AC29-26670

Best Available Copy

GARDINIER INC.

RECEIVED

February 4, 1980

Mr. Steve Smallwood
Florida Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

Subject: Construction Permit Application, No. 5 Ammonium Phosphate Plant

Dear Mr. Smallwood:

Enclosed are three copies of DER Form 17-1.122(16), Application to Construct Air Pollution Source, for the No. 5 Ammonium Phosphate Plant at the Gardinier, Inc. phosphate chemical complex.

Also included with the application are the required Certification of Good Standing and Letter of Authorization. Gardinier, Inc. checks in the amounts of $20 and $50 to cover the State of Florida and Hillsborough County filing fees are included with their respective copies.

With the submittal of this application, Gardinier withdraws the Application for Construction Permit for the No. 5 Diammonium Phosphate Plant, dated June 8, 1979.

An attempt has been made to answer all questions from the DER as discussed on January 23, 1980. Even though the emissions will be under 50 Tons/Year for each pollutant and no BACT review is required, some information was given in that section to show that Gardinier will use the best available techniques.

Also, it is felt that the explanation given in Section 4.3, Pages 4-8 through 4-11 of the PSD Application submitted to the EPA on November 26, 1979, shows adequately that the schedule for construction and shutting down of units will not result in additional emissions. Gardinier will work with the agency to make assurances of this as desired. The information on process flows was scaled from a large Weatherly plant design, however, these numbers should be reasonably accurate.

Please advise if more information is needed and I would like to emphasize once again that time is becoming critical to Gardinier.

Very truly yours,

A. E. Morrison, Manager
Environmental Services

AEM:rw
Enclosures
cc: Mr. Cabina
Mr. Daugherty
Mr. Garrett, D.E.R.
Mr. Stewart, H.C.E.P.C.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

FEB 1980
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SOURCE TYPE: Air Pollution [x] New[1] [ ] Existing[1]

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

COMPANY NAME: Gardinier, Inc. COUNTY: Hillsborough

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) No. 5 Ammonium Phosphate Plant

SOURCE LOCATION: Street U.S. H'way 41 & Riverview Drive City South of Tampa

UTM: East 362.6 North 3082.3

Latitude 27 ° 51 ' 36 "N Longitude 82 ° 23 ' 44 "W

APPLICANT NAME AND TITLE: Rudy J. Cabina, Vice President

APPLICANT ADDRESS: P.O. Box 3269, Tampa, Florida 33601

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

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

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

*Attach letter of authorization

Signed: By: [signature]

By: Rudy J. Cabina, Vice President
Name and Title (Please Type)

Date: 1/21/80 Telephone No. 813-677-9111

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

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

Signed: [signature]

C. S. Daugherty
Name (Please Type)

(Affix Seal)

Gardinier, Inc.
Company Name (Please Type)

P.O. Box 3269, Tampa, Florida 33601
Mailing Address (Please Type)

Florida Registration No. 21150 Date: 1/21/80 Telephone No. 813-677-9111

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

SECTION II: GENERAL PROJECT INFORMATION

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

See attachment H

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

Start of Construction July 21, 1980 Completion of Construction July 21, 1982

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.)

Venturi Scrubbers -

Packed Up-flow Scrubber - $1,000,000 + $400,000 Water Line

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

None

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

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

if seasonal, describe: not seasonal

*Total operating time per year expected to be approximately 7570 hours, allowing for periods of downtime.

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

1. Is this source in a non-attainment area for a particular pollutant? Yes
   a. If yes, has "offset" been applied? (See Attachment A)
   b. If yes, has "Lowest Achievable Emission Rate" been applied? (See Attachment A)
   c. If yes, list non-attainment pollutants.

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

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

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

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

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Phosphoric Acid*	Fluoride	1.8	70,724	A
Anhydrous Ammonia	Ammonia	100	21,990	B
Sulfuric Acid, 100%	N/A		3,430	D

*100% H_3PO_4, dry plus solids.

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

1. Total Process Input Rate (lbs/hr): 22.52 tons/hr P_2O_5, 48.1 tons/hr, dry solid material
2. Product Weight (lbs/hr): 100,000 lbs/hr @ 1.0% H_2O; 99,000 lbs/hr dry

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual * T/yr			lbs/hr	T/yr *	
Particulate	10.0	38	$(p.^{0.16})(17.31)$ lb/hr	32.2	557.5	2110	C
Fluoride	1.4	5.3	0.06 lb F/ton P_2O_5	1.4	27	102	C
Ammonia	10	38	No limit	N/A	22.5	85.2	C
Sulfur Dioxide	10	38	No limit	N/A	36.8	139.4	C

D. Control Devices: (See Section V, Item 4) *Based on operating schedule of 7570 hours/year.

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]
(A packed-body, up-flow	Particulate	98*	Unknown	See Attachment
scrubber)	Fluoride	95*	N/A	G.
	Ammonia	55.5**	N/A	

*Tail gas scrubber only.
**See attachment G.

[1] See Section V, Item 2.

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

[3] Calculated from operating rate and applicable standard

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

[5] If Applicable

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
No. 6 Fuel Oil	2.58 bbls/hr 1.8 GPM		15.8

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

$1.8 \frac{gal}{min} \times 60 \frac{min}{hr} \times 7570 \frac{hrs}{yr} \times .02 \frac{\#S}{\# oil} \times 8.5 \frac{\#}{gal} \times \frac{2 \# SO_2}{\#S} \times \frac{Ton}{2000\#} = 139\ T\ SO_2/yr$

Fuel Analysis:

Percent Sulfur: 2.0

Percent Ash: ______

Density: 8.5 lbs/gal

Typical Percent Nitrogen: ______

Heat Capacity: ______ BTU/lb   146,000 BTU/gal

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

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

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

Scrubber effluent will be consumed in the plant-wide water recycle system.

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

Stack Height: 132.5 ft.

Stack Diameter: 7.0 ft.

Gas Flow Rate: 101,319 ACFM

Gas Exit Temperature: 116 °F.

Water Vapor Content: 7.5 %

Velocity: 43.9 FPS

SECTION IV: INCINERATOR INFORMATION

(Not Applicable)

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

Description of Waste ______

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

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

Manufacturer ______

Date Constructed ______ Model No. ______

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

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

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

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

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

Brief description of operating characteristics of control devices: ______________

____

____

____

____

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

____

____

____

____

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight — show derivation. (See Attachment C)

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.,) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made. (See Attachment D)

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

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.). (See Attachment F)

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency). (See Attachment G)

6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained. (See Attachment H)

7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map). (See Attachment L)

8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram. (See Attachment J)

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

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit. (Not applicable)

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

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

Contaminant	Rate or Concentration
Total Fluorides	0.06 lb fluorides per ton of equivalent P_2O_5 feed

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

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration
Total Fluorides	0.06 lb fluorides per ton of equivalent P_2O_5 feed

D. Describe the existing control and treatment technology (if any). (Not applicable)

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

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

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

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

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

1.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy*: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy**: h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

*Explain method of determining efficiency.

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected:

1. Control Device: Venturi Scrubbers and Packed Up-Flow Scrubbers

2. Efficiency*: See Attachment G

3. Capital Cost: $1,000,000 + $400,000 Water Line

4. Life: 20 - 25 years

5. Operating Cost: $360,000 per year (Estimated)

6. Energy: 1190 KWe

7. Maintenance Cost: $50,000 per year (Estimated)

8. Manufacturer: D. M. Weatherly

9. Other locations where employed on similar processes:

a.

(1) Company: U.S. Steel Agricultural Chemicals

(2) Mailing Address: P.O. Box 150

(3) City: Bartow

(4) State: Florida

(5) Environmental Manager: J. Carroll

(6) Telephone No.: 813-533-0471

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration
Particulate	Avg 0.06 lb/ton DAP Max 0.132
Fluoride	Avg 0.003 lb/ton P205 Max 0.009
Sulfur Dioxide	Avg 0.06 lb/ton DAP Max 0.06

(8) Process Rate*: 70 - 90 ton/hour DAP

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

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

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

*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

A. Company Monitored Data (See Attachment K)

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

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

Other data recorded ____

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

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

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

B. Meteorological Data Used for Air Quality Modeling

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

2. Surface data obtained from (location) ____

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

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

C. Computer Models Used

1. ____ Modified? If yes, attach description.

2. ____ Modified? If yes, attach description.

3. ____ Modified? If yes, attach description.

4. ____ Modified? If yes, attach description.

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

D. Applicants Maximum Allowable Emission Data

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

E. Emission Data Used in Modeling

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

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

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

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

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

ATTACHMENT A

NONATTAINMENT AREA CONSIDERATIONS
(Section II. G. 1. a. and b.)

Gardinier's Tampa Chemical Plant is located in an area which has been designated as a nonattainment area for total suspended particulate matter (secondary standards are not being attained). According to Florida Administrative Code 17-2.17(3)(a)1.a.(ii), however, a new emission source (located in a nonattainment area) which will emit less than 1000 pounds per day and 50 tons per year of a nonattainment pollutant does not have to demonstrate application of Lowest Achievable Emission Rate (LAER) technology or obtain emission offsets.

Gardinier is willing to commit to a particulate matter emission rate for the No. 5 Ammonium Phosphate Plant of less than 1000 pounds per day and 50 tons per year as a condition of permit. The question of LAER emission rate should therefore not be applicable. In addition, the emission offsets policy for nonattainment areas should also not apply. It should be noted, however, that construction of No. 5 Ammonium Phosphate Plant is part of a larger modification program which will in fact achieve substantial internal emission offsets for particulate matter. This aspect of the proposed modification program is discussed in Chevron's Prevention of Significant Deterioration Permit Application submitted to the U. S. Environmental Protection Agency on 11/26/79. A copy of this application has been sent to Steve Smallwood at the Florida Department of Environmental Regulation, and this copy should be reviewed for further information on emission offsets.

ATTACHMENT B

SULFUR DIOXIDE EMISSIONS CONTROL
(Section III.C)

Experience with similar facilities indicates that actual sulfur dioxide emissions are negligible. Sulfur dioxide removal can occur at two points in an ammonium phosphate plant of the type proposed by Gardinier. First, there is some retention of sulfur dioxide on solid materials being dried in the dryer kiln (although no credit is taken for this retention in calculating potential emissions). Second, the remaining sulfur dioxide is captured in the scrubbers used for fluoride, ammonia, and particulate matter emissions control. Data from other installations of similar technology indicate ~~no more than 10 lbs/hr~~ of SO_2 emissions and probably less than 5 lbs/hr, ~~using oil of similar or higher sulfur content~~.

ATTACHMENT C

TOTAL PROCESS INPUT RATE
AND PRODUCT WEIGHT
(Section V.1.)

1. Input Rate

Phosphoric Acid, 100% + Solids	= 70,724 lb/hr	= 45,047 lb/hr P_2O_5
Anhydrous Ammonia	= 21,990 lb/hr	
Sulfuric Acid, 100%	= 3,430 lb/hr	
Total Input	= 96,144 lb/hr	45,047 lb/hr P_2O_5

2. Product Weight (from design information)

= 100,000 lb/hr, @ 1.0% H_2O

= 99,000 lb/hr, dry basis

= 46,000 lb/hr, P_2O_5

= 21,857 lb/hr NH_3

(Differences due to scrubber losses)

ATTACHMENT D

BASIS OF EMISSION ESTIMATE
AND PROPOSED METHODS TO
SHOW COMPLIANCE
(Section V.2)

1. Basis of Emission Estimate

Emission estimate appears on Page 3, Section III, Item C, and is based on design drawings of the D. M. Weatherly Company.

2. Proposed Methods to Show Compliance

Testing to demonstrate compliance with Federal New Source Performance Standard for fluorides will be in accordance with methods in 40 CFR 60. Any testing required to demonstrate compliance with particulate emission limits established as a condition of construction permit will be conducted in accordance with ~~either State or Federal testing methods~~.

ATTACHMENT E

BASIS OF POTENTIAL DISCHARGE
(Section V. 3)

1. Fluorides

   Fluoride potential discharge is taken from design drawings of the D. M. Weatherly Company showing a 27 lb/hr loading to the tail-gas scrubbers.

2. Particulate Matter

   Particulate potential discharge is taken from design drawings of the D. M. Weatherly Company, showing a 557.5 lb/hr particulate loading.

3. Ammonia

   Ammonia potential discharge is taken from design drawings of the D. M. Weatherly Company, showing a 22.5 lb/hr NH_3 loading.

4. Sulfur Dioxide

   Based on a No. 6 Fuel Oil firing rate of 108 gal/hr; a sulfur content of 2.0 percent, and a fuel density of 8.5 lb/gal, assuming all sulfur is converted to SO_2 and no retention of SO_2 on solids in dryer kiln.

ATTACHMENT F
Design Details for Air Pollution Control Systems
(Section V.4)

(Not yet available as final vendor selection has not been made.)

ATTACHMENT G
Efficiency of Control Devices
(Section V.5)

1. Particulate Efficiency

Stack Emissions = 10 lb/hr

Loadings to Tail Gas Scrubber= 557.5 lb/hr

$$\frac{10}{557.5} \times 100 = 1.79$$

100 - 1.79 = 98.2% Efficiency

2. Fluoride Efficiency

Stack Emissions = 1.39 lb/hr

Loadings to Tailgas Scrubber = 27 lb/hr

$$\frac{1.39}{27} \times 100 = 5.15$$

100 = 5.15 = 94.85%

3. Ammonia Efficiency

Stack Emissions = 10 lb/hr

Loading to Tailgas Scrubber = 22.5 lb/hr

$$\frac{10}{22.5} \times 100 = 44.4$$

100 - 44.4 = 55.5%*

*Overall ammonia efficiency including ammonia captured in the venturi scrubber approaches 100%. (10 lb/hr to the stack versus 21,990 lb/hr fed to the system)

ATTACHMENT II

PROCESS DESCRIPTION
(Section II.A. and V.6.)

This process uses a pre-reactor to pre-neutralize phosphoric acid with anhydrous ammonia. The resulting slurry is sprayed onto a recycling bed of product material. Anhydrous ammonia is introduced inside the recycle bed to complete the reaction of phosphoric acid and ammonia to produce di-ammonium phosphate.

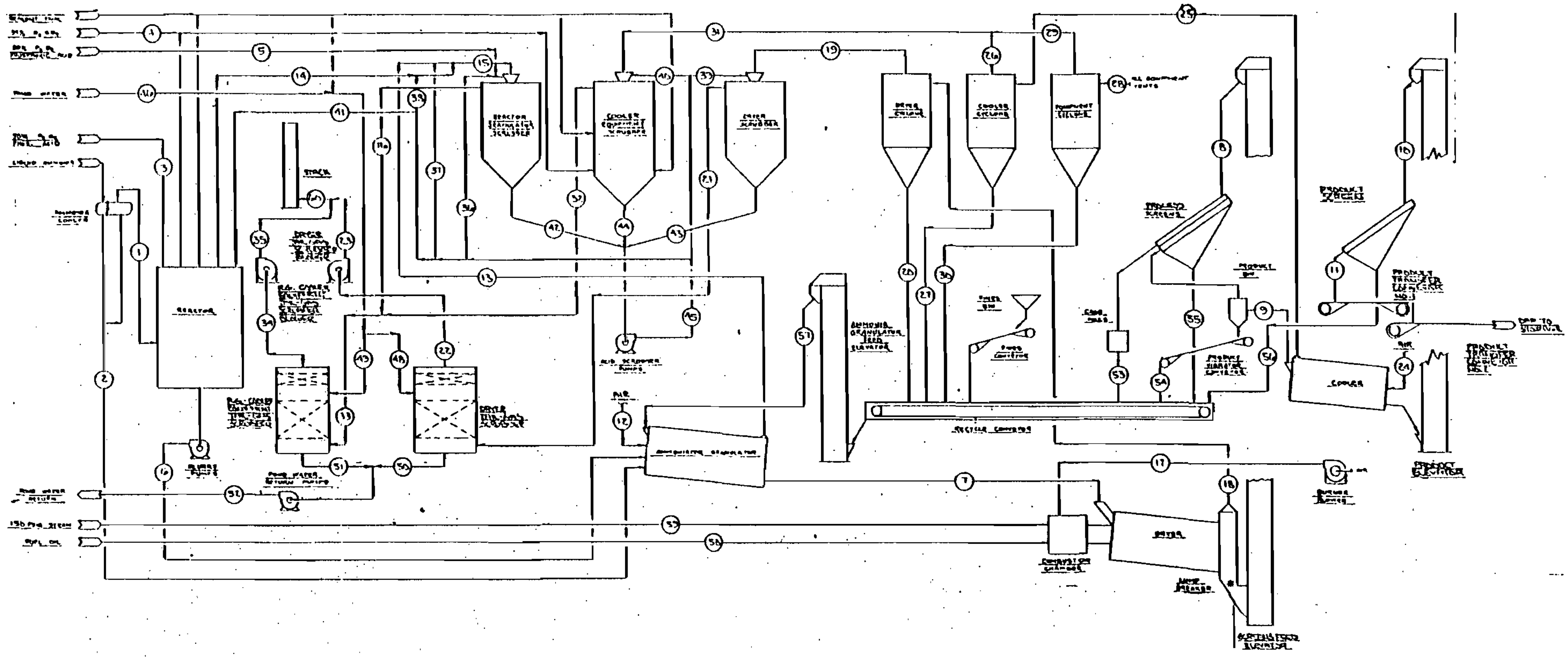
Material exiting the granulator is passed through a rotary, No. 6 Oil-fired dryer. Dried material is screened. Product-sized material is passed through a rotary cooler, re-screened and sent to storage. Over-sized material is cage-milled and recycled to the granulator. Fine material is recycled to the granulator.

Emissions from the reactor and granulator are passed through a venturi scrubber using an acidic scrubbing medium. Gases exiting the reactor-granulator venturi are conducted to a packed-body tailgas scrubber using recirculating pond water.

Emissions from the product dryer are conducted to a cyclone. Fines from the cyclone are recycled to the granulator. Gases exiting the cyclone are conducted to a venturi scrubber using an acidic scrubbing medium. Gases exiting the venturi scrubber are conducted to a packed-body tailgas scrubber dedicated to the dryer circuit.

Emissions from the product cooler and other materials handling equipment (elevators, conveyors, mills, screens, etc.) are conducted to a cooler cyclone and an equipment cyclone respectively. Fines from the cyclones are recycled to the granulator. Gases exiting these cyclones are conducted to a third venturi scrubber using an acidic scrubbing medium. Venturi scrubber liquid is consumed in the phosphric acid-ammonia reactor. Gases exiting the venturi scrubber are conducted to the packed-body tailgas scrubber which also serves the reactor-granulator circuit. Tailgas scrubber liquid effluent is recycled to a recirculating cooling pond.

Emissions from the proposed plant will equal or exceed new source performance standards and BACT requirements.



FLOW DIAGRAM

(Presented with permission of D. M. Weatherly Company)

FLOW DIAGRAM KEY

1	-	Ammonia to Reactor	14200 Lb/hr
2	-	Ammonia to Ammoniator Granulator	7790 Lb/hr
3	-	50% P_2O_5 Phosphoric Acid to Reactor	54040 Lb/hr
4	-	98% H_2SO_4 Sulfuric Acid Addition	3430 Lb/hr
5	-	30% P_2O_5 Phosphoric Acid to Scrubber	64450 Lb/hr
6	-	DAP Slurry Feed to Ammoniator Granulator	128970 Lb/hr
7	-	Granular DAP to Dryer	585830 Lb/hr
8	-	Granular DAP to Process Screens	548555 Lb/hr
9	-	Granular DAP Product to Cooler	121015 Lb/hr
10	-	Granular DAP Product to Product Screen	117645 Lb/hr
11	-	Granular DAP Product to Storage	100000 Lb/hr
12	-	Air to Ammoniator Granulator	9127 ACFM
13	-	Vent Gas from Ammoniator Granulator	13710 ACFM
14	-	Vent Gas from Reactor	10281 ACFM
15	-	Vent Gas to R/G Scrubber	23991 ACFM
16	-	Tail Gas from R/G Scrubber	22700 ACFM
17	-	Air to Dryer Burner	33984 ACFM
18	-	Vent Gas from Dryer	48573 ACFM
19	-	Vent Gas from Dryer Cyclone	49107 ACFM
20	-	Dust from Dryer Cyclone	16505 Lb/hr
21	-	Tail Gas from Dryer Scrubber	47676 ACFM
22	-	Tail Gas from Dryer Tail Gas Scrubber	38705 ACFM
23	-	Dryer Tail Gas to Stack	37084 ACFM
24	-	Air to Cooler	35749 ACFM
25	-	Vent Gas from Cooler	39305 ACFM

Flow Diagram Key, cont -

26	-	Vent Gas from Cooler Cyclone	39785 ACFM
27	-	Dust from Cooler Cyclone	2360 Lb/hr
28	-	Vent Gas from Equipment Vents	15233 ACFM
29	-	Vent Gas from Equipment Cyclone	15407 ACFM
30	-	Dust from Equipment Cyclone	4125 Lb/hr
31	-	Vent Gas to Cooler Equipment Scrubber	55293 ACFM
32	-	Tail Gas from Cooler Equipment Scrubber	58135 ACFM
33	-	Tail Gas to RG Cooler Equipment Tail Gas Scrubber	80695 ACFM
34	-	Tail Gas from RG Cooler Equipment Tail Gas Scrubber	66525 ACFM
35	-	RG Cooler Equipment Tail Gas to Stack	63739 ACFM
36	-	Scrubber Acid to RG Scrubber	352 GPM
37	-	Scrubber Acid to Ammoniator Granulator Vent Duct	95 GPM
38	-	Scrubber Acid to Reactor Duct	34 GPM
39	-	Scrubber Acid to Dryer Scrubber	469 GPM
40	-	Scrubber Acid to Cooler Equipment Scrubber	587 GPM
41	-	Scrubber Acid to Reactor	125 GPM
42	-	Scrubber Acid from Reactor Granulator Scrubber	593 GPM
43	-	Scrubber Acid from Dryer Scrubber	470 GPM
44	-	Scrubber Acid from Cooler Equipment Scrubber	598 GPM
45	-	Scrubber Acid from Pump	1661 GPM
46	-	Pond Water Supply	2600 GPM
47	-	Pond Water to Cooler Equipment Scrubber	20 GPM
48	-	Pond Water to Dryer Tail Gas Scrubber	1207 GPM
49	-	Pond Water to RG Cooler Equipment Tail Gas Scrubber	1482 GPM
50	-	Pond Water from Dryer Tail Gas Scrubber	1242 GPM

Flow Diagram Key, cont -

51	-	Pond Water to RG Cooler Equipment Tail Gas Scrubber	1541 GPM
52	-	Pond Water Return	2783 GPM
53	-	Granular DAP Oversize from Screens	123200 Lb/hr
54	-	Granular DAP Product Recycle	65000 Lb/hr
55	-	Granular DAP Fines from Screens	239340 Lb/hr
56	-	DAP Fines from Product Screens	17645 lb/hr
57	-	Granular DAP Recycle to Ammoniator Granulator	462345 lb/hr
58	-	Fuel Oil to Dryer Burner	1.8 GPM
59	-	Atomizing Steam to Dryer Burner	500 Lb/hr
60	-	Tail Gas to Stack	101318 ACFM

ATTACHMENT J

POLLUTION ABATEMENT EQUIPMENT
(Section V.8.)

Pollution abatement equipment for control of tailgas emissions would consist of two up-flow, packed-body scrubbers, both running on pond water.

The first scrubber would control emissions from the reactor-granulator and cooler and material handling equipment venturi scrubbers. Gas flow through the scrubber would be at the rate of 80,700 ACFM at 127^{o}F and -20 in. water pressure.

The second scrubber would control emissions from the dryer venturi scrubber. Gas flow through the scrubber would be at the rate of 47,700 ACFM at 137^{o}F and -19 in. water pressure.

Pond water would circulate through the scrubbers at approximately 2600 GPM.

Combined efficiencies of the two units for particulates and fluorides are 98.2% and 94.85% respectively. Efficiency for ammonia approaches 100%.

Control of fugitive particulates during and after construction will be accomplished by normal housekeeping procedures.

Accumulation of product tailings and clean-out material will be removed on a regular basis.

During construction, Gardinier's contractors will be instructed to prevent emissions from construction activities.

During operation, material handling equipment will be inspected regularly to assure screen covers and mill covers and other equipment are operating correctly.

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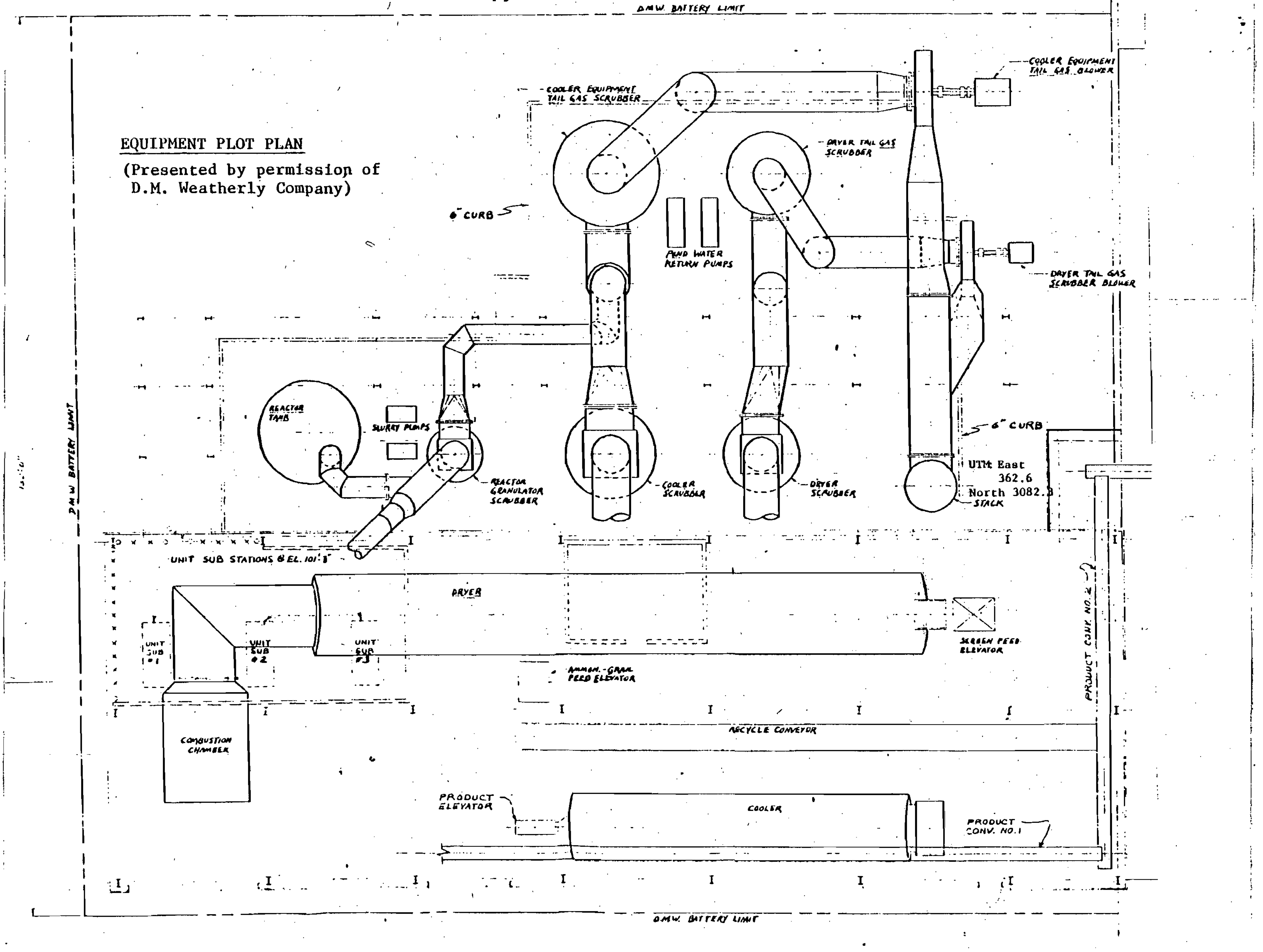


ATTACHMENT K

PREVENTION OF SIGNIFICANT DETERIORATION
(Section VII)

Proposed construction of the No. 5 Ammonium Phosphate Plant is just one phase of a much larger project involving changes in rock processing, phosphoric acid production, and sulfuric acid production. The overall effect of the total project will be a significant decrease in allowable emissions of particulate matter and sulfur dioxide emissions for the plant complex as a whole. Furthermore, the proposed construction schedule for the project is such that at no time will there be a temporary increase in particulate or sulfur dioxide emissions during the phasing out of old processes and phasing in of new processes. A description of the proposed project, including a discussion of the timing of emission source changes, is contained in the Prevention of Significant Deterioration (PSD) permit application submitted to the U.S. Environmental Protection Agency (EPA) on 11/26/79, a copy of which has been sent to the Florida Department of Environmental Regulation (DER) for review.

From the preceding comments, it can be seen that the impact of the proposed No. 5 Ammonium Phosphate Plant with respect to PSD increments (and also with respect to the Hillsborough County particulate matter nonattainment area) should not be judged in isolation from the other proposed changes to take place at the Tampa Chemical Plant. The following excerpt taken from Section 7 of the PSD permit application sent to EPA comments on the compensating emission source changes which will offset the impact of particulate emissions from the No. 5 Ammonium Phosphate Plant. This excerpt is addressed to impacts in the Hillsborough County particulate nonattainment area, but applies equally well to PSD increment consumption considerations. The excerpt has been modified to account for the change in design stack characteristics for the No. 5 Ammonium Phosphate Plant since submitting the original PSD permit application. Changes are shown in brackets. Table 4 - 1 has been revised to reflect these changes.

> Because the Tampa Chemical Plant is located in a particulate matter nonattainment area, there may be some concern about whether or not proposed particulate emission reductions will also result in reduced ambient concentrations. By reference to Table 4-1, it can be easily seen that the effective stack height (physical stack height plus plume rise) of the new particulate matter source (No. 5 Ammonium Phosphate) will exceed that of sources which will be shut down. This difference in effective stack height results from the much greater volumetric flow of the new source coupled with a stack height and exit temperature which are comparable to those of sources which will be shut down. According to standard Gaussian modeling concepts, a higher effective stack height will necessarily lead to reduced ground-level impacts provided emissions do not increase.
>
> As an example of differences in effective stack height, consider the No. 5 Ammonium Phosphate Plant in comparison with the outlet handling emissions from the No. 6, 7, 8, 10 Rock Grinding Mills. (The No. 6, 7, 8, 10 Rock Grinding Mills outlet is selected for comparison because it has the highest effective stack height of the existing particulate emission source due to temperature and volumetric flow characteristics.) The physical stack heights of these two emission points are [similar -(132 ft and 95 ft)]; therefore, any difference in effective stack height will be due to plume rise. Using the Briggs plume rise calculation method commonly applied in evaluations of this type, the expected plume rise of the No. 5 Ammonium Phosphate Plant plume is [two-and-a-half] times greater than the plume rise of the Rock Grinding Mills during unstable and neutral atmospheric conditions, and [one-and-one half] times greater during stable conditions. Coupled with reduced particulate emissions, the increase in effective stack height should result in lower ground-level concentrations.

To show that the proposed No. 5 Ammonium Phosphate Plant would have a very minor impact on particulate levels even in the absence of offsetting emission changes, an analysis has been made using conservative screening procedures developed by EPA. These procedures are described in "Guidelines for Air Quality Maintenance Planning and Analysis, Volume 10 (Revised): Procedures for Evaluating Air Quality Impact of New Stationary Sources" (EPA Office of Air

Quality Planning and Standards Publication No. EPA-450/4-77-001, OAQPS No. 1.2-029R). This publication describes two "desk-top" calculation methods for determining if more elaborate modeling techniques are required to evaluate the effects of a particular emissions source. The first method, referred to as the first-phase (simple) screening analysis, is a very conservative method used to determine if the second method, referred to as the second-phase (detailed) screening analysis, is needed. Total suspended particulate (TSP) concentrations (24-hour average) attributable to the No. 5 Ammonium Phosphate Plant have been checked using both screening methods. For these calculations, the following emission source characteristics were used:

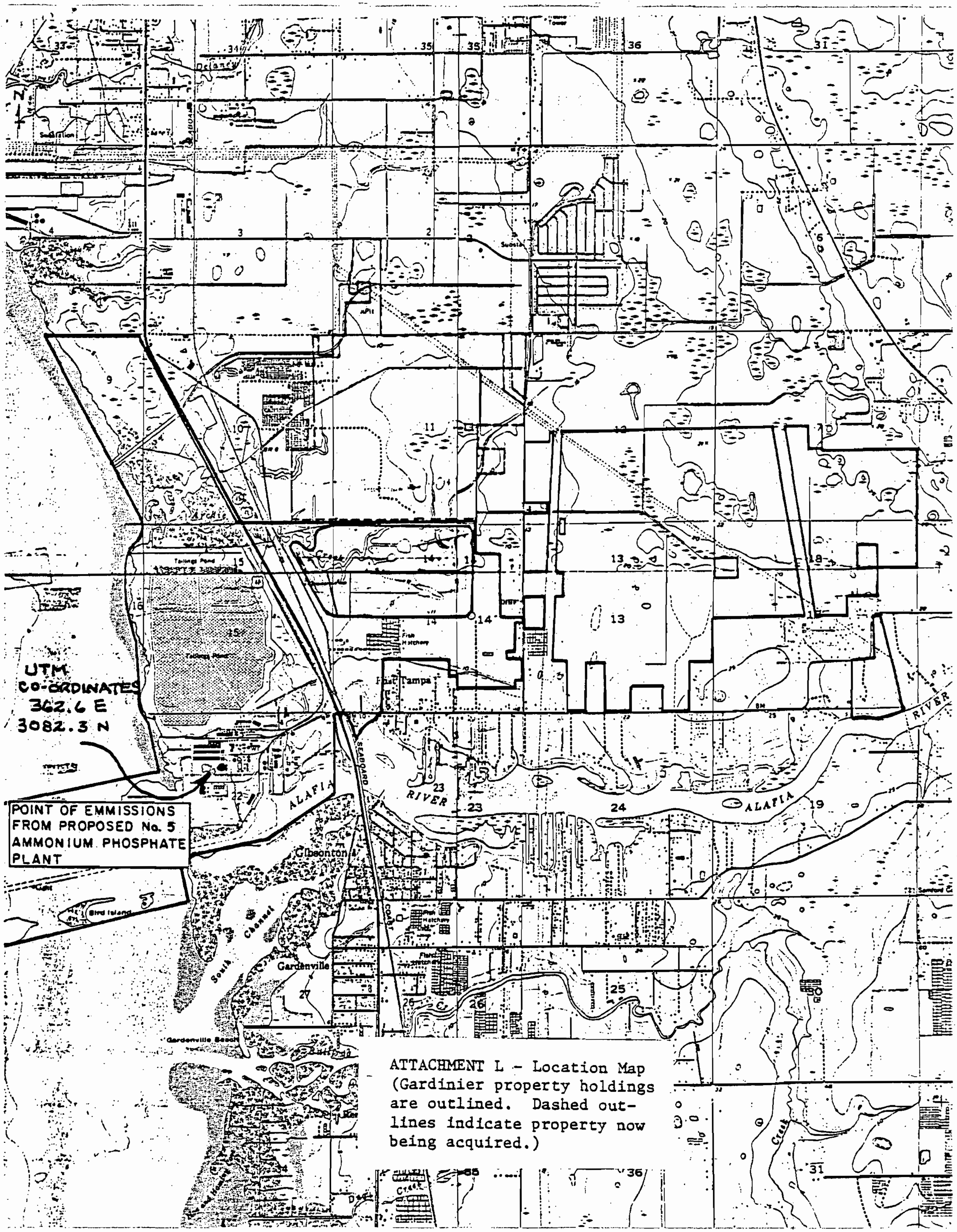
Particulate Emission Rate	=	10 lb/h	=	1.26 g/s
Stack Height	=	132 ft	=	40.2 m
Volumetric Flow	=	101,300 ft^3/min	=	47.8 m^3/s
Exit Temperature	=	$116^{o}F$	=	320 K

Based on the first-phase (simple) screening method, the maximum 1-hour TSP concentration calculated is 48 ug/m^3. This can be converted to a 24-hour concentration using an adjustment factor. A range of adjustment factors is suggested in the EPA guideline. Using an adjustment factor of 0.2, the maximum calculated 24-hour TSP concentration is 10 ug/m^3. Using a more conservative adjustment factor of 0.4, the maximum calculated 24-hour TSP concentration is 19 ug/m^3. These numbers can be compared with a 24-hour TSP concentration of 5 ug/m^3 which EPA has defined as a cutoff point between significant and insignificant levels (as stated in EPA's Emission Offset Interpretative Ruling, 44FR3283, and PSD regulations, 43FR26398). In other words, using a very conservative screening method, calculated concentrations are only slightly above the defined level of insignificance.

Based on the second-phase (detailed) screening method, the maximum 1-hour TSP concentration calculated is 10 ug/m^3. Converting this number to a 24-hour average, the maximum calculated 24-hour concentration is 2 ug/m^3 using an adjustment factor of 0.2, and 4 ug/m^3 using an adjustment factor of 0.4. Both of these concentrations are below the level of significance.

The conclusion is reached, therefore, that ambient TSP concentrations resulting from operation of the proposed No. 5 Ammonium Phosphate Plant would be insignificant even in the absence of offsetting emission source changes at Gardinier's Tampa Chemical Plant.

Similar calculations can be made to estimate the impact of sulfur dioxide emissions from the proposed No. 5 Ammonium Phosphate Plant. Maximum sulfur dioxide emissions are expected to be equal to maximum particulate matter emissions - 10 lb/hr. Using the second-phase (detailed) screening method, the maximum 1-hour SO_2 concentration is 10 ug/m^3. Using a conversion factor of 0.9 to calculate a 3-hour average concentration and a conversion factor of 0.4 to calculate a 24-hour average concentration, the maximum calculated 3-hour concentration is 9 ug/m^3, and the maximum calculated 24-hour concentration is 4 ug/m^3. These values can be compared to EPA's significance levels of 25 and 5 ug/m^3, respectively. Therefore, as was found to be the case for TSP, ambient SO_2 concentrations resulting from operation of the No. 5 Ammonium Phosphate Plant should be insignificant even in the absence of offsetting emission reductions (offsetting SO_2 reductions will result from modification of the No. 7 Sulfuric Acid Plant).



ATTACHMENT L - Location Map
(Gardinier property holdings
are outlined. Dashed out-
lines indicate property now
being acquired.)

TABLE 4-1

SUMMARY OF AFFECTED PARTICULATE MATTER EMISSION SOURCES

Emission Source Description	Potential[a] Particulate Emission Rate (lb/h)	Permitted or Allowable Particulate Emission Rate (lb/h)	Stack Height (ft)	Stack Diameter (ft)	Exit Velocity (ft/s)	Exit Temperature (°F)	Exit Volumetric Flow (ft^3/min)
1. Existing Facilities Which Will Be Shut Down							
No. 6, 7, 8, 10 Rock Grinding Mills[c]	100	39.3[b]	95	2.0	95.5	152	18,000
No. 11 KVS Rock Mill[c]	400	30.6[b]	70	1.6	44.3	145	5,340
No. 12 KVS Rock Mill[c]	80	32.9[b]	71	1.6	70.7	148	8,530
68BPL Rock Unloading and Storage	176	42.5[b]	30	1.7	97.8	100	13,320
South No. 2 Rock Transfer Airslide[c]	210	18.2[b]	96	1.0	54.5	105	2,570
North No. 2 Rock Transfer Airslide[c]	210	18.2[b]	85	0.4	83.6	102	630
South No. 3 Rock Transfer Airslide[c]	105	9.65[b]	96	1.2	21.1	132	1,430
Center No. 3 Rock Transfer Airslide[c]	105	9.65[b]	115	1.2	22.7	118	1,540
North No. 3 Rock Transfer Airslide[c]	105	9.65[b]	82	1.2	14.4	97	980
No. 3 Rock Transfer Airslide Bin[c]	105	9.65[b]	108	1.2	21.5	128	1,460
Normal Superphosphate	20	19.4[b]	73	2.5	49.8	86	14,670
Total	1616	239.7					
2. New Facilities							
No. 5 Ammonium Phosphate	210	10[d]	132	7.0	43.9	116	101,300
Net Emissions	-1406[e]	-229.7[e]					

[a]Potential emissions in the absence of control equipment, based on estimated control efficiency.
[b]From process weight-rate regulation.
[c]Equipped with bag filters having vent deflectors.
[d]Maximum based on available data.
[e]Represents a net emission reduction.

GARDINIER INC.

U.S. Phosphoric Products

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-C-E-R-T-I-F-I-C-A-T-E-

I, David G. Budd, Secretary of GARDINIER, INC. a Delaware Corporation (hereinafter called the "Corporation"), DO HEREBY CERTIFY that attached hereto is a correct and complete copy of a resolution duly adopted by the Board of Directors of the Corporation at the Regular Meeting thereof held on August 12, 1976, duly convened and held pursuant to notice, at which meeting a quorum was present and acting throughout, and such resolution has not been amended or revoked and such resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this day of August 24, 1976.

David G. Budd
Secretary

State of Florida

Department of State

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

The charter number for this corporation is 829527.

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

Given under my hand and the Great Seal of the State of Florida, at Tallahassee, the Capital, this the 8th day of November, 1979.

George Firestone
Secretary of State

CER 101 Rev. 5-79