= 1774 tons/yr

4. Control System

SO2 will be controlled by the existing two absorption towers and acid mist will be controlled with the existing high efficiency mist eliminators.

5. Control Effiency

SO2 - Sulfur input to plant = 71000 lb/hr (as S)

Efficiency = (71000-216.7)x100/7100
= 99.7%

Mist - High efficiency mist eliminators are estimated to be 94 percent efficient based on measurements made on similar double absorption plants.

6. Flow Diagram - See attached.

7. Location Map - See attached.

8. Site Map - See attached.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should b made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Con struction indicating that the source was constructed as shown in the constructio 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 6(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 operat 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
(SEE ATTACHED REPORT)

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

EXISTING AND PROPOSED PRODUCTION RATES
AND EMISSION RATES AFFECTED BY PROPOSED
SULFURIC ACID PLANT RATE INCREASES (1)

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

	Sulfuric Acid Plant	
	C	D
Date Permitted (Originally)	1973	1973
Modified (PSD-FL-119)	1988	1988
Current Permit/Actual Conditions (2)		
Rate (tpd)	2400	2400
SO2 (lb/ton)	4.0	4.0
(lb/hr)	400.0	400.0
(tpy)	1752	1752
Mist (lb/ton)	0.15	0.15
(lb/hr)	15.0	15.0
(tpy)	65.7	65.7
Operating Factor	1.0	1.0
Proposed Conditions		
Rate (tpd)	2600	2600
SO2 (lb/ton)	4.0	4.0
(lb/hr)	433.3	433.3
(tpy)	1898	1898
Mist (lb/ton)	0.15	0.15
(lb/hr)	16.2	16.2
(tpy)	71.2	71.2
Operating Factor	1.0	1.0

(1) See Section V for calculations of emission rates.
(2) Actual emissions are the same as federally enforceable permitted emissions.

ATTACHMENT 1B

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

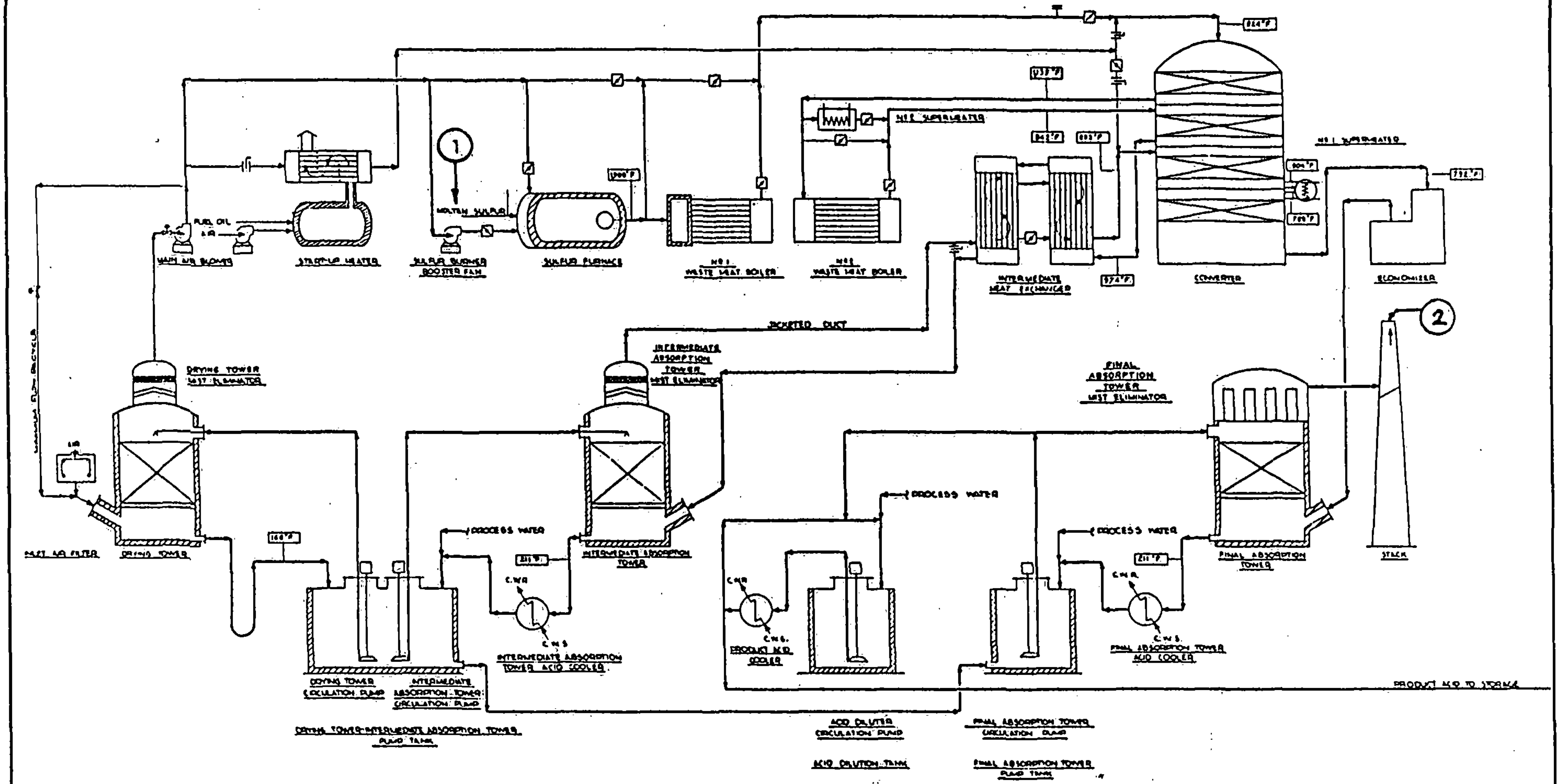
CF INDUSTRIES, INC.,
PLANT CITY PHOSPHATE COMPLEX
HILLSBOROUGH COUNTY, FLORIDA

POLLUTANT (Tons/Year)		Sulfuric Acid Plant C	Sulfuric Acid Plant D
SO2			
	Present (actual)	1752	1752
	Proposed	1898	1898
	Annual Change	146	146
	Subtotal	292	
	De minimis Increase (2)	40	
Mist			
	Present (actual)	65.7	65.7
	Proposed	71.2	71.2
	Annual Change	5.5	5.5
	Subtotal	11.0	
	De minimis Increase (2)	7	
NOx			
	Present (actual)	62.2	62.2
	Proposed	67.3	67.3
	Annual Change	5.1	5.1
	Subtotal	10.2 (3)	
	De minimis 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.

(3) The emission rate increase of 10.2 tpy, when combined with NOx emission rate increases of 5.6 tpy and 29.8 tpy permitted in 1988, exceeds the de minimis emission rate increase of 40 tpy for NOx defined in 17-2.500(2)(e)2,FAC. This will trigger a PSD review for NOx, as well as for SO2 and acid mist.

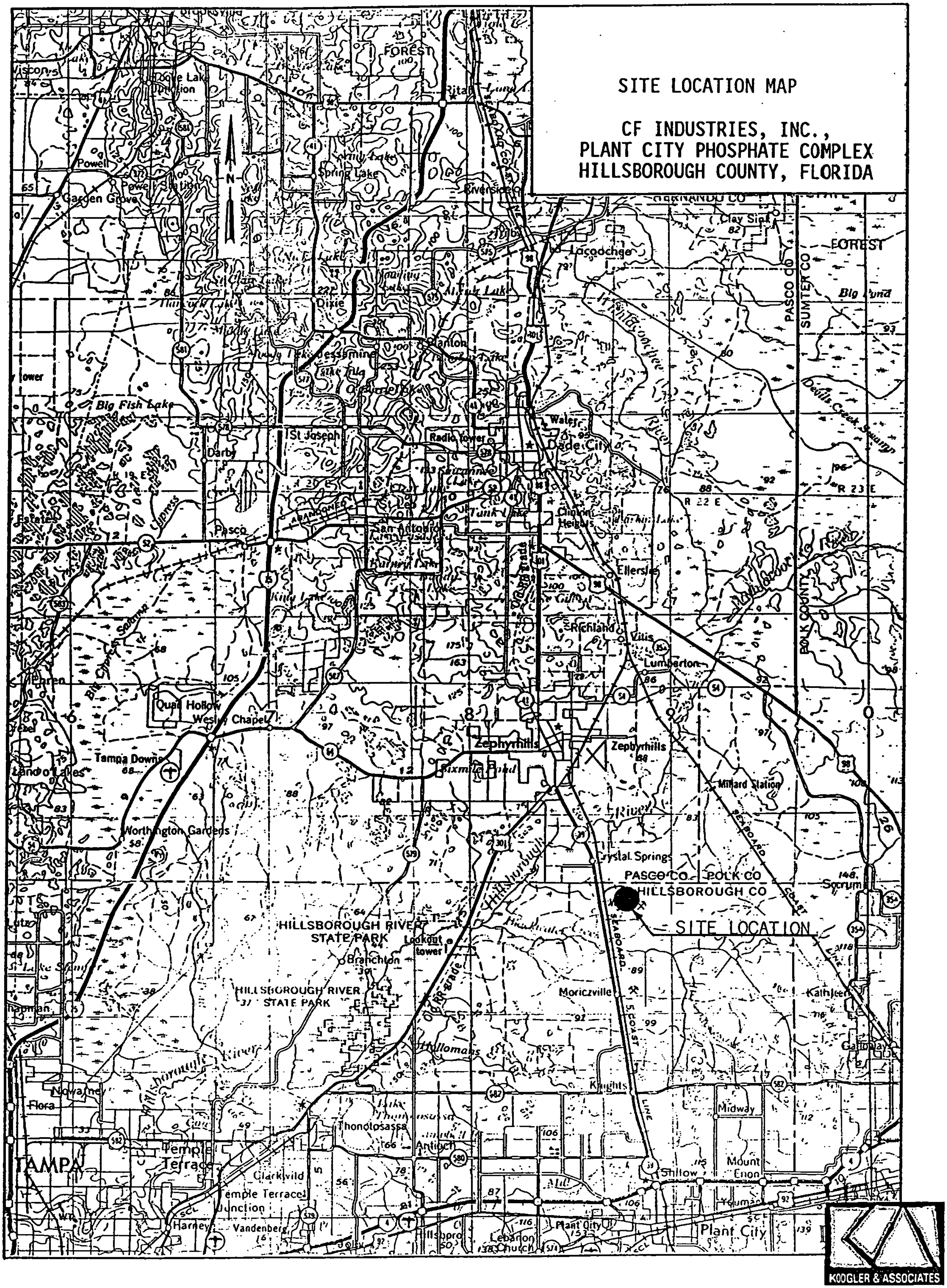


Flow Diagram of
Typical Double Absorption
Sulfuric Acid Plant

ATTACHMENT 2A

KOOGLER & ASSOCIATES

ATTACHMENT 2B



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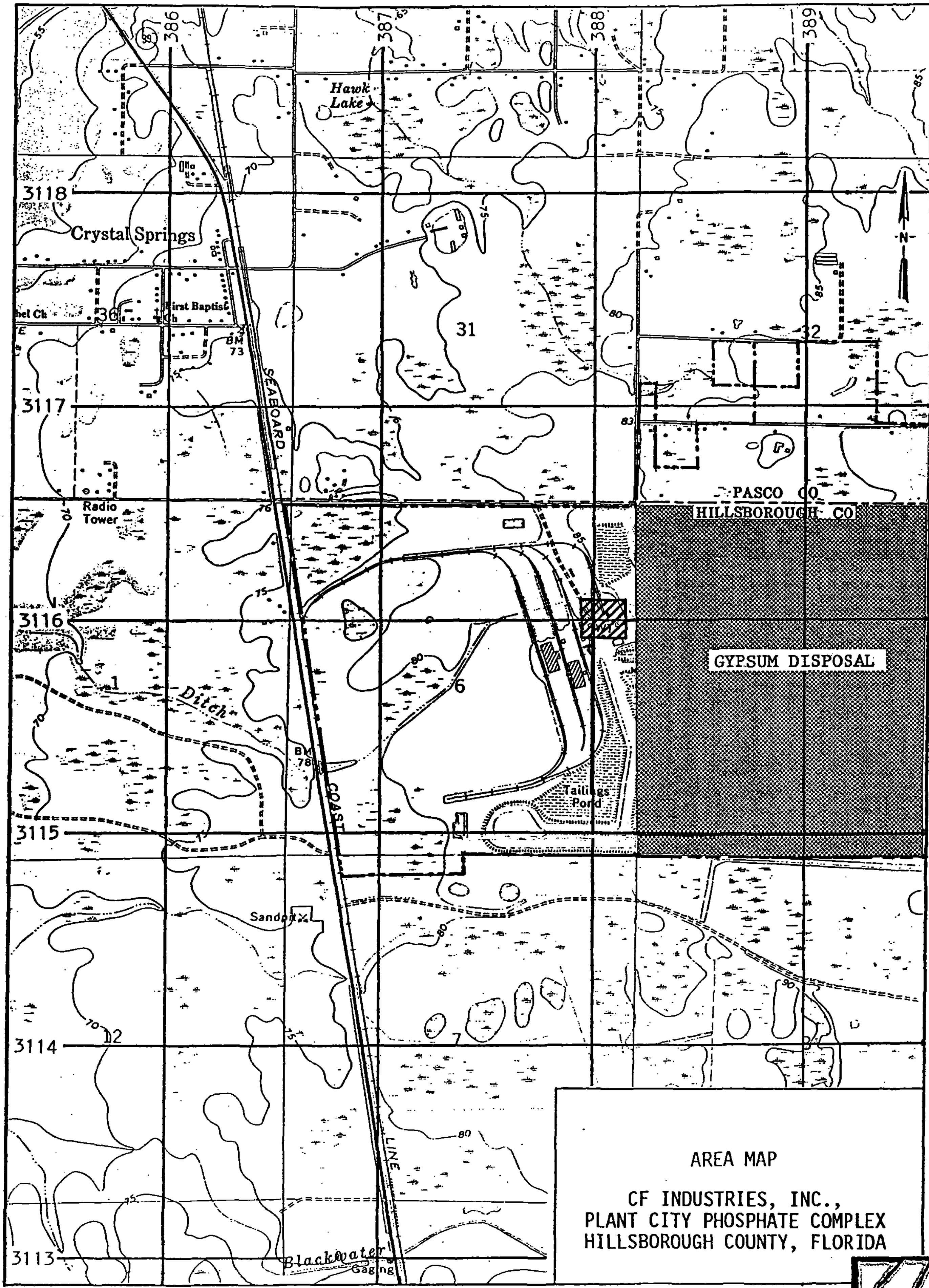


AREA MAP

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

KODGLER & ASSOCIATES

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

SOURCE TYPE: Double Absorption Sulfuric Acid [X] New[1] [ ] 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) "D" Sulfuric Acid

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, FL 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: [signature]

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

Date: 9/21/90 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: 9/18/90 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 the existing C and D sulfuric acid plants will be increased from 2400 tpd to 2600 tpd of 100% acid (@ 4.0 lb/ton SO_2 and 0.15 lb/ton mist). The plants will continue to operate in full compliance with applicable regulations.

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

Start of Construction NA* Completion of Construction NA*

*No Construction Required.

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 rates.

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

Permits: A029-65039; issued 4/12/83; expired 3/30/88

PSD-FL-119 - -

AC29-132157; issued 5/25/88; expired 9/30/90
A029-167064; issued 9/28/89; expires 9/29/94

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. YES

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

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

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

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. (2)

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

(2) A separate report addresses all issues required for a PSD review of this construction permit application.

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	71,000	1

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

1. Total Process Input Rate (lbs/hr): 71,000 as sulfur

2. Product Weight (lbs/hr): 232,975 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)

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~~ hr	T/yr	
SO_2	433.3	1898	17-2.600(2)(b)	433.3	433.3	1898	2
NOx	15.4	67.3	17-2.630	15.4	15.4	67.3	2
Acid Mist	16.2	71.2	17-2.600(2)(b)	16.2	405	1774	2
VE	10%	-	17-2.600(2)(b)	10%	-	-	2

[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).

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)
Dual absorption towers	SO2	99.7	NA	Design & test
High efficiency mist	Acid mist	94	0-10 um	Test on
eliminators				similar plant

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Not applicable			

*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

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

Stack Height: 198.5 ft. Stack Diameter: 8.0 ft.

Gas Flow Rate: 175,782 ACFM 146,162 DSCFM Gas Exit Temperature: 175 °F.

Water Vapor Content: 0 % Velocity: 58.3 FPS

SECTION IV: INCINERATOR INFORMATION

NOT APPLICABLE

Type of Waste	Type 0 (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 pages 7a - 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.) Attachment 2

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.

SECTION V - SUPPLEMENTAL REQUIREMENTS

1. Product Input/Production Rate

<u>Product</u>: Sulfuric Acid as 93% H_2SO_4

<u>Product Rate</u>: 2600 Short tons per day (STPD) of 100% H_2SO_4 as 93% H_2SO_4

-or-

232,975 lbs/hr (2600/0.93 x 2000/24) of 93% Sulfuric Acid

<u>Process Losses</u>: Sulfur recovery is 99.7%; equivalent to an emission rate of 4.0 pounds SO_2 per ton of 100% H_2SO_4 produced.

<u>Process Input</u>:

Sulfur: 2600 STPD of 100% H_2SO_4 equivalent to 849 STPD of sulfur (2600 x 32/98) which at an efficiency of 99.7% requires 852 STPD of sulfur (849/0.997)

-or-

71000 lbs/hr (852 x 2000/24)

2. Controlled Emission Rate Calculations

<u>Operating Conditions</u>:

<u>Permitted/Actual</u>: 2400 tons per day 100% acid

SO_2 - 4.0 lb/ton, max

Mist - 0.15 lb/ton

Operating factor - 1.0

Note: Federally enforceable emission limits documented in Permits AC29-132155 (C Plant), AC29-132157 (D Plant), and PSD-FL-119.

Proposed: 2600 tons per day 100% acid

SO_2 - 4.0 lb/ton

Mist - 0.15 lb/ton

Operating factor - 1.0

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

SO_2: Hourly = 4.0 lb/ton x 2400/24 tons/hr
= 400 lb/hr.

Annual = 400 lb/hr x 8760 hr/yr x 1/2000 lb/ton
= 1752 tpy

MIST: Hourly = 0.15 lb/ton x 2400/24 tons/hr
= 15.0 lb/hr

Annual = 15.0 x 8760/2000
= 65.7 tpy

NOx: Based on 67500 dscf per ton of acid and 2.1×10^{-6} lb NOx per dscf (18 ppm, v/v)

Hourly = 67500 dscf/ton x 2400/24 ton/hr
x (2.1×10^{-6}) lb/ft^3
= 14.2 lb/hr

Annual = 14.2 lb/hr x 8760/2000
= 62.2 tpy

Emission Rates: (Each plant - as proposed)

SO_2: Hourly = 4.0 lb/ton x 2600/24 tons/hr
= 433.3 lb/hr.

Annual = 433.3 lb/hr x 8760 hr/yr x 1/2000 lb/ton
= 1898 tpy

MIST: Hourly = 0.15 lb/ton x 2600/24 tons/hr
= 16.2 lb/hr

Annual = 16.2 x 8760/2000
= 71.2 tpy

NOx: Hourly = 67500 dscf/ton x 2600/24 ton/hr
x (2.1×10^{-6}) lb/ft^3
= 15.4 lb/hr

Annual = 15.4 lb/hr x 8760/2000
= 67.3 tpy

NOTE: No other air pollutants are discharged from the C and D sulfuric acid plants.

3. Uncontrolled Emissions

SO2 - Controlled and uncontrolled emissions of SO2 are identical for a double absorption sulfuric acid plant.

Mist - The control efficiency of high efficiency mist eliminators is estimated to be 94 percent based on measurements at similar plants.

Hourly = 16.2 lb/hr controlled/(1-0.94)
= 405 lb/hr

Annual = 405 lb/hr x 8760 hr/yr x 1/2000 lb/ton
= 1774 tons/yr

4. Control System

SO2 will be controlled by the existing two absorption towers and acid mist will be controlled with the existing high efficiency mist eliminators.

5. Control Effiency

SO2 - Sulfur input to plant = 71000 lb/hr (as S)

Efficiency = (71000-216.7)x100/7100
= 99.7%

Mist - High efficiency mist eliminators are estimated to be 94 percent efficient based on measurements made on similar double absorption plants.

6. Flow Diagram - See attached.

7. Location Map - See attached.

8. Site Map - See attached.

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 operat 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
(SEE ATTACHED REPORT)

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

EXISTING AND PROPOSED PRODUCTION RATES
AND EMISSION RATES AFFECTED BY PROPOSED
SULFURIC ACID PLANT RATE INCREASES (1)

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

	Sulfuric Acid Plant	
	C	D
Date Permitted (Originally)	1973	1973
Modified (PSD-FL-119)	1988	1988
Current Permit/Actual Conditions (2)		
Rate (tpd)	2400	2400
SO2 (lb/ton)	4.0	4.0
(lb/hr)	400.0	400.0
(tpy)	1752	1752
Mist (lb/ton)	0.15	0.15
(lb/hr)	15.0	15.0
(tpy)	65.7	65.7
Operating Factor	1.0	1.0
Proposed Conditions		
Rate (tpd)	2600	2600
SO2 (lb/ton)	4.0	4.0
(lb/hr)	433.3	433.3
(tpy)	1898	1898
Mist (lb/ton)	0.15	0.15
(lb/hr)	16.2	16.2
(tpy)	71.2	71.2
Operating Factor	1.0	1.0

(1) See Section V for calculations of emission rates.
(2) Actual emissions are the same as federally enforceable permitted emissions.

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

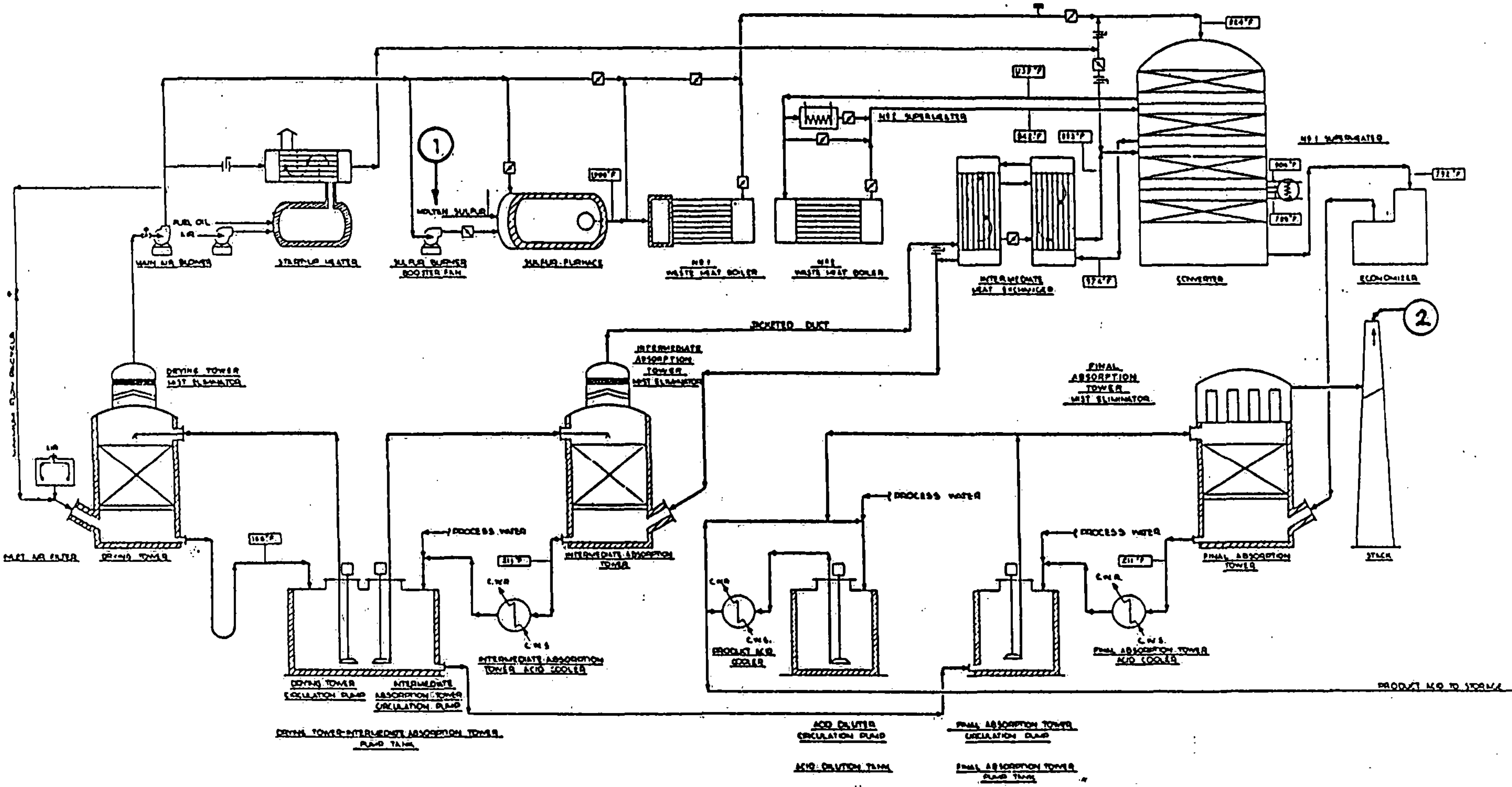
POLLUTANT (Tons/Year)		Sulfuric Acid Plant C	Sulfuric Acid Plant D
SO2			
	Present (actual)	1752	1752
	Proposed	1898	1898
	Annual Change	146	146
	Subtotal	292	
	De minimis Increase (2)	40	
Mist			
	Present (actual)	65.7	65.7
	Proposed	71.2	71.2
	Annual Change	5.5	5.5
	Subtotal	11.0	
	De minimis Increase (2)	7	
NOx			
	Present (actual)	62.2	62.2
	Proposed	67.3	67.3
	Annual Change	5.1	5.1
	Subtotal	10.2 (3)	
	De minimis 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.

(3) The emission rate increase of 10.2 tpy, when combined with NOx emission rate increases of 5.6 tpy and 29.8 tpy permitted in 1988, exceeds the de minimis emission rate increase of 40 tpy for NOx defined in 17-2.500(2)(e)2,FAC. This will trigger a PSD review for NOx, as well as for SO2 and acid mist.

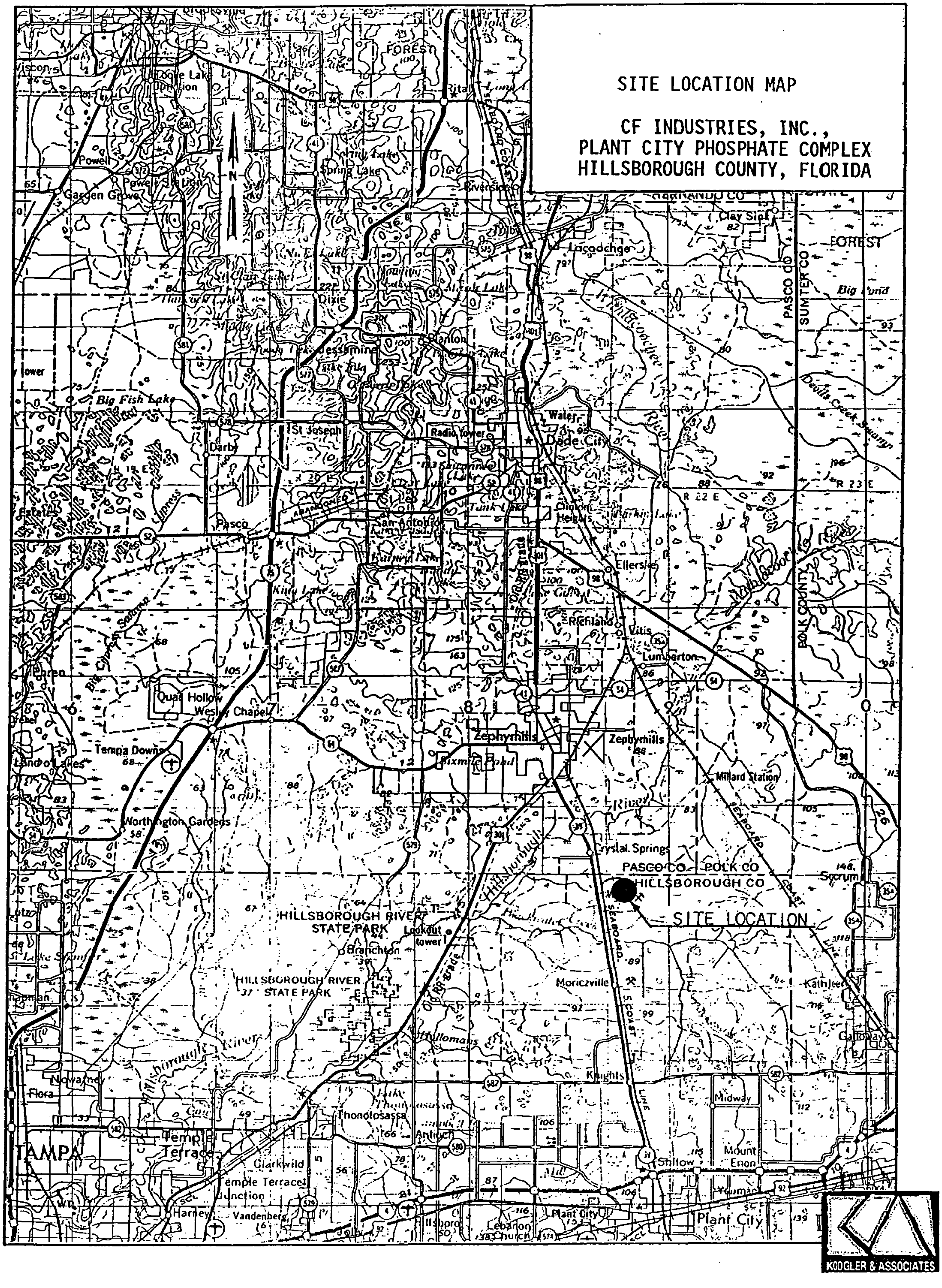
ATTACHMENT 2A



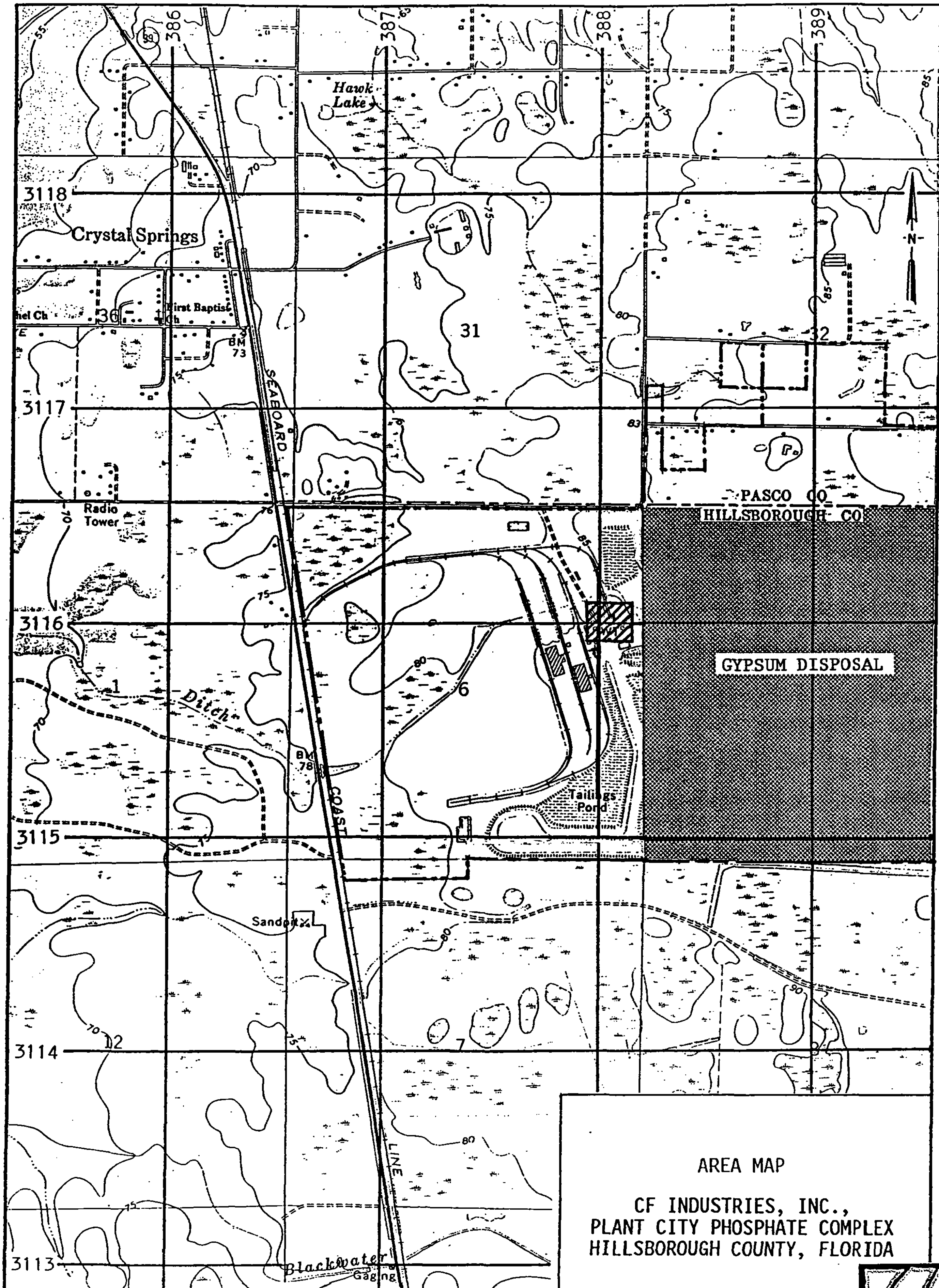
Flow Diagram of
Typical Double Absorption
Sulfuric Acid Plant

KOOGLER & ASSOCIATES

ATTACHMENT 2B



ATTACHMENT 2C



AREA MAP

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

KOOGLER & ASSOCIATES

SUPPLEMENTARY INFORMATION
IN SUPPORT OF AN APPLICATION
FOR A PSD CONSTRUCTION/MODIFICATION PERMIT REVIEW
FOR THE EXISTING C AND D SULFURIC ACID PLANTS

CF INDUSTRIES, INC.,
PLANT CITY PHOSPHATE COMPLEX

HILLSBOROUGH COUNTY, FLORIDA

AUGUST 31, 1990

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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 1525 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-199

to install a co-generation 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 - A029-167061
B Sulfuric Acid - A029-167062
C Sulfuric Acid - A029-167063
D Sulfuric Acid - A029-167064

Despite operating the sulfuric acid plants at the 1988 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 C and D sulfuric acid plants from 2400 tons per day of 100 percent sulfuric acid to 2600 tons per day of 100 percent sulfuric acid, each plant.

The C and D sulfuric acid plants were permitted in 1973 and are subject to Federal New Source Performance Standards. The requested change in production rates will result in a significant increase in the sulfur dioxide and sulfuric acid mist emission rates from the two plants and there will be a minor increase in nitrogen oxide emissions. However, when the nitrogen oxides emission increase is combined with a 5.6 ton per year increase in nitrogen oxides emissions from the A and B sulfuric acid plants in 1988 (AC29-146176 and 146177) and a 29.8 ton per year increase from the C and D sulfuric acid plants also in 1988 (AC29-132155, AC29-132157 and PSD-FL-143), the overall nitrogen oxides emission rate increase will exceed the significant increase limit of 40 tons per year.

The material herein is submitted by CF 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, a description of the proposed modification, a review of best available control technology, an air quality review and an evaluation of the impact of the proposed modifications on soils, vegetation and visibility.

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 1525 acres of land at the Hillsborough/Pasco County line on the east side of State Road 39 (see Figures 2-1 and 2-2).

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-199. 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 2400 tons per day of 100 percent sulfuric acid each. These plants were permitted in 1973 and modified in 1988 by Permits AC29-132155 (C plant), AC29-132157 (D plant) and PSD-FL-199. Air operating permits were issued for the C and D plants in September 1989. 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 C and D 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 typical stack gas flow rates for each of the four plants. There are no nitrogen oxides emission limiting standards for sulfuric acid plants.

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 P205 and the other with a production rate of 1700 tons per day of P205. 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 8400 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 tons per day. 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 C and D sulfuric acid plants.

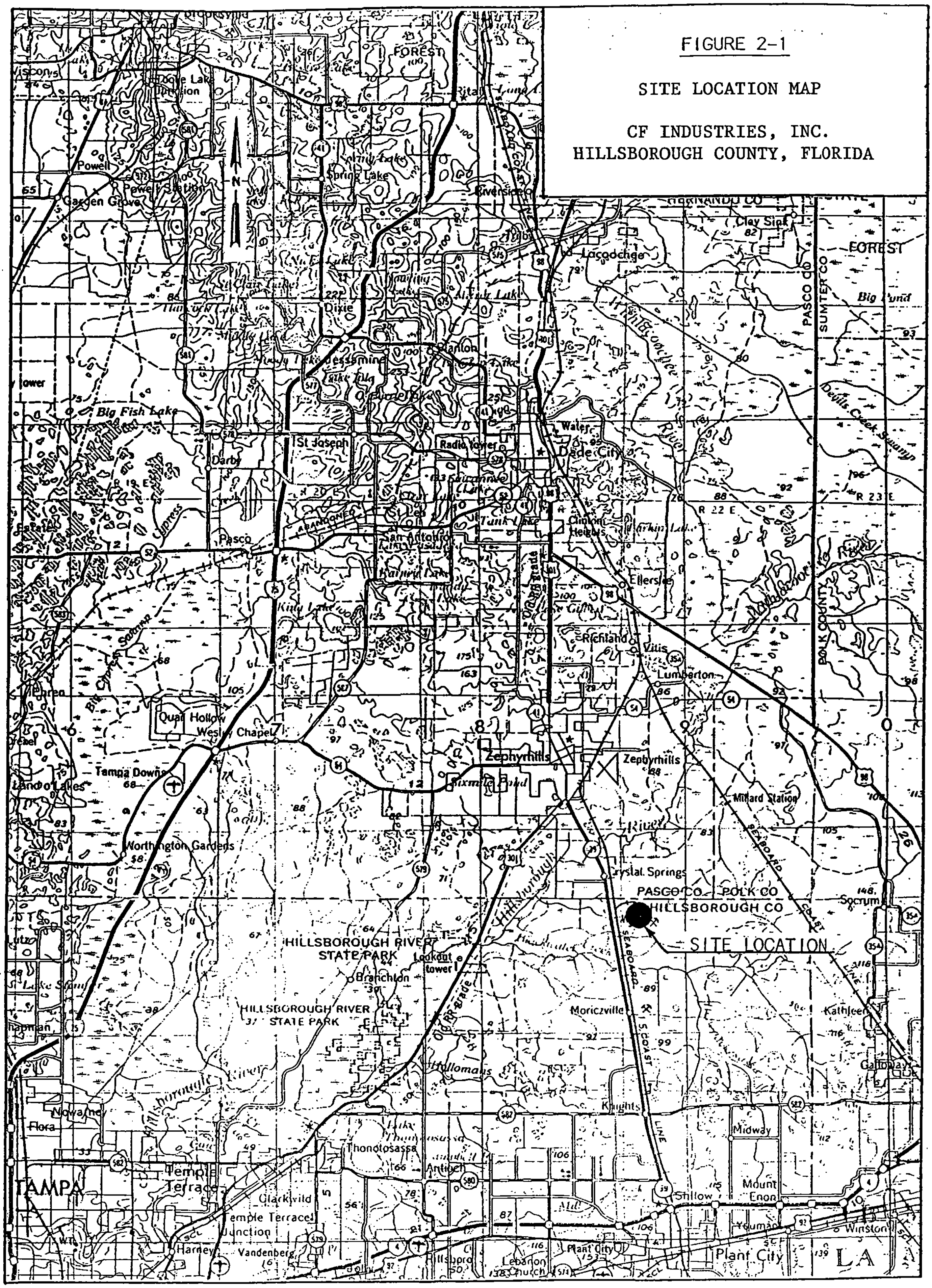
FIGURE 2-1
SITE LOCATION MAP
CF INDUSTRIES, INC.
HILLSBOROUGH COUNTY, FLORIDA
SITE LOCATION
PASCO CO
POLK CO
HILLSBOROUGH CO
HILLSBOROUGH RIVER STATE PARK
Zephyrhills
Dade City
Crystal Springs
TAMPA
Temple Terrace
Plant City
Wesley Chapel
Tampa Downs
Land o' Lakes
Moricville
Knights
Thonotosassa
Antioch
Midway
Mount Enon
Kathleen
Socrum
Lacoochee
Richland
Lumberton
Ellerslie
Clinton Heights
San Antonio
St Leo
St Joseph
Darby
Dixie
Jessamine
Spring Lake
Powell
Garden Grove
Big Fish Lake
Quail Hollow
Worthington Gardens
Branchton
Nowatney
Flora
Harney
Vandenberg
Clark
Seffner
Winston
Galloway
Millard Station
Vitis
Zephyrhills
Sixmile Pond
Lookout tower
Radio tower
Pasco
Elfers
FOREST
Big Pond
Devils Creek Swamp
PASCO CO
SUMTER CO
POLK COUNTY
HERNANDO CO
R 19 E
R 22 E
R 23 E

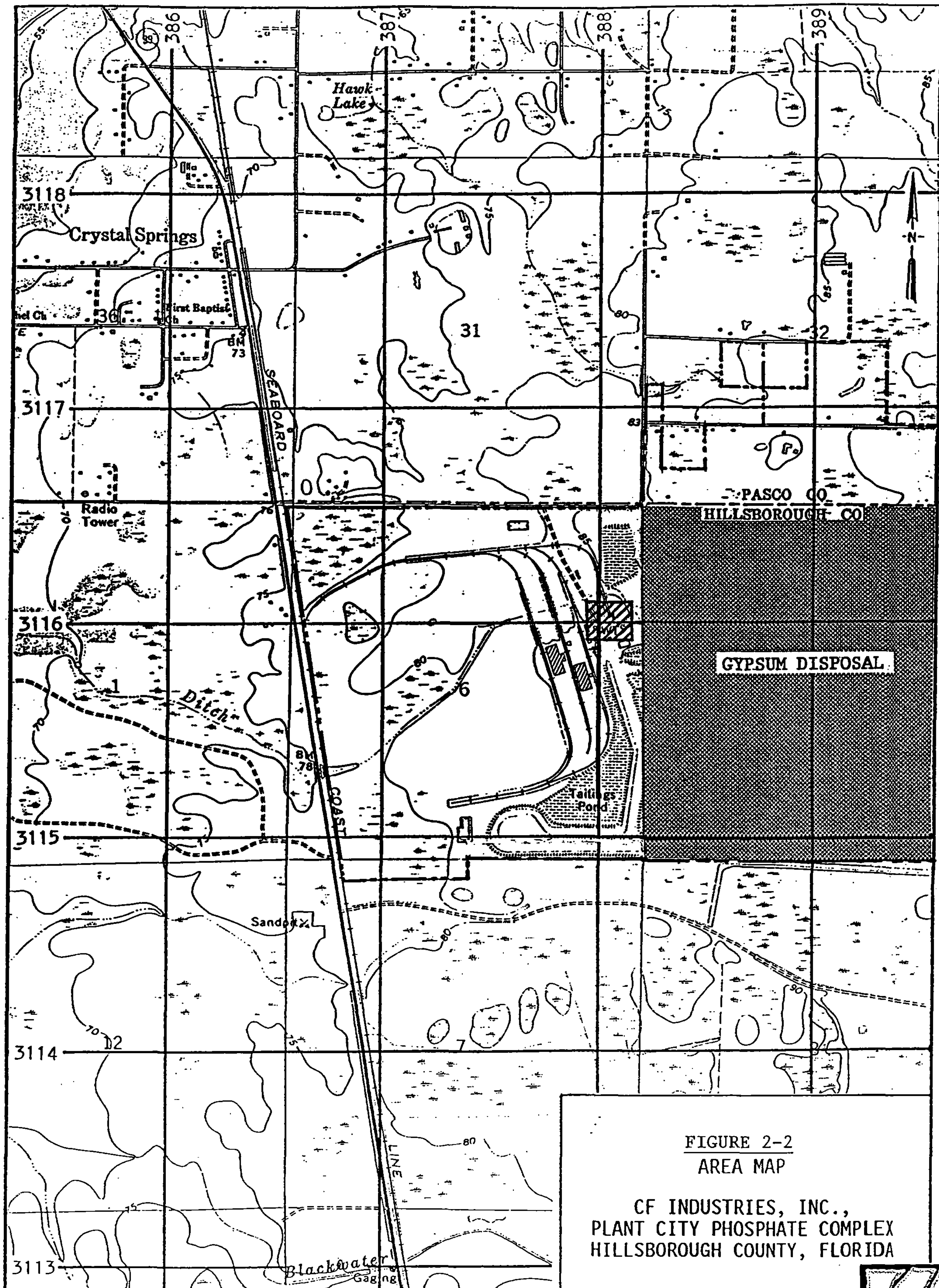

FIGURE 2-2
AREA MAP

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

KOOGLER & ASSOCIATES

3.0 PROPOSED PROJECT

To offset purchases of sulfuric acid, CF will increase the production rates of the C and D sulfuric acid plants from 2400 tons per day to 2600 tons per day of 100 percent sulfuric acid, each plant.

The emission limits for the C and D sulfuric acid plants will be remain unchanged. The sulfur dioxide emission limit will remain at 4.0 pounds per ton of 100 percent sulfuric acid and the acid mist emission limit will remain at 0.15 pounds per ton of 100 percent sulfuric acid. The nitrogen oxides concentration of the stack gas will remain at 18-20 parts per million. The increased stack gas flow rate at the higher acid production rate will result in the increase in nitrogen oxides emissions.

The production rate increases in the C and D plants will result from repacking of absorption towers with a resulting decreased pressure drop and increased gas flow providing for more sulfur burning and process rate capability.

Table 3-1 summarizes the permitted/actual and proposed conditions under which the C and D 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 a significant increase in the annual sulfur dioxide and acid mist emissions from the C and D sulfuric acid plants and a less than significant increase in nitrogen oxides emissions from these plants. The 10.2 tons per year nitrogen oxides emission increase associated with this project plus nitrogen oxides emission increases totaling 35.4 tons per year in 1988 exceed the 40 ton per year significant increase limit defined in Rule 17-2.500(2)(e), FAC.

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. These modifications were addressed through an appropriate Department permitting process.

3.1 RULE APPLICABILITY

The C and D sulfuric acid plants are classified as new sources and are subject to both state and federal regulations. As summarized in Table 3-2, there will be significant increases in the annual emission rates of sulfur dioxide and acid mist from the two plants, and the collective annual emission rate increase of nitrogen oxides resulting from this project and two previous projects is also significant.

The production rate increases for the C and D sulfuric acid plants will be accompanied by significant increases in annual sulfur dioxide, acid mist and nitrogen oxides emissions. The modifications to the C and D sulfuric acid plants will therefore be subject to the full review required of a PSD construction permit application. This will include a determination of Best Available Control Technology, an air quality review, and an evaluation of impacts on soils, vegetation, and visibility. The following sections of the application address the modifications requested for the C and D sulfuric acid plants and include all information required for the PSD review.

TABLE 3-1

EXISTING AND PROPOSED PRODUCTION RATES
AND EMISSION RATES AFFECTED BY PROPOSED
SULFURIC ACID PLANT RATE INCREASES (1)

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

	Sulfuric Acid Plant	
	C	D
Date Permitted (Originally)	1973	1973
Date Modified (PSD-FL-119)	1988	1988
Current Permit/Actual Conditions (2)		
Rate (tpd)	2400	2400
SO2 (lb/ton)	4.0	4.0
(lb/hr)	400.0	400.0
(tpy)	1752	1752
Mist (lb/ton)	0.15	0.15
(lb/hr)	15.0	15.0
(tpy)	65.7	65.7
Operating Factor	1.0	1.0
Proposed Conditions		
Rate (tpd)	2600	2600
SO2 (lb/ton)	4.0	4.0
(lb/hr)	433.3	433.3
(tpy)	1898	1898
Mist (lb/ton)	0.15	0.15
(lb/hr)	16.2	16.2
(tpy)	71.2	71.2
Operating Factor	1.0	1.0

(1) See Appendix 3A for calculations of emission rates.
(2) Actual emissions are the same as federally enforceable permitted emissions.

TABLE 3-2

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

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

POLLUTANT (Tons/Year)		Sulfuric Acid Plant C	Sulfuric Acid Plant D
SO2			
	Present (actual)	1752	1752
	Proposed	1898	1898
	Annual Change	146	146
	Total	292	
	Significant Increase (2)	40	
Mist			
	Present (actual)	65.7	65.7
	Proposed	71.2	71.2
	Annual Change	5.5	5.5
	Total	11.0	
	Significant Increase (2)	7	
NOx			
	Present (actual)	62.2	62.2
	Proposed	67.3	67.3
	Annual Change	5.1	5.1
	Total	10.2 (3)	
	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.

(3) The emission rate increase of 10.2 tpy, when combined with NOx emission rate increases of 5.6 tpy and 29.8 tpy permitted in 1988, exceeds the significant emission rate increase of 40 tpy for NOx defined in 17-2.500(2)(e)2,FAC. This will trigger a PSD review for NOx, as well as for SO2 and acid mist.

APPENDIX 3-A
EMISSION RATE CALCULATIONS

OPERATING CONDITIONS:

Permitted/Actual: 2400 tons per day 100% acid

$SO2$ - 4.0 lb/ton, max

Mist - 0.15 lb/ton

NOx - 2.10×10^{-6} lb/dscf

Operating factor - 1.0

Note: Federally enforceable emission limits documented in Permits AC29-132155 (C Plant), AC29-132157 (D Plant), and PSD-FL-119.

Proposed: 2600 tons per day 100% acid

$SO2$ - 4.0 lb/ton

Mist - 0.15 lb/ton

NOx - 2.10×10^{-6} lb/dscf

Operating factor - 1.0

EMISSION RATES:

Permitted/Actual: (Each plant)

SO2: Hourly = 4.0 lb/ton x 2400/24 tons/hr
= 400 lb/hr.

Annual = 400 lb/hr x 8760 hr/yr x 1/2000 lb/ton
= 1752 tpy

MIST: Hourly = 0.15 lb/ton x 2400/24 tons/hr
= 15.0 lb/hr

Annual = 15.0 x 8760/2000
= 65.7 tpy

NOx: Based on 67500 dscf per ton of acid and 2.1×10^{-6} lb NOx per dscf (18 ppm, v/v)

Hourly = 67500 dscf/ton x 2400/24 ton/hr x (2.1×10^{-6}) lb/ft^3
= 14.2 lb/hr

Annual = 14.2 lb/hr x 8760/2000
= 62.2 tpy

Proposed: (Each plant)

SO_2: Hourly = 4.0 lb/ton x 2600/24 tons/hr
= 433.3 lb/hr.

Annual = 433.3 lb/hr x 8760 hr/yr x 1/2000 lb/ton
= 1898 tpy

MIST: Hourly = 0.15 lb/ton x 2600/24 tons/hr
= 16.2 lb/hr

Annual = 16.2 x 8760/2000
= 71.2 tpy

NO_x: Hourly = 67500 dscf/ton x 2600/24 ton/hr
x (2.1×10^{-6}) lb/ft^3
= 15.4 lb/hr

Annual = 15.4 lb/hr x 8760/2000
= 67.3 tpy

NOTE: No other air pollutants are discharged from the C and D sulfuric acid plants.

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. The significance of an emission rate increase is defined by Rule 17-2.500(2)(e)(2), FAC.

The emission rate increases proposed by CF Industries have been summarized in Table 3-2. The increases will result from increasing the production rate of the C and D double absorption sulfuric acid plants from 2400 tons per day to 2600 tons per day of 100 percent sulfuric acid. From Table 3-2 it will be noted that sulfur dioxide and sulfuric acid mist emissions from the two sulfuric acid plants at 2600 tons per day will represent a significant increase over emissions from the plants as permitted at 2400 tons per day.

The 10.2 ton per year increase in nitrogen oxides emissions from the two plants will be less than de minimis. However, when combined with a 5.6 ton per year increase in nitrogen oxides emissions from the A and B sulfuric acid plants in 1988 (AC29-146176 and 146177) and a 29.8 ton per year increase from the C and D sulfuric acid plants also in 1988 (AC29-132155, AC29-132157 and PSD-FL-143), the overall nitrogen oxides emission rate increase will exceed the significant increase limit of 40 tons per year.

The increases in sulfur dioxide and sulfuric acid mist emissions associated with this project and the cumulative increases in nitrogen oxides emissions that have occurred in the past two years will each trigger a PSD review.

Sulfur dioxide, acid mist and nitrogen oxides are present in the tail gas from all contact process sulfuric acid plants. In a typical plant with the double absorption system, the sulfur dioxide in the tail gas is approximately four pounds per ton of acid produced and the acid mist is approximately four pounds per ton of acid produced. The nitrogen oxides that are present in the tail gas are formed in the sulfur burners as a result of the fixation of atmospheric nitrogen. Measurements have indicated that the concentration of nitrogen oxides in the tail gas of a sulfuric acid plant is in the range of 18-20 parts per million (volume).

4.1 EMISSION STANDARDS FOR SULFURIC ACID PLANTS

Federal New Source Performance Standards (NSPS) for sulfuric acid plants became effective on August 17, 1971. These standards are codified in 40 CFR 60, Subpart H and require sulfur dioxide emissions to be limited to no more than 4.0 pounds per ton of 100 percent acid produced and require that sulfuric acid mist emissions be limited to no more than 0.15 pounds per ton of 100 percent acid produced. Additionally, the standards limit the opacity of the emissions from new sulfuric acid plants to less than 10 percent. There are no emission standards for nitrogen oxides.

In the most recent EPA review of New Source Performance Standards for sulfuric acid plants in 1985 (EPA-450/3-85-012), it was concluded that because of variations in sulfur dioxide emissions as a function of catalyst age,

> "... the level of SO_2 emissions as specified in the current NSPS (should) not be changed 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."

A review of BACT/LAER determinations published in the EPA Clearinghouse indicates that no new control alternatives have been applied to sulfuric acid plants as of 1990 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.

4.2 CONTROL TECHNOLOGIES

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.

EPA published a review of NSPS for sulfuric acid plants in March 1985 (EPA-450/3-85-012). Another review of NSPS by EPA is currently due but probably will not be published before the early 1990's. In the 1985 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. All 46 plants used the high efficiency mist eliminators for acid mist control. The control of nitrogen oxides in sulfur 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 typical sulfuric acid plant is in the range of 20 parts per million. This equates to a mass emission rate of nitrogen oxide of approximately 10 pounds per hour or approximately 0.03 pounds per million Btu. As a point of comparison, NSPS for fossil fuel fired steam generators limit nitrogen oxides emissions to 0.1-0.8 pounds per million Btu heat input, depending upon the type of fuel used.

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.

4.2.1 Sulfur Dioxide Control

The control alternatives for sulfur dioxide have been summarized based upon information compiled by EPA in the 1985 NSPS review for sulfur acid plants. As stated earlier, EPA is due to review these standards again but will probably not publish the results of their review until sometime in the early 1990's.

4.2.1.1 Dual Absorption Process

The dual absorption process has become the SO_2 control system of choice within the sulfuric acid industry since the promulgation of NSPS in 1971. Of the 46 new sulfuric acid plants constructed between 1971 and 1985, 40 employed this process for sulfur dioxide control. The process offers the following advantages over other SO_2 control technologies:

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

2. there are no by-products produced;

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

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

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

6. there is no increase in manpower requirements.

The dual absorption process is capable of reducing sulfur dioxide emission rates to less than 4.0 pounds per ton of acid as required by New Source Performance Standards. The information reviewed by EPA indicates that even lower sulfur dioxide emission levels occur with new catalyst but as the catalyst ages, the conversion efficiency drops and sulfur dioxide emission rates begin to approach the 4.0 pound per ton limit.

4.2.1.2 Sodium Sulfite-Bisulfite Scrubbing

Between 1971 and 1985, two sulfuric acid plants were constructed employing sodium sulfite-bisulfite scrubbing to control sulfur dioxide emissions. One of the plants was subsequently converted to ammonia scrubbing and the second plant has never been used. As a result, sodium sulfite-bisulfite scrubbing is not considered a demonstrated sulfur dioxide control alternative.

4.2.1.3 Ammonia Scrubbing

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

Five sulfuric acid plants constructed between 1971 and 1985 use ammonia scrubbing for sulfur dioxide control. The process has proved effective for reducing sulfur dioxide emissions to below 4.0 pounds per ton and also for controlling sulfuric acid mist emissions.

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

1. a waste by-product is produced unless there is a market for fertilizer grade ammonium sulfate;

2. the scrubbing system introduces a process that is foreign to sulfuric acid plant operators;

3. the scrubbing system is a high maintenance item and requires additional manpower for operation; and

4. no sulfuric acid plant size reduction benefits are achieved with the scrubbing system.

4.2.1.4 Molecular Sieves

A molecular sieve was installed at one sulfuric acid plant in Florida for sulfur dioxide control. Extensive operating problems were experienced as the molecular sieve absorbed nitrogen oxides as well as sulfur dioxide. The regeneration of these gases resulted in the formation of nitric acid within the sulfuric acid plant. The nitric acid/sulfuric acid mixture resulted in severe corrosion problems which caused the molecular sieve system to be scrapped. As a result, molecular sieves are not considered a viable alternative for sulfur dioxide control in the sulfuric acid industry.

4.2.2 Sulfuric Acid Mist Control

Control alternatives that were reviewed by EPA in the 1985 New Source Performance Standards review are summarized in the following sections.

4.2.2.1 Fiber Mist Eliminators

The 46 new sulfuric acid plants constructed between 1971 and 1985, all used the fiber type mist eliminators for sulfuric acid mist control. Operations demonstrated that these types of mist eliminators can control sulfuric acid mist emissions to less than 0.15 pounds per ton of sulfuric acid.

The mist eliminators are the choice of control for sulfuric acid mist within the sulfuric acid industry because they require very little operation and maintenance attention and because of the small space requirement associated with these devices. The disadvantage of this type of mist eliminator is that the pressure drop across the elements varies from five to 15 inches of water; resulting in an increase in operating utility costs.

4.2.2.2 Electrostatic Precipitators

The electrostatic precipitators have the potential for controlling sulfuric acid mist emissions from sulfuric acid plants; however, there is no demonstrated application of precipitators. The disadvantages associated with precipitators, and hence, the reason they have not been used, include the initial cost, size requirements, operating and maintenance requirements and the potential for corrosion. The advantage of the precipitator is that it would operate at a low pressure drop; approximately 0.5 inches of water.

4.3 COST ANALYSIS

In reviewing the cost analyses presented in this section, it should be recognized that the two control alternatives that have been analyzed for sulfur dioxide achieved about the same degree of efficiency; i.e, there is no advantage of one system over the other from the standpoint of the level of sulfur dioxide control that can be achieved. The same holds true for the control alternatives evaluated for sulfuric acid mist; both alternatives (fiber mist eliminators and electrostatic precipitators) are capable of achieving approximately the same degree of acid mist control.

Hence, the choice of the control alternative for sulfur dioxide and the control alternative for sulfuric acid mist can be made on the basis of cost, operating familiarity and operating convenience.

In Tables 4-1 and 4-2, the capital costs and annual costs of controlling sulfur dioxide emissions by dual absorption and by ammonia scrubbing are presented. In Table 4-3 and 4-4, similar costs are presented for controlling sulfuric acid mist emissions by fiber mist eliminators and electrostatic precipitators. The cost data are based upon analyses presented in EPA-450/3-85-012 and in EPA-450/3-76-014 (Capital and Operating Costs of Selected Air Pollution Control Systems); both updated to 1989 costs. The capital recovery in the annual cost calculation is based upon a 10 percent rate of return and a 10 year equipment life.

The cost analyses demonstrate that the annual cost of the dual absorption process for sulfur dioxide is less than half the annual cost for ammonia scrubbing. Similarly the annual cost for sulfuric acid mist with the fiber type mist eliminators is approximately one-fourth the annual cost of controlling acid mist with electrostatic precipitators. As the two control alternatives for sulfur dioxide and the two control alternatives for sulfuric acid mist are capable of the same level of control, it is evident why the dual absorption and the fiber type mist eliminators have been the control alternatives of choice for sulfur dioxide and sulfuric acid mist, respectively.

4.4 CONCLUSION

Based upon the analysis presented in previous sections, the dual absorption process had been selected by CF Industries as the control alternative for sulfur dioxide control and the fiber type high efficiency mist eliminator has been selected for sulfuric acid mist control. The dual absorption system will be operated with catalyst screening and make up every three to five years as is typical in the industry.

There is no effective and demonstrated technology for controlling nitrogen oxides emissions from sulfuric acid plants. Typical emissions are in the range of 18-20 parts per million (volume basis). CF Industries will minimize these emissions by operating the burners of the sulfuric acid plants within the limits established by the designer.

TABLE 4-1

COST ANALYSIS FOR SO2 CONTROL BY DUAL ABSORPTION
2600 TPD CONTACT SULFURIC ACID PLANT

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

CAPITAL COST		
Direct		
Absorber	1,299,000	
Pumps	260,000	
Piping	390,000	
Heat Exchanger	650,000	
		$2,599,000
Indirect		
Engineering and Supervision	248,000	
Construction	138,000	
Contractor	149,000	
Contingency	311,000	
		846,000
TOTAL CAPITAL COST		$3,445,000
ANNUAL COST		
Direct		
Operating Labor and Supervision	8,000	
Maintenance Labor	7,000	
Maintenance Materials	8,000	
Utilities	2,770,000	
Catalyst	40,000	
		$2,833,000
Indirect		
OH	10,000	
Payroll	4,000	
		14,000
Capital Recovery		562,000
Insurance and Taxes		139,000
Credit for Acid Recovery		1,105,000
TOTAL ANNUAL COST		$2,443,000

TABLE 4-2

COST ANALYSIS FOR SO2 CONTROL BY AMMONIA SCRUBBING
2600 TPD CONTACT SULFURIC ACID PLANT

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

CAPITAL COST		
Direct		
Scrubber and Auxiliaries		$3,960,000
Indirect		
Engineering and Supervision	377,000	
Construction	301,000	
Contractor	226,000	
Contingency	475,000	
		1,379,000
TOTAL CAPITAL COST		$5,339,000

ANNUAL COST		
Direct		
Operating Labor and Supervision	540,000	
Maintenance Labor	80,000	
Maintenance Materials	95,000	
Utilities	288,000	
Chemicals	2,430,000	
		$3,433,000
Indirect		
OH	369,000	
Payroll	124,000	
		493,000
Capital Recovery		871,000
Insurance and Taxes		215,000
TOTAL ANNUAL COST		$5,012,000

TABLE 4-3

COST ANALYSIS FOR ACID MIST CONTROL BY FIBER TYPE MIST ELIMINATORS
2600 TPD CONTACT SULFURIC ACID PLANT

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

CAPITAL COST		
Direct		$ 80,000
Indirect		37,000
TOTAL CAPITAL COST		$ 117,000
ANNUAL COST		
Direct		
Utilities		$ 189,000
Indirect		
Capital Recovery	19,000	
Insurance and Taxes	5,000	
		24,000
Credit for Acid Recovery		(124,000)
TOTAL ANNUAL COST		$ 90,000

TABLE 4-4

COST ANALYSIS FOR ACID MIST CONTROL BY ELECTROSTATIC PRECIPITATOR
2600 TPD CONTACT SULFURIC ACID PLANT

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

CAPITAL COST		
Direct		
Collector	398,000	
Auxiliaries	138,000	
		$ 536,000
Indirect		
Engineering and Supervision	51,000	
Construction	40,000	
Contractor	31,000	
Contingency	64,000	
		186,000
TOTAL CAPITAL COST		$ 722,000
ANNUAL COST		
Direct		
Operating Labor and Supervision	23,000	
Maintenance Labor	20,000	
Maintenance Materials	38,000	
Utilities	65,000	
		$ 146,000
Indirect		
OH	25,000	
Payroll	9,000	
		34,000
Capital Recovery		118,000
Insurance and Taxes		28,000
TOTAL ANNUAL COST		$ 326,000

5.0 IMPACTS ON SOILS, VEGETATION AND VISIBILITY

The land-use in the vicinity of CF Industries is a mixture of unimproved land and pasture land. Plant City is located about 10 miles south of the site, Zephyrhills is located about four miles north of the site and the small community of Crystal Springs is located about two miles northwest of the CF plant. Additionally, there are scattered residences between CF and the two population centers. The C and D sulfuric acid plants are not expected to have any significant impact on activities in the area. Air quality modeling has demonstrated that sulfur dioxide levels which will exist after the proposed modifications will not differ significantly from current levels. Also, modeling has indicated that there will not be a significant impact from either sulfuric acid mist or nitrogen oxides emissions. Thus it is expected that the proposed production increase will not adversely impact soils, vegetation and visibility in the area.

The proposed modification will not require any additional operating personnel for the acid plants. The increase in sulfuric acid production will cause a slight increase in truck deliveries of molten sulfur but a greater decrease in truck traffic presently used for sulfuric acid import. As one sulfur truck is equivalent to three sulfuric acid trucks, the 200 ton per day rate increases for the C and D sulfuric acid plants will reduce annual truck traffic to the plant by about 3600-3700 vehicles per year.

6.0 GOOD ENGINEERING PRACTICE STACK HEIGHT

The criteria for good engineering practice stack height states that the height of a stack should not exceed the lesser of 65 meters (213 feet) or the height of nearby structures plus the lesser of 1.5 times the height or crosswind width of the nearby structure. The C and D sulfuric acid plant stacks are 198.5 feet or less than 65 meters (213 feet). Thus, the stack heights do not have to be justified as being excessively high.

The stacks of the C and D sulfuric acid plants were also compared with nearby structures and were found to be greater than 2.5 times the height of the nearby structures. This will minimize stack downwash. The heights of the sulfuric acid plant stacks (relative to nearby structures) with the fact that the stacks are approximately 0.7 kilometers from the nearest CF property line provides assurance that excessive ground-level concentrations of sulfur dioxide will not occur as a result of plume downwash.

7.0 AIR QUALITY REVIEW

The air quality review required of a PSD construction permit application potentially requires both air quality modeling and air quality monitoring. 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 defined by Rule 17-2.500(3)(e)1, FAC (Table 7-1) or in cases where an applicant wishes to define existing ambient air quality by monitoring rather than by air quality modeling.

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 PSD increments defined by Rule 17-2.310, FAC (Table 7-1). Additionally, air quality modeling is required to provide assurance that the emissions from the proposed project, together with the emissions of all other air pollutants in the project area, will not cause or contribute to a violation of any ambient air quality standard.

If air quality modeling demonstrates that the ambient impact of air pollutant emission increases and decreases associated with a project is not significant, demonstration of compliance with ambient air quality standards and PSD increment consumption is not required.

The air pollutants that must be addressed in this air quality review are sulfur dioxide, sulfuric acid mist and nitrogen oxides. These pollutants must be addressed as there will be a significant increases in their emission rates as discussed in Section 3.0 of this document.

The air quality modeling associated with this air quality review was conducted in accordance with guidelines established by EPA and published in the document Guideline for Air Quality Modeling, (revised, July 1986).

The modeling demonstrates that the impact of increased sulfur dioxide emissions and the impact of increased nitrogen oxide emissions (from this project and other emission increases not previously accounted for) will not be significant at any location for any averaging time. As a result, detailed modeling to demonstrate compliance with ambient air quality standards, PSD increment consumption and de minimis impact levels is not required. The ambient impacts of increased sulfuric acid mist emissions from the CF complex were compared with an acceptable ambient level developed from the threshold limit value for sulfuric acid mist. The modeling demonstrated that the impact of the increased sulfuric acid emissions will be approximately 3.5 percent of the acceptable ambient level.

In the following sections, the air quality modeling for sulfur dioxide, sulfuric acid mist and nitrogen oxides is described. The characteristics of the C and D sulfuric acid plants utilized for modeling purposes are summarized in Table 7-2. Also included in Table 7-2 are the characteristics of the A and B sulfuric acid plants used for evaluating the impact of nitrogen oxide emission increases from these plants.

7.1 AIR QUALITY MODELING FOR SULFUR DIOXIDE

As previously described, the net increase in the emission rate of sulfur dioxide used for air quality modeling purposes is defined as the emission rate increase associated with increasing the production rates of the C and D sulfuric acid plants from 2400 tons per day to 2600 tons per day of 100 percent sulfuric acid. The development of these emission rates was documented in Section 3.0.

The impact of the net increase in sulfur dioxide emissions was assessed with the Industrial Source Complex - Short Term (ISC-ST) air quality model. The 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 1982-1986. For modeling purposes, it was assumed that the plants would operate 8,760 hours a year. The receptors were defined by a polar grid system extending to 15.0 kilometers from the plant. Twelve sets of receptor rings were placed at distances ranging from 0.5 to 15.0 kilometers from the plant with receptors placed at 10 degree intervals on each receptor ring. The receptor ring at 0.5 kilometers represents the distance form the sulfuric acid plants to the nearest CF property line.

The results of the air quality modeling are summarized in Table 7-3 and demonstrate that the sulfur dioxide impacts of the proposed project are not significant for the three-hour, 24-hour or annual time periods. As the net impact of the sulfur dioxide emission rate changes are not significant for any time period, no further air quality modeling is required for sulfur dioxide.

7.2 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. For purposes of this permit application, an Acceptable Ambient Level (AAL) was developed by dividing the Threshold Limit Value of 1,000 micrograms per cubic meter by 210. The factor of 210 includes of a factor of 4.2 to convert the eight-hour per day, five day per week exposure allowed by the Threshold Limit Value to a 24-hour per day, seven day per week exposure; that is, (24 x 7)/(8 x 5). In addition to the factor of 4.2, a safety factor of 50 was applied to reduce the exposure established for the working population to an exposure that is applicable to the general population. The factor of 50 was selected as sulfuric acid mist is not a highly toxic material. The 24-hour AAL that has been established based upon these factors is 5.0 micrograms per cubic meter.

The air quality modeling that was conducted to evaluate the impact of sulfuric acid mist emissions was conducted with ISC-ST air quality model using the guidelines established for sulfur dioxide modeling described in Section 7.1 of this application. The receptor grid used was identical to the polar coordinate grid system used in the sulfur dioxide modeling. Modeling was conducted to determine the net impact of acid mist emission increases associated with the production rate increase in the C and D sulfuric acid plants.

The results of the air quality modeling for sulfuric acid mist are summarized in Table 7-4. The result of the modeling demonstrate that the maximum expected increase in ambient sulfuric acid mist levels associated with the rate increase in the C and D plants will be approximately 0.07 micrograms per cubic meter averaged over a 24-hour period. This impact will occur approximately 1.5 kilometers from the plant and compares with the AAL for sulfuric acid mist of 5.0 micrograms per cubic meter, 24-hour average.

The impact of sulfuric acid mist emissions from new sources outside the CF chemical complex were not included in the air quality review based upon an engineering judgment. It was estimated that because of the expected magnitude of the sulfuric acid mist emissions from other sources and the distances of these sources from CF, it would be very unlikely that any of the sources, individually or collectively, will result in a significant contribution to ambient acid mist levels in the project area.

7.3 AIR QUALITY MODELING FOR NITROGEN OXIDES

Air quality modeling conducted to evaluate the impact of increased nitrogen oxide emissions was conducted with the ISC-ST air quality model, using the same guidelines as used for sulfur dioxide modeling described in Section 7.1 of this application. The meteorological data and the receptor grid used for the nitrogen oxides modeling were identical to those used in the sulfur dioxide modeling.

The modeling was conducted to determine the net impact of the emission increases associated with increasing the production rates of the C and D sulfuric acid plants from 2400 tons per day to 2600 tons per day of 100 percent sulfuric acid and the impacts of the 1988 rate increases for the A, B, C and D sulfuric acid plants. In 1988, the production rates of the A and B sulfuric acid plants were increased from 1000 tons per day to 1050 tons per day of 100 percent sulfuric acid and the production rates of the C and D sulfuric acid plants were increased from 1900 tons per day to 2400 tons per day of 100 percent sulfuric acid. The nitrogen oxides emission increases associated with the 1988 permitting was not significant (less than 40 tons per year). The nitrogen oxides emissions increases associated with the presently proposed production rate increases for the C and D sulfuric acid plants, when combined with the 1988 nitrogen oxides emission increases, exceeded the 40 ton per year significant increase limit however. As a result, the air quality review for nitrogen oxides is required.

The results of the air quality modeling are summarized in Table 7-5. The results of this modeling show that the increase in ambient levels of nitrogen oxides will be less than 0.01 micrograms per cubic meter, annual average, as a result of increasing the production rates of the C and D sulfuric acid plants from 2400 to 2600 tons per day of 100 percent sulfuric acid, and approximately 0.01 micrograms per cubic meter, annual average, as a result of the proposed C and D plant rate increases plus the nitrogen oxides emissions increases permitted in 1988. Both of these increases are well below the significant level.

TABLE 7-1

AMBIENT STANDARDS FOR SULFUR DIOXIDE,
SULFURIC ACID MIST AND NITROGEN OXIDES

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

Pollutant/ Averaging Time	Ambient Air Quality Standard (ug/m^3)	Class II PSD Increment (ug/m^3)	De minimis Impact Level (ug/m^3)	Significant Impact Level (ug/m^3)
Sulfur Dioxide				
Annual	60	20	NA	1
24-Hour	260	91	13	5
3-Hour	1300	512	NA	25
Sulfuric Acid Mist				
	(1)	NA	NA	NA
Nitrogen Oxides				
Annual	100	25	14	1

(1) No ambient standard established, impact addressed under FDER air toxics policy.

TABLE 7-2

SUMMARY OF SULFURIC ACID PLANT STACK PARAMETERS AND EMISSION DATA

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

Plant	Production Rate	EMISSIONS					STACK		STACK GAS	
		SO2		Acid Mist		NOx	Ht	Dia	Vel	Temp
	(tpd)	(lb/ton)	(lb/hr)	(lb/ton)	(lb/hr)	(lb/hr)	(ft)	(ft)	(fps)	(°F)
A (pre-1988)	1000	10.0	416.7	0.22	9.2	7.9(1)	78	5.0	61.5	110
A (permitted)	1050	8.0	350.0	0.20	8.8	8.5	110	5.0	64.6	110
B (pre-1988)	1000	10.0	416.7	0.22	9.2	7.9(1)	78	5.0	61.5	110
B (permitted)	1050	8.0	350.0	0.20	8.8	8.5	110	5.0	64.6	110
C (pre-1988)	1900	3.79	300.0	0.15	11.9	10.9(2)	198	8.0	42.6	175
C (permitted)	2400	4.0	400.0	0.15	15.0	14.2	198	8.0	53.8	175
C (proposed)	2600	4.0	433.3	0.15	16.2	15.4	198	8.0	58.3	175
D (pre-1988)	1900	3.79	300.0	0.15	11.9	10.9(2)	198	8.0	42.6	175
D (permitted)	2400	4.0	400.0	0.15	15.0	14.2	198	8.0	53.8	175
D (proposed)	2600	4.0	433.3	0.15	16.2	15.4	198	8.0	58.3	175

(1) Adjusted for annual operating factor of 0.972 (see application for PSD-FL-119).
(2) Adjusted for annual operating factor of 0.971 (see application for PSD-FL-119).

TABLE 7-3

SUMMARY OF SULFUR DIOXIDE IMPACT ANALYSES
ASSOCIATED WITH THE C & D SULFURIC ACID PLANT
RATE INCREASES

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

METEOROLOGICAL DATA	SULFUR DIOXIDE IMPACT (ug/m3)		
	ANNUAL	3-HOUR	24-HOUR
1982	0.13	6.8	1.8
1983	0.10	7.2	1.5
1984	0.13	8.0	1.9
1985	0.17	7.7	1.6
1986	0.21	8.0	2.0
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

TABLE 7-4

SUMMARY OF ACID MIST IMPACT ANALYSES
ASSOCIATED WITH THE C & D SULFURIC ACID PLANT
RATE INCREASES

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

METEOROLOGICAL DATA	24-HR ACID MIST IMPACT (ug/m^3) C & D Production Rate Increase
1982	0.06
1983	0.05
1984	0.07
1985	0.05
1986	0.07
AAL (1)	5.0

(1) AAL = TLV/210, 24-Hour Average

TABLE 7-5

SUMMARY OF NITROGEN OXIDES IMPACT ANALYSES
ASSOCIATED WITH THE C & D SULFURIC ACID PLANT
RATE INCREASES

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

METEOROLOGICAL DATA	ANNUAL NITROGEN OXIDES IMPACT (UG/M3)	
	C & D Plant Rate Increase	C & D Plants Plus 1988 Increases
1982	0.005	0.008
1983	0.004	0.007
1984	0.005	0.007
1985	0.006	0.011
1986	0.007	0.010
Significant Impact (17-2.100(171)(a),FAC	1.0	1.0
De minimis Impact 17-2.500(3)(e)1,FAC	14.0	14.0