Agrico

ONE OF THE WILLIAMS COMPANIES

October 1, 1985

Mr. C. H. Fancy, P.E.
Bureau of Air Quality Management
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301-8241

Dear Mr. Fancy,

Enclosed please find four copies of an Application To Construct an Air Pollution Source. The purpose of the application is to revise our present prilled sulfur construction permit for South Pierce to meet the requirements of the new Sulfur Rule.

Also enclosed you will find a check for $100.00 and three copies of the Air Quality Assessment. If you have any questions please do not hesitate to contact me at (813) 428-1423.

Sincerely,

Ed Mayer,
Environmental Engineer

Enclosures

cc: Mr. Ed de la Parte, Jr.

EEM/lgm

DER

OCT 04 1985

AQM

Agrico Chemical Company • South Pierce Chemical Works • P. O. Box 1969, Hwy. 630 • Bartow, Florida 33830
(813) 428-1423

50-817
213

477752

Agrico

Agrico Chemical Company
One Williams Center
Tulsa, Oklahoma 74103

No. 477752

General Disbursement Account

CITIBANK (NEW YORK STATE), N.A.
NORTH AMERICAN BANKING GROUP

Date 5-13-85

Pay ********100.00 Dollars

Pay To The Order of STATE OF FLORIDA DEPT OF ENVIRONMENTAL REGULATION
7601 N HIGHWAY 301
TAMPA, FL 33610

Authorized Signatures

⑈477752⑈ ⑆021308176⑆ 30990228⑈

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

No 76094

RECEIPT FOR APPLICATION FEES AND MISCELLANEOUS REVENUE

Received from Agrico Chemical Company Date Sept. 14, 1984

Address One Williams Center Tulsa Okla. Dollars $ 100.00

Applicant Name & Address Agrico Chem. Co. P.O. Box 1967, Parkar FL 33573

Source of Revenue

Revenue Code 461031 Application Number AC 53 111196

By Patricia A. Pitt

DER

OCT 04 1985

BAQM

PATS AC 53-111196

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTHWEST DISTRICT

7601 HIGHWAY 301 NORTH
TAMPA, FLORIDA 33610

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Prilled Sulfur [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [X] Construction [ ] Operation [X] Modification (Re: AC53-55780)

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; Peaking Unit No. 2, Gas Fired) H2S Scrubber

SOURCE LOCATION: Street State Road 630 City N.A.

UTM: East 407.6 Km E North 3071.3 Km N

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

APPLICANT NAME AND TITLE: L. C. Lahman, Plant Manager

APPLICANT ADDRESS: P. O. Box 1969, S.P.C.W, 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

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

Date: 10/1/85 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

[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 William S. Hornbeck

William S. Hornbeck
Name (Please Type)

Agrico Chemical Company
Company Name (Please Type)

P. O. Box 1969, Bartow, FL 33830
Mailing Address (Please Type)

Florida Registration No. 20095 Date: Sept. 25, 1985 Telephone No. 428-1423

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.

Receiving and melting Prilled Sulfur. See Appendix A for process description.

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

Start of Construction See Appendix B Completion of Construction Appendix B

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.)

See Appendix C

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

AC53-55780, the permit was issued on April 20, 1984 and will expire on November 20, 1985. A request for extension is now pending with the D.E.R.

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

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

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

1. Is this source in a non-attainment area for a particular pollutant? No

   a. If yes, has "offset" been applied?

   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. No

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. No

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No

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

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

   a. If yes, for what pollutants?_____

   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.

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		
Standard Sulfur	H2S	0.025 or	168,000	1
Pellets		less		

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

1. Total Process Input Rate (lbs/hr): 168,000

2. Product Weight (lbs/hr): Air formed -167,999.923 Wet Formed - 167,999.976

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	T/yr	
Particulate			*	N.A.			
0.5% Air Form	0.0773	0.31			13608.0	6.8	1,6
2.0% Wet Form	0.0242	0.10			4257.8	2.1	1,6
H2S	0.84	3.36	*	N.A.	336,000	168	

[1]See Section V, Item 2. *See Appendix D

[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)
Water Sprays	Particulate	85%	N.A.	*
Shielded Hopper	Particulate	75% windage	N.A.	*
H2S Scrubber	H2S	98%	N.A.	Design

E. Fuels

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

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

Fuel Analysis:

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ BTU/lb _____ BTU/gal

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

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

Annual Average _____ Maximum _____

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

See Description of Process

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

Stack Height: 50' ft. Stack Diameter: 4.0 ft.

Gas Flow Rate: 26,560 ACFM 23,077 DSCFM Gas Exit Temperature: 150 °F.

Water Vapor Content: 8.5 % Velocity: 35.24 FPS

SECTION IV: INCINERATOR INFORMATION N.A.

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

Description of Waste _____

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

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

Manufacturer _____

Date Constructed _____ Model No. _____

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

Stack Height: _____ ft. Stack Diamter: _____ Stack Temp. _____

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

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

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) _____

Brief description of operating characteristics of control devices: _____

_____

_____

_____

_____

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

_____

_____

_____

_____

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

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

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

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

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

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

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

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

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

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

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

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY N.A.

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

[ ] Yes [ ] No

Contaminant	Rate or Concentration

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

[ ] Yes [ ] No

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration

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

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

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

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

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

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

j. Applicability to manufacturing processes:

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

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

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

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

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION N.A.

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.

APPENDIX A
PROCESS DESCRIPTION
PRILLED SULFUR

The purpose of the project is to construct a handling facility at the existing Agrico South Pierce Plant to receive and transfer prilled sulfur to a new sulfur melting system. The sulfur will be received at a rate of 1800 long tons per day. The facility will process a maximum of 600,000 long tons per year.

Standard sulfur pellets are received in covered hopper railroad cars, or covered hopper trucks, and positioned over the unloading hopper, Item 1, within the unloading shed. The unloading hopper is a below grade small hopper which will receive material from only one hopper section of a railcar at a time so as to minimize the free fall and minimize the hopper area required. This in turn minimizes the amount of fugitive particulate generated by the free fall of material from the hopper car or truck to the unloading hopper. The unloading hopper is equipped with high efficiency water sprays, Item 2, around the periphery, which will collect 85% of the fugitive particulate generated by this free

fall. The spray water will contain a surfactant.

The unloading rate is controlled by the belt feeder, at the bottom of the unloading hopper. Under normal unloading conditions the unloading hopper will be full, and the flow from the hopper car or hopper truck will flow under choked conditions, thereby eliminating the free fall.

The sulfur pellets are transferred from the belt feeder to the unloading belt, Item 4, and conveyed to the 150 ton surge hopper, Item 6. The transfer point of the material to the surge hopper is hooded and equipped with a water spray containing surfactants, Item 5.

The sulfur pellets are metered and conveyed by the feed/transfer screws, Item 7, to one of three sulfur melters, in which the sulfur prills are melted. The resulting molten sulfur flows by gravity to the existing sulfur pit, Item 9. The sulfur melters, Item 8, are completely enclosed, high speed and agitated. The capacity of the melters is 900 long tons per day each, with one of the melters serving as an installed spare. The vent gases from the melter contain steam produced by the vaporization of the water content of the sulfur, a small amount (up to approximately 3,000 ppm) of H_2S and even a smaller amount of sulfur vapor. These off

gases from the melters are collected in a dust system into which heated air is introduced after having been heated by the dilution air pre-heat coil. This heated dilution air prevents the condensation of sulfur vapor in the duct work leading to the vapor scrubber, Item 10.

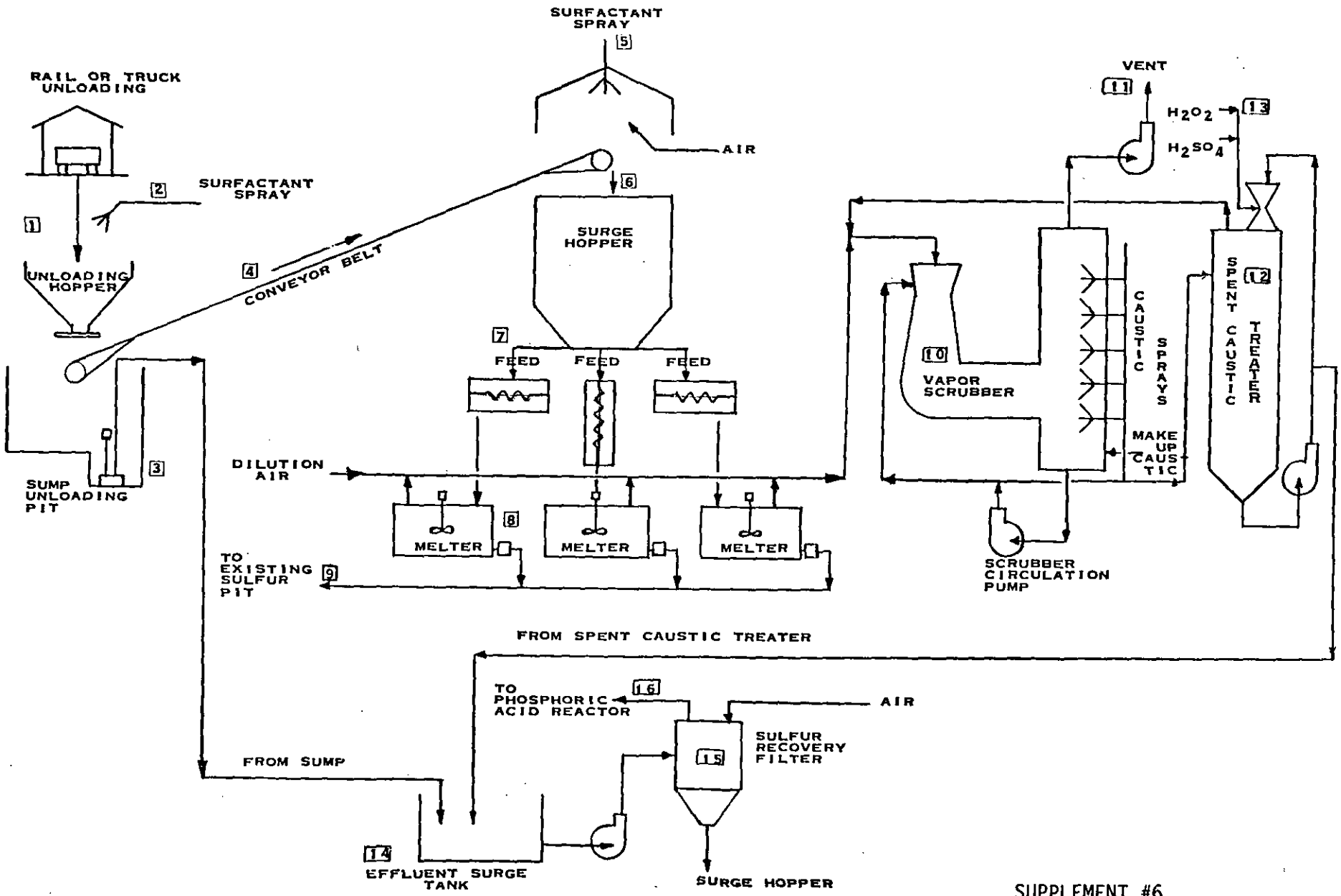
The vapor scrubber system consists of a Venturi spray tower scrubber, the vapor scrubber circulation pumps, and the vapor scrubber fan. The sulfur melter vapors are scrubbed by a circulating solution of sodium hydroxide with the hydrogen sulfide being converted to sodium sulfide. The scrubber system is designed for a 98% removal of hydrogen sulfide and 95% removal of condensed sulfur. An additional purpose of the heated air is to maintain a water balance on the vapor scrubber circulating liquid, that is, a sufficient amount of heat will be added to balance the condensation of water vapor into the scrubbing solution with evaporation of water from this solution.

The volume of circulating solution within the scrubber system is such that this solution will not need to be changed more than once per day. The circulating solution is spent when essentially all of the sodium hydroxide has been converted to sodium sulfide. When this occurs, the nearly spent solution is pumped to the spent caustic treater, Item 12, while the vapor scrubber is in

operation. The scrubber is then refilled with fresh caustic solution back to normal operating level.

The spent caustic is treated on a batch basis by the slow addition of hydrogen peroxide and sulfuric acid into the circulating solution. This converts the sodium sulfide to sodium sulfate and elemental sulfur. Any excess caustic is also neutralized by the addition of sulfuric acid, Item 13.

The effluent from the spent caustic treatment and water spray drainage will all be collected in the effluent surge tank, Item 14. The liquid is then pumped to the sulfur recovery filter, Item 15. Sulfur is removed and the remaining liquid is then consumed in the phosphoric acid plant reactor, Item 16, where it is used as process water. The recovered sulfur is discharged to the surge hopper, Item 6.



SUPPLEMENT #6

PROCESS FLOW DIAGRAM - SULFUR UNLOADING AND MELTING SYSTEM - SOUTH PIERCE CHEMICAL WORKS

PAS-4/85

APPENDIX B

START OF CONSTRUCTION

Construction will commence as soon as the final engineering is completed and if a formal administrative hearing is initiated after the deadline for filing an appeal expires.

COMPLETION OF CONSTRUCTION

April 1, 1988. This is the expiration date for Agrico Permit AC29-5954 (Big Bend Sulfur Terminal).

APPENDIX C

COST OF POLLUTION CONTROL SYSTEMS (ESTIMATE)

Covered Shed for Unloading	$ 85,000
Melter Scrubber	120,000
Caustic Storage	25,000
Water Sprays	75,000
Effluent Piping	35,000
Caustic Piping	20,000
Paving and Sumps	55,000
Sulfur Recovery	75,000
Surfactant Treatment	50,000
Underground Hopper	175,000
TOTAL	$ 715,000

APPENDIX D

ALLOWED EMISSION RATE PER RULE 17-2. Florida Administrative Code Rules 17-2.600 (11)(b), 17-2.610 (2), 17-2.610 (3), and 17-2.620 (2).

The proposed installation has the potential to emit unconfined sulfur particulate matter and hydrogen sulfide. The only emission limiting standard applicable to unconfined sulfur particulate emissions are FAC Rules 17-2.600 (11)(b), 17-2.610 (2), and 17-2.610 (3). The only emission limiting standard applicable to hydrogen sulfide emissions is FAC Rules 17-2.620 (2).

DERIVATION OF PROCESS INPUT WEIGHT MINUS TOTAL PRODUCT WEIGHT

FOR AIR FORMED PRILL

168,000 lb/hr input - 0.077 lb/hr dust emission

= 167,999.923 lb/hr. product to melter.

FOR WET FORMED PRILL

168,000 lb/hr input - 0.024 lb/hr dust emissions

= 167,999.976 lb/hr. product to melter.

Supplement #1

LOCATION OF PARTICULATE EMISSION SOURCES

POINT 1

Car Unloading Hopper

1. From point of release to midway in hopper is 5 feet.
2. Wind - 2 MPH based upon 8 MPH Avg. x 75% control factor for enclosure.
3. Spray efficiency with surfactant - 85%.

POINT 2

Transfer from hopper belt to conveyor belt.

1. Underground drop of 2 feet from one belt to another.
2. Underground transfer - wind 1 MPH (or less).

POINT 3

1. Conveyor belt into 150 T surge hopper. Midway distance is 15 feet.
2. Wind - 2 MPH based upon 8 MPH Avg. x 75% control factor for enclosure.
3. Spray efficiency with surfactant - 85%.

ASSUMPTIONS AND REFERENCES

The following document contains information on the average moisture and silt content of standard sulfur pellets:

> Technical Supplement to Comments and Testimony on Florida Department of Environmental Regulation Draft Sulfur Report, Volume IV, Occidental Chemical Agricultural Products, Inc., October, 1984.

1. Silt Content

Table 1, Page 7 lists the silt content of various forms of sulfur. For a conservative estimate of emissions we will use higher values.

	TABLE I	AGRICO
Air Formed Prills	0.7	1.0
Wet Formed Prills	2.0	5.0

2. Moisture

For the purpose of emission calculations, Agrico will utilize the moisture content of 2 and 0.5 percent for wet and dry formed prills respectively.

3. Water Sprays

A collection efficiency of 85% will be assigned to the Points 1 and 3 water spray system. The water in the sprays will utilize a surfactant. Wind screens at Points 1 and 3 will be assigned a control efficiency of 75%.

References: NCASI, "Fugitive Dust Emission Factors and Control Methods Important to Forest Products Industry Manufacturing Products", Technical Bulletin No. 424. (1984)

Edwin L. Currier, Barry D. Neal, "Fugitive Emissions from Coal-Fired Power Plants", paper presented at the 72nd Annual Meeting of APCA. (1979)

Peter W. Kalika, Pietro Catizone, "Fugitive Emissions Concerns for Coal Storage and Handling at Utility Operation Stations", Fourth Symposium on Fugitive Emissions Measurement and Control. (1980)

EMISSION ESTIMATE EQUATION

From Section 11.2.3.3, Predictive Emission Factor Equations, Supplement No. 14, AP42.

$$E = K\ (0.0018)\ \frac{\left(\frac{S}{5}\right)\ \left(\frac{U}{5}\right)\ \left(\frac{H}{10}\right)}{(M/2)^2} \qquad \text{(LB/TON)}$$

Where:
- E = Emission Factor
- K = Particle Size Multiplier
- S = Material Silt Content, %
- U = Mean Wind Speed, (MPH)
- H = Drop Height, (FT.)
- M = Material Moisture Content (%)

INPUTS FOR PREDICTIVE EMISSION FACTOR EQUATION

The following chart indicates the inputs used to calculate the emission factors for the controlled particulate emissions. A K factor of 1 will be assumed to provide a conservative estimate.

LOCATION	K	S	U	H	M	SPRAY EFFICIENCY w/SURFACTANT	E LB/TON
AIR FORMED PRILLS							
Point 1	1	1	2	5	0.5	85%	0.000173
Point 2	1	1	1	2	0.5	0%	0.000230
Point 3	1	1	2	15	0.5	85%	0.000518
WET FORMED PRILLS							
Point 1	1	5	2	5	2	85%	0.0000540
Point 2	1	5	1	2	2	0%	0.0000720
Point 3	1	5	2	15	2	85%	0.000162

PARTICULATE EMISSION SUMMARY

The following chart is a summary of the particulate emission calculations. The hourly process rate used for the calculations was 84 TPH. A yearly process rate of 672,000 TPY was used.

LOCATION	EMISSION RATE LB/TON	HOURLY EMISSIONS-LBS	YEARLY EMISSIONS-LBS	YEARLY EMISSIONS-TONS
AIR FORMED				
Point 1	0.000173	0.0145	116.26	
Point 2	0.000230	0.0193	154.56	
Point 3	0.000518	0.0435	348.10	
TOTAL		0.0773	618.92	0.31
WET FORMED				
Point 1	0.0000540	0.00454	36.3	
Point 2	0.0000720	0.00605	48.4	
Point 3	0.000162	0.0136	108.9	
TOTAL		0.0242	193.6	0.10

SUPPLEMENTS #2,3 & 5

SUMMARY OF POTENTIAL PARTICULATE EMISSION CALCULATIONS

In the following chart all emission rates have been recalculated utilizing an 8 MPH wind speed to remove the effects of a wind screen. Also, the surfactant water spray efficiency was removed at Points 1 and 3.

LOCATION	EMISSION RATE LB/TON	YEARLY EMISSIONS-LBS	YEARLY EMISSIONS-TONS
AIR FORMED			
Point 1	0.00461	3097.9	
Point 2	0.00184	1236.5	
Point 3	0.0138	9273.6	
TOTAL		13,608.0	6.8
WET FORMED			
Point 1	0.00144	967.7	
Point 2	0.000576	387.1	
Point 3	0.00432	2903.0	
TOTAL		4257.8	2.1

SUPPLEMENTS #2,3 & 5.

CONTROL OF HYDROGEN SULFIDES

Technical data obtained from the Sulfur Development Institute of Canada shows that 25-50 PPM of H_2S could normally be released during the melting of prilled sulfur. For a conservative case the scrubber will be designed to remove 250 PPM H_2S.

The maximum throughput of the three melters is 1800 LTPD. The uncontrolled emission rate would be:

$$1800 \frac{\text{L Ton}}{\text{Day}} \times .00025 \frac{\text{L Ton } H_2S}{\text{L Ton}} \times \frac{1 \text{ Day}}{24 \text{ hrs.}} \times \frac{2240 \text{ Lb}}{1 \text{ L Ton}} = \frac{42 \text{ Lbs } H_2S}{\text{Hr.}}$$

The scrubber will be designed (per Jacobs) for 98% efficiency.

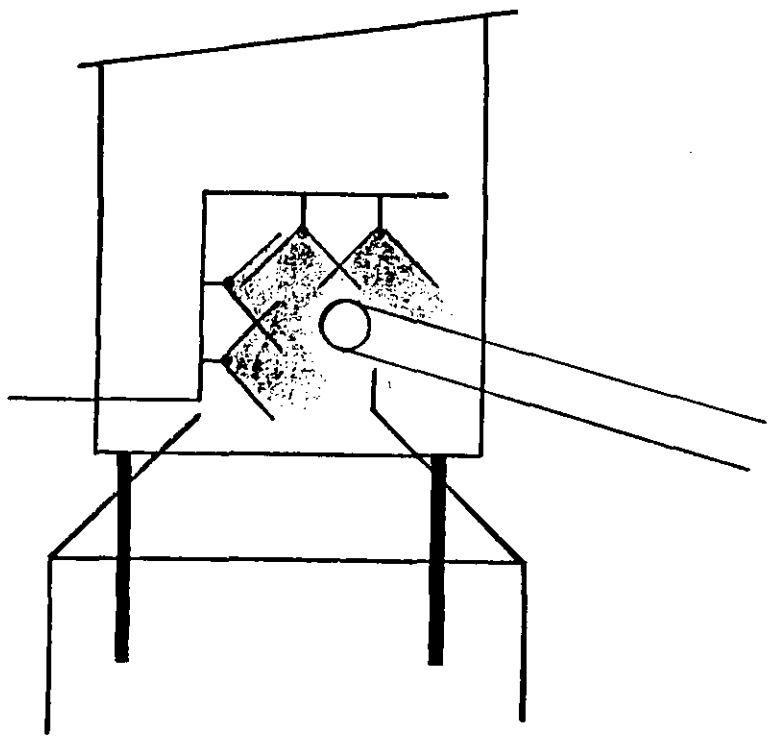
Yearly emissions rate:

$$600{,}000 \frac{\text{L Ton}}{\text{Yr.}} \times .00025 \frac{\text{L Ton } H_2S}{\text{L Ton}} \times .02 \times 1.12 \frac{\text{Ton}}{\text{L Ton}} = \frac{3.36 \text{ Tons } H_2S}{\text{Yr.}}$$

Hourly emission rate:

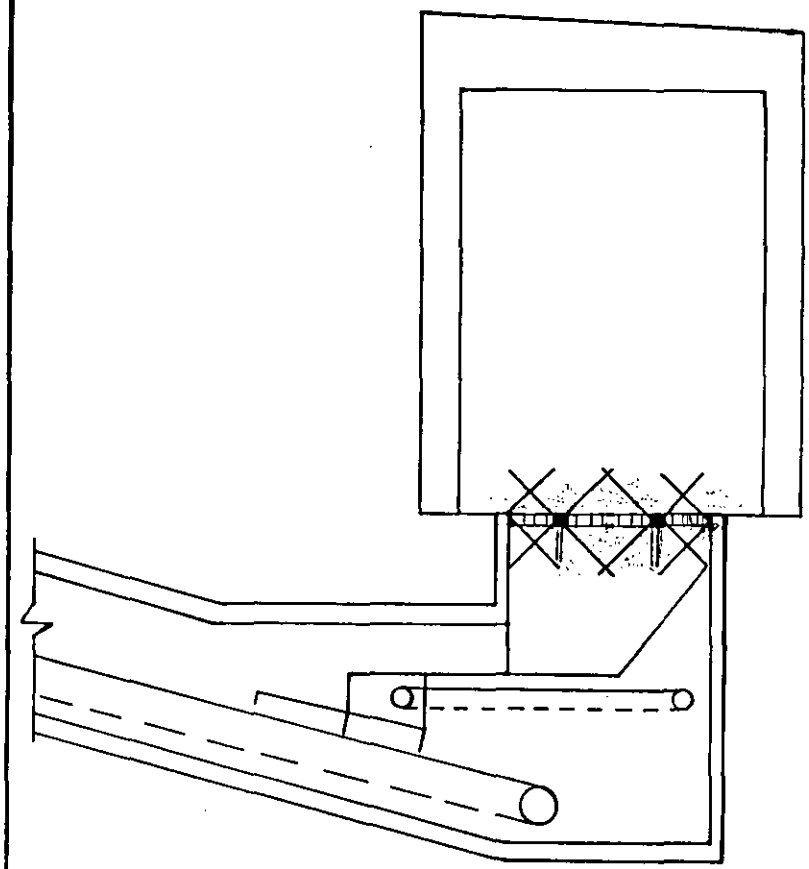
$$42 \frac{\text{Lb } H_2S}{\text{Hr.}} \times .02 = .84 \frac{\text{Lb } H_2S}{\text{Hr.}}$$

NOTE: All yearly calculations are based upon 600,000 L Ton/Yr.
All hourly calculations are based upon 1800 L Ton/Day.



4 FOG SPRAY NOZZLES, 1/8" , 0.28 GPM EACH
AT 40 PSI, 90 DEGREE OR EQUIVALENT.
SURFACTANT ADDED TO WATER.

SURGE HOPPER - WATER SPRAYS



23 SPRAYING SYSTEM NOZZLES
MODEL 1/8 G 1.5 OR EQUAL
SURFACTANT ADDED TO WATER.

UNLOADING HOPPER - WATER SPRAYS

SUPPLEMENT #4

1.0 SCOPE

This specification defines requirements for scrubber system consisting of a Venturi scrubber and a void spray tower with an entrainment separator.

2.0 OPERATING CONDITIONS

2.1 The scrubber unit will be installed outdoors and will operate at a temperature ranging from 100°F to 200°F.

2.2 The scrubber will normally operate 24 hours per day, seven days per week.

2.3 The scrubber will serve a sulfur melting system through a system of ducts. The equipment served will be three sulfur melters. Before entering the scrubber system, the mixture of air and steam leaving the melters will be diluted with hot air to avoid mist formation.

2.4 The following normal operating conditions shall apply at the inlet to the scrubber system:

Gas Composition:	
Air	90,000 lb/h
Water Vapor	8,351 lb/h
Sulfur	4 lb/hr max.
Hydrogen Sulfide	42 lb/hr max.
TOTAL	98,397 lb/hr
Temperature:	150°F
Pressure:	-0.25" WC
Density:	0.0617 lb/ft^3
Volume:	26,560 ACFM
Scrubbing Liquid:	15% solution of sodium hydroxide in water by weight.

3.0 DESIGN REQUIREMENTS

3.1 The unit shall be constructed of fiberglass reinforced plastic.

3.2 Inspection doors shall be provided.

3.3 Estimated total resistance for the scrubber unit is 22" W.G.

SUPPLEMENT #4

4.0 PERFORMANCE GUARANTEE

The vendor shall guarantee that emissions from the scrubber unit will not exceed 2% of inlet loading of Hydrogen Sulfide.

5.0 MATERIALS AND SERVICES FURNISHED BY OTHERS

5.1 Stairways and platforms

5.2 Motor starters and wiring

5.3 Piping external to the scrubber

5.4 Ductwork interfacing with the scrubber

5.5 Instrumentation

5.6 Makeup water

6.0 PAINTING

Painting to be in accordance with Specification No. . Surface preparation Painting to be in accordance with SP-6-63.

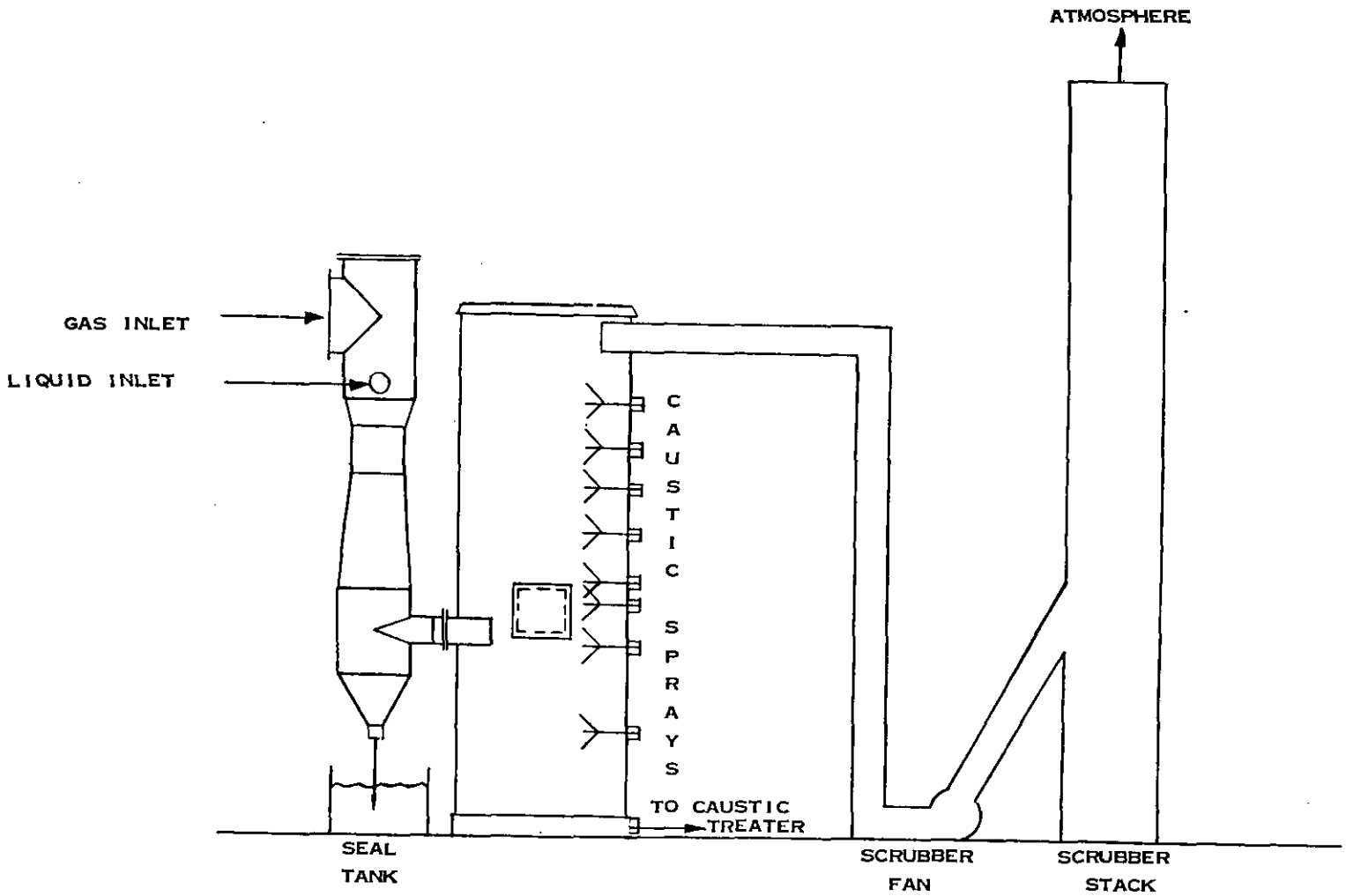
7.0 SHIPPING

The related equipment shall be shop assembled to the greatest degree consistent with a reasonable economical balance between shipping cost, field assembly labor cost, and good practice relating to machinery damage in transit.

8.0 NAMEPLATE

A stainless steel nameplate shall be permanently attached to the equipment showing the following information:

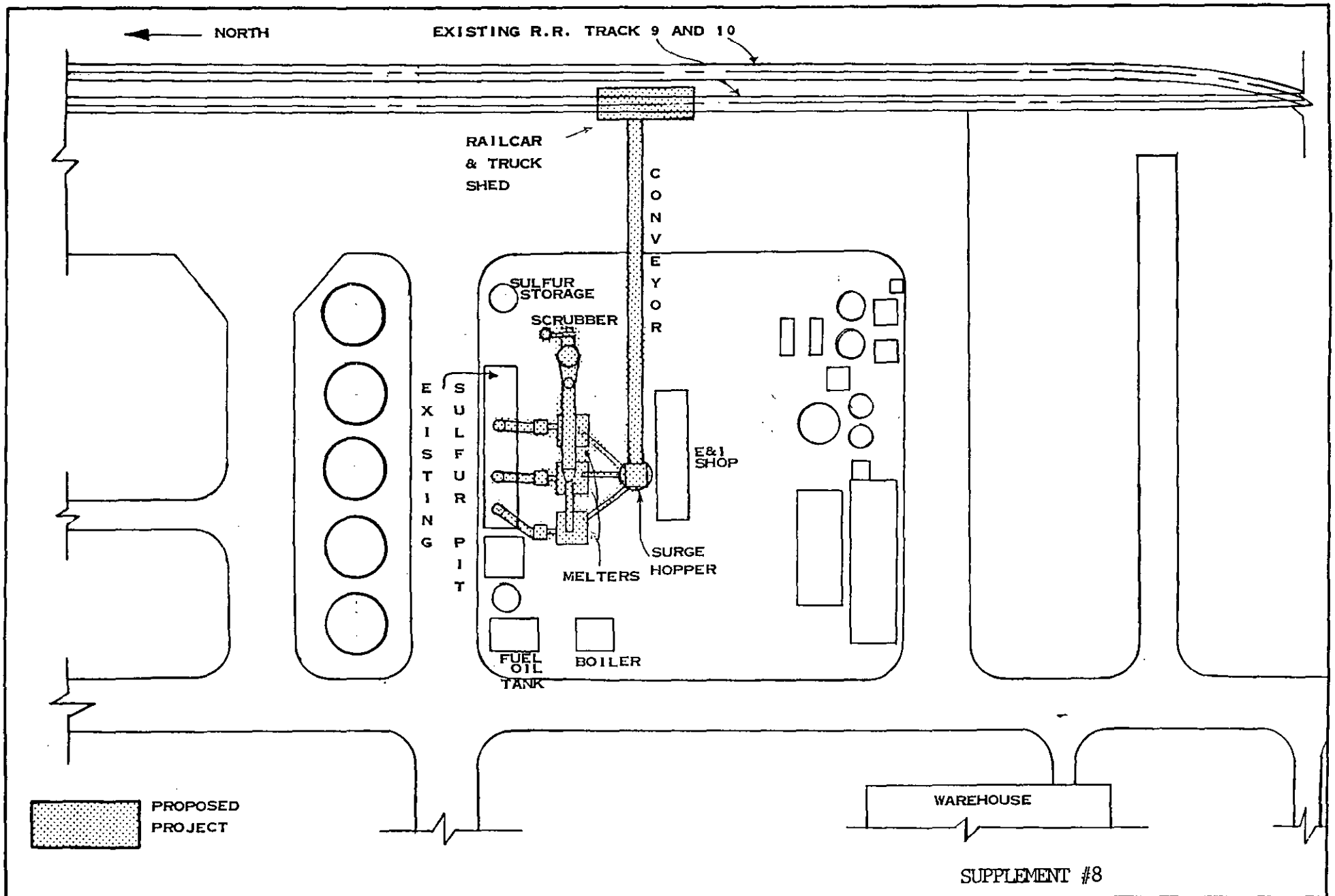
Equipment Description
Equipment Model and Serial Numbers
Equipment Item Numbers



SUPPLEMENT #4

VENTURI FUME SCRUBBER AND STACK - SOUTH PIERCE CHEMICAL WORKS

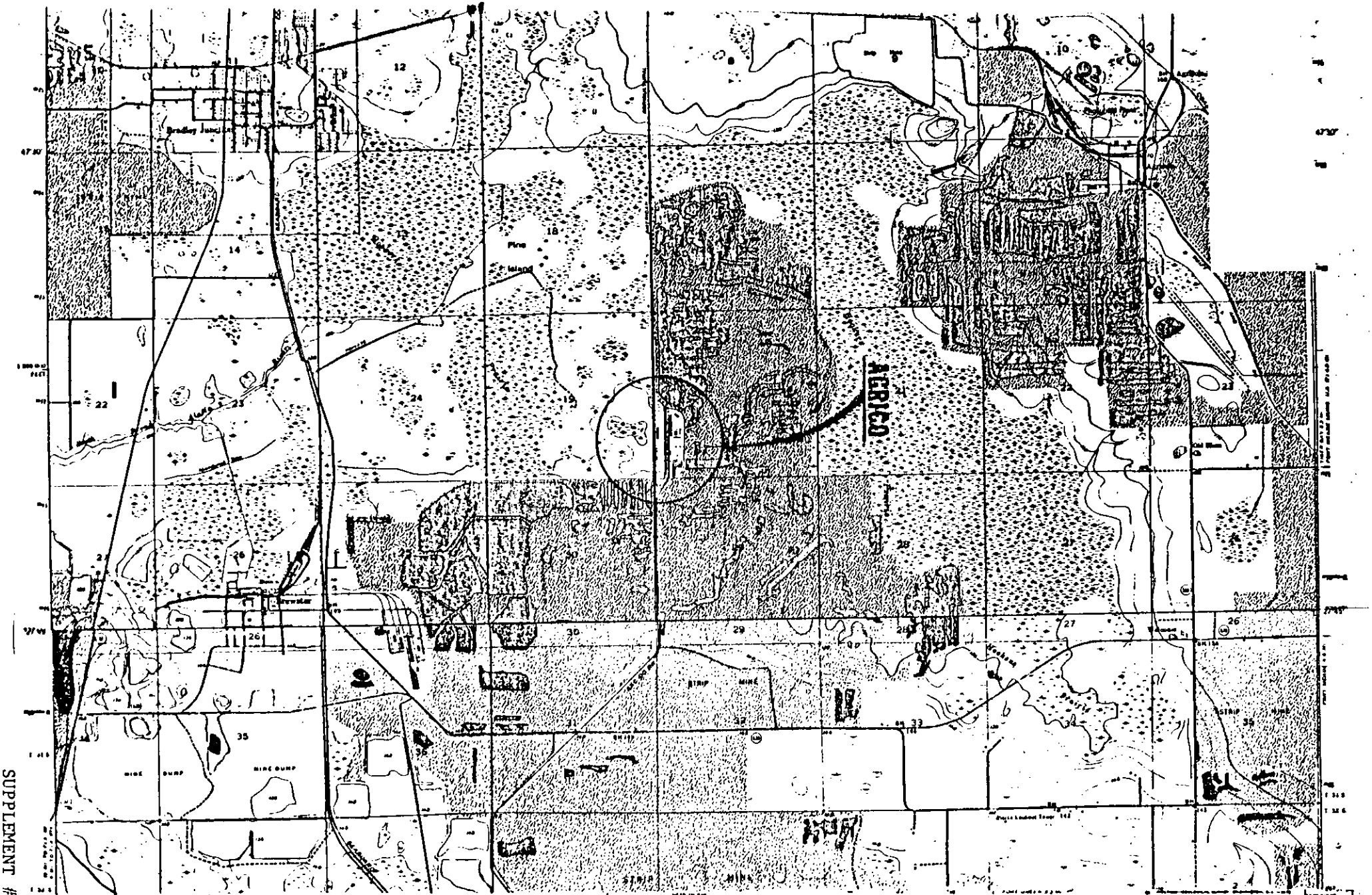
PAS 4/85



SUPPLEMENT #8

LOCATION PLAN - PRILLED SULFUR HANDLING FACILITY - SOUTH PIERCE CHEMICAL WORKS

PAS 4/85



Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and Florida Geodetic Survey

Culture and drainage in part compiled from aerial photographs taken 1951, 1952. Topography by photogrammetric methods 1955

Polyconic projection. 1927 North American datum
10,000-foot grid based on Florida coordinate system, east zone

1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Revisions shown in purple compiled from aerial photographs taken 1972. This information not field checked

SCALE 1:24,000

CONTOUR INTERVAL 5 FEET
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, WASHINGTON, D.C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION

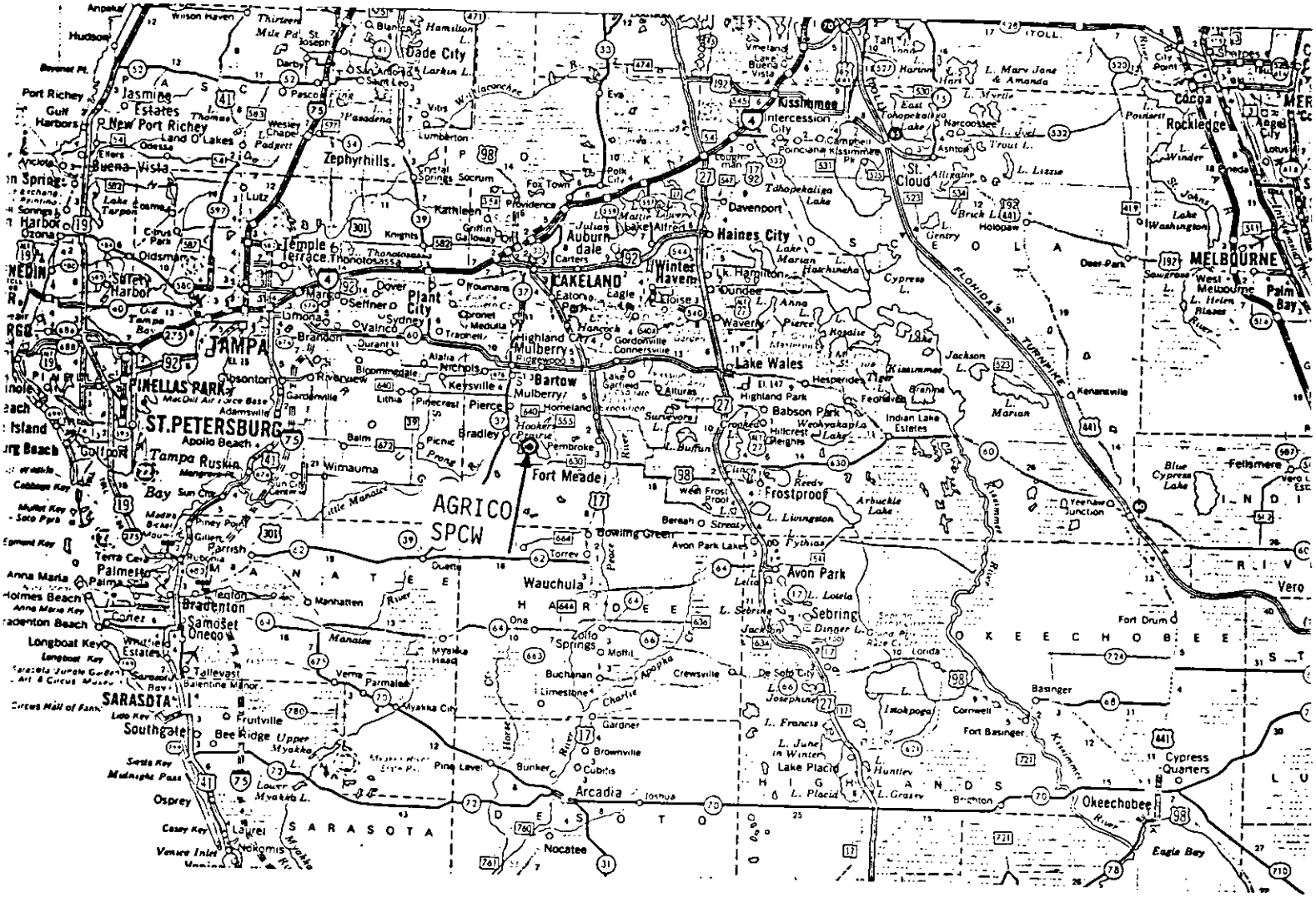
Heavy duty ——— Light duty ———
Medium duty ——— Unimproved dirt .....
U.S. Route ◯ State Route

BAIRD, FLA.
N2737.5—W8152.5/7.5

1959
PHOTOREVISED 1972
AMS 6836 III SW—SERIES V842

SUPPLEMENT # 7

LOCATION MAP
AGRICO CHEMICAL COMPANY
SOUTH PIERCE CHEMICAL WORKS



Scale: One inch: approximately 17.5 miles

miles: 0 5 10 15 20 30 40

inches: 0 1 2