6/10/80
Rev. 8/25/80

AC 53-34868

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

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

SOURCE TYPE: Phosphoric Acid Plant [ ] New[1] [X] Existing[1]

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

COMPANY NAME: Agrico Chemical Company COUNTY: Polk

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

SOURCE LOCATION: Street SR 630 City Polk County

UTM: East 407.5 km E North 3071.4 km N

Latitude 27 ° 45 ' 45 "N Longitude 81 ° 56 ' 28 "W

APPLICANT NAME AND TITLE: Agrico Chemical Company

APPLICANT ADDRESS: P.O. Box 1969 SPCW Bartow, Florida 33830

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Agrico Chemical Company

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: _____

L. C. Lahman, Plant Manager
Name and Title (Please Type)

Date: _____ Telephone No. (813) 428-1423

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: _____

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

(Affix Seal)

SHOLTES & KOOGLER ENVIRONMENTAL CONSULTANTS
Company Name (Please Type)

1213 NW 6th Street, Gainesville, FL 32601
Mailing Address (Please Type)

Florida Registration No. 12925 Date: 9/2/80 Telephone No. (904) 377-5822

[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.

Existing phosphoric acid trains will be modified by adding additional evaporation capacity to increase production from 430,000 TPY to 625,000 TPY. Fluoride emissions from both "A" and "B" trains will meet NSPS.

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

Start of Construction September, 1980 Completion of Construction December, 1981

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.)

Existing control systems; cost not applicable

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

"A" Train Permit A053-4531 Issued 10/5/77, Expires 9/30/82.
"B" Train Permit A053-4525 Issued 10/5/77, Expires 9/30/82.
EPA PSD Review for Phase I Expansion; Approved 3/1980.

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

F. Normal equipment operating time: hrs/day 21.3; days/wk 7; wks/yr 50; if power plant, hrs/yr ____; if seasonal, describe: 7455 hours per year.

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

1. Is this source in a non-attainment area for a particular pollutant? No
   a. If yes, has "offset" been applied?
   b. If yes, has "Lowest Achievable Emission Rate" been applied?
   c. If yes, list non-attainment pollutants.
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. Yes
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. 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

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		
Phos. Rock	F	3.4	653,612 (Avg.)	(1)
Sulfuric Acid	-	-	536,828 (Avg.)	(2)
Pond Water	-	-	513,935 (Avg.)	(3)

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

1. Total Process Input Rate (lbs/hr): 1,704,375 lb/hr = 852 TPH (Avg.) or 1015 TPH (Max.)

2. Product Weight (lbs/hr): 322,800 lb/hr = 161 TPH (Avg.) at 52% P_2O_5.
= 84 TPH (Avg.) at 100% P_2O_5 or 100 TPH (Max.) at 100% P_2O_5

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	
Fluoride							
Total	2.22	6.93	NSPS	2.22	502	1573	(4)
Increase over Exist.	0.69	2.16	NSPS	0.69	157	491	(4)

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5])
Existing "A" & "B" Scrubbers-cross-flow packed scrubbers	Fluoride	99.6	N/A	(See V.4)

[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 N/A

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

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

Fuel Analysis:

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ BTU/lb _____ BTU/gal

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

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

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

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

	"A" Train	"B" Train		"A" Train	"B" Train	
Stack Height:	120'	100'	ft.	Stack Diameter: 6.33	5.0	ft.
Gas Flow Rate:	67,000	70,000	ACFM	Gas Exit Temperature: 115	115	°F.
Water Vapor Content:	8	8	%	Velocity: 35.5	59.4	FPS

SECTION IV: INCINERATOR INFORMATION

NOT APPLICABLE

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
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.
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, etc.).
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency).
6. An 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.

ATTACHMENT 1

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).

ATTACHMENT 2

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.

ATTACHMENT 3

V, 1 Process INput and Product Weight Rates

Input (Average)*

Wet ground phosphate rock	-	653,612 lb/hr w/28.5% P_2O_5
Sulfuric Acid	-	536,828
Pond Water	-	513,935
TOTAL		1,704,375 lbs/hr

Total P_2O_5 input = 653,612 x 0.285
= 186,279 lb/hr

Output (Average)*

P_2O_5 Recovery = 90.12%

Output = 186,279 lb P_2O_5/hr x 0.9012
= 167,875 lb P_2O_5/hr
= 84 tons/hr P_2O_5
= 161.4 tons/hr 52% P_2O_5 acid.

* Average production rate is 84 tons/hr P_2O_5; Max. hourly production rate will be 100 tons/hr. P_2O_5 input rate at max production will be:

186,279 x 100/84 = 221,760 lb/hr
= 110.9 tons/hr P_2O_5

V, 2 and 3 Emission Estimates and Potential Emissions

Since wet rock will be used for phosphoric acid production there will be no particulate matter emissions.

Fluorides

Potential Emissions - Based upon existing plant operating data Agrico has determined that 1.8986% of the fluoride input to the "A" and "B" phosphoric acid trains enters the tail gas scrubbers.

Proposed

Rock input = 653,612 lb/hr w/3.4% F
F^- input = 22,223 lb/hr
F^- to scrubber = 22,223 x 0.018986
= 421.9 lb/hr (avg.) x 100/84
= 502.3 lb/hr (max.)
Annual Average = 421.9 x 7455 x 1/2000
= 1572.6 tons/year.

Existing

= Proposed emission rate x $\frac{\text{Existing Production Rate}}{\text{Proposed Production Rate}}$

= Proposed emission rate x $\frac{430{,}000 \text{ TPY}}{625{,}000 \text{ TPY}}$

Hourly Rate = 421.9 x $\frac{430,000}{625,000}$ = 290.3 lb/hr (avg.)

= 502.3 x $\frac{430,000}{625,000}$ = 345.6 lb/hr (max.)

Annual Avg. Rate = 1572.6 x $\frac{430,000}{625,000}$ = 1081.9 tons/year (avg.)

Increase in Potential Emissions

Hourly max. = 502.3 - 345.6
= 156.7 lbs/hr F (max.)

Annual avg. = 1572.6 - 1081.9
= 490.7 tons/year (avg.)

Actual Emissions - Based on NSPS of 0.02 lb F/ton P_2O_5 input to plant.

Proposed

Hourly Avg. = 186,279 lb P_2O_5/hr x 0.02 x 1/2000
= 1.86 lb F/hr.

Hourly Max. = 1.86 x 100/84
= 2.22 lb F/hour

Annual Avg. = 1.86 x 7455 hr/yr x 1/2000
= 6.93 tons F/year

Existing

Hourly Avg. = 1.86 x 430,000/625,000
= 1.28 lb/hr

Hourly Max. = 2.22 x 430,000/625,000
= 1.53 lb/hr

Annual Avg. = 6.93 x 430,000/625,000
= 4.77 tons/year

Increase in Actual Emissions

Hourly Max. = 2.22 - 1.53
= 0.69 lb/hr (max)

Annual Avg. = 6.93 - 4.77
= 2.16 tons/year

V, 4 Control Efficiency Estimates (Reference Emission Estimates in Previous Section)

Fluoride

E_f = (502.3 - 2.22)/502.3 = 99.6%.

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

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

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

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

Contaminant	Rate or Concentration
Fluorides	0.02 lb/ton P_2O_5 input

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

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration
Fluorides	0.02 lb/ton P_2O_5 input

D. Describe the existing control and treatment technology (if any). The "A" and "B" trains are both currently equipped with cross-flow packed scrubbers which have demonstrated compliance with NSPS.

1. Control Device/System:
2. Operating Principles: Absorption, condensation
3. Efficiency:* 99.6% (See V, 4)
4. Capital Costs: $300,000
5. Useful Life: 10 years
6. Operating Costs: Unknown
7. Energy: Unknown-Several interconnected systems
8. Maintenance Cost: $20,000/year
9. Emissions:

Contaminant	Rate or Concentration
Fluorides	$\leq$ 0.02 lb/ton P_2O_5 input

*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. The "A" and "B" trains are presently equipped with cross-flow packed scrubbers which have proved compliance with NSPS and which are of sufficient size to accomodate the proposed modification without alteration. Since these scrubbers are existing, no other control systems were evaluated.

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: (See Section VI, D)

1. Control Device:

2. Efficiency*:

3. Capital Cost:

4. Life:

5. Operating Cost:

6. Energy:

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. The system described is an existing system at

(1) Company: Agrico Chemical Company

(2) Mailing Address: P. O. Box 1969, Bartow, FL 33830

(3) City: South Pierce (4) State: Florida

(5) Environmental Manager: Ed Mayer

(6) Telephone No.: (813) 428-1423

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration
Fluorides	$\leq$ 0.02 lb/ton P_2O_5

(8) Process Rate*: 430,000 TPY

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:

Scrubber system is an existing system

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

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

NOT APPLICABLE FOR FLUORIDES

A. Company Monitored Data

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

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

Other data recorded _____

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

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

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

B. Meteorological Data Used for Air Quality Modeling

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

2. Surface data obtained from (location) _____

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

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

C. Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

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

D. Applicants Maximum Allowable Emission Data

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

E. Emission Data Used in Modeling

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

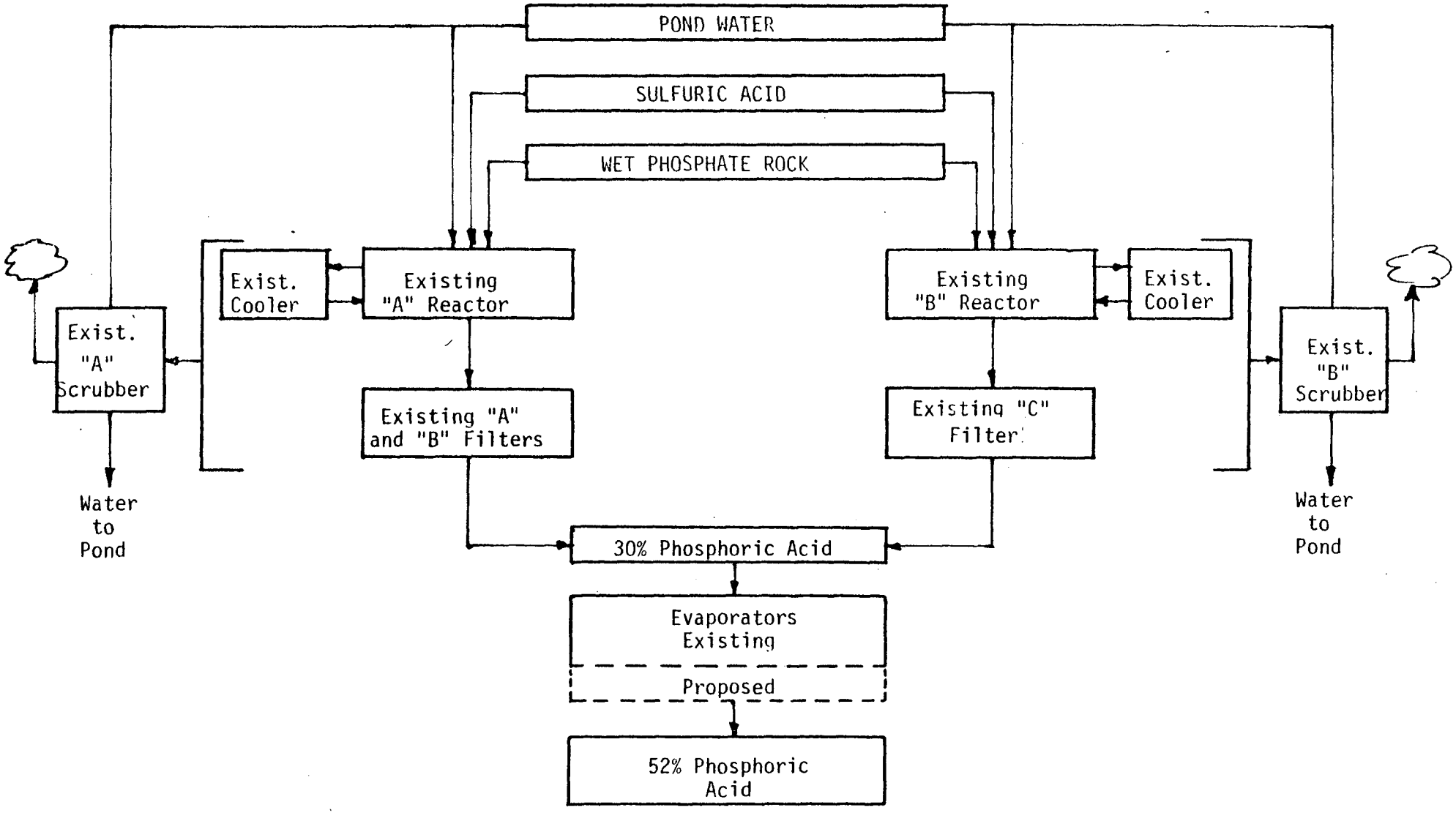
F. Attach all other information supportive to the PSD review.

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

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

SEE ATTACHMENT 4

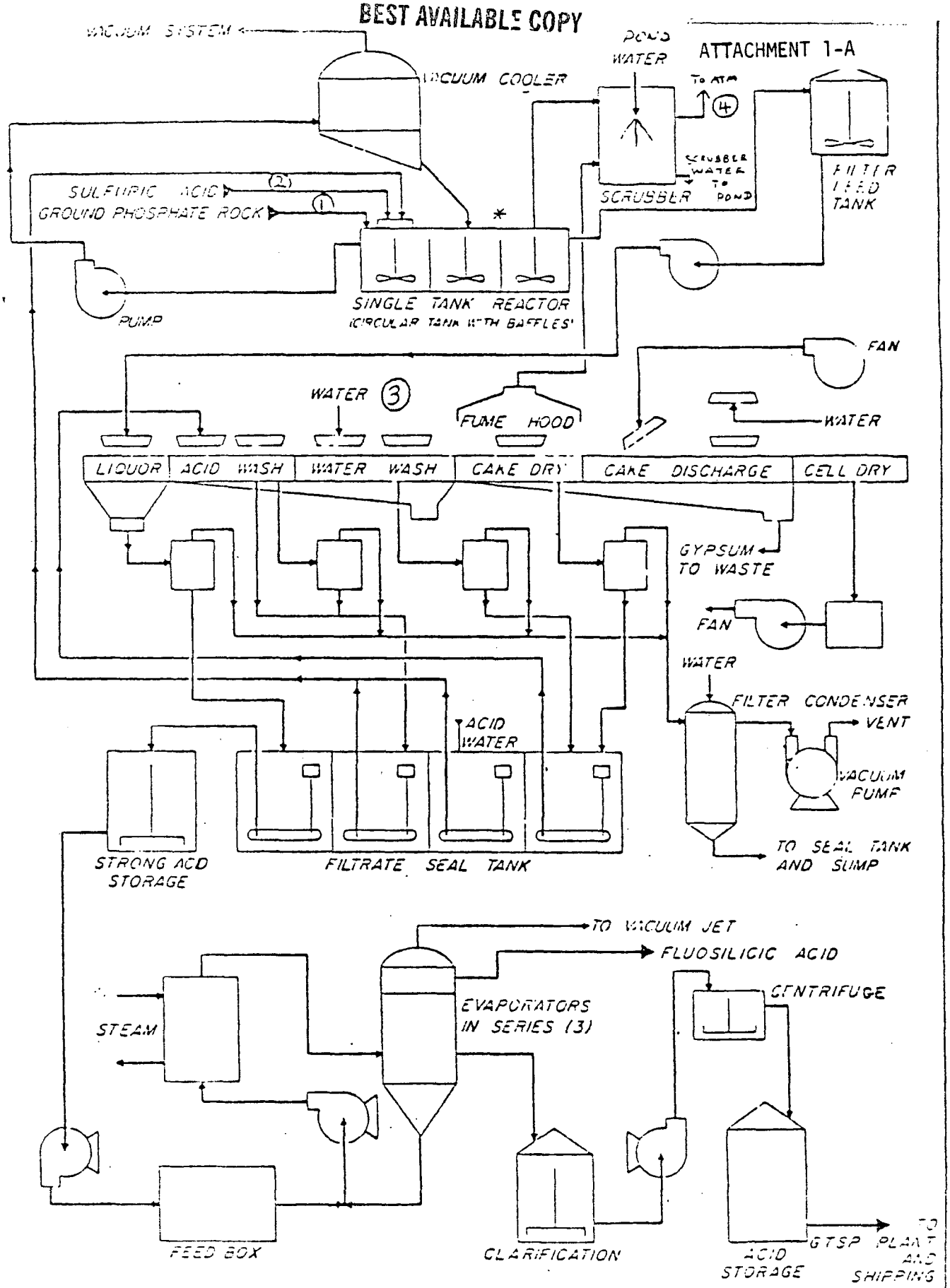
H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.



Flow Diagram of "A" and "B" Phosphoric
Acid Trains Showing Proposed Evaporator Expansion

ATTACHMENT 1

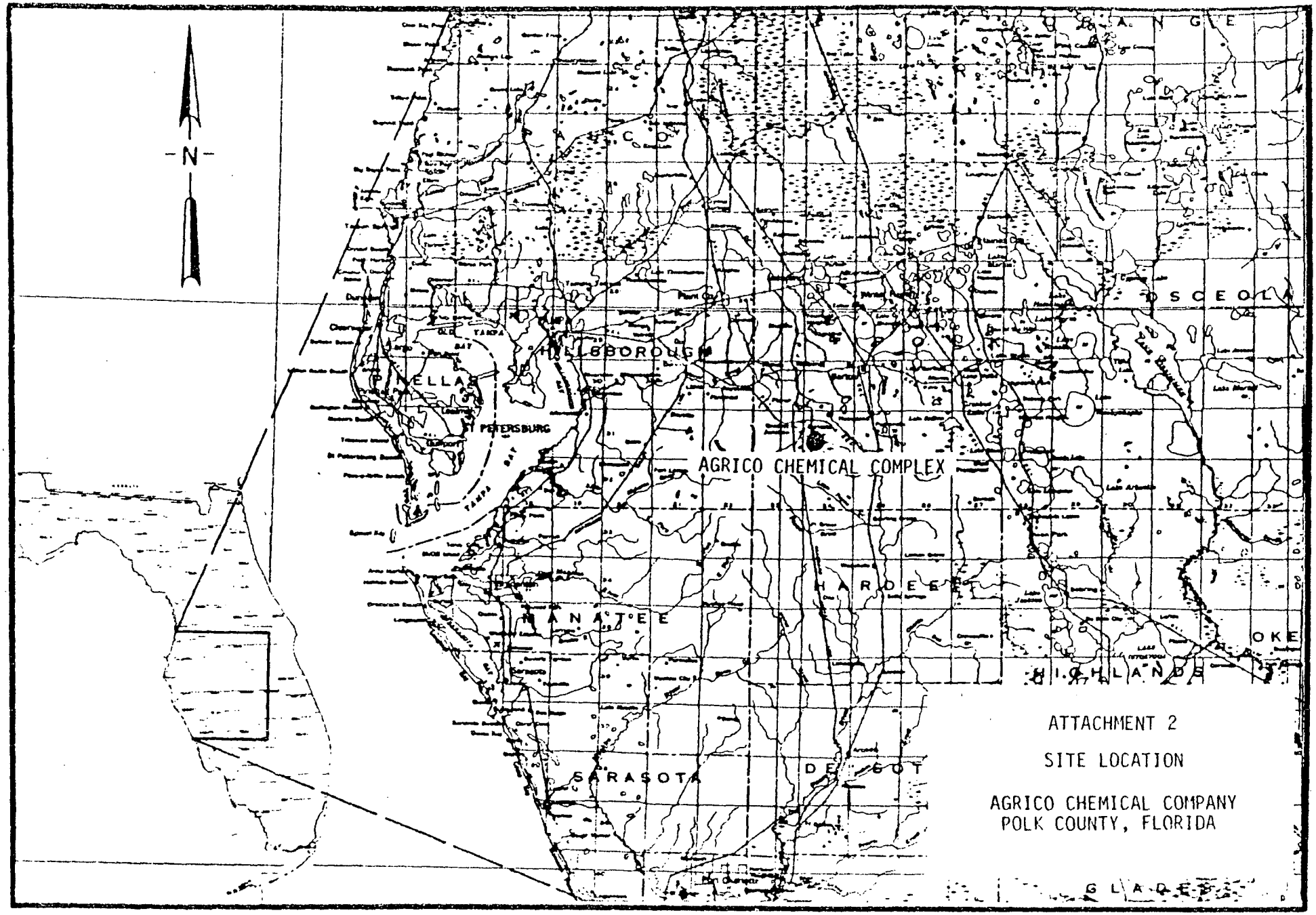
ATTACHMENT 1-A



* EXISTING

PROPOSED

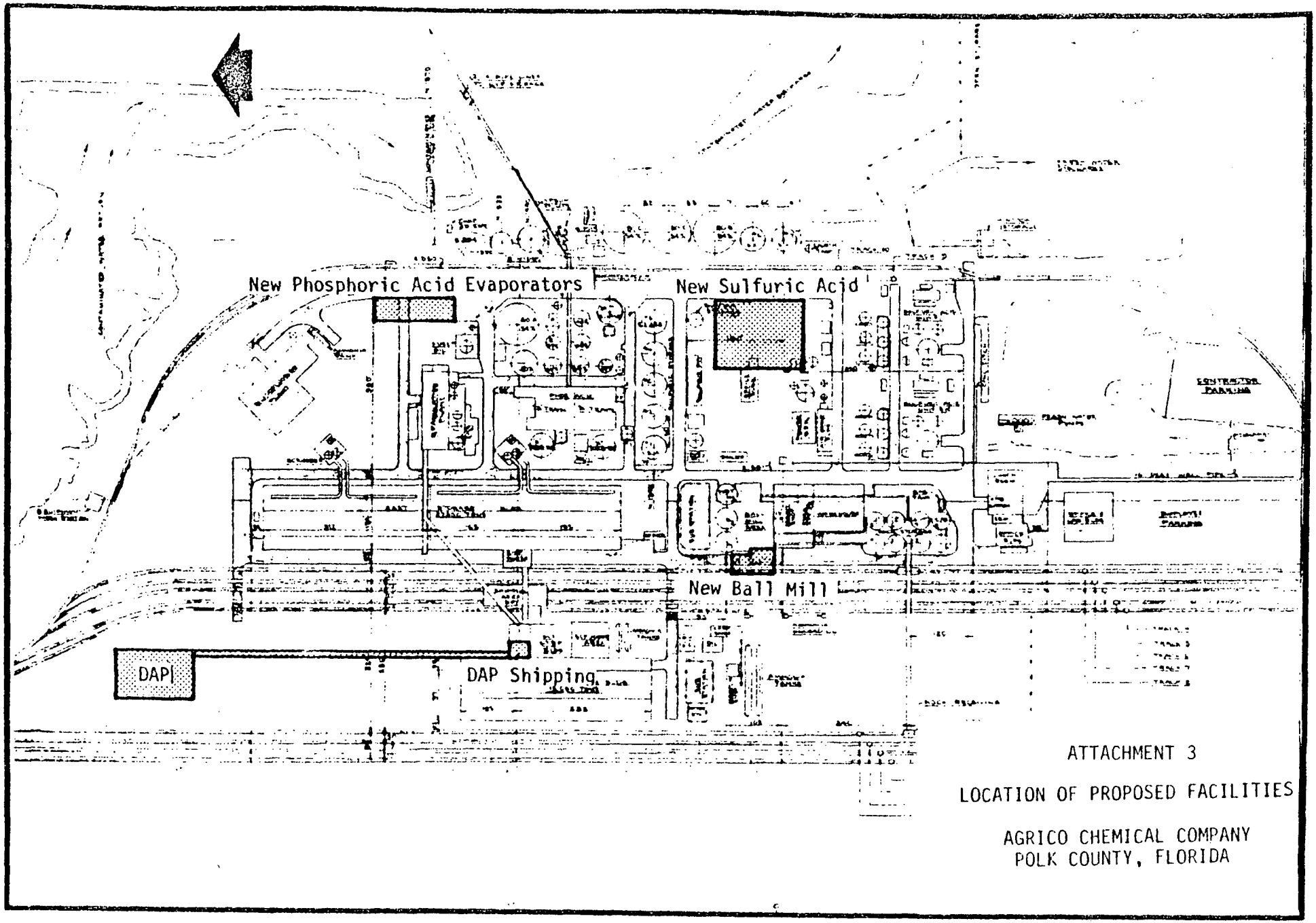
WET PROCESS PHOSPHORIC ACID FLOW SHEET



ATTACHMENT 2

SITE LOCATION

AGRICO CHEMICAL COMPANY
POLK COUNTY, FLORIDA



ATTACHMENT 3

LOCATION OF PROPOSED FACILITIES

AGRICO CHEMICAL COMPANY
POLK COUNTY, FLORIDA

SHOLTES & KOOGLER

6.0 SECONDARY IMPACTS

6.1 Introduction

A qualitative evaluation of the proposed expansion on soils, vegetation, visibility and commercial growth in the area has been prepared.

6.2 Fluorides

The fluoride emissions from the proposed modification are not expected to create any adverse secondary impacts. An Environmental Impact Statement recently submitted for a phosphate fertilizer complex in north Florida (Environmental Impact Statement, Occidental Chemical Company Swift Creek Chemical Complex, Hamilton County, Florida, US EPA, Region IV, Atlanta, Georgia, July 1978) includes a section on the environmental impact of fluoride emissions. In this document it states that no significant impact to cattle, agricultural crops or timber was established (See Appendix 3A-2).

Property for several miles in all directions from Agrico is owned by phosphate interests. The closest non-phosphate company owned property on which there is a fluoride sensitive receptor; citrus, is located four kilometers southeast of Agrico. Agrico has not received any complaints from the grove owner related to emissions from the chemical complex or cooling ponds. This is significant since the point source fluoride emissions rate from the entire chemical complex prior to the program of replacing older plants with latest technology (mid-1977) was about 60 tons per year.

Under the conditions of the proposed expansion the fluoride emission rate from all point sources in the SPCW will decrease to approximately 40 tons per year. Since there will be an overall reduction in fluoride emissions from point sources and since the emissions from the ponds will increase only slightly (approximately five tons per year) it is doubtful that any fluoride related impacts will be observed in the future.