Gypsum Storage Area

Fresh Water Pond

Contaminated Water Pond

N

(1) Proposed Sulfur Melting Area

(2) Proposed Sulfur Unloading Area

Location of Hi-Vol Sampler

Location of Modified Nipher Gauge

ISU	DATE	DESCRIPTION	BY	CKD	APD
2	2-54	UPDATED (ADDED MAP/DAY)			
1	5-67	UPDATES			

Agrico Chemical Company

COMPLEX PLOT PLAN
SOUTH PIERCE, FLORIDA
SOUTH PIERCE CHEMICAL WORKS

DRAWN NUTT DATE 3-20-78
APPROVED DATE
SCALE 1"=

DWG. NO. 35 21 02

SCALES FOR MICROFILMED DRAWINGS

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

February 6, 1986

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. L. C. Lahman
Plant Manager
Agrico Chemical Company
South Pierce Chemical Works
Post Office Box 1969
Bartow, Florida 33830

Dear Mr. Lahman:

Attached is one copy of the Technical Evaluation and Preliminary Determination, and proposed permit to construct a sulfur pellet handling and melting facility at the South Pierce Chemical Works in Bartow, Polk County, Florida.

Before final action can be taken on your permit, you are required by Florida Administrative Code Rule 17-103.150 to publish the attached Notice of Proposed Agency Action in the legal advertising section of a newspaper of general circulation in Polk County no later than fourteen days after receipt of this letter. The DER Bureau of Air Quality Management must be provided with proof of publication within seven days of the date the notice is published. Failure to publish the notice may be grounds for denial of the permit.

Please submit, in writing, any comments which you wish to have considered concerning the department's proposed action to Mr. Bill Thomas of the Bureau of Air Quality Management.

Sincerely,

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa
Attachments
cc: William S. Hornbeck, P.E.
Edward de la Parte
Bill Thomas

P 408 533 738

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Mr. L. C. Lahman	
Street and No.	
P.O., State and ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 2/6/86	

PS Form 3800, Feb. 1982

PS Form 3811, July 1983

SENDER: Complete items 1, 2, 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☐ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:
Mr. L. C. Lahman
Agrico Chemical Company
Post Office Box 1969
Bartow, Florida 33830

4. Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Article Number
P 408 533 738

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X

7. Date of Delivery
2-11-86

8. Addressee's Address *(ONLY if requested and fee paid)*

DOMESTIC RETURN RECEIPT

State of Florida
Department of Environmental Regulation
Notice of Proposed Agency Action
on Permit Application

The Department of Environmental Regulation gives notice of its intent to issue a permit to Agrico Chemical Company to construct a sulfur pellet handling and melting facility at their existing South Pierce Chemical Works in Bartow, Polk County, Florida. A determination of best available control technology (BACT) was not required.

Persons whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must conform to the requirements of Chapters 17-103 and 28-5, Florida Administrative Code, and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32301, within fourteen (14) days of publication of this notice. Failure to file a request for hearing within this time period constitutes a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, persons who may not wish to file a petition may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Model Rule 28-5.207, Florida Administrative Code, at least five (5) days before the final hearing and be filed with the hearing officer if one has been assigned at the Division of Administrative Hearings, Department of Administration, 2009, Apalachee Parkway, Tallahassee, Florida 32301. If no hearing officer has been assigned, the petition is to be filed with the department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32301. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, Florida Statutes.

The application is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Dept. of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

Dept. of Environmental Regulation
Southwest District
7601 Highway 301 North
Tampa, Florida 33610

Any person may send written comments on the proposed action to Mr. Bill Thomas at the department's Tallahassee address. All comments mailed within 30 days of the publication of this notice will be considered in the department's final determination.

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

In the Matter of Application for Permit by:	)	
Agrico Chemical Company Post Office Box 1969 Bartow, Florida 33830	)	DER File No. AC 53-111196

INTENT TO ISSUE

The Department of Environmental Regulation hereby gives notice of its Intent to Issue, and proposed order of issuance for, a permit pursuant to Chapter 403, Florida Statutes, for the proposed project as detailed in the application specified above. The Department is issuing this Intent to Issue for the reasons stated in the attached Technical Evaluation and Preliminary Determination.

The applicant, Agrico Chemical Company, applied on October 1, 1985, to the Department of Environmental Regulation for a permit to construct a sulfur pellet handling and melting facility at their South Pierce Chemical Works in Bartow, Polk County, Florida.

The Department has permitting jurisdiction under Chapter 403, Florida Statutes and Florida Administrative Code Rules 17-2 and 17-4. The project is not exempt from permitting procedures. The applicant was officially notified by the Department that an air construction permit was required for the proposed work.

This intent to issue shall be placed before the Secretary for final action unless an appropriate petition for a hearing pursuant to the provisions of Section 120.57, Florida Statutes, is filed within fourteen (14) days from receipt of this letter or

publication of the public notice (copy attached) required pursuant to Rule 17-103.150, Florida Administrative Code, whichever occurs first. The petition must comply with the requirements of Section 17-103.155 and Rule 28-5.201, Florida Administrative Code (copy attached) and be filed pursuant to Rule 17-103.155(1) in the Office of General Counsel of the Department of Environmental Regulation at 2600 Blair Stone Road, Tallahassee, Florida 32301.

Petitions which are not filed in accordance with the above provisions are subject to dismissal by the Department. In the event a formal hearing is conducted pursuant to Section 120.57(1), all parties shall have an opportunity to respond, to present evidence and argument on all issues involved, to conduct cross-examination of witnesses and submit rebuttal evidence, to submit proposed findings of facts and orders, to file exceptions to any order or hearing officer's recommended order, and to be represented by counsel. If an informal hearing is requested, the agency, in accordance with its rules of procedure, will provide affected persons or parties or their counsel an opportunity, at a convenient time and place, to present to the agency or hearing officer, written or oral evidence in opposition to the agency's action or refusal to act, or a written statement challenging the grounds upon which the agency has chosen to justify its action or inaction, pursuant to Section 120.57(2), Florida Statutes.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, persons who may not wish to file a petition, may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Model Rule 28-5.207 at least five (5) days before the final hearing and be filed with the hearing officer if one has been assigned at the Division of

Administrative Hearings, 2009 Apalachee Parkway, Tallahassee, Florida 32301. If no hearing officer has been assigned, the petition is to be filed with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32301. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, Florida Statutes.

Executed the 6th day of February, 1986, in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

Copies furnished to:

Mr. L. C. Lahman
Mr. William S. Hornbeck, P.E.
Mr. Edward de la Parte, Jr.
Mr. Bill Thomas

CERTIFICATION

This is to certify that the foregoing Intent to Issue and all copies were mailed before the close of business on Feb. 6, 1986.

For C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management
2600 Blair Stone Road
Tallahassee, Florida 32301

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to §120.52(9), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Patricia G. Adams — Clerk
Feb. 6, 1986 — Date

RULES OF THE ADMINISTRATIVE COMMISSION
MODEL RULES OF PROCEDURE
CHAPTER 28-5
DECISIONS DETERMINING SUBSTANTIAL INTERESTS

28-5.15 Requests for Formal and Informal Proceedings

(1) Requests for proceedings shall be made by petition to the agency involved. Each petition shall be printed typewritten or otherwise duplicated in legible form on white paper of standard legal size. Unless printed, the impression shall be on one side of the paper only and lines shall be double spaced and indented.

(2) All petitions filed under these rules should contain:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name and address of the petitioner or petitioners;

(c) All disputed issues of material fact. If there are none, the petition must so indicate;

(d) A concise statement of the ultimate facts alleged, and the rules, regulations and constitutional provisions which entitle the petitioner to relief;

(e) A statement summarizing any informal action taken to resolve the issues, and the results of that action;

(f) A demand for the relief to which the petitioner deems himself entitled; and

(g) Such other information which the petitioner contends is material.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

September 2, 1986

Mr. Phillip A. Steadham
Agrico Chemical Company
Post Office Box 1969
Bartow, Florida 33830

Dear Mr. Steadham:

Re: Permit No. AC 53-111196, Sulfur Pellet Handling and Melting Facility, Specific Condition No. 10

The department has received and reviewed your letter of August 5, 1986.

Your sulfur monitoring plan is acceptable to the department. However, 90 days prior to the commencement date of the monitoring network, the department shall be notified of the monitoring equipment chosen (part C of your letter) and the commencement date.

If you have any questions, please call Pradeep Raval at (904)488-1344 or write to me at the above address.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/PR/s

cc: H. Long
V. Snow
B. Thomas

DER

AUG 8 1986

BAQM

Agrico

ONE OF THE WILLIAMS COMPANIES

August 5, 1986

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

RE: PERMIT NO. AC53-111196, SULFUR PELLET HANDLING AND MELTING FACILITY, SPECIFIC CONDITION NO. 10: AMBIENT AIR AND DEPOSITION MONITORING PLAN

Dear Mr. Fancy:

In response to your letter of July 22, 1986 requesting additional information on the above referenced subject, I submit the following:

A) MONITORING PLAN OBJECTIVE

To comply with F.D.E.R. Permit No. AC53-111196, Specific Condition No. 10, which requires a Sulfur Deposition and an Ambient Air Monitoring Plan to be submitted within 90 days of issuance of the subject permit.

B) MONITORING SITE SELECTION CRITERIA

The monitoring sites were selected based on the consideration of several factors:

1. All stations have a free exposure from local pollution sources and interference from buildings and other high objects.

2. All sites are accessible, yet are located in a secure area to assure freedom from tampering. The southwest and southeast stations are located within a five-foot chain link fence. The north station is about 2000 feet from the nearest plant activities in a remote area.

3. All sites are at least 100 meters away from the source of sulfur particulate.

4. The Hi-Vol sampler site was chosen because of a nearby electrical power source.

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

B) [Continued]

5. The stations were chosen so that they would be influenced by the three most predominant wind directions as indicated by the attached wind rose for Lakeland, Florida (1974).

C) MONITORING EQUIPMENT DESCRIPTION

As yet, no equipment has been purchased for implementing the monitoring plan. We anticipate using modified Nipher Gauges and Hi-Vol samplers. We will provide a description of the equipment once available and prior to commencement of the monitoring program.

D) METHOD OF MONITORING EVALUATION AND ITS FREQUENCY

Method of monitoring evaluation and frequency will be in accordance with Chapter 17-2.753, F.A.C.

E) QUALITY ASSURANCE MEASURES

Test method, sampling, laboratory procedure, and calculations and recordkeeping will be performed in accordance with DER Reference Method for Monitoring the Deposition of Sulfur Particulate, Chapter 17-2.753, F.A.C.

F) FREQUENCY OF MONITORING REPORT SUBMISSION

Monitoring reports will be submitted quarterly.

G) MONITORING NETWORK COMMENCEMENT DATE

Approximately four to five months before completion of construction and before receipt or handling of prilled sulfur, monitoring plan will begin for purposes of determining background amounts of particulate sulfur.

Monitoring will continue as required by the permit.

This completes the topics for which you requested additional information in evaluating our ambient air and sulfur deposition monitoring plan.

Should you have any other questions, please contact me.

Sincerely,

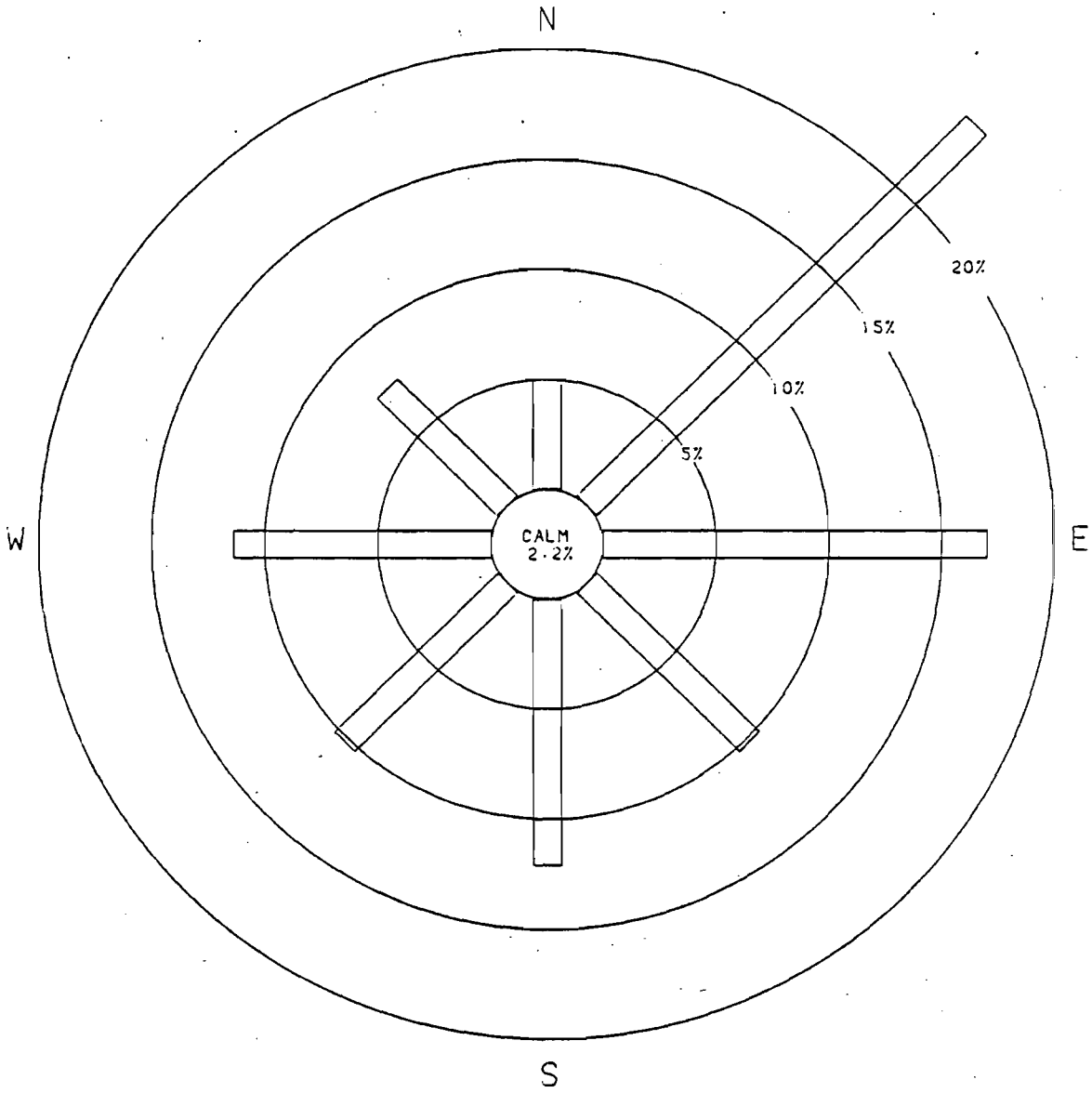
Phillip A. Steadham

Phillip A. Steadham,
Environmental Chemist

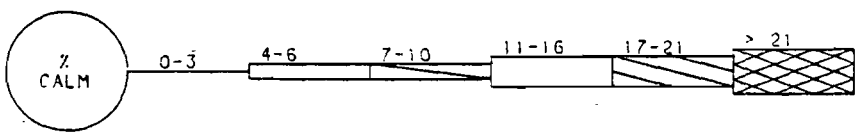
Attachment

cc: H. Long
V. Snow
L. Lahman

PAS/lgm



WIND SPEED CLASSES (KTS)



LAKELAND, FLORIDA
FREQUENCY OF WIND DIRECTION
YEAR = 1974

Agrico
Chemical Company
SOUTH PIERCE CHEMICAL WORKS
P. O. Box 1969
State Road 630
Bartow, Florida 33830

Mr. C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management
Fla. D.E.R.
Twin Towers Office Bldg.
2600 Blair Stone Road
Tallahassee, FL 32301-8241

CERTIFIED
P 451 148 267
MAIL

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

July 22, 1986

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Maurice Johnson
Agrico Chemical Company
Post Office Box 1969
Bartow, Florida 33830

Dear Mr. Johnson:

Re: Permit No. AC 53-111196, Sulfur Pellet Handling and Melting Facility, Specific Condition No. 10

The department has received and reviewed your submittal dated June 27, 1986, on the requirements of the above referenced subject, and has decided that additional information will be required to evaluate your ambient air and deposition monitoring plan.

Please submit information regarding:

a) Monitoring plan objective
b) Monitoring site selection criteria
c) Monitoring equipment description
d) Method of monitoring evaluation and its frequency
e) Quality assurance measures
f) Frequency of monitoring report submission
g) Monitoring network commencement date

If you have any questions, please contact Pradeep Raval at (904)488-1344 or write to me at the above address.

Sincerely,

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management

CHF/PR/s

cc: H. Long
V. Snow
B. Thomas

PS Form 3800, Feb. 1982

P 408 532 024

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to	Mr. Maurice Johnson
Street and No.	
P.O., State and ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date	7/23/86

PS Form 3811, July 1983 447-845

DOMESTIC RETURN RECEIPT

● SENDER: Complete items 1, 2, 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☐ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:
Mr. Maurice Johnson
Agrico Chemical Company
Post Office Box 1969
Bartow, FL 33830

4. Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Article Number
P 408 532 024

Always obtain signature of addressee or agent and **DATE DELIVERED.**

5. Signature – Addressee
X

6. Signature – Agent
X D. Barton

7. Date of Delivery
JUL 25 1986

8. Addressee's Address *(ONLY if requested and fee paid)*

Agrico
ONE OF THE WILLIAMS COMPANIES

June 27, 1986

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

RE: Permit Number AC53-111196, Sulfur Pellet Handling And Melting Facility, Specific Condition Number 10

Dear Mr. Fancy,

We are enclosing a plot plan of Agrico Chemical Company's South Pierce Chemical Works, showing the proposed location of modified nipher gauges and hi volume sampler to satisfy specific condition number 10 on Permit AC53-111196.

Please contact us if you have any questions about this plan.

Sincerely,

Maurice Johnson

Maurice Johnson,
Environmental Chemist

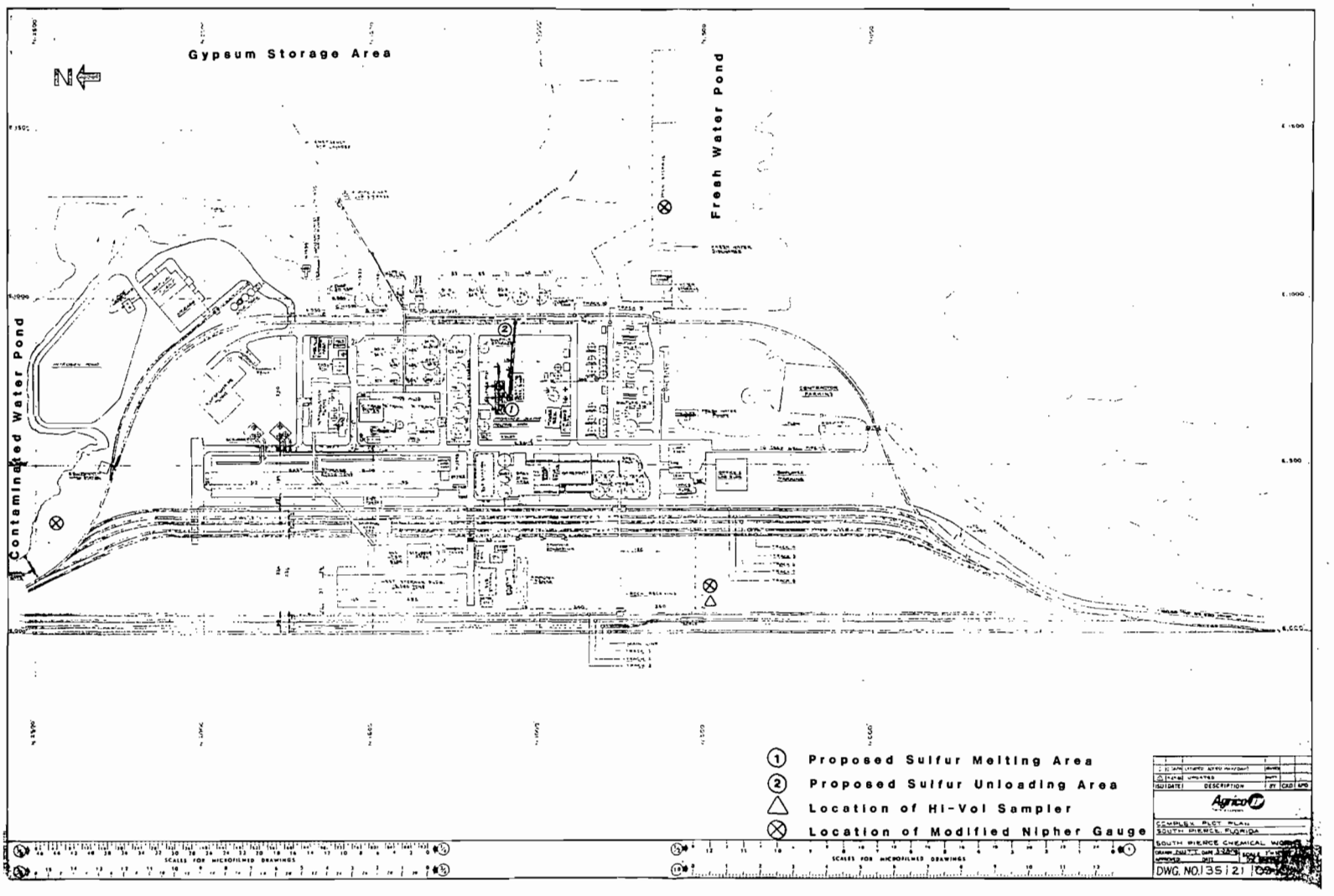
DER
JUN 30 1986
BAQM

cc: H. Long
V. Snow

MJ/lgm

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

BEST AVAILABLE COPY



State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

FOR ROUTING TO OTHER THAN THE ADDRESSEE

To: _____ Loctn: _____
To: _____ Loctn: _____
To: _____ Loctn: _____
From: _____ Date: _____

TO: Victoria J. Tschinkel

FROM: for Clair Fancy

DATE: March 31, 1986

SUBJ: Approval of Attached Air Construction Permit

Attached for your approval and signature is one Air Construction Permit to Agrico Chemical Companpy to modify their permit to construct a sulfur pellet handling and melting facility at the South Pierce Chemical Works in Bartow, Polk County, Florida.

Day 90, after which the permit would be issued by default, is April 2, 1986.

The Bureau recommends your approval and signature.

CF/pa

Attachment

P 408 533 186

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Mr. L. C. Lahman	
Street and No.	
P.O., State and ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 4/3/86	

PS Form 3800, Feb. 1982

PS Form 3811, July 1983

SENDER: Complete items 1, 2, 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☐ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

RECEIVED APR 9 1986

3. Article Addressed to:
Mr. L. C. Lahman
Agrico Chemical Company
P. O. Box 1969
Bartow, FL 33830

4. Type of Service:	Article Number
☐ Registered ☐ Insured XX Certified ☐ COD ☐ Express Mail	P 408 533 186

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X Agrico / R. Black

7. Date of Delivery
APR 07 1986

8. Addressee's Address *(ONLY if requested and fee paid)*

DOMESTIC RETURN RECEIPT

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
NOTICE OF PERMIT

Mr. L. C. Lahman
Plant Manager
Agrico Chemical Company
South Pierce Chemical Works
Post Office Box 1969
Bartow, Florida 33830

April 2, 1986

Enclosed is Permit Number AC 53-111196 to Agrico Chemical Company which authorizes a modification to the permit to construct a sulfur pellet handling and melting facility at the South Pierce Chemical Works in Bartow, Polk County, Florida. This permit is issued pursuant to Section 403, Florida Statutes.

Any Party to this permit has the right to seek judicial review of the permit pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32301; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this permit is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

For W. H. Thomas

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

Copies furnished to:
William S. Hornbeck, P.E.
Edward de la Parte
Bill Thomas

CERTIFICATE OF SERVICE

This is to certify that this NOTICE OF PERMIT and all copies were mailed before the close of business on April 3, 1986 to the listed persons.

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to §120.52(9), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Patricia G. Adams — Clerk

April 3, 1986 — Date

Final Determination

Agrico Chemical Company
South Pierce Chemical Works
Polk County, Florida

Sulfur Pellets Handling and Melting Facility

Permit No. AC 53-111196

Florida Department of Environmental Regulation
Bureau of Air Quality Management
Central Air Permitting

March 31, 1986

Final Determination

The application by Agrico Chemical Company to modify their permit to construct a sulfur pellet handling and melting facility at the South Pierce Chemical Works in Bartow, Polk County, Florida, has been reviewed by the Bureau of Air Quality Management. Public Notice of the department's Intent to Issue the modified permit was published in The Ledger on February 15, 1986.

Comments were received from Agrico in response to the Public Notice on:

1. Specific Condition No. 3: Particulate matter (PM) emissions from the vapor scrubber should be 0.2 lb/hr and not 0.02 lb/hr.

2. Specific Condition No. 5(a): Request that DER Method 5 not be required to test for compliance of PM emissions from the vapor scrubber since there are no applicable mass emission standards in Chapter 17-2, Florida Administrative Code.

3. Specific Condition No. 5(c): Request that an Alternate Procedure provision be allowed, should Agrico have site specific problems in conducting EPA Method 15.

The bureau agrees with the comments and the following Specific Conditions will be changed:

No. 3
From:
The emissions of sulfur particulate (PM) and hydrogen sulfide (H_2S) from the sulfur facility shall not exceed 1 ton per year (TPY) for PM, and 5 TPY for H_2S.

Summary of Emissions

Source	Emissions lb/hr	Emissions TPY	Pollutant
a) Unloading hopper	0.03	0.12	PM
b) Hopper-conveyor belt transfer	0.04	0.16	PM
c) Belt-surge bin transfer	0.09	0.37	PM
d) Vapor scrubber (i)	0.02	0.08	PM
(ii)	0.84	3.36	H_2S

To:
The emissions of sulfur particulate (PM) and hydrogen sulfide (H_2S) from the sulfur facility shall not exceed 2 ton per year (TPY) for PM, and 5 TPY for H_2S.

Summary of Emissions

Source	Emissions lb/hr	Emissions TPY	Pollutant
a) Unloading hopper	0.03	0.12	PM
b) Hopper-conveyor belt transfer	0.04	0.16	PM
c) Belt-surge bin transfer	0.09	0.37	PM
d) Vapor scrubber (i)	0.2	0.8	PM
(ii)	0.84	3.36	H_2S

No. 5
From:
Initial compliance tests shall be conducted using:

a) DER Method 5, Determination of Particulate Emissions from Stationary Sources (by liquid impingement), for PM emissions from the vapor scrubber.

b) DER Method 9, for all sources in the sulfur facility.

c) EPA Method 15, Determination of H_2S, in the gas stream from the vapor scrubber.

To:
Initial compliance tests shall be conducted using:

a) DER Method 9, for all sources in the sulfur facility.

b) EPA Method 15, Determination of H_2S, in the gas stream from the vapor scrubber, or a DER approved Alternate Test Procedure.

No. 11
From:
The following shall be submitted for approval to DER's District office within 45 days of completion of compliance tests, and a minimum of 90 days before the expiration date of this permit (copy to CAPS):

a) Compliance test results of DER Method 5, DER Method 9 and EPA Method 15.

b) Initial sulfur deposition monitoring report conducted according to Rule 17-2.753(2), FAC (DER Reference Method for Monitoring the Deposition of Sulfur Particulate).

To:
The following shall be submitted for approval to DER's District office within 45 days of completion of compliance tests, and a minimum of 90 days before the expiration date of this permit (copy to CAPS):

a) Compliance test results of DER Method 9 and EPA Method 15/DER approved Alternate Test Procedure.

b) Initial sulfur deposition monitoring report conducted according to Rule 17-2.753(2), FAC (DER Reference Method for Monitoring the Deposition of Sulfur Particulate).

The final action of the department will be to issue the modified permit as proposed in the Preliminary Determination with amendments to the permit conditions as a result of the Department's consideration of the afore mentioned comments.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
Agrico Chemical Company
P. O. Box 1969
Bartow, Florida 33830

Permit Number:AC 53-111196
Expiration Date: April 1, 1988
County: Polk
Latitude/Longitude: 27° 45' 45"N/
81° 56' 28"W
Project: Sulfur Pellet Handling
and Melting Facility

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the construction of a sulfur pellets handling and melting facility consisting of a receiving underground hopper, conveyor belts, 150 ton surge bin, screw conveyors, three 900 tons per day sulfur static melters, a scrubber system, and a water spray system.

Construction shall be in accordance with the attached permit application unless otherwise stated in the General and Specific Conditions herein.

Attachments are as follows:

1. Agrico's application package dated October 1, 1985.

2. DER's letter dated October 31, 1985.

3. Agrico's response dated November 27, 1985.

PERMITTEE:
Agrico Chemical Company

Permit Number: AC 53-111196
Expiration Date: April 1, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

GENERAL CONDITIONS:

6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

a. Having access to and copying any records that must be kept under the conditions of the permit;

b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

a. a description of and cause of non-compliance; and

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

( ) Determination of Best Available Control Technology (BACT)
( ) Determination of Prevention of Significant Deterioration (PSD)
( ) Compliance with New Source Performance Standards.

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. The sulfur pellets handling and melting facility may operate continuously i.e., 8760 hours per year.

2. The maximum sulfur handling and melting rates shall not exceed 1800 long tons per day (LTPD), or 600,000 LTPY.

PERMITTEE:
Agrico Chemical Company

Permit Number: AC 53-111196
Expiration Date: April 1, 1988

SPECIFIC CONDITIONS:

3. The emissions of sulfur particulate (PM) and hydrogen sulfide (H_2S) from the sulfur facility shall not exceed 2 ton per year (TPY) for PM, and 5 TPY for H_2S.

Summary of Emissions

Source	Emissions lb/hr	Emissions TPY	Pollutant
a) Unloading hopper	0.03	0.12	PM
b) Hopper-conveyor belt transfer	0.04	0.16	PM
c) Belt-surge bin transfer	0.09	0.37	PM
d) Vapor scrubber (i)	0.2	0.8	PM
(ii)	0.84	3.36	H_2S

4. Visible emissions from any source in the sulfur facility shall not exceed 10% opacity, as determined by DER Method 9, Visual Determination of the Opacity of Emissions from Stationary Sources.

5. Initial compliance tests shall be conducted using:

a) DER Method 9, for all sources in the sulfur facility.

b) EPA Method 15, Determination of H_2S, in the gas stream from the vapor scrubber, or a DER approved Alternate Test Procedure.

6. Annual compliance tests shall be conducted for all sources in the sulfur facility using DER Method 9, unless other tests are also deemed necessary by the results obtained in the initial compliance tests.

7. All applicable emission limiting precautions and procedures specified in this permit application, and in Rule 17-2.600(11), FAC, shall be followed at all times.

8. All compliance tests shall be conducted at 90-100% of the permitted equipment capacities.

9. A 15 day prior notice shall be given to DER's Southwest District office, of the compliance testing date(s).

SPECIFIC CONDITIONS:

10. The permittee shall submit a Sulfur Deposition and an Ambient Air Monitoring Plan to the Central Air Permitting (CAPS) office for approval, within 90 days of issuance of this permit. These monitoring plans shall be implemented for a minimum of 2 years from the date of issuance of the initial operating permit. Monitoring may be required beyond the initial 2 years should the department deem it necessary at the end of the initial monitoring period.

11. The following shall be submitted for approval to DER's District office within 45 days of completion of compliance tests, and a minimum of 90 days before the expiration date of this permit (copy to CAPS):

a) Compliance test results of DER Method 9 and EPA Method 15/ DER approved Alternate Test Procedure.

b) Initial sulfur deposition monitoring report conducted according to Rule 17-2.753(2), FAC (DER Reference Method for Monitoring the Deposition of Sulfur Particulate).

12. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, the Department must be notified in writing, 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit. (Rule 17-4.09, FAC)

13. To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with compliance test results and Certificate of Completion, to DER's District office 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate. (Rules 17-4.22 and 17-4.23, FAC)

14. If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application. (Rule 17-4.10, FAC)

PERMITTEE:
Agrico Chemical Company

Permit Number: AC 53-111196
Expiration Date: April 1, 1988

SPECIFIC CONDITIONS:

15. Upon obtaining an operating permit the permittee will be required to submit annual reports, unless otherwise requested by DER, on the actual operation and emissions of the sources to the DER's District office.

16. Any change in the method of operation, equipment, or operating hours shall be submitted for approval to the DER's District office.

17. This permit shall replace all previous permits issued to the permittee for the construction of the sulfur pellet handling and melting facility.

Issued this 2 day of April 1986

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

VICTORIA J. TSCHINKEL, Secretary

____ pages attached.

DEPARTMENT OF ENVIRONMENTAL REGULATION

ROUTING AND TRANSMITTAL SLIP

ACTION NO

ACTION DUE DATE

1. TO: (NAME, OFFICE, LOCATION) Vicki Tschinkel	Initial / Date
2.	Initial / Date
3.	Initial / Date
4.	Initial / Date

REMARKS:

I plan to have our stack sampling team conduct a Method 5 particulate emission test on the vapor scrubber. The 0.2 #/hr is near the detectable limit of the Method. Method 5 is not required for compliance according to Condition # 5

INFORMATION	
	Review & Return
	Review & File
	Initial & Forward

DISPOSITION	
	Review & Respond
	Prepare Response
	For My Signature
	For Your Signature
	Let's Discuss
	Set Up Meeting
	Investigate & Report
	Initial & Forward
	Distribute
	Concurrence
	For Processing
	Initial & Return

FROM: Pradeep Raval 6'86

DATE 4/11/86

PHONE

Agrico
ONE OF THE WILLIAMS COMPANIES

February 20, 1986

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

RE: AC53-11196

Dear Mr. Fancy,

Attached please find an Affidavit of Publication pertaining to a Notice of Proposed Agency Action for a sulfur pellet handling and melting facility construction permit at the South Pierce Chemical Works.

If you have any questions please feel free to contact me at (813) 428-1423.

Sincerely,

Ed Mayer

Ed Mayer,
Environmental Engineer

cc: E. de la Parte
V. Snow
G. d'Aquin
M. Livingood
H. Long

EEM/lgm

DER
FEB 24 1986
BAQM

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

AFFIDAVIT OF PUBLICATION

THE LEDGER

Lakeland, Polk County, Florida

Case No .....

STATE OF FLORIDA)
COUNTY OF POLK) ss.

Before the undersigned authority personally appeared Walter Garris, who on oath says that he is Controller of The Ledger, a daily newspaper published at Lakeland in Polk County, Florida; that the attached copy of advertisement, being a.....

Notice

.....

.....

in the matter of .....

Proposed Agency Action

.....

.....

in the .....

.....

Court, was published in said newspaper in the issues of .....

February 15, 1986

.....

Affiant further says that said The Ledger is a newspaper published at Lakeland, in said Polk County, Florida, and that the said newspaper has heretofore been continuously published in said Polk County, Florida, daily, and has been entered as second class matter at the postoffice in Lakeland, in said Polk County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Signed Walter Garris
Controller

Sworn to and subscribed before me this 19th day of February A.D. 1986

(Seal)

Notary Public

Notary Public, State of Florida at Large
My Commission Expires June 1, 1987

My Commission Expires .....

Attach Notice Here

State of Florida
Department of Environmental Regulation
Notice of Proposed Agency Action
on Permit Application

The Department of Environmental Regulation gives notice of its intent to issue a permit to Agrico Chemical Company to construct a sulfur pellet handling and melting facility at their existing South Pierce Chemical Works in Bartow, Polk County, Florida. A determination of best available control technology (BACT) was not required.

Persons whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must conform to the requirements of Chapters 17-103 and 28-5, Florida Administrative Code, and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32301, within fourteen (14) days of publication of this notice. Failure to file a request for hearing within this time period constitutes a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

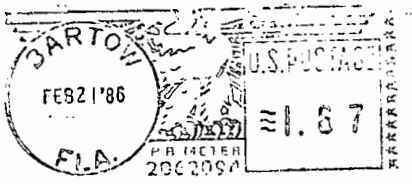
If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, persons who may not wish to file a petition may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Model Rule 28-5.207, Florida Administrative Code, at least five (5) days before the final hearing and be filed with the hearing officer if one has been assigned at the Division of Administrative Hearings, Department of Administration, 2009, Apalachee Parkway, Tallahassee, Florida 32301. If no hearing officer has been assigned, the petition is to be filed with the department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32301. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, Florida Statutes.

The application is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:
Dept. of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301
Dept. of Environmental Regulation
Southwest District
7601 Highway 301 North
Tampa, Florida 33610

Any person may send written comments on the proposed action to Mr. Bill Thomas at the department's Tallahassee address. All comments mailed within 30 days of the publication of this notice will be considered in the department's final determination.

J-310 — 2-15; 1986

Agrico
Chemical Company
SOUTH PIERCE CHEMICAL WORKS
P. O. Box 1969
State Road 630
Bartow, Florida 33830



Mr. C. H. Fancy, P.E.
Bureau of Air Quality Management
Fla. Dept. of Env. Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32301-8241

Technical Evaluation
and
Preliminary Determination

Agrico Chemical Company
South Pierce Chemical Works
Polk County, Florida

Sulfur Pellets Handling and Melting Facility

Permit Number: AC 53-111196

Florida Department of Environmental Regulation
Bureau of Air Quality Management
Central Air Permitting

January 29, 1986

I. Application

A. Applicant

Agrico Chemical Company
P. O. Box 1969
Bartow, Florida 33830

B. Project and Location

The applicant proposes to modify a permit to construct a sulfur pellet handling and melting facility at their existing South Pierce Chemical Works (SPCW). The project will involve receiving a maximum of 600,000 long tons per year (LTPY) of sulfur pellets by rail-cars or trucks, unloading into an underground hopper, conveying to a 150 ton (T) surge bin, feeding to two out of three 900 long tons per day (LTPD) static melters, and then supplying the molten sulfur to their existing, on-site, sulfuric acid plant.

The UTM coordinates of the facility are:

Zone: 17
Easting: 407.6 km
Northing: 3071.3 km

C. Sources Reviewed

The main sources reviewed in this technical evaluation are:

(a) Railcar/Truck unloading
(b) Hopper to conveyor-belt transfer
(c) Conveyor-belt to surge bin transfer
(d) Vapor Scrubber

Agrico Chemical Company applied for the modification of their current permit on October 1, 1985. The application was deemed complete on December 2, 1985.

D. Facility Category

The facility at SPCW is classified under the Standard Industrial Classification (SIC) Code as Group No. 20, Chemical and Allied Products, and Industry No. 2819, Sulfuric Acid Contact Process. The proposed modified project will be a new minor source in an existing major facility.

II. Project

A. Process and Controls

Standard sulfur pellets will be received in covered hopper railroad cars, or covered hopper trucks, and will be positioned

over the unloading hopper within an unloading shed. The unloading hopper will be a below grade small hopper which will receive material from only one hopper section of a railcar at a time. The unloading hopper will be equipped with high efficiency water sprays around the periphery, which will collect 85% of the particulate generated by this free fall. The spray water will contain a surfactant.

Under normal unloading conditions the unloading hopper will be full, and the flow from the hopper car or hopper truck will be under choked conditions.

The sulfur pellets will be transferred from the belt feeder, at the bottom of the unloading hopper, to the unloading conveyor belt and conveyed to the 150 ton surge hopper. The transfer point of the material to the surge hopper will be hooded and equipped with water sprays containing a surfactant.

The sulfur pellets will be metered and conveyed by feed screws to two of three sulfur melters, from which the molten sulfur will flow by gravity to an existing sulfur pit. The sulfur melters will be completely enclosed. The capacity of the melters will be 900 long tons per day each, with one of the melters serving as an installed spare. The vent gases from the melter will contain steam produced by the vaporization of the water content of the sulfur, a small amount of H_2S and an even smaller amount of sulfur vapor. These off gases from the melters will be collected in a duct system, into which heated air will be introduced to prevent the condensation of sulfur vapor in the duct work, leading to the vapor scrubber.

The vapor scrubber system will consist of a Venturi spray tower scrubber, vapor scrubber circulation pumps, and a vapor scrubber fan. The sulfur melter vapors will be scrubbed by circulating a solution of sodium hydroxide with the hydrogen sulfide being converted to sodium sulfide. The scrubber system will be designed towards 98% removal of hydrogen sulfide and 95% removal of condensed sulfur. The circulating solution is spent when essentially all of the sodium hydroxide is converted to sodium sulfide (24 hour period). When this occurs, the nearly spent solution will be pumped to the spent caustic treater while the vapor scrubber will be replenished with fresh caustic solution.

The spent caustic will be treated on a batch basis by the slow addition of hydrogen peroxide and sulfuric acid into the circulating solution to convert the sodium sulfide to sodium sulfate and elemental sulfur.

The effluent from the spent caustic treatment and water spray drainage will be collected in the effluent surge tank. The liquid will then be pumped to the sulfur recovery filter. Sulfur will be removed and the remaining liquid consumed in the

phosphoric acid plant reactor, used as process water. The recovered sulfur will be discharged to the surge hopper.

B. Operating Times and Rates

The maximum operating times and rates of the sulfur handling and melting project will be:

- Continuous operation i.e., 8760 hours per year
- 1800 LTPD sulfur pellets received
- 150 T sulfur pellets surge capacity (surge bin)
- 1800 LTPD sulfur melted (900 LTPD/melter)
- 600,000 LTPY sulfur processed

III. Rule Applicability

The proposed modified project will emit the pollutants sulfur particulate matter (PM), and hydrogen sulfide (H_2S). The project is therefore subject to preconstruction review under Chapters 17-2 and 17-4 of the Florida Administrative Code (FAC) and Chapter 403 of the Florida Statutes.

The project will be located in an area designated as attainment for all pollutants, in Polk County, in accordance with Rule 17- 2.420, FAC. The proposed project will be a minor new source in an existing major facility. It is not subject to Prevention of Significant Deterioration (PSD) Review in accordance with Rule 17-2.500(2)(d)1, FAC.

The project will be subject to the Source Specific New Source Review Requirements in accordance with Rule 17-2.540(2), FAC, Sulfur Storage and Handling Facilities. The requirements include Preconstruction Ambient Air Quality Analysis, Preconstruction Sulfur Deposition Analysis, Postconstruction, Ambient Air Monitoring and Postconstruction Sulfur Deposition Monitoring. Emission estimates have to be made using methods specified in Rule 17-2.215, FAC.

The project shall comply with Specific Source Emission Limiting Standards, in accordance with Rule 17-2.600(11)(a), FAC, for molten sulfur handling, and Rule 17-2.600(11)(b), FAC, for solid sulfur handling. These rules specify reasonable measures to be implemented, and a 10% opacity limit for visible emissions from any emission point in the sulfur handling facility.

Only the handling of standard sulfur pellets shall be allowed at the facility in accordance with Rule 17-2.600(11), FAC.

The applicant will show compliance with emission standards using DER Method 5, Determination of Particulate Emissions from Stationary Sources (by liquid impingement), in accordance with

Rule 17-2.700(6)(a)5, FAC, for emissions from the vapor scrubber.

The applicant will conduct annual compliance tests using DER Method 9, Visual Determination of the Opacity of Emissions from Stationary Sources, in accordance with Rule 17-2.700(6)(a)9, FAC, for all sources in the sulfur facility.

The applicant will conduct compliance tests using EPA Method 15, in accordance with Rule 17-2.700(6)(b)15, FAC, Determination of H_2S in the gas stream exiting from the scrubber.

The applicant shall file reports of compliance tests in accordance with Rule 17-2.700(7), FAC.

IV. Ambient Air Quality and Deposition Analysis

A. Introduction

The Agrico Chemical Company is proposing to construct a prilled sulfur (a type of sulfur pellet) handling and melting facility at their existing South Pierce Chemical Works facility located in southern Polk County, Florida. The proposed facility will have the capacity of receiving and melting 672,000 tons of prilled sulfur per year. The construction of this facility is subject to Rule 17-2.540, FAC, Source Specific New Source Review Requirements. These requirements include:

- o Preconstruction Ambient Air Quality Analysis;
- o Preconstruction Sulfur Deposition Analysis, and;
- o Postconstruction Monitoring.

The applicant has submitted the required preconstruction analyses. Based on these analyses, the department has reasonable assurance that the proposed sulfur handling and melting facility, as described in this report and subject to the conditions of approval proposed herein, will not cause or contribute to a violation of any ambient air quality standard or prevention of significant deterioration (PSD) increment. A discussion of the modeling methodology and required analysis follows.

B. Modeling Methodology

The EPA-approved Industrial Source Complex (ISC) models were used to predict 24-hour average and annual average particulate sulfur ambient concentrations, and monthly and annual average sulfur deposition. The ISC short-term (ISCST) model was used to estimate the 24-hour maximum concentrations using sequential, hourly meteorological data. The ISC long-term (ISCLT) model was used to predict annual average ambient concentrations, and monthly and annual average sulfur deposition using joint

frequencies of wind direction, wind speed, and atmospheric stability.

The ISC models allow for various options to be selected to make the model more accurately depict the specific geography and source characteristics of the subject facility. These options include: distinguishing between point, area, and volume type sources; urban or rural geography; building induced downwash; and gravitational settling of large particulates. These options were used by the applicant (except downwash) in completing the required modeling analyses.

The individual sources of particulate sulfur associated with the proposed project are listed in Table 1. The initial plume dispersion for the volume type sources were calculated in accordance with the guidelines contained in the ISC Users Manual. All of the sources associated with the handling of prilled sulfur were modeled as volume type sources. Only the sources associated with the proposed sulfur handling were modeled. Table 2 lists the sulfur particulate matter emission rates used in the models. The detailed calculation of these rates, for both the wet and air formed prills, can be found in the permit application.

The meteorological data used for the analysis consisted of the five-year period (1974-1978) of hourly surface weather observations from the National Weather Service station in Orlando, Florida. The upper air data for this same period were obtained from Tampa, Florida. Since five years of data were used, the highest, second-high short-term predicted concentrations were compared with the appropriate standards. For the long-term (monthly and annual) predicted concentrations and deposition, these same data were processed into joint frequency distributions of wind speed, wind direction, and atmospheric stability.

The particulate sulfur deposition rate analysis required the applicant to define the particle size distribution (see Table 3). The applicant separated the total particulate emissions into 10 size categories, each of equal mass. The gravitational settling velocity and surface reflection coefficient for each size category were calculated as specified in the ISC Users Manual. The ISCLT model used this information to estimate the maximum monthly and annual deposition. Only one year of deposition modeling was completed, based on the year in which maximum annual ambient concentrations were predicted.

A post-processing computer program, CALMPRO, was used to adjust the predicted short-term average concentrations when calm wind conditions occurred within the averaging period. The purpose of this post-processing was to adjust for the artificial persistence of wind direction in the processed hourly meteorological data set.

Table 1

Agrico South Pierce Sulfur Pellet Handling Facility
Source Data

Source	Type	Relative Location X(m)	Y(m)	Height (m)	Initial Plume Dispersion Vertical (m)	Horizontal (m)
Railcar to Hopper	Ground-based volume	68	0	3.8	3.5	2.0
Hopper to Conveyor Belt	Ground-based volume	68	0	3.8	3.5	2.0
Conveyor Belt to Surge Hopper	Elevated volume	0	0	14.6	2.3	1.4

Table 2

Agrico South Pierce Sulfur Pellet Handling Facility
Emissions Data

Source	Pellet Type(1)	Suspended Particulate (lb/hr)	Suspended Particulate (ton/yr)	Total Particulate (lb/hr)	Total Particulate (ton/yr)
Railcar to Hopper	Wet-Formed	0.00454	0.01815	0.00953	0.03812
	Air-Formed	0.0145	0.0581	0.0305	0.1220
Hopper to Conveyor Belt	Wet Formed	0.00605	0.02420	0.01271	0.05082
	Air-Formed	0.0193	0.0773	0.0405	0.1623
Conveyor Belt to Surge Hopper	Wet-Formed	0.01360	0.05445	0.02856	0.11435
	Air-Formed	0.0435	0.1741	0.0914	0.3656
Total	Wet-Formed				0.20329
	Air-Formed				0.6499

(1) Wet-Formed pellet at 2.0 percent moisture
Air-Formed pellet at 0.5 percent moisture

Table 3

Agrico South Pierce Sulfur Pellet Handling Facility
Particle Size Distribution

Class	Mass-Median Diameter (um)	Percent Weight in Class	Settling Velocity(cm/s)	Reflection Coefficient
1	2	10	0.013	0.95
2	6	10	0.11	0.90
3	11	10	0.37	0.85
4	18	10	0.98	0.77
5	26	10	2.04	0.70
6	37	10	4.14	0.64
7	52	10	8.14	0.54
8	64	10	11.7	0.45
9	110	10	29.0	0.025
10	160	10	52.0	0.0

The receptor grid used for the short-term ambient concentration analysis consisted of 288 receptors located along 36 radials spaced in ten degree intervals surrounding the proposed facility. Each radial had receptors at 200, 300, 400, 600, 800, 1000, 1500, and 2000 meters from the center point. A refined analysis was completed for the day predicted to give the highest, second-high concentration using a 100 meter resolution. The long-term analyses used the same receptor grid as the short-term analyses except that no refined runs were made.

In the above modeling analyses, two types of prilled sulfur, wet-formed and air-formed, were evaluated. Both types of sulfur will potentially be received at the facility. In general, the air-formed prill, with its lower moisture content, has greater emissions. Therefore, the predicted concentrations and deposition summarized in this report are based on the air-formed prilled sulfur.

C. Analysis of Existing Air Quality

The total ambient impact to an area is determined by adding the maximum predicted modeled impacts to the existing background concentrations. The existing background level is often estimated from air quality monitoring data located near the proposed new or modified facility. The background concentration should account for all sources not included in the dispersion modeling calculations.

The two closest particulate matter monitors to the Agrico facility are 5.7 and 7.2 kilometers away. The state site codes are 3680-011 and 3680-012, respectively. The most recent year of data (1984) showed the maximum concentrations from either of these two monitors to be 46 ug/m^3, annual mean, and 90 ug/m^3, 24-hour average.

D. PSD Increment Analysis

The Agrico South Pierce facility is located in an area designated as "attainment" for meeting the ambient air quality standards for particulate matter. As such, increased emissions of this pollutant occurring after the baseline date must not cause ambient concentrations to increase beyond specified amounts known as PSD increments. The new sulfur handling emissions at this facility are subject to this limitation.

The modeling results, taking into account only the net emissions increase from the proposed new facility, show that the highest, second-high 24-hour average predicted concentration is 2.3 ug/m^3. The maximum annual average predicted concentration is 0.33 ug/m^3. Both of these values are less than the significant impact levels defined in Chapter 17-2 of the Florida

Administrative Code. Since the predicted impacts are less than these levels, no further analysis is required.

E. Ambient Air Quality Standards Analysis

Given the existing air quality in the area of the Agrico South Pierce facility, and given the insignificant increases in predicted ambient concentrations, emissions from the proposed sulfur handling and melting operation are not expected to cause or contribute to a violation of an ambient air quality standard. The results of the modeling and the ambient air quality standards are given in Table 4.

F. Additional Air Quality Impacts

The melting of solid sulfur will result in the release of hydrogen sulfide (H_2S) gas. The vapor scrubber system proposed for H_2S removal will be designed towards a 98% removal efficiency. A conservative estimate of H_2S released from the sulfur pellets (H_2S at 250 ppm) translates to an hourly uncontrolled emission rate of 42 lb/hr, and a controlled hourly rate of 0.84 lb/hr (3.36 TPY). These emissions are well below the significant emission levels listed in 17-2.500 Table 1, FAC, of 10 TPY.

G. Particulate Sulfur Deposition Analysis

The results of the sulfur particulate deposition analysis are contained in Table 5. The maximum monthly deposition predicted was 0.079 g/m^2 (1.79 lb/hectare). The maximum annual deposition was 0.32 g/m^2 (7.05 lb/hectare). The above results are based on 100 percent air-formed prill being handled at the facility. Wet-formed prill, with its lower emissions, result in less deposition.

V. Conclusion

The Agrico Chemical Company has applied for a permit to construct a solid sulfur handling and melting facility. The new facility will be located at Agrico's South Pierce Chemical Works facility in southern Polk County, Florida. The applicant currently receives sulfur in molten form. The proposed project allows the applicant to additionally receive sulfur in a solid (prilled, pellet) form.

The applicant has submitted, along with the application, an analysis of the impacts predicted to occur on the ambient air and surrounding grounds as a result of the proposed new facility. The analysis addressed the requirements of Rule 17-2.540, FAC for an air quality impact analysis.

Based on this analysis, submitted by Agrico Chemical Company, the department has reasonable assurance that the

Table 4

Agrico South Pierce Sulfur Pellet Handling Facility
Ambient Air Quality Impacts

Pollutant	Averaging Time	Maximum Impact of Proposed Project (ug/m^3)	Significant Impact Level (ug/m^3)	Florida AAQS (ug/m^3)
Particulate Matter	24-hour	2.3 (1)	5	150
	Annual	0.33 (1)	1	60

(1) Impact of Air-Formed pellets; Wet-Formed impacts are less.

Table 5

Agrico South Pierce Sulfur Pellet Handling Facility
Deposition Analysis (1)

Pollutant	Averaging Time	Pellet Type	Maximum Deposition (g/m^2)	(lb/hectare)
Particulate Sulfur	Monthly	Wet-Formed	0.025	0.55
		Air-Formed	0.79	1.74
	Annual	Wet-Formed	0.099	2.18
		Air-Formed	0.320	7.05

(1) Based on 1974 meteorological data

construction of the new sulfur handling and melting facility, as described in this report and subject to the conditions of approval proposed herein, will not cause or contribute to a violation of an ambient air quality standard or PSD increment, or any other provision of Chapter 17-2, FAC.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
Agrico Chemical Company
P. O. Box 1969
Bartow, Florida 33830

Permit Number:AC 53-111196
Expiration Date: April 1, 1988
County: Polk
Latitude/Longitude: 27° 45' 45"N/
81° 56' 28"W
Project: Sulfur Pellet Handling
and Melting Facility

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the construction of a sulfur pellets handling and melting facility consisting of a receiving underground hopper, conveyor belts, 150 ton surge bin, screw conveyors, three 900 tons per day sulfur static melters, a scrubber system, and a water spray system.

Construction shall be in accordance with the attached permit application unless otherwise stated in the General and Specific Conditions herein.

Attachments are as follows:

1. Agrico's application package dated October 1, 1985.

2. DER's letter dated October 31, 1985.

3. Agrico's response dated November 27, 1985.

PERMITTEE:
Agrico Chemical Company

Permit Number: AC 53-111196
Expiration Date: April 1, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

GENERAL CONDITIONS:

6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

a. Having access to and copying any records that must be kept under the conditions of the permit;

b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

a. a description of and cause of non-compliance; and

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

( ) Determination of Best Available Control Technology (BACT)
( ) Determination of Prevention of Significant Deterioration (PSD)
( ) Compliance with New Source Performance Standards.

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. The sulfur pellets handling and melting facility may operate continuously i.e., 8760 hours per year.

2. The maximum sulfur handling and melting rates shall not exceed 1800 long tons per day (LTPD), or 600,000 LTPY.

PERMITTEE:
Agrico Chemical Company

Permit Number: AC 53-111196
Expiration Date: April 1, 1988

SPECIFIC CONDITIONS:

3. The emissions of sulfur particulate (PM) and hydrogen sulfide (H_2S) from the sulfur facility shall not exceed 1 ton per year (TPY) for PM, and 5 TPY for H_2S.

Summary of Emissions

Source	Emissions lb/hr	Emissions TPY	Pollutant
a) Unloading hopper	0.03	0.12	PM
b) Hopper-conveyor belt transfer	0.04	0.16	PM
c) Belt-surge bin transfer	0.09	0.37	PM
d) Vapor scrubber (i)	0.02	0.08	PM
(ii)	0.84	3.36	H_2S

4. Visible emissions from any source in the sulfur facility shall not exceed 10% opacity, as determined by DER Method 9, Visual Determination of the Opacity of Emissions from Stationary Sources.

5. Initial compliance tests shall be conducted using:

a) DER Method 5, Determination of Particulate Emissions from Stationary Sources (by liquid impingement), for PM emissions from the vapor scrubber.

b) DER Method 9, for all sources in the sulfur facility.

c) EPA Method 15, Determination of H_2S, in the gas stream from the vapor scrubber.

6. Annual compliance tests shall be conducted for all sources in the sulfur facility using DER Method 9, unless other tests are also deemed necessary by the results obtained in the initial compliance tests.

7. All applicable emission limiting precautions and procedures specified in this permit application, and in Rule 17-2.600(11), FAC, shall be followed at all times.

8. All compliance tests shall be conducted at 90-100% of the permitted equipment capacities.

9. A 15 day prior notice shall be given to DER's Southwest District office, of the compliance testing date(s).

SPECIFIC CONDITIONS:

10. The permittee shall submit a Sulfur Deposition and an Ambient Air Monitoring Plan to the Central Air Permitting (CAPS) office for approval, within 90 days of issuance of this permit. These monitoring plans shall be implemented for a minimum of 2 years from the date of issuance of the initial operating permit. Monitoring may be required beyond the initial 2 years should the department deem it necessary at the end of the initial monitoring period.

11. The following shall be submitted for approval to DER's District office within 45 days of completion of compliance tests, and a minimum of 90 days before the expiration date of this permit (copy to CAPS):

a) Compliance test results of DER Method 5, DER Method 9 and EPA Method 15.

b) Initial sulfur deposition monitoring report conducted according to Rule 17-2.753(2), FAC (DER Reference Method for Monitoring the Deposition of Sulfur Particulate).

12. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, the Department must be notified in writing, 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit. (Rule 17-4.09, FAC)

13. To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with compliance test results and Certificate of Completion, to DER's District office 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate. (Rules 17-4.22 and 17-4.23, FAC)

14. If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application. (Rule 17-4.10, FAC)

PERMITTEE:
Agrico Chemical Company

Permit Number: AC 53-111196
Expiration Date: April 1, 1988

SPECIFIC CONDITIONS:

15. Upon obtaining an operating permit the permittee will be required to submit annual reports, unless otherwise requested by DER, on the actual operation and emissions of the sources to the DER's District office.

16. Any change in the method of operation, equipment, or operating hours shall be submitted for approval to the DER's District office.

17. This permit shall replace all previous permits issued to the permittee for the construction of the sulfur pellet handling and melting facility.

Issued this_____day of_____, 19__

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

_____
VICTORIA J. TSCHINKEL, Secretary

____ pages attached.

Agrico
ONE OF THE WILLIAMS COMPANIES

November 27, 1985

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

Dear Mr. Fancy:

This letter is being sent in response to your communication of October 21, 1985, RE: Review of Application to Modify Permit No. AC53-55780, Sulfur Pellet Handling and Melting Project.

In regard to the first request pertaining to a copy of the computer print-out of the modeling study, a report has been forwarded directly to Mr. Tom Rogers. Mr. Bob McCann of ES & E sent the print-out on November 19th. A copy of his letter of transmittal is attached.

The second item in the letter requested more supporting literature on the efficiency of the H2S scrubber. Attached is a report from the scrubber vendor that addresses the efficiency of the unit. Notice that the handwritten note at the bottom of the page gives the basis for 98% efficiency.

If you have any questions please do not hesitate to contact me at (813) 428-1423.

Yours truly,

Edward E Mayer

Edward E. Mayer,
Environmental Engineer

Attachment

cc: V. Snow
E. de la Parte
L. Lahman

EEM/lgm

DER
DEC 02 1985
BAQM

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

ESE

AN R&H COMPANY

ENVIRONMENTAL SCIENCE
AND ENGINEERING, INC.

November 19, 1985
ESE No. 85-123-0100-2110

Mr. Thomas Rogers
Department of Environmental Regulation
Bureau of Air Quality Management
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

Dear Tom:

Enclosed are the hard copy printouts for the Agrico South Pierce Facility. If you have any questions, please contact me.

Sincerely,

Bob McCann

Robert C. McCann
Department Manager
Air Quality Modeling and
Permitting

RCM/MHL/jay

cc: Ed Mayer, Agrico

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATIC

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

October 31, 1985

Mr. L.C. Lahman
Agrico Chemical Company
P.O. Box 1969
Bartow, Florida 33830

RE: Review of Application to Modify Permit No AC53-55780, Sulfur Pellet Handling and Melting Project

Dear Mr. Lahman:

The bureau has received your application package dated October 1, 1985. Please submit the following information to the bureau, in order to process your application:

1. The computer print-out of the modeling done on the sources in your project.

2. Supporting literature for the basis of hydrogen sulfide removal efficiency of your proposed scrubber system.

If you have any questions please call Pradeep Raval or Tom Rogers at (904) 488-1344 or write to me at the above address.

Sincerely,

C. H. Fancy
Deputy Chief,
Bureau of Air Quality
Management

cc: Bill Thomas
Edward de la Parte

P 408 533 636

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Mr. L. C. Lahman	
Street and No.	
P.O., State and ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 10/31/85	

PS Form 3800, Feb. 1982

PS Form 3811, July 1983

SENDER: Complete items 1, 2, 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☐ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:
Mr. L. C. Lahman
Agrico Chemical Company
P. O. Box 1969
Bartow, Florida 33830

4. Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Article Number
P 408 533 636

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Addressee
X [signature]

6. Signature — Agent
X

7. Date of Delivery
11/5/85

8. Addressee's Address *(ONLY if requested and fee paid)*

DOMESTIC RETURN RECEIPT

TABLE OF CONTENTS

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LIST OF FIGURES

1.0 INTRODUCTION

Agrico Chemical Company is proposing to construct a prilled sulfur handling and melting installation at their existing South Pierce Chemical Works (SPCW) facility in Southern Polk County, Florida (see Figure 1-1). The proposed installation will have a 600,000 long tons per year (TPY) or 672,000 short TPY capacity for receiving and melting prilled sulfur. The Florida Department of Environmental Regulation (DER) has recently promulgated revisions to Florida Administrative Code (FAC), Chapter 17-2, which relate to the handling of solid sulfur in the State of Florida. These rules require that an analysis of the probable particulate matter (PM) air quality and deposition impact of any sulfur handling and storage facility be assessed.

Agrico Chemical Company retained the services of Environmental Science and Engineering, Inc. (ESE) to conduct the air quality impact analysis of the PM emissions from the proposed prilled sulfur installation. The air quality analysis was performed to assess the probable impacts upon total suspended particulate (TSP) concentrations in the vicinity of SPCW. The Florida Ambient Air Quality Standards (AAQS) and significant impact levels for TSP are presented in Table 1-1. DER has adopted the significant impact levels to specifically define air quality levels which are considered to be insignificant and therefore no threat to AAQS. In addition, an analysis of sulfur particulate deposition rates expected from the proposed prilled sulfur installation was conducted.

The air quality analysis was based on predicted TSP concentrations using the Industrial Source Complex (ISC) model approved by the U.S. Environmental Protection Agency (EPA) and DER. For addressing the 24-hour average TSP impacts, hourly concentrations were predicted with the short-term version of the model (ISCST) using actual hourly meteorological data collected during a 5-year period by the National Weather Service (NWS) in the Orlando area. A method recommended by EPA for eliminating calm conditions (i.e., no measured wind direction and

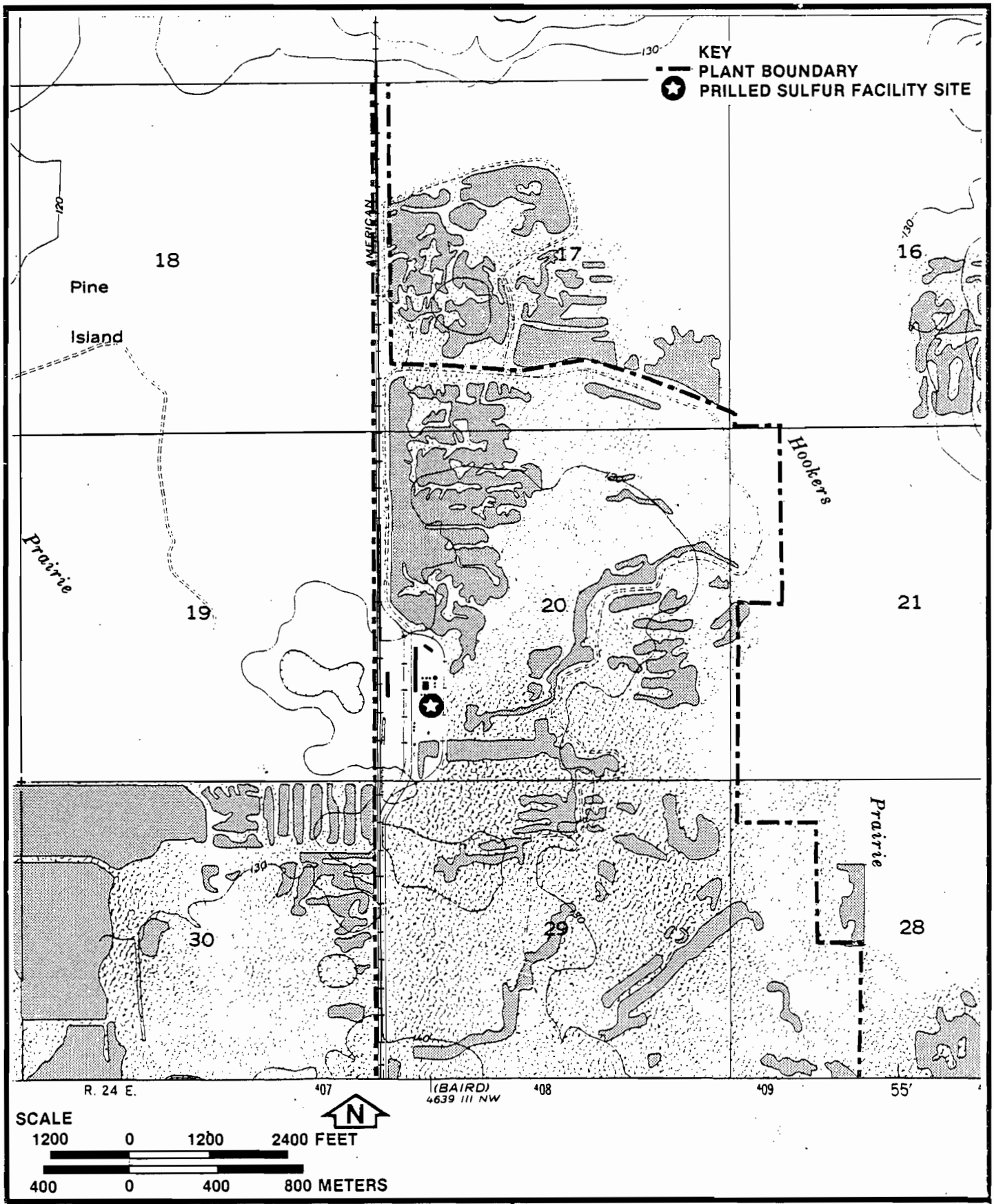


Figure 1-1
SITE LOCATION OF SOUTH PIERCE CHEMICAL WORKS PLANT

AGRICO CHEMICAL COMPANY
Prilled Sulfur Facility

Table 1-1. Air Quality Standards for Total Suspended Particulates Applicable to the Proposed SPCW Prilled Sulfur Installation

Standard	Concentration ($\mu g/m^3$)	
	Annual Geometric Mean	24-Hour
Florida Ambient Air Quality Standards	60	150*
Significance Limit	1	5

*Not to be exceeded more than once per year.

Sources: Code of Federal Regulations, Title 40, Parts 50, 51, and 52.
FAC, Chapter 17-2.100.

wind speed less than 3 knots) from the meteorological data base was used to produce valid 24-hour average concentrations. The ISC model may produce unrealistically high concentrations if calm conditions are included in the analysis. Annual average concentrations were determined using the long-term version of the model (ISCLT) with annual average emission rates reflective of the maximum annual hours of operation of each activity.

The sulfur particulate deposition rate analysis was based upon predicting deposition rates using the ISC model. Maximum annual and maximum monthly deposition rates were estimated for the prilled sulfur installation using the ISCLT model. This model is approved by EPA and DER for estimating particulate deposition rates.

The following sections present a description of the facility, the methods used in predicting expected maximum concentrations and deposition rates, and the results of the air quality impact assessment.

2.0 SOURCE DESCRIPTION

The air quality impact analysis addresses impacts from the proposed prilled sulfur storage installation only. The proposed prilled sulfur installation will consist of facilities to unload prilled sulfur from a railcar, convey the sulfur to a surge hopper, and feed to one of three sulfur melters. A flow diagram of the process is presented in Figure 2-1, and a plot plan of the facility is shown in Figure 2-2. Prilled sulfur will be unloaded within a railcar unloading building by bottom-dump rail cars and dropped into an enclosed underground hopper and onto a conveyor belt (see Figure 2-3). A surfactant water spray system will be located around the periphery at the top of the unloading hopper to supress sulfur particulate emissions. The prilled sulfur will then be transferred onto a conveyor belt for transport to the surge hopper. The conveyor belt discharges directly into the surge hopper. A surfactant/water fog system will be installed at the transfer point to suppress sulfur particulate emissions (see Figure 2-3). The prilled sulfur is fed to the sulfur melters through enclosed systems, and no sulfur particulate emissions will occur from this operation. A more complete description of the process, taken from the revised air construction permit application, is presented in Appendix A.

The PM emissions from most of the proposed prilled sulfur emission sources are fugitive because they are not vented through a stack or vent. The activities which will result in fugitive emissions and the estimated maximum emissions for each activity are presented in Table 2-1. Emission estimates are presented for both wet-formed prill at 2.0 percent moisture (H_2O) and air-formed prilled sulfur at 0.5 percent H_2O. Suspended sulfur particulate emissions (for estimating ambient air quality impacts) and total sulfur particulate emissions (for estimating total sulfur deposition rates) are both shown. The suspended particulate estimates are considered representative of particulate which would be collected by the standard high-volume air sampler. For estimating maximum 24-hour emissions, the maximum throughput of prilled sulfur for the installation

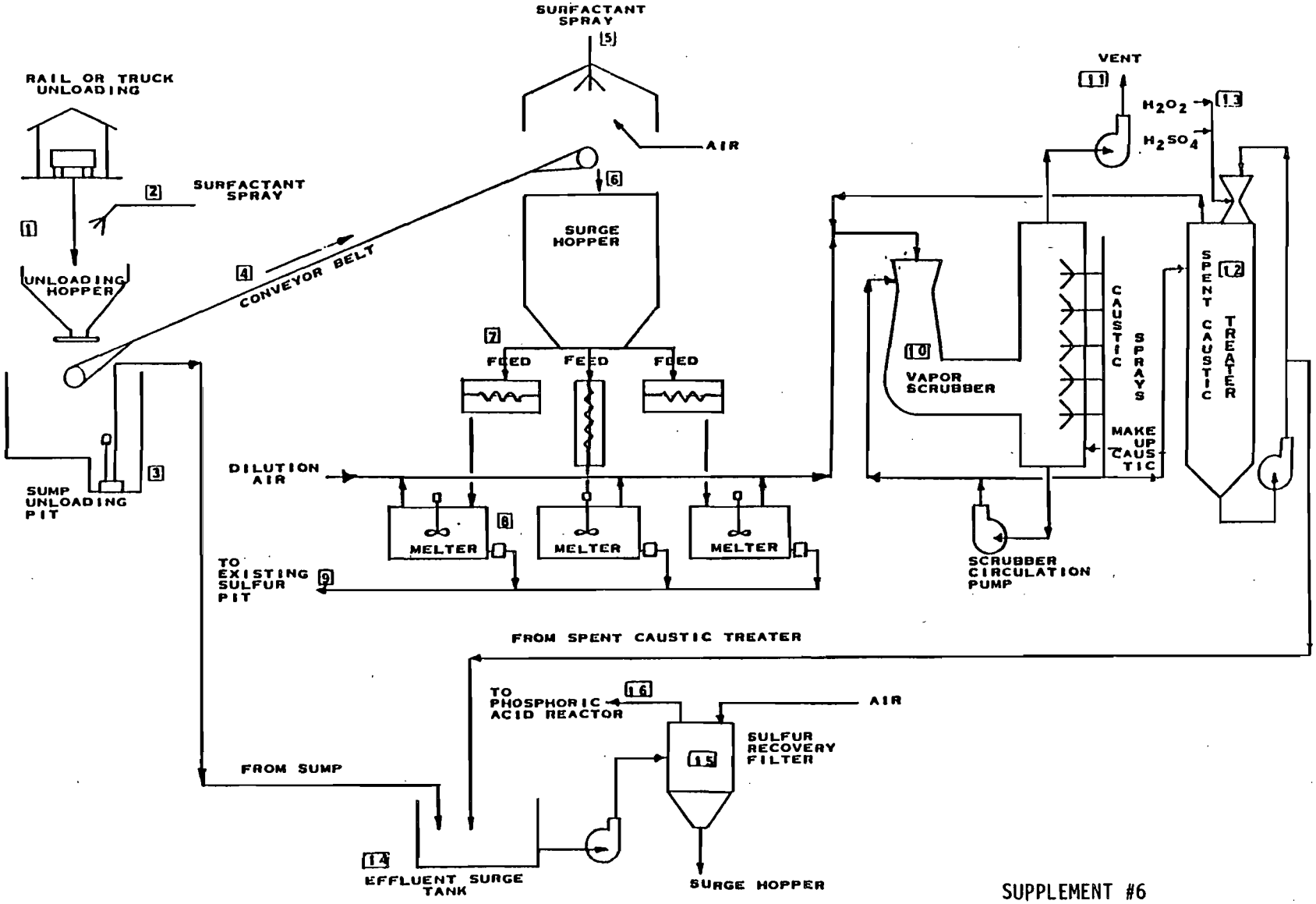


Figure 2-1
PROCESS FLOW DIAGRAM--
SULFUR UNLOADING AND MELTING
SYSTEM--SOUTH PIERCE CHEMICAL WORKS

AGRICO CHEMICAL COMPANY
Prilled Sulfur Facility

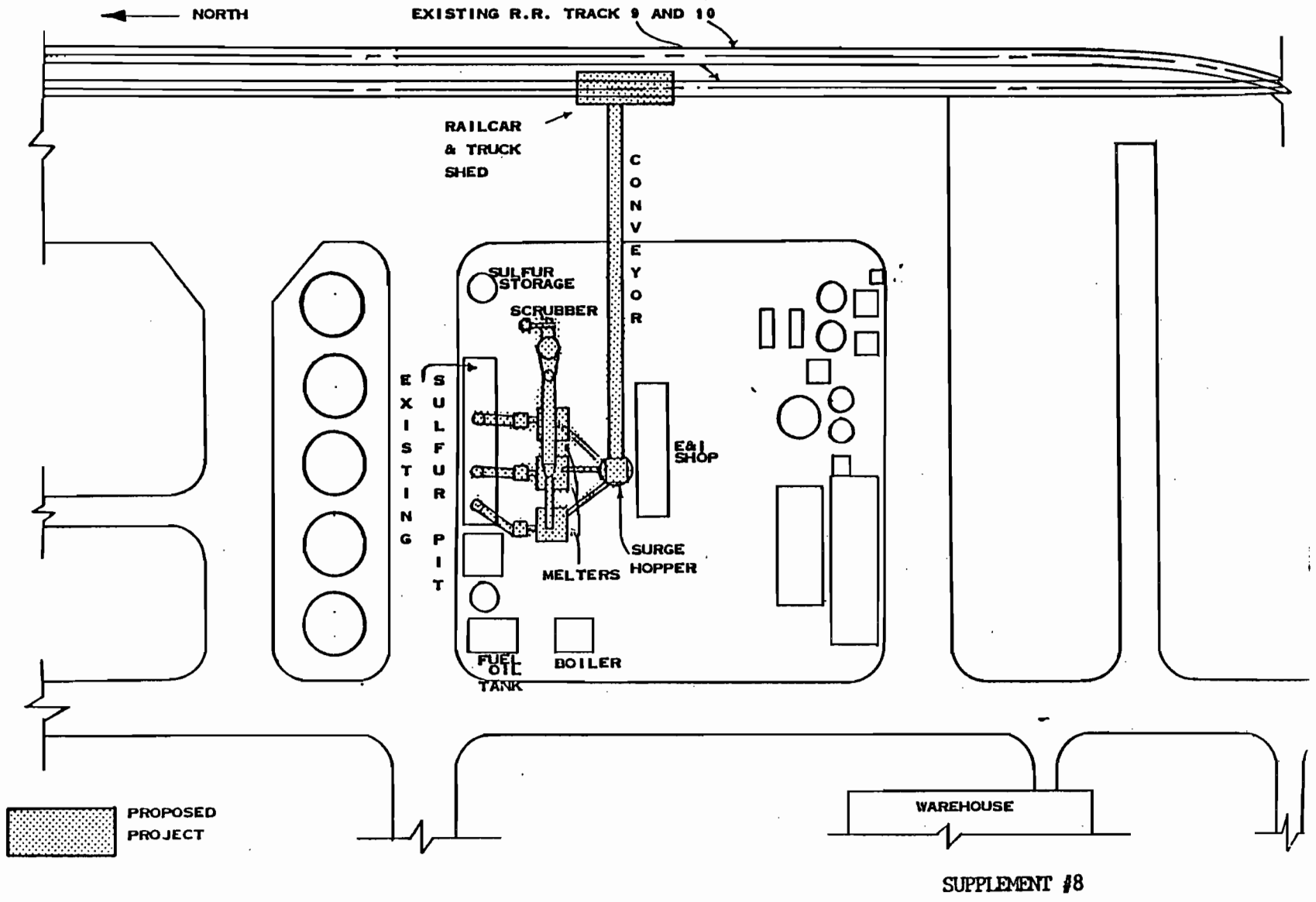
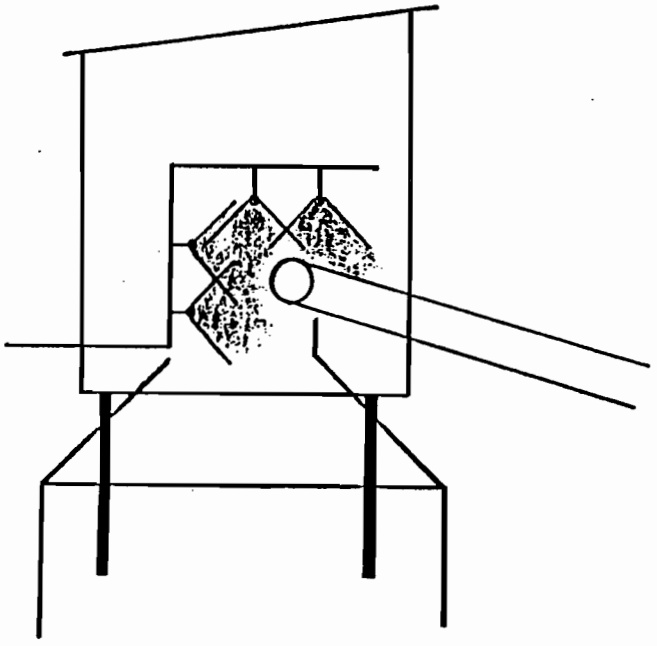
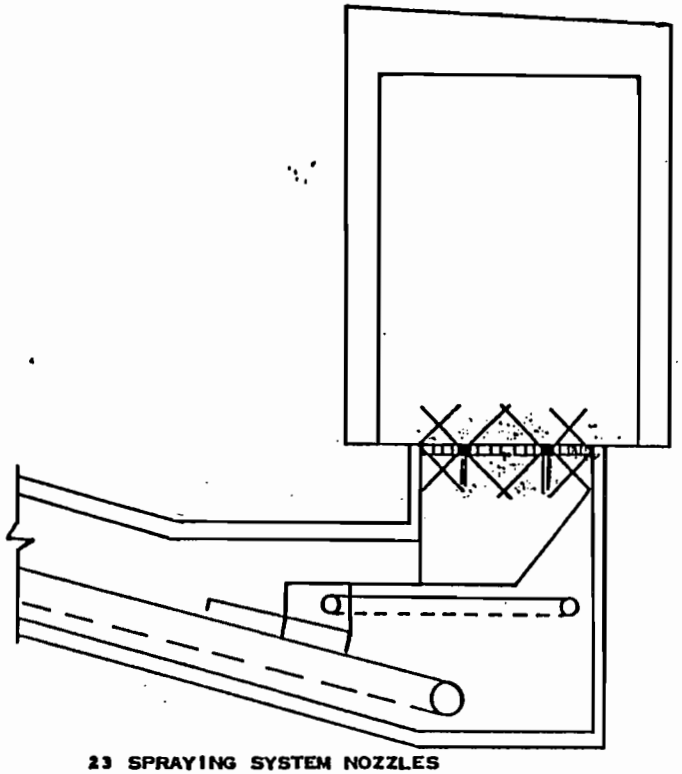


Figure 2-2
LOCATION PLAN--
PRILLED SULFUR HANDLING FACILITY--
SOUTH PIERCE CHEMICAL WORKS

AGRICO CHEMICAL COMPANY
Prilled Sulfur Facility



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



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

SUPPLEMENT #4

Figure 2-3
SURGE HOPPER--
WATER SPRAYS AND UNLOADING HOPPER--
WATER SPRAYS

AGRICO CHEMICAL COMPANY
Prilled Sulfur Facility

Table 2-1. Maximum Sulfur Particulate Emissions Associated with the Proposed South Pierce Prilled Sulfur Handling and Melting Installation

Activity	Suspended Particulate Emissions		Total Particulate Emissions	
	lb/hr	short TPY	lb/hr	short TPY
Wet-Formed Prill at 2.0 Percent H_2O				
Railcar to hopper	0.00454	0.01815	0.00953	0.03812
Hopper to conveyor belt	0.00605	0.02420	0.01271	0.05082
Conveyor belt to surge hopper	0.01360	0.05445	0.02856	0.11435
TOTALS	0.02419	0.09680	0.05080	0.20329
Air-Formed Prill at 0.5 Percent H_2O				
Railcar to hopper	0.0145	0.0581	0.0305	0.1220
Hopper to conveyor belt	0.0193	0.0773	0.0405	0.1623
Conveyor belt to surge hopper	0.0435	0.1741	0.0914	0.3656
TOTALS	0.0773	0.3095	0.1624	0.6499

Sources: ESE, 1985.
Agrico Chemical Company, 1985.

was 84 short tons per hour (TPH). For estimating maximum annual emissions, a maximum annual throughput of prilled sulfur of 672,000 TPH was used. The derivation of emission estimates, including supporting data, assumptions, and control efficiencies, are presented in the revised construction permit application for the prilled sulfur installation.

3.0 METHODOLOGY

3.1 MODEL DESCRIPTION

3.1.1 Ambient Air Quality Analysis

The ISC model (Cramer, 1979) was used to predict the 24-hour and annual average TSP concentrations due to emissions from all sources considered in the analysis. The ISC model is capable of simulating the effects of emissions from a wide variety of industrial sources, including the fugitive PM emissions resulting from the proposed prilled sulfur installation. In estimating suspended particulate concentrations, the effects of gravitational settling of PM were not considered. Therefore, the emitted suspended particulate was assumed to remain suspended indefinitely in the atmosphere. Based on the generic modeling approach recommended in the ISC Model User's Guide, the proposed prilled sulfur installation activities were modeled as volume sources.

Concentrations due to volume source emissions are calculated by the ISC model using the steady-state Gaussian plume equation for a continuous point source. Initial horizontal and vertical dimensions are assigned to each volume source to simulate the initial dispersion of pollutants within the volume source. For sources located in or near buildings, these initial dimensions are generally based on the physical structure of the building to account for the wake effects produced by the building. A summary of the procedures used to estimate the initial dimensions is given in Table 3-1. The horizontal dimensions of the volume source must be square for input to the model. If a source cannot be characterized as square, then the general procedure for describing the source is to determine the actual area of the source and recalculate an effective square area.

The generalized Briggs (1971, 1975) plume rise equations, including the momentum terms, are used to calculate plume rise as a function of downwind distance for point sources. In this study, no point sources were modeled; therefore, the plume rise equations were not a factor in

Table 3-1. Summary of Procedures for Estimating Initial Lateral (σ_{yo}) and Vertical (σ_{zo}) Dimensions for Volume Sources

Source Type	σ_{yo}	σ_{zo}
Single, elevated volume source on or adjacent to a building	$\frac{(\text{width x length})^{1/2}}{4.3}$	$\frac{\text{building height}}{2.15}$
Single, ground-based volume source	$\frac{(\text{width x length})^{1/2}}{4.3}$	$\frac{\text{vertical dimension of source}}{2.15}$
Single, elevated volume source not on or adjacent to a building	$\frac{(\text{width x length})^{1/2}}{4.3}$	$\frac{\text{vertical dimension of source}}{4.3}$

Source: Cramer, 1979.

calculating concentrations. A wind profile exponent law is used to adjust the observed mean wind speed from the measurement height to the emission height for the concentration calculations. The Pasquill-Gifford (Turner, 1970) dispersion curves are used to calculate the horizontal standard deviation (σ_y) and vertical standard deviation (σ_z) of the plume spread.

The ISC model has rural and urban options which affect the wind speed profile exponent law, dispersion rates, and mixing height formulations used in calculating ground-level concentrations. The criteria used to determine when the rural or urban mode is appropriate are based on land use near the proposed installation's surroundings (Auer, 1978). If the land use is classified as heavy industrial, light-moderate industrial, commercial, or compact residential for more than 50 percent of the area within a 3-kilometer (km) radius circle centered on the proposed installation, the urban option should be selected. Otherwise, the rural option is more appropriate. Based upon review of the Bradley Junction, Florida, United States Geological Survey quadrangle map (1972) and survey of the SPCW area, less than 50 percent of the area within a 3-km radius is utilized as heavy industrial, light moderate industrial, commercial, or compact residential. Therefore, the rural mode was used in calculating ground-level concentrations.

The ISC model consists of two sets of computer codes which are used to calculate short- and long-term ground-level concentrations. The main differences between the two codes are the input format of the meteorological data and the method of estimating the plume's horizontal dispersion.

The first model code, the ISCST model, is an extended version of the single-source (CRSTER) model (EPA, 1977). The ISCST model is designed to calculate hourly concentrations based on hourly meteorological parameters (i.e., wind direction, wind speed, atmospheric stability, ambient

temperature, and mixing heights), emission rates, and emission characteristics. The hourly concentrations are processed into nonoverlapping, short-term and annual averaging periods. For example, a 24-hour average concentration is based on twenty-four 1-hour averages calculated from midnight to midnight of each day. For each short-term averaging period selected, the highest and highest, second-highest average concentrations are calculated for each receptor. As an option, a table of the 50 highest concentrations over the entire field of receptors can be produced.

The second model code is the ISCLT model, which is an extension of the Air Quality Display Model (AQDM) and the Climatological Dispersion Model (CDM). The ISCLT model uses joint frequencies of wind direction, wind speed, and atmospheric stability to calculate seasonal and/or annual average ground-level concentrations. Because the input wind directions are for 16 sectors, with each sector defined as 22.5 degrees, the model calculates concentrations by assuming that the pollutant is uniformly distributed in the horizontal plane within a 22.5-degree sector. For this analysis, the ISCLT model was used to calculate annual average concentrations.

3.1.2 Particulate Deposition Rate Analysis

Sulfur particulate deposition rates were predicted for the proposed prilled sulfur installation only. The ISCLT model was used for this analysis. The ISCLT model was applied in the same manner as the ambient air quality analysis discussed in Section 3.1.1, except that particulate deposition information was also input into the model. The ISC model accounts for both gravitational settling and dry deposition of PM. As stated in the ISC User's Guide, the effects of gravitational settling are considered in the model (at the user's option) by assuming the plume is tilted, with the plume axis inclined to the horizontal at an angle given by the arctan of $V_s/\bar{u}$, where V_s is the gravitational settling velocity and $\bar{u}$ is the ambient wind speed. For a given source, the total

particulate emissions can be separated into a maximum of 20 particle-size categories, for which the mass-mean diameter and settling velocity are calculated.

Dry deposition is considered in the analysis by assigning a reflection coefficient for each particle-size category. The reflection coefficient, which was based on the settling velocity and Figure 2-8 in the ISC User's Guide, is a term used in the ISC model to account for the amount of material that reaches the ground surface by the combined processes of gravitational settling and atmospheric turbulence and is reflected from the surface. A value of 1.0 for the reflection coefficient term assumes that the material is completely reflected from the surface, while a value of 0.0 indicates complete retention or deposition at the surface.

Joint frequencies of wind direction, wind speed, and atmospheric stability were developed on a monthly and annual basis to estimate maximum monthly and annual sulfur particulate deposition rates. The year of meterological data selected for analysis was the year which resulted in the highest annual ambient air quality impact.

3.2 EMISSION INVENTORY

3.2.1 Ambient Air Quality Analysis

For determining impacts on ambient air quality due to the proposed prilled sulfur installation, the suspended particulate emissions presented in Table 2-1 were used as input to the ISC model. The actual physical dimensions associated with the prilled sulfur installation are presented in Table 3-2. The source input parameters considered in the ISC model are presented in Table 3-3. The actual physical dimensions of the proposed source configuration were based on the physical layout of the building or structure in which the activities occur and reasonable estimates of the initial extent of emission releases. As shown in Table 3-3, the fugitive sources were treated as volume sources because the emissions were assumed to be uniformly mixed in a volume of air

Table 3-2. Physical Dimensions of Activities Associated with the Prilled Sulfur Installation

Activity	Emission Release Height (ft)	Activity Dimensions (ft)*	
		Horizontal	Vertical
Railcar to hopper	0-25	20 x 40	25
Hopper to conveyor belt	0-25	20 x 40	25
Conveyor belt to surge hopper	40-56	20 x 20	16

*Based on structure in which activity occurs.

Source: ESE, 1985.

Table 3-3. Model Inputs of Emission Sources Associated with the Prilled Sulfur Installation

Modeled Source	Activity	ISC Source Type	Source Dimensions (ft)				Initial Plume Dispersion (ft)	
			Height	Horizontal	Vertical	Diameter	Horizontal	Vertical
Railcar to hopper/ hopper to belt	Railcar unload/transfer	Ground-based volume	12.5	28.3*	25	—	6.6	11.6
Belt to surge hopper	Load surge hopper	Elevated volume†	48	20	16	—	4.65	7.44

*The actual horizontal dimensions are assumed to be 20 ft x 40 ft. Since the model requires that all volume sources be represented as a square, the modeled horizontal source dimension is based on calculating the side of a square using the area defined by the actual dimensions (i.e., $28.3 = \sqrt{20 \times 40}$).
†Assumed to be on or adjacent to a building.

Source: ESE, 1985.

before dispersing in the atmosphere. Emissions for certain activities were combined because they were assumed to occur over the same area in both horizontal and vertical directions. For modeling purposes, the belt-to-surge hopper source was arbitrarily located at the center of the model grid and had x and y coordinates of 0.0 and 0.0 meter (m), respectively. The railcar-to-hopper and hopper-to-belt sources were located relative to the belt-to-surge hopper source and had x and y coordinates of 68.3 and 0.0 m, respectively.

3.2.2 Particulate Deposition Rate Analysis

The emission inventory used in the sulfur particulate deposition rate impact analysis was the same as described in Section 3.2.1 for the prilled sulfur installation, except that the estimated emissions for each source were the total particulate emissions shown in Table 2-1. The derivation of these emissions is presented in Appendix B.

Several other input parameters to the ISC must be specified for each source, as described in Section 3.1.2. These parameters are shown in Table 3-4, and their derivations are presented in Appendix B.

3.3 METEOROLOGICAL DATA

Meteorological data used in the ISC model to determine air quality impacts consisted of a 5-year period (1974-1978) of hourly surface weather observations from the NWS station in Orlando, Florida, and upper air observations from Ruskin, Florida. Meteorological data from these stations were used because they are considered representative of the plant site's conditions due to the NWS station's proximity to the plant site and similar surrounding topographical features at the plant site.

Maximum 24-hour average concentrations were calculated using the ISCST model, which calculates hourly ground-level concentrations using hourly meteorological data. The hourly concentrations were processed into sequential, nonoverlapping 24-hour average concentrations.

Table 3-4. Particle Size Distribution and Settling Velocities for Total Sulfur Particulate Emissions Used in ISC Model

Class	Mass-Median Diameter (microns)	Percent Weight in class	Settling Velocity (cm/s)	Reflection Coefficient
1	2	10	0.013	0.95
2	6	10	0.11	0.90
3	11	10	0.37	0.85
4	18	10	0.98	0.77
5	26	10	2.04	0.70
6	37	10	4.14	0.64
7	52	10	8.14	0.54
8	64	10	11.7	0.45
9	110	10	29.0	0.025
10	160	10	52.0	0.0

Sources: ESE, 1985.
Agrico Chemical Company, 1985.
Dr. Dale Lundgren, 1985.

An integral part of the short-term modeling evaluation was the analysis of calm meteorological conditions, which occurred about 8.8 percent of the time in the 5-year Orlando meteorological data base. During calm conditions, neither a wind direction nor wind speed is recorded. For such hours, the ISCST model uses the last recorded wind direction and a wind speed of 1 meter per second (m/s) to calculate concentrations and continues these conditions until the next noncalm condition is recorded. The persistence in wind direction caused by calm conditions can cause artificially and unrealistically high concentrations to be predicted by the ISC model.

As part of the analysis to review occurrences of calm meteorological conditions, the post-processing computer program, Calms Processor (CALMPRO), was used to identify the wind direction and wind speed assigned for each hour and to adjust the short-term average concentrations if an hourly average concentration was produced during calm conditions. The CALMPRO program was developed by EPA (1984), and the method used for evaluating the effects of calm conditions is reflective of current EPA modeling policy (EPA, 1983). The following criteria were used to calculate valid 24-hour average concentrations.

1. Valid hourly average concentrations for each receptor were based on any concentration predicted during noncalm conditions.
2. Hours of calm conditions were considered invalid, and concentrations were set to zero for all receptors for that hour.
3. Valid 24-hour average concentrations were calculated by summing concentrations produced during noncalm hours and dividing by the maximum of 18 hours or the number of noncalm hours during the 24-hour period.

The following examples illustrate how this method is used to calculate 24-hour average concentrations when calm conditions occur.

1. If calm conditions occurred for 6 hours, a valid 24-hour average concentration would be calculated using the 18 hours of valid concentrations only (i.e., 18-hour average), which is the

minimum number of hours used for determining a 24-hour average concentration. The 6 hours of calm conditions would be eliminated from the data set.

2. If calm conditions occurred for 12 hours, a valid 24-hour average concentration would be calculated based on the summation of concentrations produced by the remaining 12 hours, divided by 18.

Maximum annual average concentrations and monthly and annual average depositions were calculated using the ISCLT model, which calculates concentrations and depositions based on the joint frequencies of wind direction, wind speed, and atmospheric stability for the specific averaging period. The joint frequencies were tabulated using the stability array (STAR) program developed by the National Climatic Center and accepted by the EPA and DER. No adjustments were made to the predicted concentrations for calm conditions.

3.4 RECEPTOR GRID

3.4.1 Ambient Air Quality Analysis

3.4.1.1 Short-Term Analysis--To address the maximum air quality impacts of the proposed prilled sulfur installation in the vicinity of the Agrico SPCW facility, screening and refined phases were considered in the general modeling approach. For the screening phase, concentrations were predicted for a coarse receptor grid that included 288 receptors. The receptors were located along 36 radials spaced at ten degree increments around the facility and centered at the belt-to-surge hopper source. Along each radial, receptors were located at 200, 300, 400, 600, 800, 1,000, 1,500, and 2,000 m from the center of the grid.

For this phase, only emissions for the air-formed prilled sulfur were considered since emissions for wet-formed prilled sulfur were lower, which will result in lower ground-level concentrations and deposition rates.

After the screening phase was completed, the refined modeling was conducted by modeling the proposed sources using a refined receptor grid centered on the receptor which had the highest, second-highest 24-hour concentration. The receptors were located at intervals of 100 m in a 200-m by 200-m grid, for a total of nine receptors. Concentrations were predicted for only the period which produced the highest, second-highest 24-hour concentration. For this phase, both emissions for the wet-formed prilled and air-formed prilled sulfurs were modeled since the maximum concentrations for both emission scenarios are expected to occur under the same meteorological conditions and at the same location.

3.4.1.2 Long-Term Analysis--Annual average concentrations were predicted for emissions from both the wet-formed and air-formed prilled sulfurs using the same receptor grid used in the screening analysis for 24-hour concentrations. Refined modeling analysis was not performed for the annual averaging time because the spatial distributions of annual average concentrations are not expected to vary significantly from those produced during the screening analysis.

3.4.2 Particulate Deposition Rate Analysis

The receptor grid used in the particulate deposition rate analysis is presented in Figure 3-1, which is the same grid used in the screening phase of the ambient air quality analysis. No refined analysis was performed because monthly or annual average deposition calculations are not expected to vary significantly for the receptor locations modeled.

4.0 RESULTS

4.1 AMBIENT AIR QUALITY ANALYSIS

Based upon the screening analysis, a summary of the highest, second-highest 24-hour and annual average TSP concentrations due to the proposed Agrico SPCW prilled sulfur installation only are presented in Table 4-1. Results are presented for both wet-formed prill and air-formed prill. As discussed in Section 3.0, a screening analysis was not performed for wet-formed prill emissions for the 24-hour period, since emissions are lower than the air-formed prill emissions, which will result in lower predicted concentrations. For the 5 years of analysis, the highest, second-highest predicted 24-hour TSP concentration due to the proposed prilled sulfur installation only was predicted to occur during 1974 (Day 115). This worst-case day was refined for both wet- and air-formed prill emissions and resulted in concentrations of 1.4 microgram per cubic meter ($\mu g/m^3$) and 2.3 $\mu g/m^3$, respectively. These maximum concentrations are both predicted to occur at 200 m to the south-southeast (i.e., direction of 160 degrees) of the prilled sulfur installation. The spatial distribution of the composite highest, second-highest 24-hour TSP concentrations for the 5 years due to the proposed sulfur installation only is shown in Figure 4-1 for air-formed prill. The predicted spatial distribution for wet-formed prill is expected to be similar, but concentrations for wet-formed prill would be decreased by a factor of about 3.2 (i.e., ratio of short-term air-formed to wet-formed emissions).

The maximum annual average TSP concentration predicted for the proposed sulfur installation only is 0.21 $\mu g/m^3$ for wet-formed prill and 0.33 $\mu g/m^3$ for air-formed prill (see Table 4-1). These maximum concentrations are less than 1 percent of the Florida AAQS of 60 $\mu g/m^3$ and 33 percent of the significance limit of 1 ug/m^3.

The spatial distribution of the composite highest annual concentrations due to the proposed sulfur installation only, for wet- and air-formed prill are shown in Figures 4-2 and 4-3, respectively.

AIR QUALITY ASSESSMENT OF THE PROPOSED AGRICO SOUTH PIERCE PRILLED SULFUR HANDLING AND MELTING INSTALLATION

Prepared for:

DE LA PARTE AND GILBERT, P.A.

Regarding:

DER PERMIT NO. AC 53-55780
AGRICO CHEMICAL COMPANY'S PRILLED SULFUR
HANDLING AND MELTING INSTALLATION
SOUTH PIERCE CHEMICAL WORKS
Polk County, Florida

Prepared by:

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
Gainesville, Florida

ESE No. 85-123-0100-2110

August 1985

Table 4-1. Predicted Highest, Second-Highest 24-Hour and Maximum Annual Average TSP Concentrations from the Screening Analysis

Year	Concentration ($\mu g/m^3$) Predicted for Proposed Sulfur Installation Only	
	24-hour	Annual
	Air-Formed Prill at 0.5 Percent H_2O	
1974	2.3	0.33
1975	2.1	0.25
1976	1.7	0.25
1977	1.4	0.22
1978	1.7	0.24
	Wet-Formed Prill at 2.0 Percent H_2O	
1974	*	0.21
1975	*	0.16
1976	*	0.16
1977	*	0.14
1978	*	0.15

Note: Florida AAQS: 150 $\mu g/m^3$, 24-hour; 60 $\mu g/m^3$, annual.
Significance Limit: 5 $\mu g/m^3$, 24-hour; 1 $\mu g/m^3$, annual.

*No screening analysis performed.

Source: ESE, 1985.

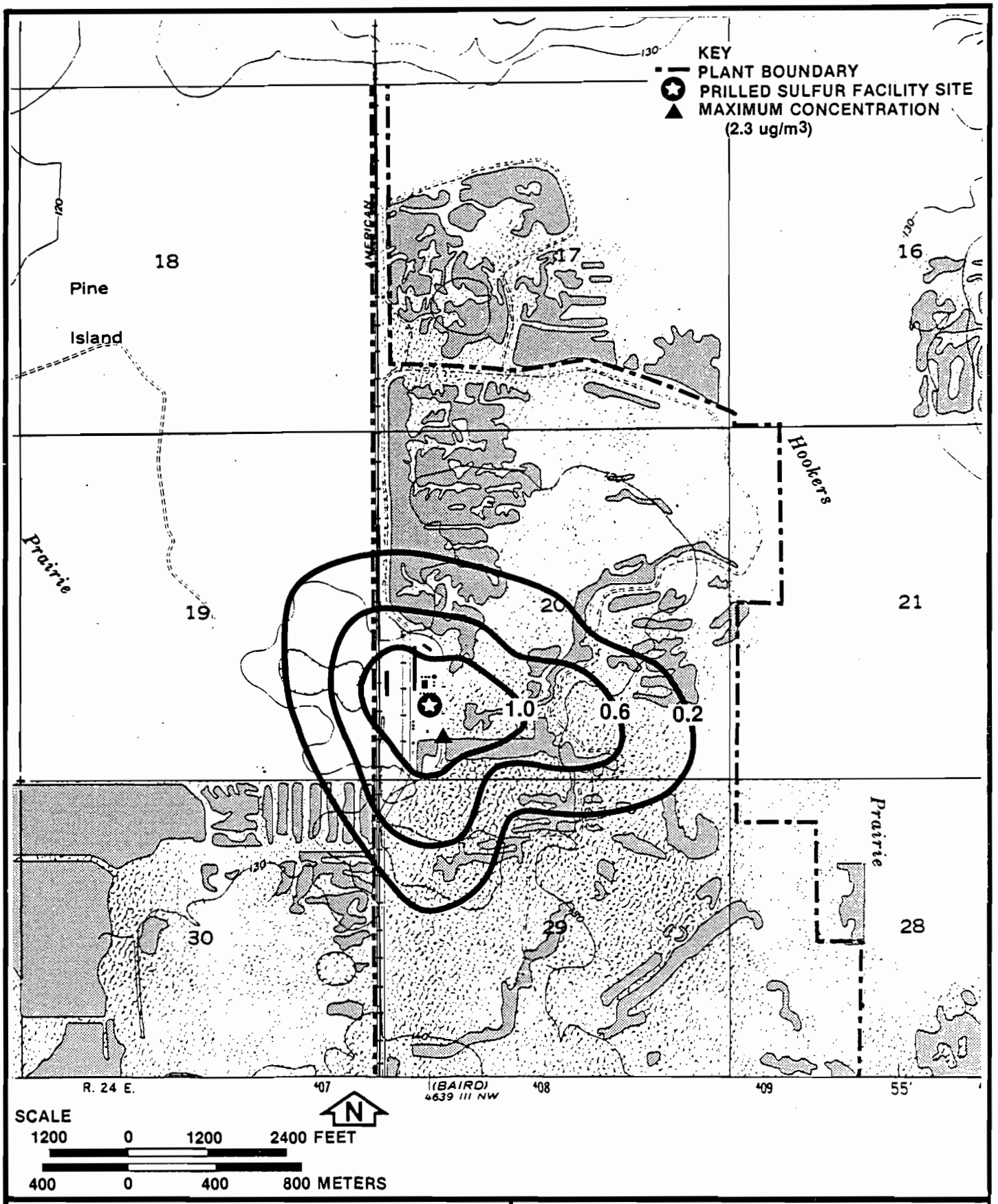


Figure 4-1
COMPOSITE OF MAXIMUM 24-HOUR AVERAGE TSP CONCENTRATIONS (ug/m^3) FOR PRILLED SULFUR INSTALLATION ONLY——AIR-FORMED PRILL

AGRICO CHEMICAL COMPANY
Prilled Sulfur Facility

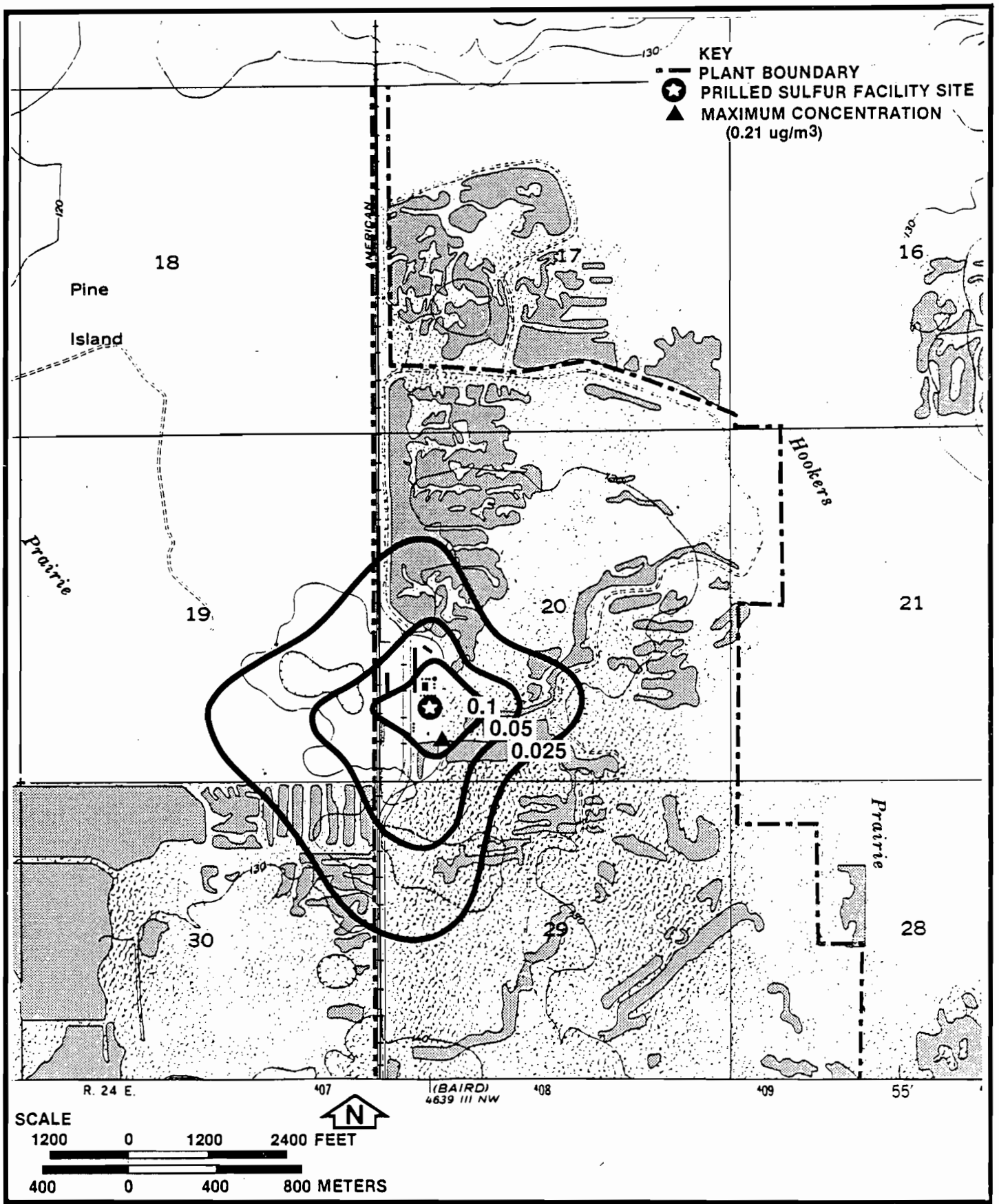


Figure 4-2
COMPOSITE OF MAXIMUM ANNUAL AVERAGE TSP CONCENTRATIONS (ug/m^3) FOR PRILLED SULFUR INSTALLATION ONLY——WET-FORMED PRILL

AGRICO CHEMICAL COMPANY
Prilled Sulfur Facility

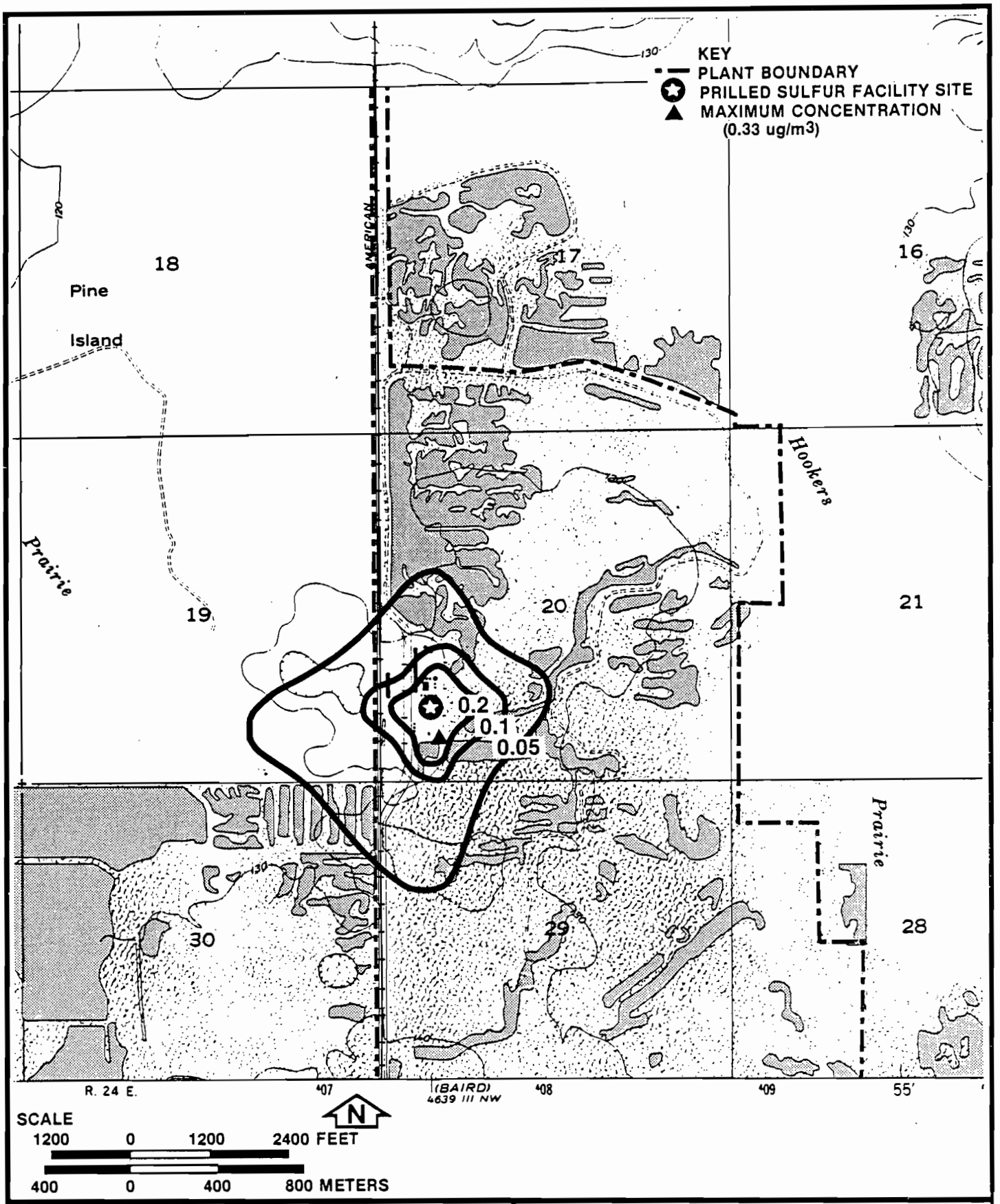


Figure 4-3
COMPOSITE OF MAXIMUM ANNUAL AVERAGE TSP CONCENTRATIONS (ug/m^3) FOR PRILLED SULFUR INSTALLATION ONLY——AIR-FORMED PRILL

AGRICO CHEMICAL COMPANY
Prilled Sulfur Facility

4.2 PARTICULATE DEPOSITION RATE ANALYSIS

Results of the sulfur particulate deposition rate analysis for the prilled sulfur installation only are presented in Table 4-2. The results are based upon 1974 meteorological data, which is the year of predicted maximum annual average TSP impacts (see Table 4-1). The maximum annual deposition rate predicted at any receptor was 0.099 grams per square meter (g/m^2) [2.18 pounds per hectare (lb/ha)] for the wet-formed prill and 0.32 g/m^2 (7.05 lb/ha) for the air-formed prill. The maximum monthly deposition rate predicted for any receptor was 0.025 g/m^2 (0.55 lb/ha) for wet-formed prill and 0.079 g/m^2 (1.74 lb/ha) for air-formed prill. The maximum monthly deposition rate was predicted to occur in October for both wet and air-formed prill.

The spatial distribution of annual sulfur particulate deposition rates is portrayed in Figure 4-4 for wet-formed prill and in Figure 4-5 for air-formed prill. Similarly, Figures 4-6 and 4-7 depict the spatial distribution of the composite maximum monthly deposition rates for wet- and air-formed prill, respectively. These figures show that air-formed prill results in the maximum annual and monthly deposition rates at each receptor.

Table 4-2. Estimated Sulfur Particulate Deposition Rates, Prilled Sulfur Installation Only

Period†	Wet-Formed Prill Maximum Deposition Rate* g/m^2	Wet-Formed Prill Maximum Deposition Rate* lb/hectare	Air-Formed Prill Maximum Deposition Rate* g/m^2	Air-Formed Prill Maximum Deposition Rate* lb/hectare
January	0.013	0.29	0.043	0.95
February	0.010	0.22	0.031	0.68
March	0.012	0.26	0.038	0.84
April	0.008	0.18	0.027	0.59
May	0.011	0.24	0.037	0.82
June	0.010	0.22	0.033	0.73
July	0.009	0.20	0.029	0.64
August	0.011	0.24	0.036	0.79
September	0.010	0.22	0.032	0.71
October	0.025	0.55	0.079	1.74
November	0.019	0.42	0.060	1.32
December	0.012	0.26	0.039	0.86
Annual	0.099	2.18	0.320	7.05

*The location of maximum monthly values change; therefore, the sum of the monthly values does not equal the annual deposition value.
†Based on 1974 meteorological data.

Note: g/m^2 x 22.03 = lb/hectare.

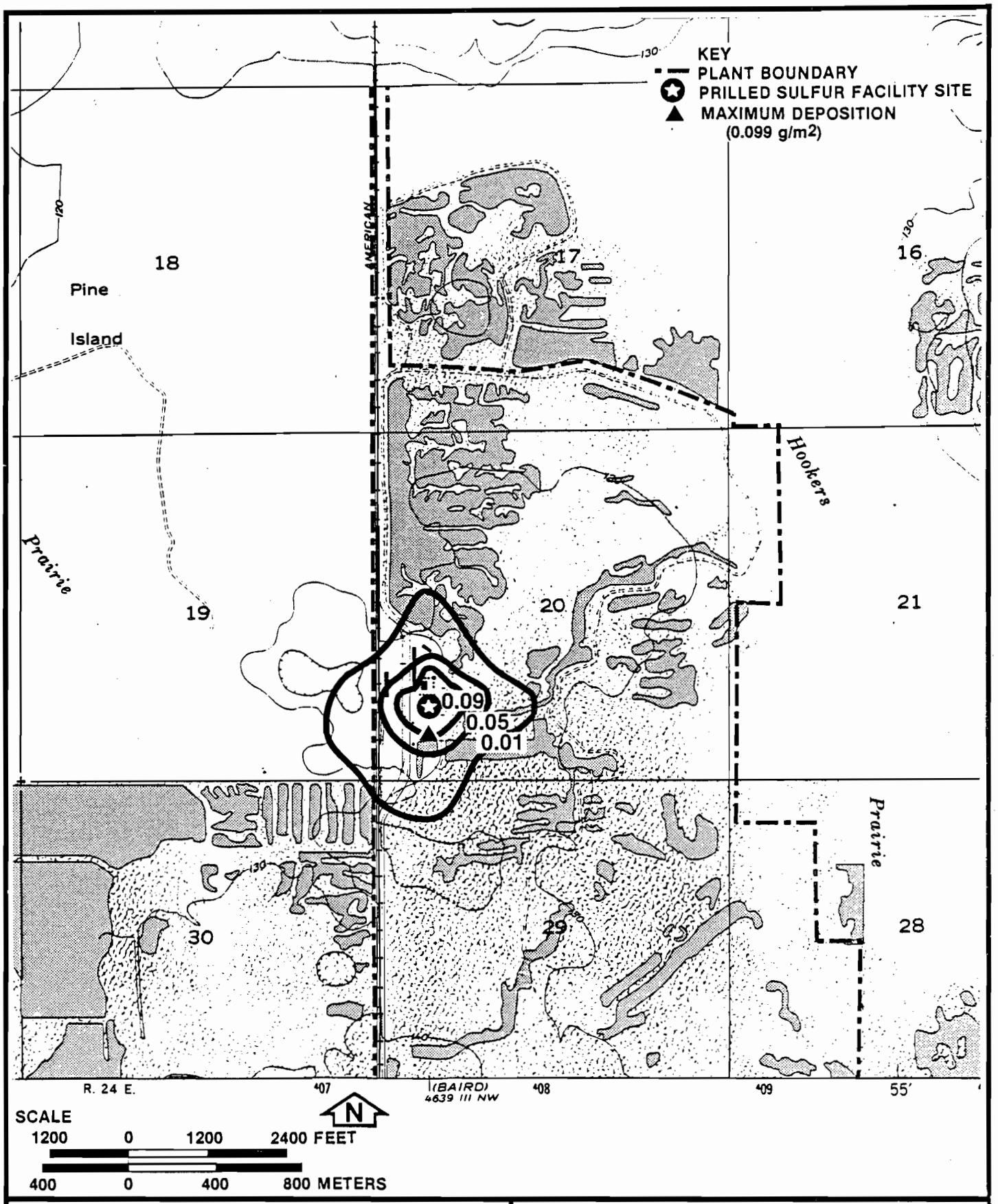


Figure 4-4
1974 ANNUAL SULFUR PARTICULATE DEPOSITION RATES (g/m^2)—— WET-FORMED PRILL

AGRICO CHEMICAL COMPANY
Prilled Sulfur Facility

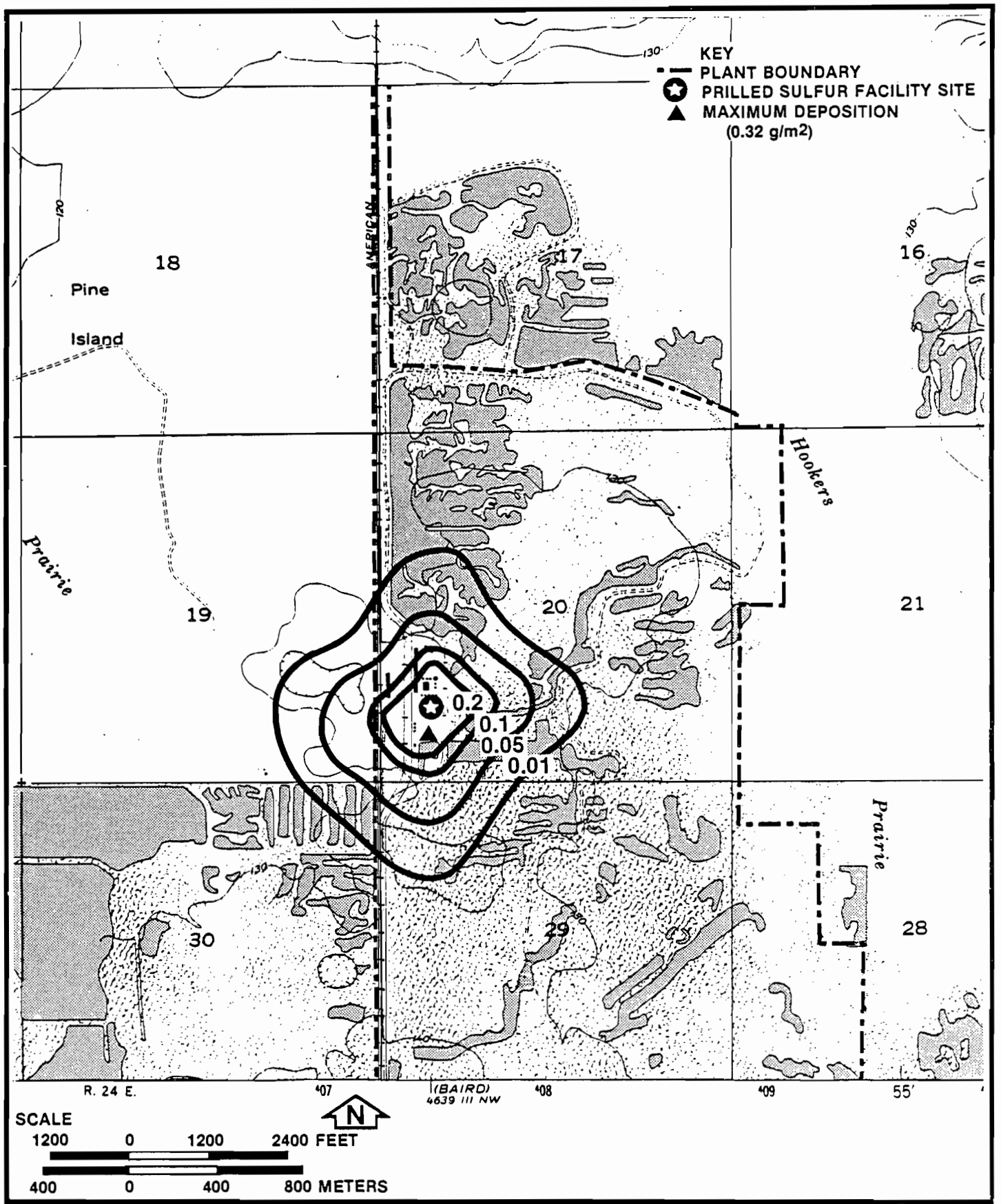


Figure 4-5
1974 ANNUAL SULFUR PARTICULATE DEPOSITION RATES (g/m^2)—— AIR-FORMED PRILL

AGRICO CHEMICAL COMPANY
Prilled Sulfur Facility

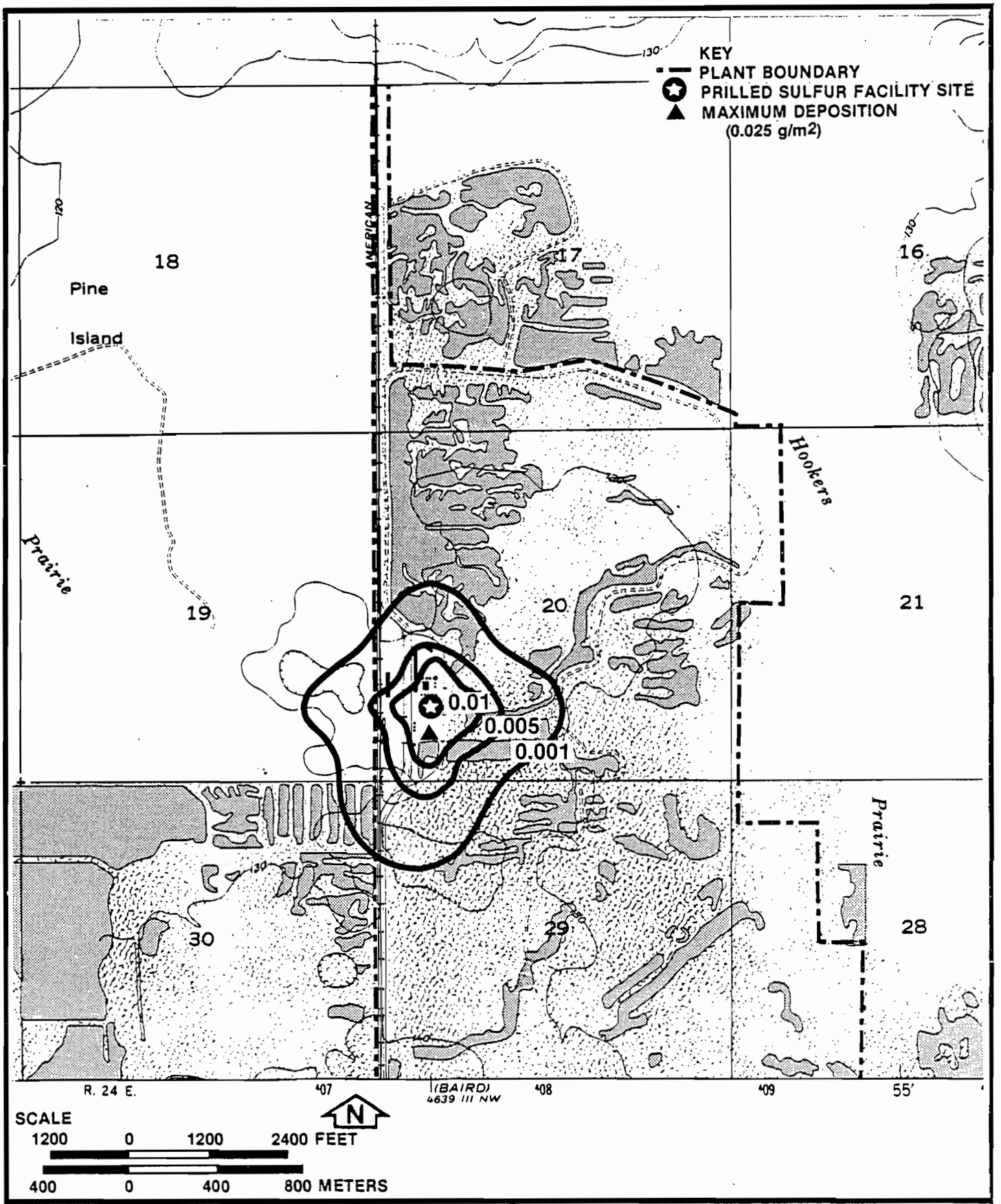


Figure 4-6
COMPOSITE OF MAXIMUM 1974 MONTHLY SULFUR PARTICULATE DEPOSITION RATES (g/m^2)——WET-FORMED PRILL

AGRICO CHEMICAL COMPANY
Prilled Sulfur Facility

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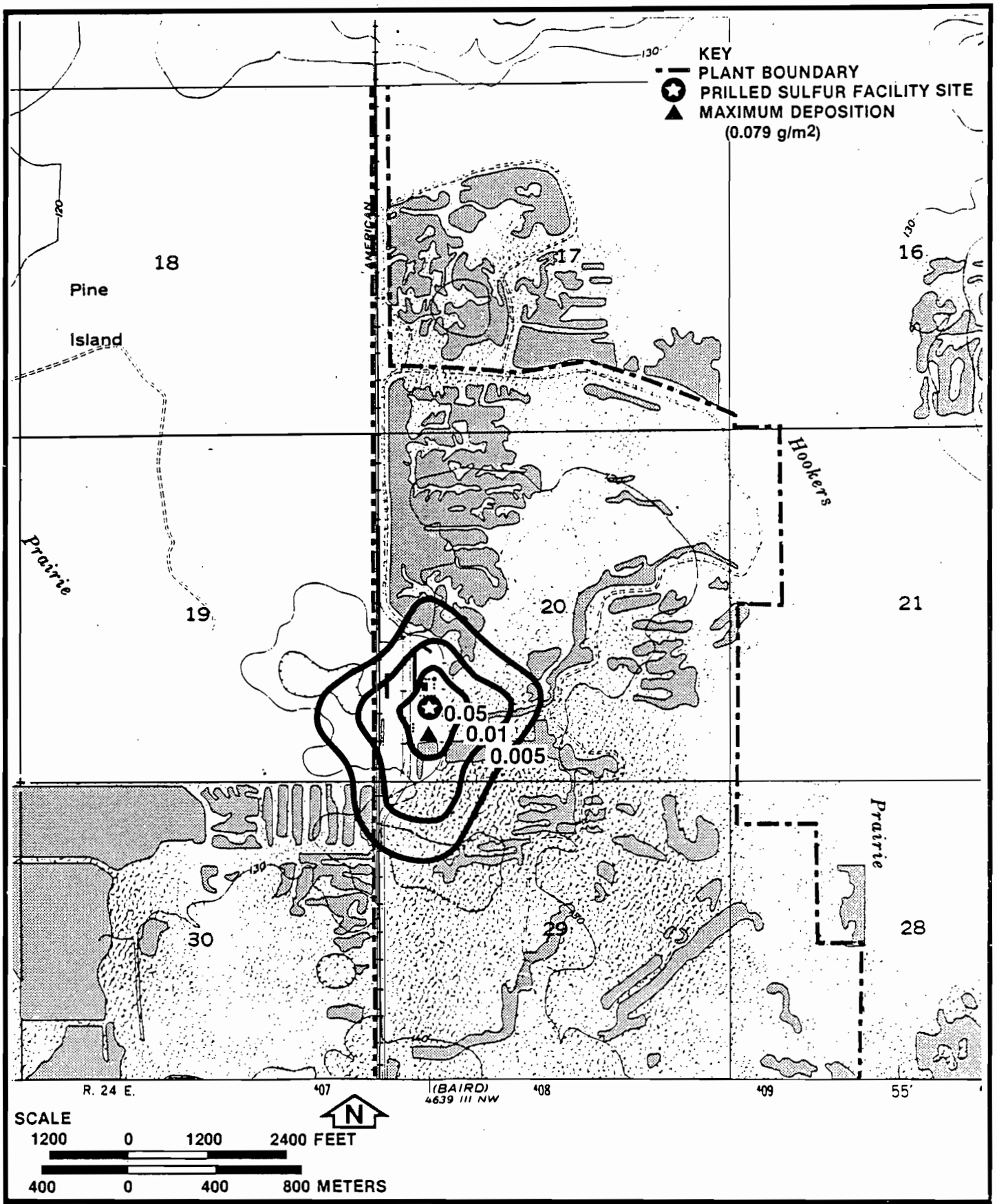


Figure 4-7
COMPOSITE OF MAXIMUM 1974 MONTHLY SULFUR PARTICULATE DEPOSITION RATES (g/m^2)——AIR-FORMED PRILL

AGRICO CHEMICAL COMPANY
Prilled Sulfur Facility

APPENDIX A

EXCERPTS FROM REVISED AIR CONSTRUCTION PERMIT APPLICATION FOR PRILLED SULFUR

AGRICO CHEMICAL COMPANY
SOUTH PIERCE CHEMICAL WORKS

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 be treated with 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 transfrerred 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 suffactants, 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 duct 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 both 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 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 essentailly all of the sodium hydroxide has been converted to sodium sulfide. When this occurs, the nearly spent solution is pumped to the spent caustic treated, 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.

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%.

SUPPLEMENTS #2, 3 & 5

APPENDIX B

ESTIMATION OF TOTAL SULFUR PARTICULATE EMISSIONS FROM AGRICO'S SPCW PRILLED SULFUR HANDLING AND MELTING INSTALLATION

Rule 17-2.515(4)(c) sets forth the requirements to determine total sulfur particulate emissions for deposition rate analysis. These factors are to be used to estimate sulfur deposition rates due to emissions from a sulfur handling facility. The rule requires that a particle-size distribution curve (aerodynamic particle diameter size) be calculated based upon tests, published data, or prior test results. Particles from 0 to 300 micrometers (μm) in diameter are to be considered. The emission estimates developed according to Rule 17-2.215(4)(a) (i.e., Table 2-1 as applied to SPCW) must be assumed to represent the 0- to 30-μm size particles. Using these emission estimates and the calculated particle-size distribution, the weight of particles in the 30- to 300-μm size range is to be estimated. For deposition calculations, the distribution is to be broken into a number of particle-size ranges, with the mass median diameter used to represent each particle-size category. Control efficiencies are to be developed and applied to each particle-size range. Agrico has developed sulfur deposition emission estimates according to the applicable rules, as described below.

A particle-size distribution curve for particulate emissions from prilled sulfur was prepared by Dr. Chatten Cowherd of Midwest Research Institute (MRI). This distribution is based on particle-size data given in AP-42 and MRI prilled sulfur emissions measurements reported in "Measurement of Fugitive Dust Emissions from Prilled Sulfur Handling" (June 1984). The MRI data, obtained for wet-formed prilled sulfur, are in general agreement and support the AP-42 data.

The procedure for developing the particle-size distribution is based on the particle size data given in AP-42 (batch drop equation) together with the MRI emissions data collected during the June (1984) field tests. The size distribution of the <50 μm Aerodynamic (μmA) particulate emissions measured during the first nine handlings of the sulfur prill in California was found to agree very closely with AP-42. A spline-fit of the sulfur particle-size data, following the procedure described in

"A Computer-Based Cascade Impactor Data Reduction System" (EPA-600/7-78-042), was used to obtain an estimate of the mass fraction of total particulate emissions in the <50 µmA particle-size range, for which the AP-42 equations were originally developed. A second spline-fit for particles of all sizes was then obtained using the estimated <50 µmA fraction, the size fractions given in AP-42, and an estimated largest particle diameter of 300 µmA. The resulting particle size distribution is shown in Figure B-1 and represents uncontrolled total sulfur particle emissions. Since the California testing represents the only particle size data for sulfur particulate emissions, Figure B-1 was assumed applicable to both wet- and air-formed prilled sulfur particulate emissions.

In performing the deposition calculation, the mass distribution curve must be divided into a number of particle-size intervals. This number should normally be 10, or at most 20. The distribution should be divided into equal weight fractions. If 10 intervals are chosen, each interval should represent 10 percent of the total aerosol mass. Each interval should be modeled using the interval mass median particle size to represent that interval. For example, the cumulative mass distribution curve (see Figure B-1) would be divided into 10 equal mass fractions (0 to 10 percent, 10 to 20 percent, 20 to 30 percent, etc.). The mass median diameter of the 0- to 10-percent fraction is the 5-percent particle size. The mass median diameter of the 10- to 20-percent fraction is the 15-percent particle size, etc.

These 10 median diameters (5-percent size, 15-percent size, 25-percent size, 35-percent size, etc.) are then used to make the deposition calculations using the gravitational settling velocity for particles of these sizes. Ten percent of the total aerosol mass is attributed to each interval and the results of the ten calculations summed to obtain the total deposition.

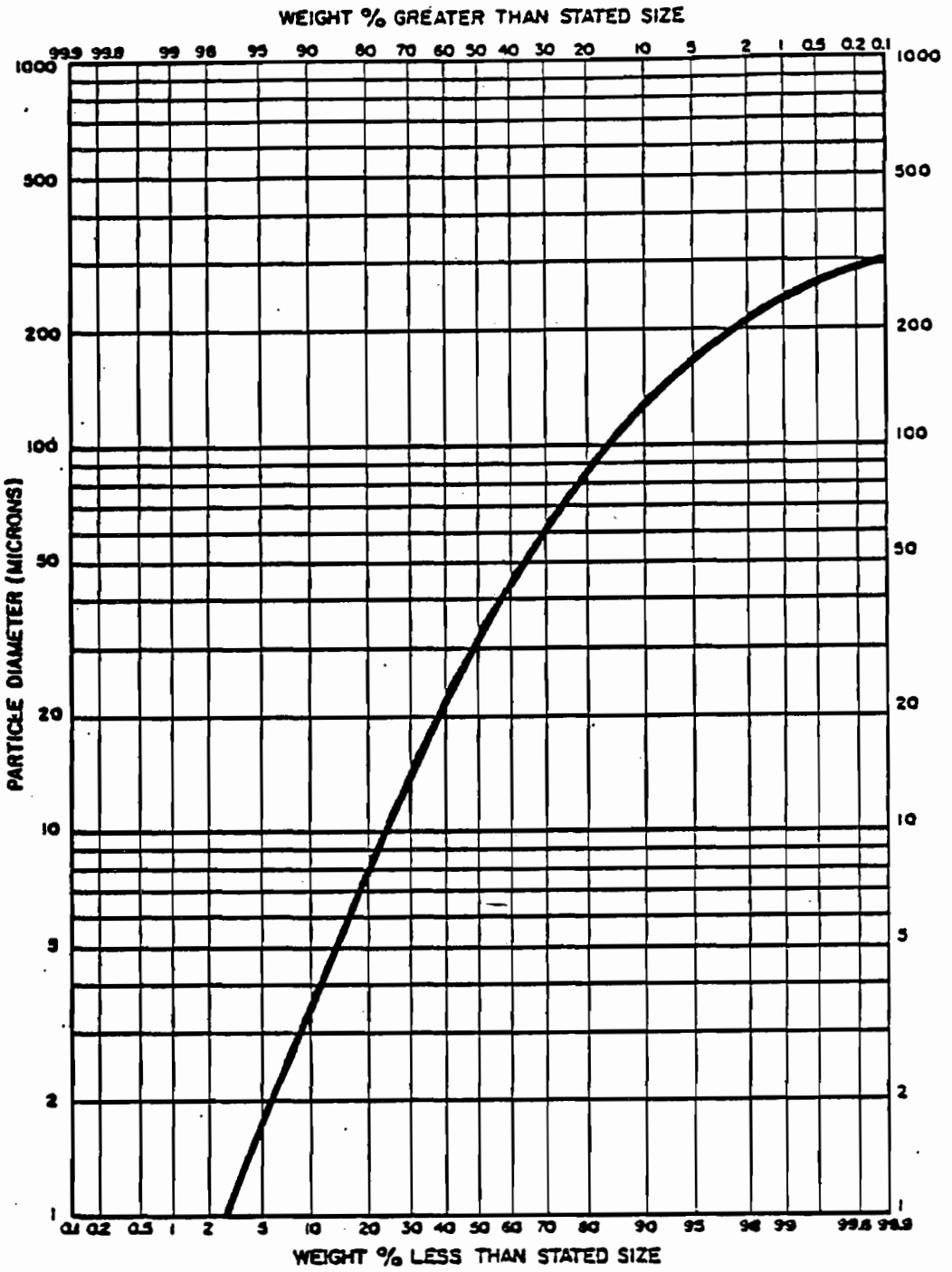


Figure B-1
PARTICLE SIZE DISTRIBUTION FOR FUGITIVE EMISSIONS FROM PRILLED SULFUR

AGRICO CHEMICAL COMPANY
Prilled Sulfur Facility

If the most accurate calculation is desired, then 20 intervals, each representing 5 percent of the total aerosol mass, would be used. Inherent model limitations and inaccuracy limit the maximum useful interval number to 20. Ten intervals would normally produce similar accuracy. Ten intervals were therefore used for the Big Bend analysis.

For the distribution shown, the ten diameters used in the deposition calculations are as follows:

D-5% = 2 μm, Settling Velocity = 0.013 cm/sec
D-15% = 6 μm, Settling Velocity = 0.11 cm/sec
D-25% = 11 μm, Settling Velocity = 0.37 cm/sec
D-35% = 18 μm, Settling Velocity = 0.98 cm/sec
D-45% = 26 μm, Settling Velocity = 2.04 cm/sec
D-55% = 37 μm, Settling Velocity = 4.14 cm/sec
D-65% = 52 μm, Settling Velocity = 8.14 cm/sec
D-75% = 64 μm, Settling Velocity = 11.7 cm/sec
D-85% = 110 μm, Settling Velocity = 29.0 cm/sec
D-95% = 160 μm, Settling Velocity = 52.0 cm/sec

Total aerosol mass used in the deposition calculations is determined by multiplying the AP-42 calculated emissions by 2.1. The 2.1 factor was derived from Figure A-1 by assuming that the AP-42 estimates represent the total aerosol mass in the 0- to 30-μm size range (i.e., 48 percent by weight). The resulting emissions represent total aerosol mass in the 0- to 300-μm size range. Ten percent of this total mass is apportioned to each of the ten particle sizes listed above to represent the ten distribution weight fractions modeled.

The control measures to be applied to the prilled sulfur installation operations consist of water/surfactant spray or fogging systems. Sufficient data are not available to estimate control efficiency versus particle-size category for these control measures for 0- to 300-μm particles. Therefore, the estimated control efficiencies were assumed to

apply equally to all particle-size categories. The suspended particulate emissions after control can then be multiplied by the previously derived factor of 2.1 to obtain total particulate emissions (0 to 300 μm) after control.

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

BEST AVAILABLE COPY

[redacted]

Agrico

Agrico Chemical Company
One Williams Center
Tulsa, Oklahoma 74103

No. [redacted]

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

Robert B. Swope

Authorized Signatures

[redacted]

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

No. 76094

RECEIPT FOR APPLICATION FEES AND MISCELLANEOUS REVENUE

Received from Agrico Chemical Company Date Oct. 14, 1985

Address One Williams Center Tulsa Okla. Dollars $ 100.00

Applicant Name & Address Agrico Chem. Co. P.O. Box 74103 1969, Bartow, FL 33830

Source of Revenue

Revenue Code 001031 Application Number AC 53-111196

By Patricia G. Adams

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 contro facilities in such a manner as to comply with the provision of Chapter 403, Florid Statutes, and all the rules and regulations of the department and revisions thereof. also understand that a permit, if granted by the department, will be non-transferabl and I will promptly notify the department upon sale or legal transfer of the permitte establishment.

*Attach letter of authorization

Signed: L.C.Lahman

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

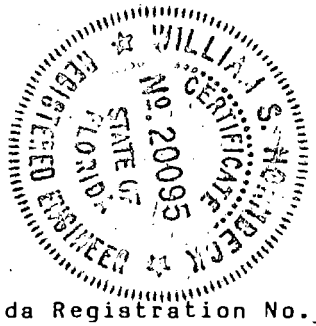
Date: 10/1/85 Telephone No. (813) 428-1423

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 hav been designed/examined by me and found to be in conformity with modern engineerin principles applicable to the treatment and disposal of pollutants characterized in th permit application. There is reasonable assurance, in my professional judgment, tha

[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	

*See Appendix D

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard.

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

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
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 atructures 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 aa 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.

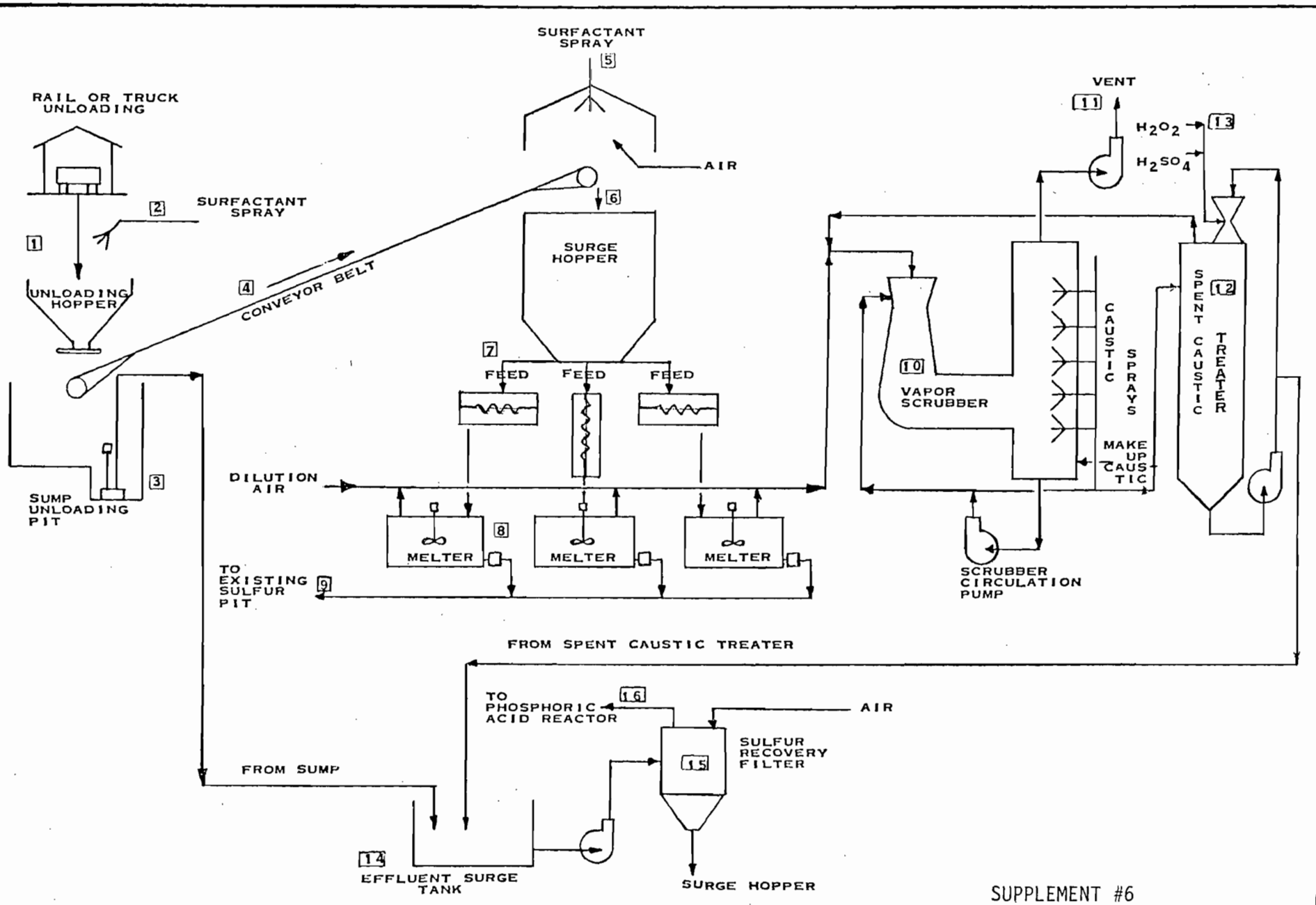
The vapor scrubber system consists of a Venturi spray tower scrubber, the vapor scrubber circulation pumps, and the vapor scrubber fan. The sulfur melter vapors are scrubbed by a circulating solution of sodium hydroxide with the hydrogen sulfide being converted to sodium sulfide. The scrubber system 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.

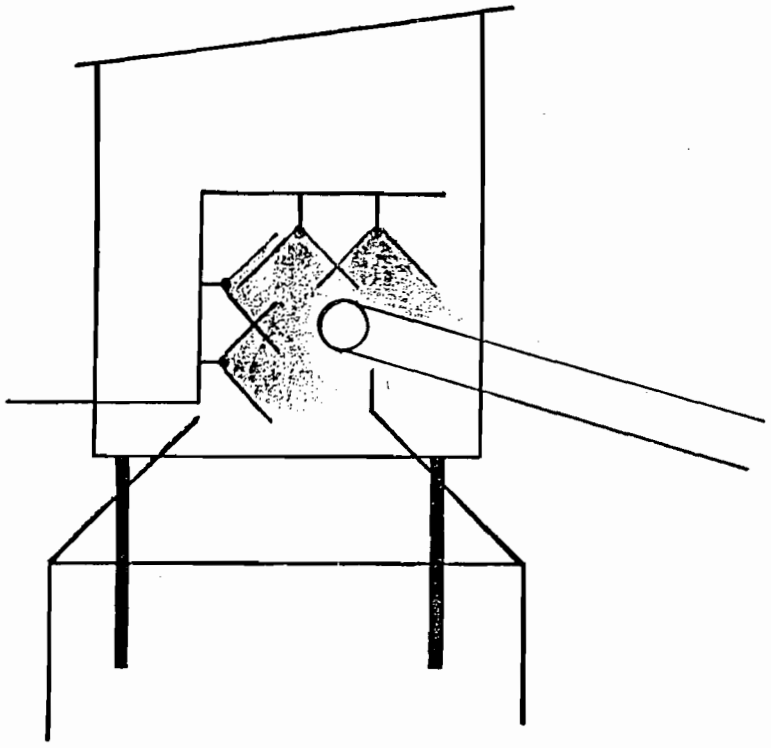
Yearly emissions rate:

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

Hourly emission rate:

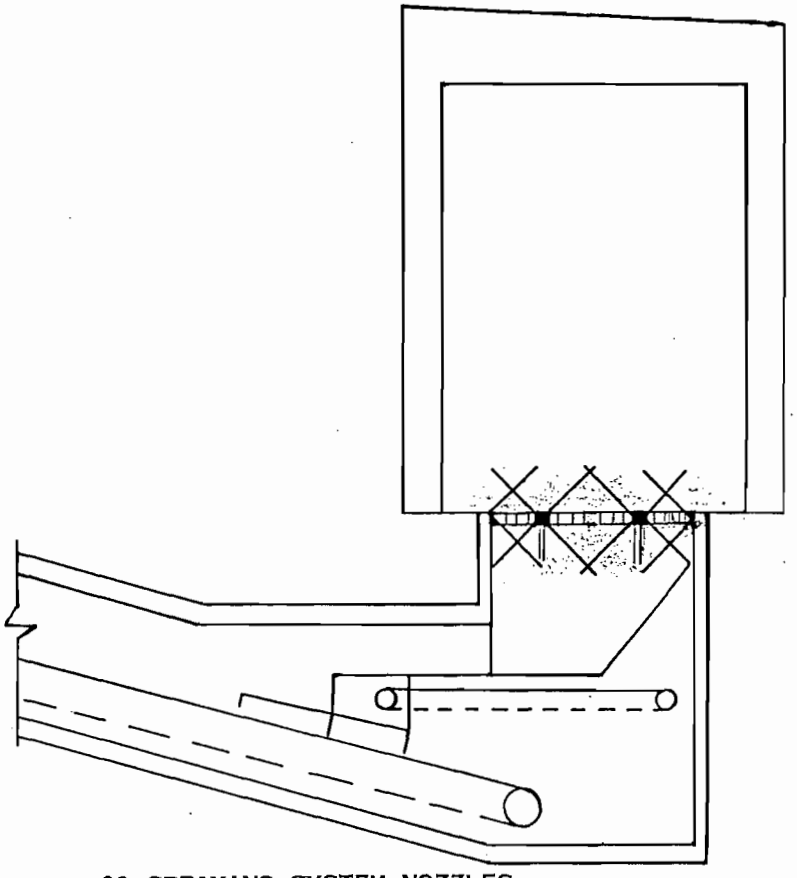
$$42 \frac{\text{Lb } H_2S}{\text{Hr.}} \times .02 = \frac{.84 \text{ Lb } H_2S}{\text{Hr.}}$$

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.

SUPPLEMENT #4

UNLOADING HOPPER - WATER SPRAYS

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

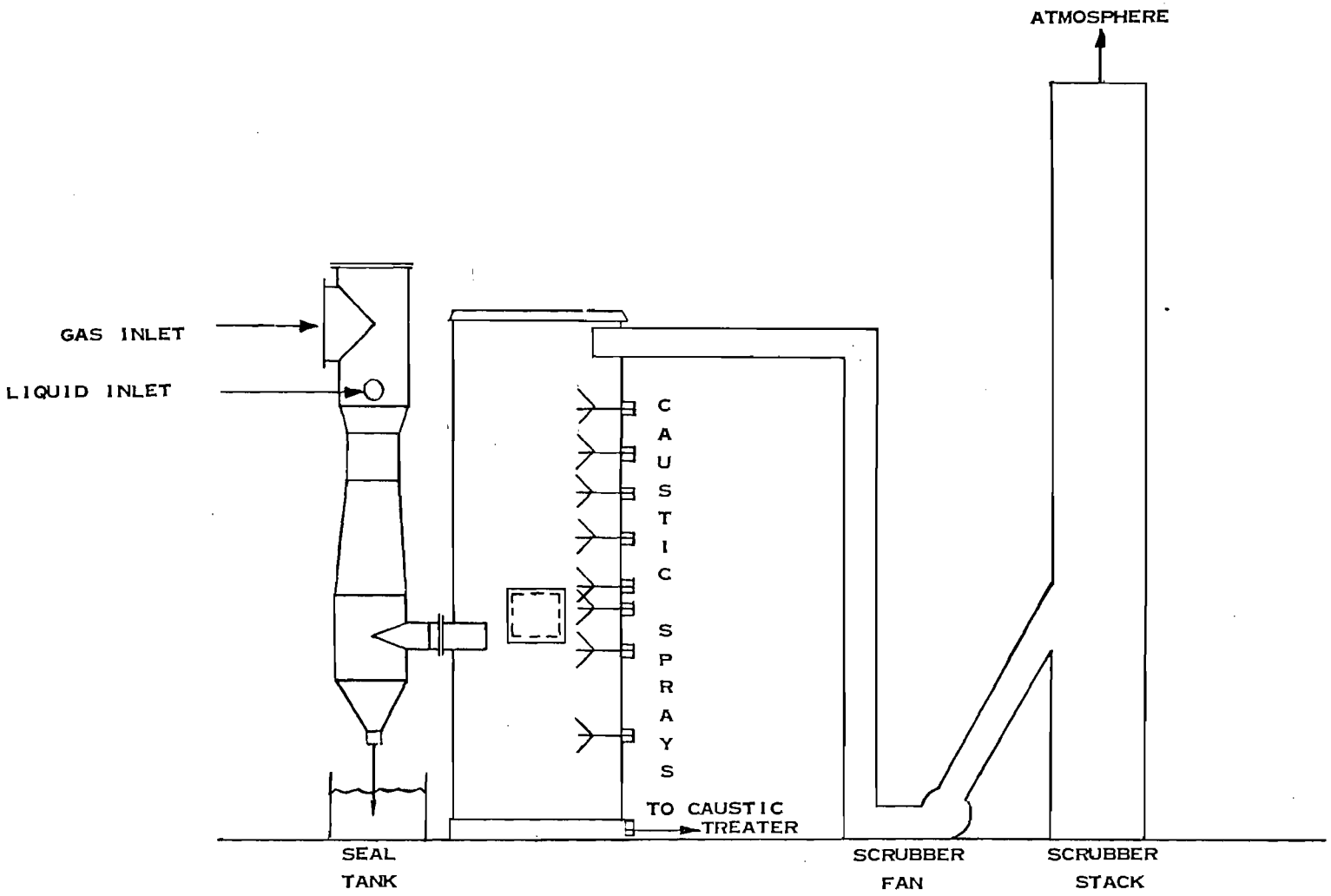
7.0 SHIPPING

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:

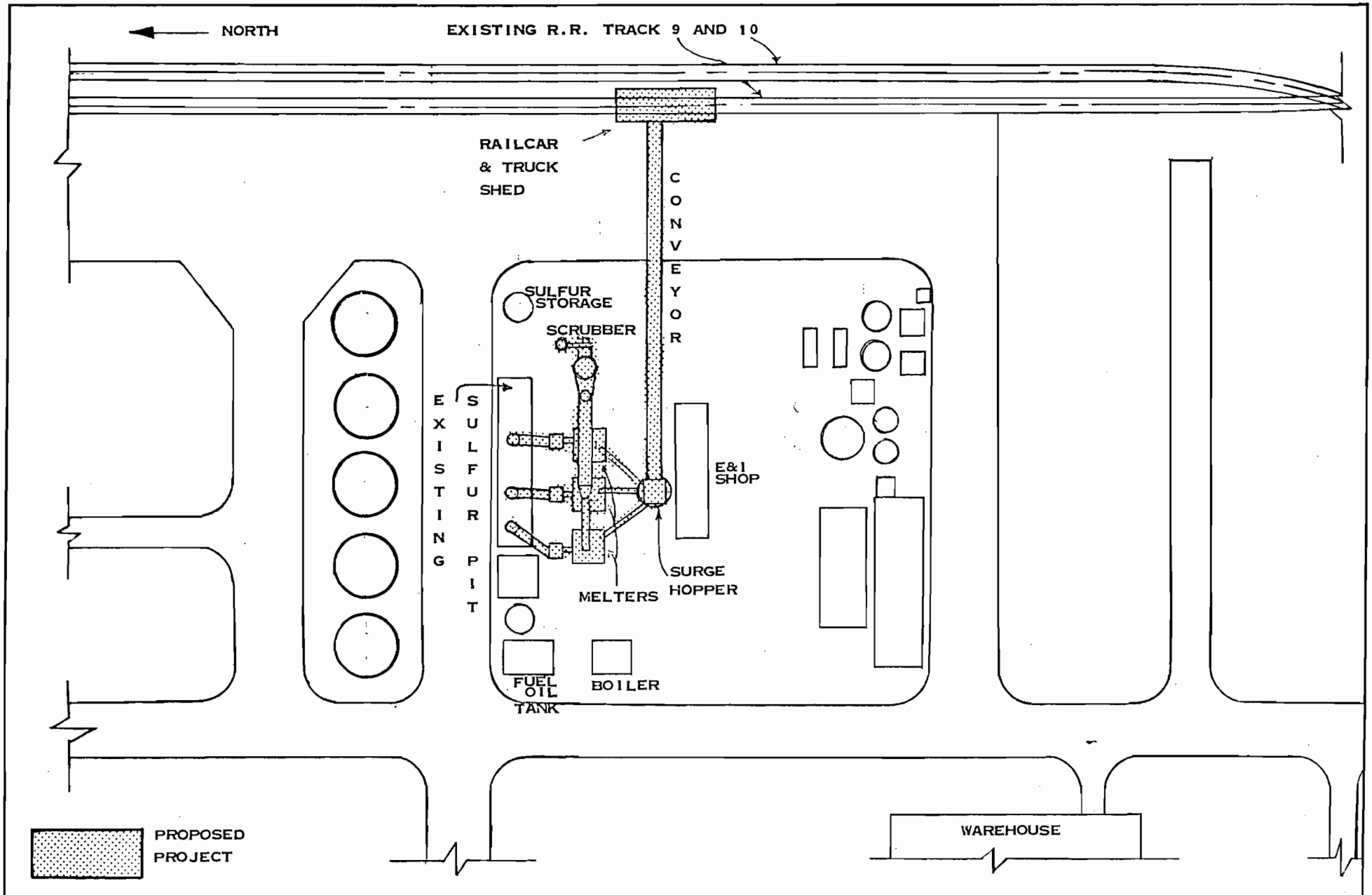
Equipment Description
Equipment Model and Serial Numbers
Equipment Item Numbers



SUPPLEMENT #4

VENTURI FUME SCRUBBER AND STACK - SOUTH PIERCE CHEMICAL WORKS

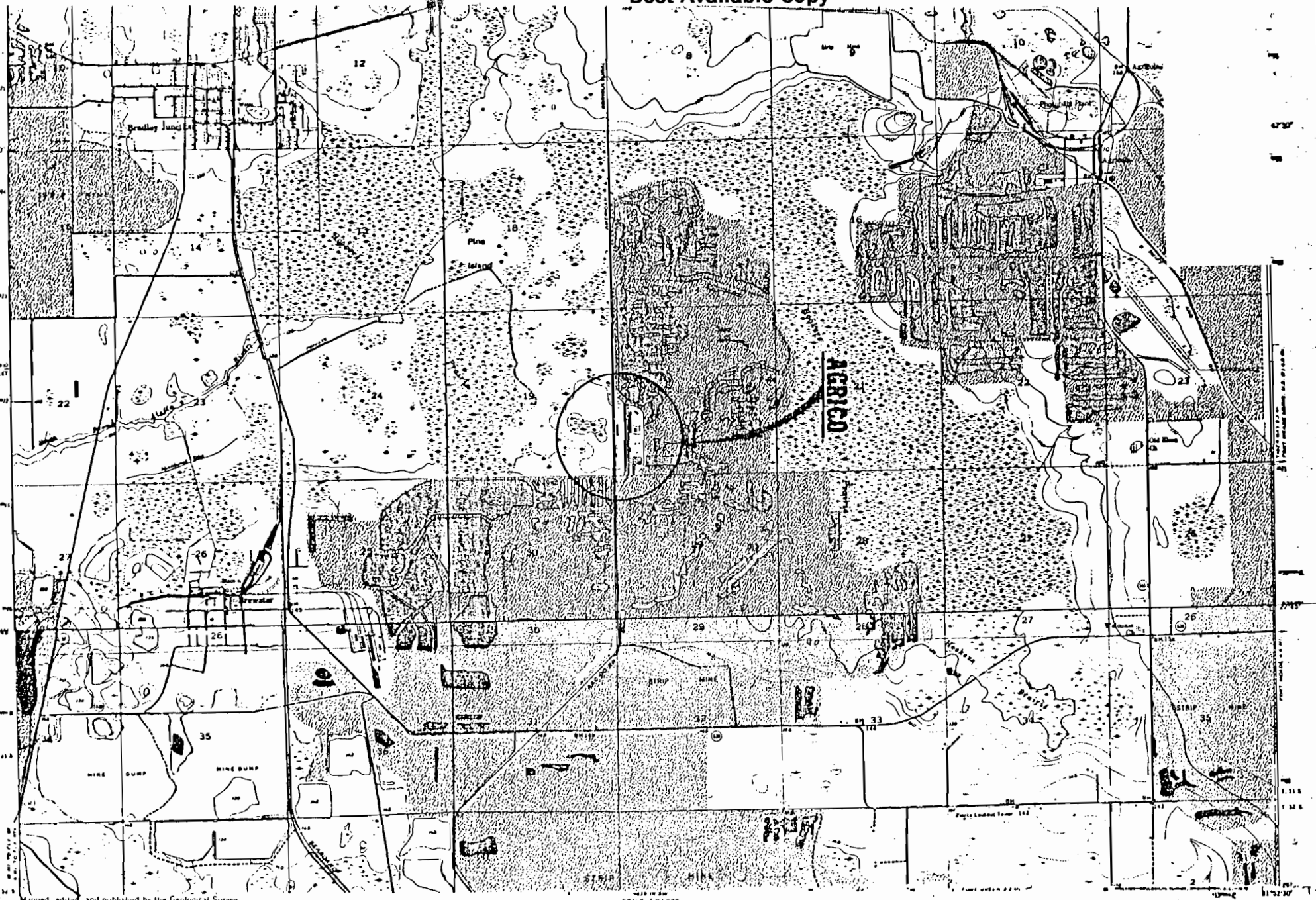
PAS 4/85



SUPPLEMENT #8

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

PAS 4/85



SUPPLEMENT #7

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 planetable surveys 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

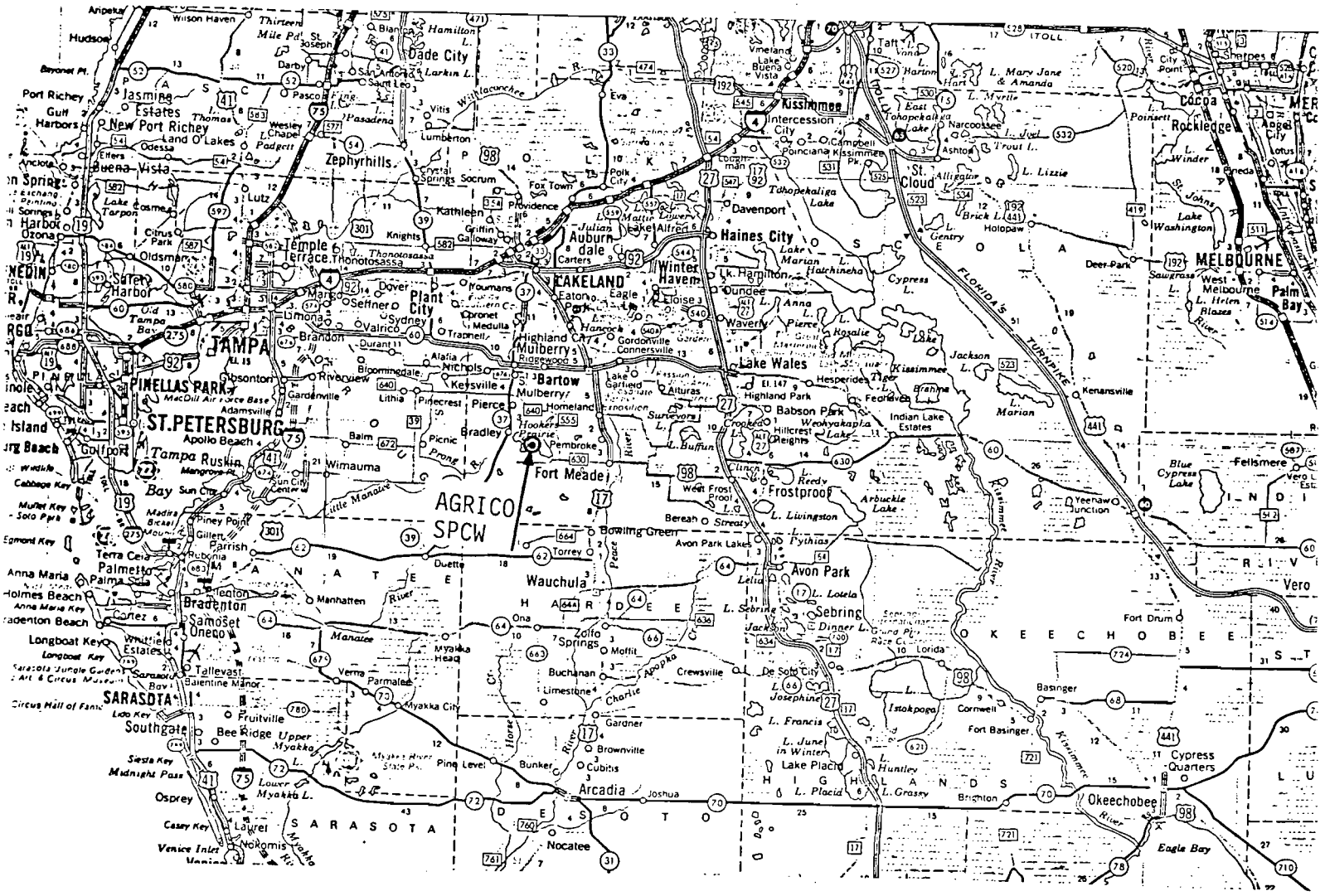
UTM GRID AND 1972 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

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

BAIRD, FLA.
N2737.5—W8152.5/7.5

1955
PHOTOREVISED 1972

LOCATION MAP
AGRICO CHEMICAL COMPANY
SOUTH PIERCE CHEMICAL WORKS



XERXES CORPORATION
CENTURY FIBERGLASS™
HEIL PROCESS EQUIPMENT™
SFRP* STORAGE TANKS

February 1, 1984

Jacobs Engineering Group, Inc.
Lakeland, Florida 33802

Attention: Mr. Stash Janikowski

Subject: Sulfur/Hydrogen Sulfide Scrubber System

Reference: Heil Proposal #QN-1300

Gentlemen:

We are pleased to submit our confirming budget proposal to furnish a scrubber system to scrub off-gases from a sulfur melting pit operation. The proposed system will consist of a venturi scrubber, followed by a spray chamber, a fan, a recirculation pump & piping system, interconnecting ductwork, and a pH control system.

The design basis for the system is as follows:

Gas flow - 26,560 ACFM.
Temperature - 150°F.
Moisture content - 0.0928 lbs. water/lbs. dry air.
Hydrogen sulfide - 42 lbs. per hour.
Elemental sulfur - 4 lbs. per hour.

Individual equipment items are as follows:

ITEM I - Venturi

The venturi will be a Heil Model 728 vertical venturi scrubber, fabricated of Atlac 382 FRP resin in general accordance with NBS PS 15-69. Dimensions of the scrubber are shown on our attached bulletin. Based on a gas flow of 26,560 CFM at 150°F. The scrubber will operate at a static pressure drop of 20" w.c. The scrubber will remove 95% of the particulate matter 0.5 microns in size and 98% of the particulate matter 1.0 microns in size, and in addition, approximately 60 - 70% of the H_2S contained in the incoming gas stream, using a recirculated flow of 228 gpm of dilute caustic solution at a nozzle pressure of 20 psig.

ITEM II - Spray Chamber

Following the venturi, the gas stream will enter a modified 718 fume washer/spray tower. The unit will be 8' dia. by approximately 20' overall height. This unit will be fabricated of Atlac 382 FRP resin and also in general accordance with NBS PS 15-69. This unit will contain four (4) separate spray banks* spaced at approximately 2' intervals. Using the recirculated flow of dilute caustic solution at a flow rate of 100 gpm per spray bank, this unit will remove approximately * 90 - 92% of the hydrogen sulfide remaining in the gas exhausted from the venturi scrubber. In addition, this unit will also remove 99.9% of the entrained droplets

* Based on ~0.7 transfer units per spray bank. 5 spray banks = 96-97%
Overall H_2S efficiency w/5 spray banks = $100[0.6 + 0.96(0.4)] = 98.4\%$

AVON MANUFACTURING FACILITY/XERXES CORPORATION
34250 MILLS ROAD, AVON, OHIO 44011 • PHONE (216) 327-6051
Dan Himmel - Ventimics

before exhausting the gas to the fan. The bottom of the scrubber will act as a sump for recirculated solution. Sump capacity will be approximately 2200 gallons. Also the unit will be complete with a mist eliminator. The mist eliminator will be a Heilex EB 2-Bend design fabricated of Noryl ENG 265 material.

ITEM III - Fan

The fan will be a Heil Model HCB-36 FRP centrifugal fan fabricated of Atlac 382 resin. The fan will be designed for 26,000 ACFM at 23" w.c. static pressure. The fan will operate at approximately 1130 RPM at 175 BHP. The fan will be complete with a 200 h.p. 1800 RPM TEFC motor and will also include an access door, a housing drain, a belt and shaft guard, flex connector for the inlet, a fixed speed V-belt drive, and a standard Neoprene shaft seal. The fan will be statically and dynamically balanced at operating speed prior to shipment.

ITEM IV - Recirculation System

The recirculation system will consist of a Vanton polypropylene centrifugal pump rated for 628 gpm at approximately 85' TDH. The pump will be complete with a baseplate coupling, coupling guard, mechanical seal with an external flush, and a TEFC motor. The recirculation piping will be SCH 80 CPVC and will include the necessary fittings and valves to circulate solution at the proper rate to each of the spray banks in both the spray chamber and the venturi scrubber. The recirculation piping system will also include a flow sensor (Signet paddle wheel type) and an FRP basket suction line strainer.

ITEM V - pH Control System

A pH control system is included for the purpose of controlling caustic make-up to the system. Based on the data provided, caustic make-up will be approximately 0.26 gpm of 50% solution. The pH control system will include a pH probe, a pH analyzer with control relays, a metering pump, and a 4000 gallon bulk caustic storage tank fabricated of FRP material. The probe and analyzer will be as manufactured by Great Lakes Instruments. The metering pump will be a Chem Tech Series 300. The bulk storage tank will be a Heil Standard FRP tank and will include a clear strip liquid gage.

ITEM VI - Interconnecting Ductwork

Ductwork is included to connect the exhaust of the fume washer/spray tower to the inlet of the fan. It is based on the fan and the scrubbers being located in close proximity to minimize the amount of ductwork involved. Ductwork will be fabricated of Atlac 382 resin in general accordance with NBS PS 15-69.

To provide the above described equipment, we are pleased to quote a budget price of $85,000.00. This price is quoted F.O.B. Avon, Ohio and/or Bartow, Florida and does not include any state or local taxes, should they be applicable.

Estimated delivery schedule will be approximately 6-8 weeks after return of approved drawings. Approval drawings would be submitted approximately 2-3 weeks after receipt of purchase order.

Heil standard terms and conditions, Form HTC-1079 including paragraph eleven-B are made a part of this proposal. Escalation policy Item A-2 in terms of payment in accordance with B-1 of Form HTE-1079 will also apply.

Terms and conditions substantially different from our standard terms, may require review to determine acceptability should we be favored with an order on the basis of this quotation.

We thank you for the opportunity to provide this budget proposal and assist you in selecting Heil Process equipment for this application. Should you have any other questions, or if we may be of further service during the course of this project, please contact our representative, Mr. Jack Terrell of Techni-Quip, or this office direct.

Very truly yours,

XERXES CORPORATION
HEIL PROCESS EQUIPMENT

Ernest Rosenberg
Product Manager

ER:es

cc: Techni-Quip, Inc.
P.O. Box 843
Palm Harbor, Fl. 33563
A.C. 813, 785-4904

HEIL
Process Equipment

FRP
Fume Scrubbers

SERIES 720
VENTURI SCRUBBERS

Series 720 Venturi Scrubbers

Heil Series 720 Venturi Scrubbers are designed to efficiently remove fumes, dust, solids and aerosols ranging in size down to 0.1 micron. This is accomplished by contacting the particulate laden gas stream with the scrubbing liquid (most commonly water) in a highly turbulent, high velocity venturi throat. As the droplets contact the particulate they begin to agglomerate in the diverging or evase section of the venturi. The entrained droplets now contaminated with particulate matter are removed from the gas stream by means of a cyclonic separator. The cleansed gas exits the top of cyclone while the recovered scrubbing liquid is returned to a separate sump tank for recycle. By selecting the appropriate pressure drop (which relates directly to throat velocity) efficiencies of 99%+ can be achieved over the entire range of particle sizes.

Although standardized in size and capacity, each individual unit is custom designed and engineered to meet the specific requirements of each application.

Series 720 Applications

Heil Series 720 Venturi Scrubbers have proven performance records for fume and dust control in the fertilizer industry (both in general ventilation and ventilation of specific processes), foundries, chemical plants, pulp and paper, food and food processing, smelting, frit and glass, dyestuff, aluminizing processing, galvanizing, and chemical waste incinerators.

In general, the Series 720 Scrubbers are effective for removal of submicron sized particulates (both solid and liquid), heavy particulate loads that would clog other devices, and removal of gummy, tacky or scaling materials.

Series 720 Features

Principal features of the Series 720 Venturi Scrubber are:

Low maintenance cost - no moving internal parts to wear. Large spray nozzles are used on the scrubbers to provide uniform distribution of liquid into the incoming gas stream. The spray nozzles have large orifices and are designed to be non-clogging. They are strategically located such that they can be removed for inspection and/or replacement without having to shut down the equipment.

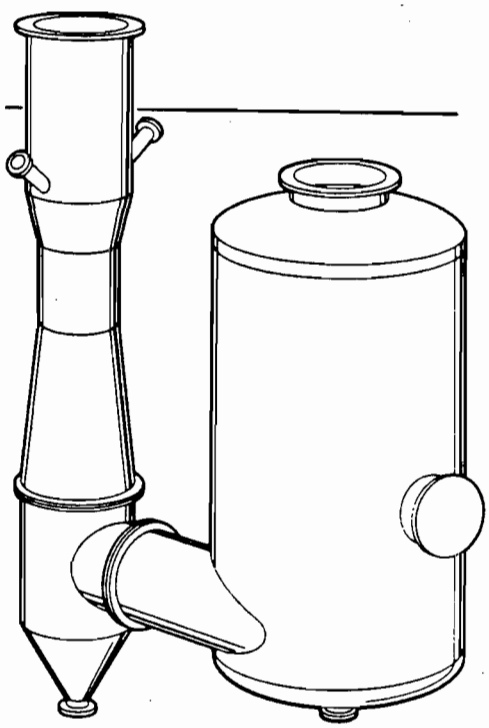
High efficiency - Proper sizing and selection of pressure drop will result in efficiencies exceeding 99% for particles ranging in size down to 0.1 micron. Since the throat section is made removable, new inserts can be provided to either increase or decrease the pressure drop to meet changing gas stream conditions.

Low initial cost - Pre-engineered standard designs are available in capacities from 1800 CFM to 67,000 CFM.

Extended service life - Individual units are designed with maximum corrosion resistance as a primary consideration. The wide selection of corrosion resistant materials feature Rigidon FRP (fiberglass reinforced plastic) as a standard material with stainless steel and other alloy construction available.

Series 720 Equipment Selection

The air or gas volume required to ventilate the process is the principal guide in selecting the proper sized scrubber. Where the specific volume of air required is not already known, references such as the Industrial Ventilation Handbook should be consulted.



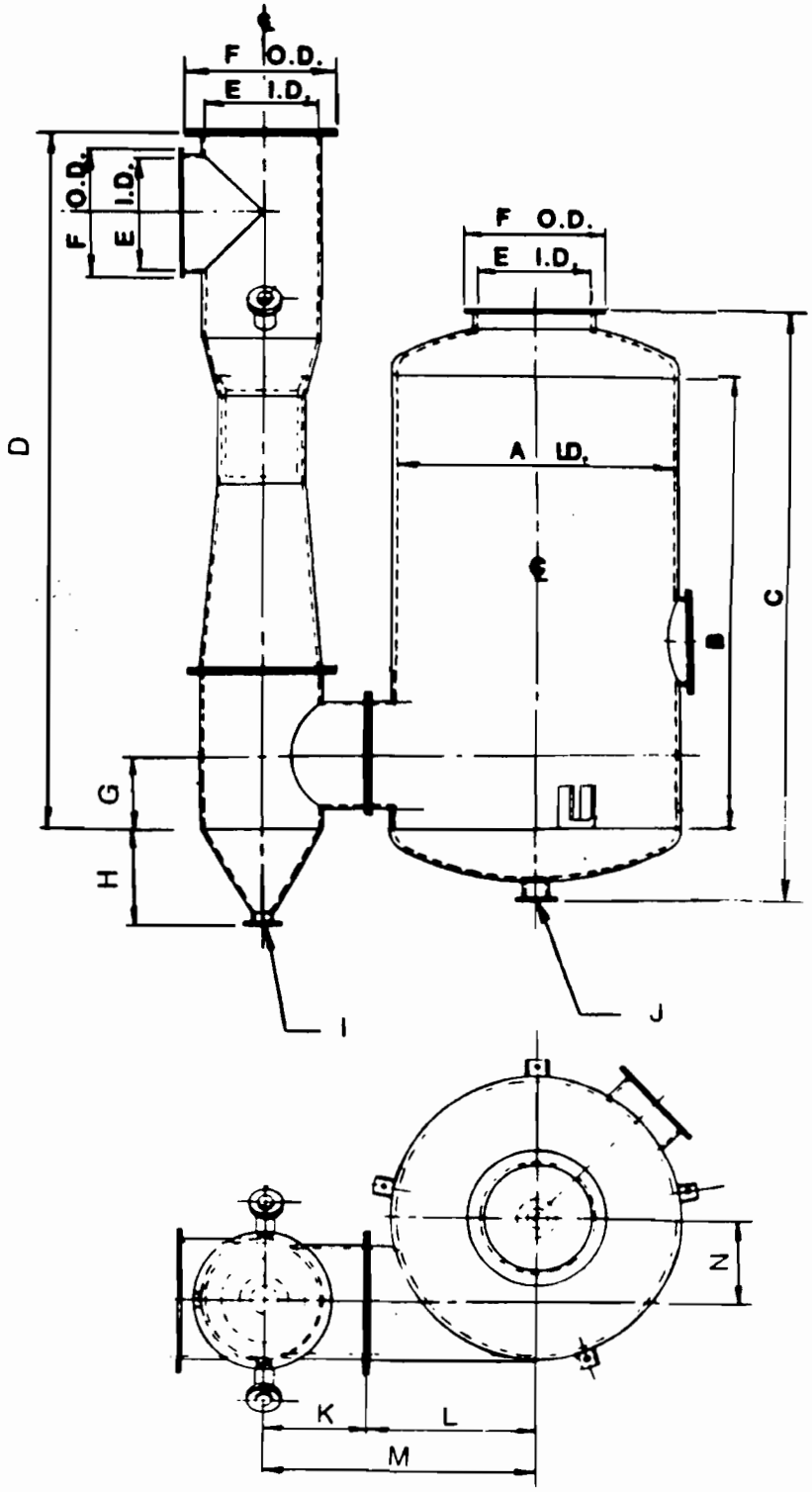
After determining the total air volume to be scrubbed, the efficiency of the unit must then be selected. The required efficiency will depend upon several factors including type of particulate, size distribution, quantity, concentration, plant environment, local, state and federal codes.

Heil's engineers will then assist in determination of pressure drop, recirculation rate, specific material selection, as well as sizing and specification of accessory items (pumps, recirculation tanks, fans, etc.) to make the system complete. Heil's engineers will then provide a specific quotation on the appropriate scrubber and/or system.

XERXES

NOTE: All dimensions are approximate.

Size	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Gas Flow	Water Rate
722	24"	40	60	68	10	14⅜	8	11	2	2	10	16	26	7	1800	14
723	36"	60	84	82	14	18⅜	11	13	3	3	12	24	38	11	4200	30
724	48"	80	108	115	20	24⅜	15	18	3	4	20	30	50	14	7500	54
725	60"	100	132	133	24	28⅜	17	20	4	4	24	36	60	18	11500	80
726	72"	120	154	163	30	34⅜	19	26	4	6	30	42	72	22½	16500	114
727	84"	140	178	193	36	40⅜	21	29	6	6	36	48	84	27	23000	168
728	96"	160	205	230	42	46⅜	24	34	6	8	42	54	96	30	30000	228
729	108"	180	228	212	42	46⅜	27	34	8	8	42	60	102	33	38000	280
7110	120"	200	253	239	48	52⅜	27	39	8	8	48	66	114	39	47000	354
7111	132"	220	277	277	54	58⅜	30	44	8	10	54	72	126	42	57000	420
7112	144"	240	302	309	60	64⅜	33	49	8	10	60	78	138	45	67000	486



HEIL PROCESS EQUIPMENT

Heil Process Equipment™
34250 Mills Road
Avon, Ohio 44011
216/327-6051
Telex: 24-3446

XERXES

Xerxes Corporation™
Corporate Offices:
7901 Xerxes Avenue South
Minneapolis, Minnesota 55431

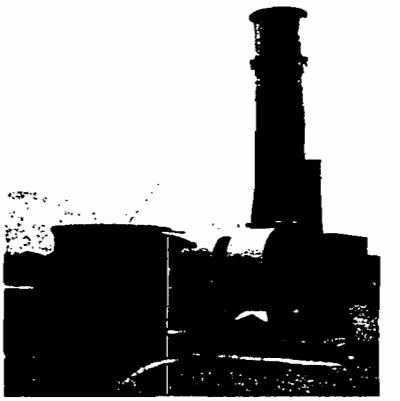
Specialists in . . . CHEMICAL-PROOF CONSTRUCTION

Engineering Notebook

FUME SCRUBBERS
IMPINGEMENT TYPE—SERIES 710

Designed Specifically to Eliminate Corrosive Effluents for Effective Air Pollution Control

- ★ Tested and Proved in Actual Applications
- ★ Complete Ventilation Installations or Individual Units Only
- ★ Efficient Fume Removal
- ★ Wide Range of Applications
- ★ Low Initial Cost & Operating Cost
- ★ Maximum Corrosion Resistance
- ★ Less Than 2" Static Pressure Drop



Series 710 Fume Scrubbers are designed to remove undesirable contaminates from process gases. They combine efficient fume removal with low initial cost, low installation cost and low operating cost. The 710 Series is highly efficient for washing fumes from plating, anodizing, pickling, laboratories and other operations producing corrosive fumes.

The fume laden air receives two separate washings. The cleaned, washed air then passes through a mist eliminator that removes more than 99% of the entrained moisture.

Series 710 Fume Scrubbers can be manufactured in plain steel, coated steel, lined steel, stainless steel and Heil RIGIDON solid plastic construction to meet a wide range of fume washing requirements. The adjacent chart shows the material that best meets the corrosive environment encountered in common operations.

EFFICIENCIES WASHING VARIOUS FUMES AND PREFERRED MATERIALS OF CONSTRUCTION

SOLUTION	TYPICAL REMOVAL EFFICIENCY	Materials of Construction				
		RIGIDON PLASTIC	Plain Steel	Coated Steel	Lined Steel	Stainless Steel
Chromic Acid Plating	98 - 99%	A	B	A	A	A
Cyanide	95 - 99%	A	C	A	A	A
Anodizing	97 - 99%	A	E	C	A	D
Sulfuric Acid Pickle	97 - 99%	A	E	C	A	D
Hydrochloric Acid	70 - 85%	A	E	C	A	E
Phosphoric Acid	97 - 99%	A	B	A	A	A
Phosphate	95 - 98%	A	B	A	A	A
Alkaline Cleaning	97 - 99%	A	B	A	A	A
Caustic Soda	97 - 99%	A	B	A	A	A
Detergent	97 - 99%	A	B	A	A	A
Sodium Glutenate	97 - 99%	A	B	A	A	A
*Aluminum Bright Dip	65 - 95%	A	E	E	A	B
*Nitric Acid	50 - 55%	A	E	E	A	B
*Nitric - Hydrofluric Acid	50 - 55%	A	E	E	A	D

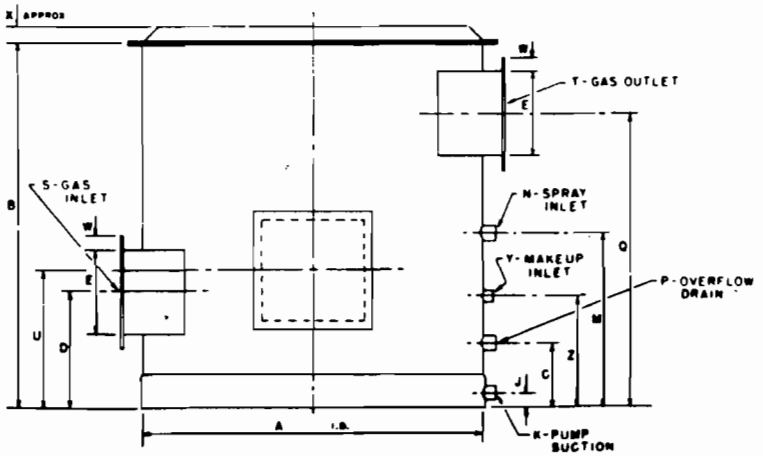
A - Excellent; B - Good; C - Fair; D - Poor; E - Not Recommended
*For more efficient removal of oxides of nitrogen fumes, a Heil 730 Series packed fume washer is recommended.
For solutions not listed, please write giving details—
CFM Req'd. — Temperature
Solution — Tonk Sizes
Percent Concentration — Material of Construction

Designed and manufactured by:
HEIL PROCESS EQUIPMENT
34250 Mills Road • Avon, Ohio 44011
Phone: 216-327-6051 • Telex: 24-3446

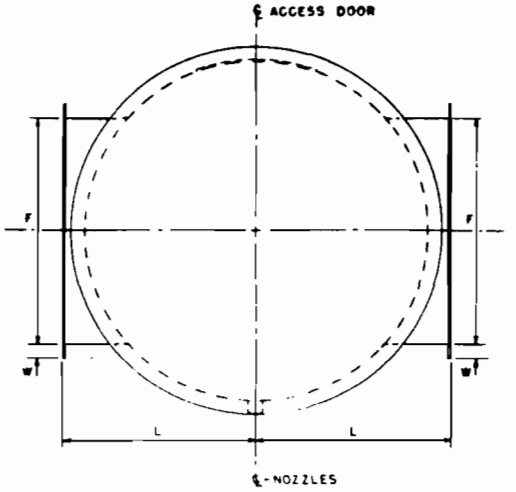
Offering over 50 years' experience

FUME SCRUBBERS

IMPINGEMENT TYPE-SERIES 710



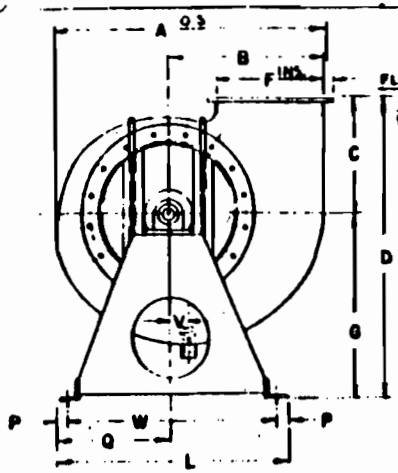
ELEVATION VIEW



PLAN VIEW

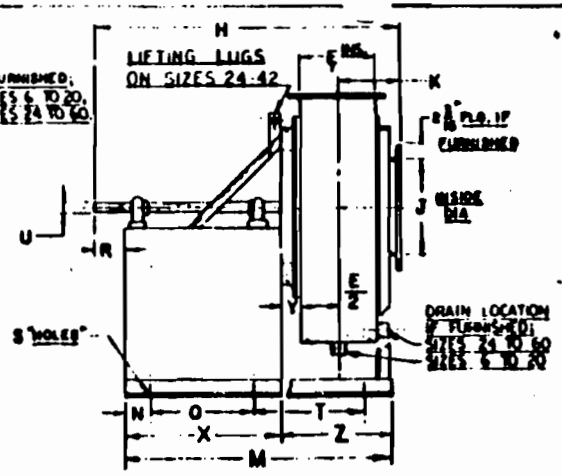
710-P APPROXIMATE DIMENSIONS								
SIZE	712	713	714	715	716	717	718	719
A	24	36	48	60	72	84	96	108
B	48	60	60	72	72	72	72	72
C	4	7-1/2	7-1/2	11	11	11	11	11
D	12	17	17	25-1/2	25-1/2	25-1/2	25-1/2	25-1/2
E	12	12	12	15	15	15	15	18
F		24	30	40	48	60	72	72
J	2	2	2-1/2	2-1/2	2-1/2	2-1/2	2-3/4	2-3/4
K	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	2	2	2
L	16	22	28	34	40	46	52	58
M	21	27	27	39	39	39	39	39
N	1	1-1/2	1-1/2	1-1/2	2	2	2	2
P	1-1/2	1-1/2	1-1/2	1-1/2	2	2	2	2
Q	40	48	48	60	60	60	60	60
U	16	21	21	25	25	25	25	25
W	2-3/16	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	3	3
X	3	3	3	3	3	3	3	3
Y	1	1	1	1	1	1	1	1
Z	12	20	20	20	20	20	20	20
RIG. WT.	150#	375#	500#	650#	850#	975#	1200#	1400#
STL. WT.	450#	1125#	1500#	1950#	2550#	2925#	3600#	4200#
C.F.M.	1,600	3,500	6,500	10,000	14,000	19,000	25,000	32,000
G.P.M.	1	3	6	10	14	20	25	30

BEST AVAILABLE COPY



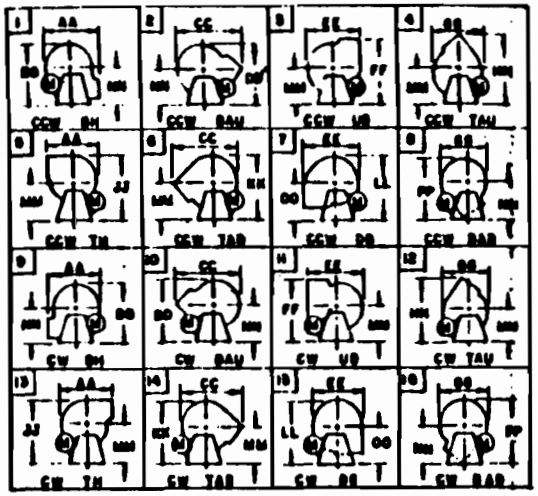
DRIVE END ELEVATION

POSITION 3 SHOWN

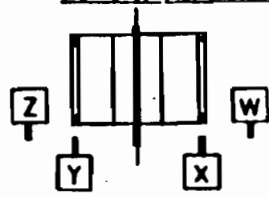


SIDE ELEVATION

— MODEL HCB —



DISCHARGE POSITION DRIVE END VIEW



STANDARD MOTOR ARRANGEMENT BL (LEFT SIDE) BR (RIGHT SIDE) AS SHOWN ⓜ. ARRANGEMENT 1 (MOTOR ON FLOOR) ALSO AVAILABLE. SEE ABOVE

DIMENSIONAL DATA

FOR ESTIMATE ONLY

SIZE	A	B	C	D	E DIA	F DIA	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
ADJUSTABLE HOUSING 6	19 3/8	11 1/8	8 11/16	24 11/16	4 7/8	6	16	30 1/2	6	5 1/8	21 7/8	–	2	12	3/4	10 1/4	5	11/16	0	1	3/4	20	16	2	–
8	26	14 7/8	11	29	6 1/2	8	18	34 1/4	8	5 13/16	24	–	2	14	1	12	5	11/16	0	1 1/16	1 1/16	22	18	2	–
10	29 3/4	16 1/2	11 1/2	31 1/2	8 1/2	10	20	38 1/2	10	7 3/16	29	–	2	16	1	14 1/2	5	11/16	0	1 1/16	1 1/16	27	20	2 1/16	–
12	35	20	13 1/2	37 1/2	9 3/4	12	24	43 1/2	12	8 1/4	29	–	2	18	1	14 1/2	5 1/2	11/16	0	1 7/16	1 3/16	27	22	2 1/16	–
14	40 3/8	23 1/4	15 1/2	42 1/2	11 3/4	14	27	45 1/2	14	9 1/2	34	–	2	18	1	17	5 1/2	11/16	0	1 1/16	1 1/8	32	22	2 1/16	–
16	46 1/8	26 3/8	17 3/4	47 3/4	13	16	30	51 1/2	16	11	39	–	3	19	1	19 1/2	6	11/16	0	1 15/16	2 1/8	37	25	2 11/16	–
18	52 1/8	30 1/2	20	53	14 3/4	18	33	59	18	11 3/8	44	–	3	24	1 1/2	22	6 1/2	11/16	0	1 15/16	2 3/16	41	30	3 5/16	–
20	58 1/4	33 1/2	22	58	16 1/4	20	36	60 3/8	20	12 3/8	45 1/2	–	3	25	1 1/2	22 3/4	5 1/2	11/16	0	1 15/16	2 5/16	42 1/2	31	3 5/16	–
24	5 5/16	38 3/8	24	61	19 1/4	24	37	65 7/16	24	14 3/8	56	59 1/2	8	22 1/2	7/8	28	6.	13/16	22 1/2	2 7/16	3	53	32 1/2	3 3/8	27
27	73	42 1/16	27	68	21 7/8	27	41	71 1/8	27	15 3/16	62	64	8	25	1	31	7 1/2	15/16	25	2 13/16	3 1/16	59	34 5/8	3 1/16	29 1/2
30	81 5/16	47 7/8	30	75	24 1/2	30	45	76 1/2	30	18 1/16	68	67 1/2	8	26 1/2	1	34	6 1/2	15/16	26 1/2	2 15/16	4 1/16	65	35	3 7/16	32 1/2
36	98 1/2	57 1/16	36	89	29 1/2	36	53	86	36	21	77	75 5/8	9	30	1	38 1/2	8	1 1/16	30	2 15/16	4 5/8	75	38 1/2	3 11/16	34 1/4
42	114 3/8	66 1/8	42	103	34 1/2	42	61	91	42	23 1/2	82 1/2	80 1/2	9	38 1/2	1	41 1/2	8	1 1/16	32 1/2	3 7/16	6	80 1/2	38 1/2	3 7/16	42 1/4

CERTIFY FOR CONSTRUCTION

SIZE	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	NN	OO	PP	DIA
6	18 1/8	24	22 1/4	23 1/4	19 1/8	24 11/16	18 1/8	30	27 1/8	26 1/16	25 1/2	16	16	16	24 1/2	1/2
8	23 1/16	29 1/16	30	28 1/2	25 1/2	29	24 1/4	36 1/2	33	31 1/4	30 1/8	18	18	18	29 1/8	1/2
10	25 1/2	32 1/4	33 1/4	31 1/16	29 1/16	31 1/4	27 1/8	40	37	35 1/2	34 1/4	20	20	20	33 1/4	1
12	30 1/2	38 1/8	39 1/2	38	34 1/8	37 1/2	32 1/2	48	44 1/4	42 1/2	41 1/4	24	24	24	39 1/2	1
14	35 1/8	44	46	43 1/4	40 1/8	42 1/2	37 1/2	54 1/4	50 1/4	48 1/2	47	27	27	27	45 1/4	1
16	40 1/16	49 1/16	52 1/8	48 1/8	46 1/16	47 1/4	43 1/16	61 1/4	56 1/4	54 1/2	52 1/8	30	30	30	50 1/2	1
18	45 1/2	54 3/16	59 1/16	53 1/8	51 15/16	53	48 1/16	68 3/8	63 1/2	60 7/16	58 1/8	33	33	33	56 3/4	1
20	50 1/16	60 1/16	65 1/2	58 1/8	57 1/8	58	53 1/2	75 1/2	69 3/16	66 1/8	64 1/16	36	36	36	62 3/4	1
24	66 7/8	73 1/8	73 1/8	72 1/8	65 1/16	61	60 1/8	81 1/16	75 7/16	72	*	37	47	*	*	1 1/4
27	63 1/4	82 1/16	81 1/2	81	73 1/16	68	68 1/4	90 9/16	84 1/16	80 1/4	*	41	52	*	*	1 1/2
30	71	89 3/16	90 1/8	88 1/8	81 1/4	75	75 1/2	100 1/16	92 7/16	88 3/8	*	45	56	*	*	1 1/2
36	85	106 1/4	109 1/16	103 1/4	98 1/16	89	89 1/2	119 1/16	110	106 1/4	*	53	66	*	*	1 1/2
42	99	123 5/16	127 3/16	119 1/8	114 1/8	103	104 1/4	138 1/8	127 5/16	121 5/16	*	61	76	*	*	1 1/2

FAN DATA									
ITEM NO	IDENTIFICATION	NO REQD	FAN SIZE	CLASS	MATERIAL	ROT	DISCH	POS	SP FEATURE

PERFORMANCE						
CFM	OV	SP	RPM	HP	TEMP	ELEV

MOTOR DATA					
MFG	HP	RPM	TYPE	FRAME	CURRENT

DRIVE DATA				
MOTOR PULLEY	FAN PULLEY	BELTS	CENTER	MOTOR POS

SPECIAL FEATURES	
	INLET FLANGE — UNDRILLED
	OUTLET FLANGE — UNDRILLED
	INLET FLANGE — DRILLED
	OUTLET FLANGE — DRILLED
	INLET GASKET
	OUTLET GASKET
	DRAIN
	ROUND FLEXIBLE CONNECTOR
	ACCESS DOOR
	DISCHARGE TRANSITION (SEE NOTES)
	MOTOR RAILS OR BASE

SPECIAL FEATURES	
	VIBRATION MOUNT
	MOTOR & DRIVE CANOPY (SEE NOTE)
	V - BELT DRIVE (SEE DRIVE DATA)
	MOTOR (SEE MOTOR DATA)
	SHAFT SEAL
	BELT GUARD
	SHAFT GUARD

NOTES

CUSTOMER & JOB
CUSTOMER
P O NO
JOB NAME
ARCHITECT
ENGINEER
CERTIFIED
S O NO

NO	DATE	BY	REVISION

HEIL PROCESS EQUIPMENT

XERXES FIBERGLASS INC.

MODEL HCB, SERIES A
SOLID PLASTIC FANS
SIZES 6 THRU 42

SO | SCALE NONE

DRAWN M. NELSON | DATE 8-24-76 | APPROVED | DATE

CHECKED VAL | DATE 8-31-76 | PRINTED

DRAWING NO.

CB-