AMAX Phosphate, Inc.
A SUBSIDIARY OF AMAX INC
402 SOUTH KENTUCKY AVE., SUITE 600, LAKELAND, FLORIDA 33801

CONTROL NUMBER C 43520

BRANDON STATE BANK
BRANDON, FLORIDA

63-685
631

CHECK DATE NUMBER

10/2[illegible]/82 4137

PAY TO THE ORDER OF

THE FLORIDA DEPT OF
ENVIRONMENTAL REGULATION

CHECK AMOUNT $ *******1,000.00

AMAX Phosphate, Inc.

Richard J. Guerrero

Courtney Granger

⑈048520⑈ ⑆063106857⑆ 10 615318⑈01

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

Nº 33650

RECEIPT FOR APPLICATION FEES AND MISCELLANEOUS REVENUE

Received from [illegible] Date [illegible]

Address [illegible] Dollars $ [illegible]

Applicant Name & Address [illegible]

Source of Revenue [illegible]

Revenue Code [illegible] Application Number [illegible]

By [illegible]

AMAY

Received
2-10-83
wnl

29-655834

PSD-FL-094

AMAX Phosphate, Inc.

A SUBSIDIARY OF AMAX INC.

402 SOUTH KENTUCKY AVENUE • SUITE 600 • LAKELAND, FLORIDA 33801 • (813) 687-2561

February 2, 1983

D.E.R.
FEB 3 1983
SOUTHWEST DISTRICT
TAMPA

Mr. Dan Williams, P.E.
Air Permitting
Southwest District
Department of Environmental Regulation
7601 Highway 301, North
Tampa, Florida 33610

Dear Mr. Williams:

Please find attached four copies of a PSD (Prevention of Significant Deterioration) review and a check in the amount of $1,000 for the AMAX Phosphate Big Four Mines Dryer. The PSD review was prompted by a change in fuel for the dryer from the present low sulfur number 6 fuel oil to either high sulfur number 6 fuel oil or a high sulfur coal-oil-water mixture.

The fuel conversion will result in emissions in excess of the significance levels for sulfur dioxide, particulate matter and nitrous oxides as defined in Section 17-2 of the Florida Administrative Code.

The attached PSD review includes two volumes and a Construction Modification Permit Application. Volume One of the review includes a description of the conversion and a summary of the results of the review. Volume Two (one copy only) contains all of the supporting technical data and documentation for Volume One.

The application copy required by the Hillsborough County Environmental Protection Commission, along with the required fee, has been transmitted to that agency under a separate letter.

If after reviewing this material you find that you have questions or need additional information, please let me know.

Sincerely,

Fred G. Mullins
Compliance Manager

FGM/la

Attachments: As stated above

cc: Mr. R. Sandrik Mr. F. Crabill
Mr. J. Koogler (Sholtes & Koogler Consultants)

AC 29-65834

D.E.R.

FEB 3 1983

SOUTHWEST DISTRICT
TAMPA

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

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

12/10/82
12/27/82
1/27/83

SOURCE TYPE: Air Pollution [X] New[1] [ ] Existing[1] (New for PSD purposes)

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

COMPANY NAME: AMAX Phosphate, Inc. COUNTY: Hillsborough

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) Big Four Mine Phosphate Rock Dryer

SOURCE LOCATION: Street SR 674 & Bethlehem Road City Fort Lonesome

UTM: East 394.77 North 3069.62

Latitude 27 ° 44 · 54 "N Longitude 82 ° 04 · 04 "W

APPLICANT NAME AND TITLE: S. R. Sandrik, Plant Manager

APPLICANT ADDRESS: Post Office Box 508, Bradley, Florida 33835

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

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

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

*Attach letter of authorization

Signed: S. R. Sandrik

S. R. Sandrik, Plant Manager
Name and Title (Please Type)

Date: _____ Telephone No. (813) 688-1130

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

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

Signed: _____

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

(Affix Seal)

SHOLTES & KOOGLER ENVIRONMENTAL CONSULTANTS, INC
Company Name (Please Type)

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

Florida Registration No. 12925 Date: 1/28/83 Telephone No. (904) 377-5822

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

SECTION II: GENERAL PROJECT INFORMATION

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

SEE ATTACHMENT (Page 2A)

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

Start of Construction Not Applicable Completion of Construction Not Applicable

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.)

Not Applicable; The control systems are existing and presently in operation.

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

The Big Four Mine phosphate rock dryer is currently operating under FDER Permit No. A029-22821, which was issued on September 20, 1979 and expires on August 15, 1984.

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes _X_ No 8736 hrs/yr

F. Normal equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr N/A ; if seasonal, describe: 365 d/y x 24 hr/d = 8760 hrs/yr

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

1. Is this source in a non-attainment area for a particular pollutant? YES
   a. If yes, has "offset" been applied? Not Applicable
   b. If yes, has "Lowest Achievable Emission Rate" been applied? Not Applicable
   c. If yes, list non-attainment pollutants. Ozone and Volatile Organic Carbons
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. YES
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. YES
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? YES
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? NO

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

SECTION II: General Project Information (Continued)

This project will provide alternate energy sources for an existing 299 tons per hour phosphate rock dryer. This source is used to dry beneficiated phosphate rock from a moisture of 10-15% to a moisture of 1.5-3.50%. The dryer is a Heyl Patterson 12-foot diameter fluid bed dryer followed by a Peabody emissions control system consisting of two cyclones and a wet impingement scrubber with a demisting section. The dryer presently uses No. 6 fuel oil containing approximately 0.7% sulfur. Due to the rapidly escalating price of fuel oil, which is increasing faster than the weakened price of dried phosphate rock, it was necessary for AMAX to seek alternate fuel sources for the operation of the dryer. Two alternate fuels were selected which are higher in sulfur content: No. 6 fuel oil (up to 2.5%) and a coal-oil-water mixture with sulfur content up to 2.5%. NO. 5?

This project will result in an increase in the annual particulate matter, nitrogen oxides and sulfur dioxide emissions from the dryer point source. These increased emissions are expected to exceed the significance levels as defined in Section 172.500, Table 5003 of the Florida Administrative Code. The sulfur dioxide emissions are expected to increase from the 1981 level of 354 tons per year to 568 tons per year, the particulate emissions will increase from 38.5 tons per year to 78.8 tons per year and nitrogen oxides emissions will increase from 74.2 tons per year to a maximum of 117.2 tons per year. These emissions increases will be due to fuel changes. There will also be some minor particulate matter emissions increases due to changes in the hours of operation.

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		
Wet Phosphate Rock	Dust	100	600,000*	Attachment D
			(270 - 275TPH Dry Rock)	
*Includes 10-15%	moisture			

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

1. Total Process Input Rate (lbs/hr): 600,000 (including 10-15% moisture)

2. Product Weight (lbs/hr): 534,000 (including 1.5-3.5% moisture)

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	
				Pebble	1500 Pebble	≤5616 TPY	
Particulate	18.0	78.8	0.06 lbs/ton input	18	600* Pebble	2626*	D
SO_2	129.8	568.5	1.10 lbs/MM BTU	129.8	373	1634	D
NOx	26.8	117.2	N/A	26.8	27	117	D
CO	4.5	19.5	N/A	4.5	5	20	D
HC	1.1	5.0	N/A	1.1	1	5	D

*Variable with type of material being dried (Pebble, concentrate or combinations of the two). These numbers represent average, the max would be 1500 lbs/hr or 5616 tons/year.

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]
Peabody Engineering Co.	Particulate	+97%	Not Applicable	Test Data
Impingement Scrubber,	Sulfur Dioxide	48-78%	Not Applicable	Test Data
Type M160, Size 88				

[1] See Section V, Item 2.

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

[3] Calculated from operating rate and applicable standard

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

[5] If Applicable

2.5 % S, 8.3 #/gal ● Theor. amount SO_2 per ● 10^6 BTU from 2.5% S no 6 oil

$$\frac{2.5\ \#S}{100\ \#OIL} \quad \frac{2\ \#SO_2}{\#S} \quad \frac{\#OIL}{17{,}744\ BTU} \times 10^6 = 2.82\ \frac{\#SO_2}{10^6\ BTU}$$

Theor. $SO_2/10^6$ BTU from 2.5% S Coal

$$\frac{2.5}{100} \left| \frac{2}{14{,}704} \right. \times 10^6 = 3.4\ \#SO_2/10^6\ BTU$$

Theo. $SO_2/10^6$ BTU from 0.7% no S oil

$$\frac{0.7}{100} \left| \frac{2}{18{,}502} \right. \times 10^6 = 0.76\ \#SO_2/10^6\ BTU$$

% S fuel oil that equivalent to 1.1 $\#SO_2/10^6$ BTU

$$\%S = \frac{(1.1)(100)(17{,}744)}{(2)(10^6)} = 0.98$$

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
No. 6 fuel oil (0.7% S), or	10.8 BBL	19.9 BBL	125
No. 6 fuel oil (2.5% S),or	10.8 BBL	20.2 BBL	125
Coal-Oil-Water Mix (2.5% S)	10.8 BBL	21.9 BBL	125

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

Fuel Analysis: No. 6 oil/No. 6 oil/COM

Percent Sulfur: 0.7/2.5/2.5 Percent Ash: 0.1/0.2/1.9

Density: 8.1/8.3/9.3 lbs/gal Typical Percent Nitrogen: 0.2/0.2/Unknown

Heat Capacity: 18,502/17,744/14,704* BTU/lb 149,500/147,095/135,876* BTU/gal

*These values are typical values and may vary as much as ± 10%.

Other Fuel Contaminants (which may cause air pollution): None

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

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

Collected solids are pumped to a closed circuit recirculated mine water system.

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

Stack Height: 100 ft. Stack Diameter: 5.96 ft.

Gas Flow Rate: 65,000 ACFM Gas Exit Temperature: 142 °F.

Water Vapor Content: 18 % Velocity: 38.79 FPS

SECTION IV: INCINERATOR INFORMATION

Not Applicable

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

Description of Waste

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

Approximate Number of Hours of Operation per day days/week

Manufacturer

Date Constructed Model No.

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

Stack Height: _____ ft. Stack Diameter _____ Stack Temp. _____

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

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

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

Brief description of operating characteristics of control devices: _____

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

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight – show derivation. See Attachment A
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.,) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made. See Attachments B and C
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test). See Attachment C
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.). (See Sect. IIA and IIID for existing scrubber information)
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency). (See Sect. IIID for test data)
6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained. See Attachment D
7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map). See Attachment E
8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram. See Attachment F

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

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

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

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

Contaminant	Rate or Concentration
Particulate Matter	0.06 lbs/ton of rock

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

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration
Particulate Matter	0.06 lbs/ton of rock
Sulfur Dioxide	1.1 lbs/10^6 BTU
Nitrogen Oxides	0.21 lbs/10^6 BTU

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

1. Control Device/System: SEE SECTION 3.0 OF PSD APPLICATION.
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:
5. Useful Life:
6. Operating Costs:
7. Energy:
8. Maintenance Cost:
9. Emissions:

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

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

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

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

1.

a. Control Device: SEE SECTION 3.0 OF PSD APPLICATION.

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy*: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy**: h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

*Explain method of determining efficiency.

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected:

1. Control Device:

2. Efficiency*:

3. Capital Cost:

4. Life:

5. Operating Cost:

6. Energy:

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

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

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

SEE SECTION 3.0 OF PSD APPLICATION.

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

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

SEE SECTIONS 4.0 AND 5.0 OF PSD APPLICATION.

A. Company Monitored Data

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

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

Other data recorded _____

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

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

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

B. Meteorological Data Used for Air Quality Modeling

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

2. Surface data obtained from (location) _____

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

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

C. Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

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

D. Applicants Maximum Allowable Emission Data

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

E. Emission Data Used in Modeling

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

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

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

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

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

ATTACHMENT A

Total Process Input Rate

- 300 tons per hour of wet phosphate rock (14% moisture content) or 600,000 lbs/hr.

Total Product Weight

600,000 lbs/hr input - 64,500* lbs/hr moisture removed in dryer - 1500 lbs/hr particulate to the scrubbers
= 534,000 lbs/hour product weight.

* (Assumes a reduction in moisture from 14% to approximately 2.5%)

ATTACHMENT B

The following coal-oil-water mixture (COM) stack emissions test was run at the AMAX Big Four Mine dryer on March 2, 1982. This test had the highest sulfur dioxide emissions rate of any of the COM tests run on this dryer; therefore, this test could be considered to be the "worst case" emperical data. The sulfur dioxide removal for this test series was found to be 77.42%.

The allowable sulfur dioxide emissions, based on the recent FDER BACT ruling of 1.1 lbs per million BTU, is:

prod + % possible ? test method ?

7.93 GPM firing rate x 9.3 lbs/gallon Density = 73.75 lbs/min. x 60 min/hr = 4,425 lbs/hour x 14,704 BTU/lb heat Content = 65,064,318 BTU/hour heat input.

65.06 MMBTU/hr x 1.1 lbs SO_2/MMBTU input

$\frac{71.57}{1.1} = \frac{38.23}{x}$

71.57 lbs SO_2/hour allowable emissions

$x \sim 0.6$ # SO_2/MM BTU input

Actual Emissions = 30.8 lbs/hour SO_2

The allowable particulate emissions based upon the EPA New Source Performance Standard of 0.06 pounds of particulate per ton of input to a phosphate rock dryer is as follows:

0.06 lbs of particulate/ton of rock input x 300 tons/hour phosphate rock input = 18.0 lbs/hour allowable particulate emissions.

Actual Emissions = 17.49 lbs/hr particulate.

LOOKS LIKE DRYER WAS PROCESSING 300 TPH WITH 65,064,318 BTU/hr HEAT INPUT. CO. WANTS MAX. 125,000,000 BTU/hr heat input. THEREFORE, SO_2 STD. NEEDS TO BE IN LBS SO_2/MBTU - NOT #/hr

MEMORANDUM

AMAX Phosphate, Inc.

402 SOUTH KENTUCKY AVENUE · SUITE 600 · LAKELAND, FLORIDA 33801

TO: Mr. Fred Mullins

DATE: March 12, 1982

FROM: George Townsend

* WHERE IS DATA ON FIRST TEST BURN?

SUBJECT: Coal-Oil Test Burn

During the second* coal-oil mixture test burn on March 2, 1982, we again conducted tests to determine particulate and sulfur dioxide emission rates. During the test, pebble was being dried at an average rate of 252 tons per hour. Test results were as follows:

* 84% CAPACITY

	Stack Conditions		Particulate Emissions		Sulfur Dioxide Emissions
Run	DSCFM	Temp°F	Lbs./Hr.	Grains/DSCF	Lbs./Hr.
1	55,028	123	15.50	.0328	25.11
2	54,319	123	14.11	.0302	28.69
3	55,164	126	22.85	.0482	(38.23)
Avg.	54,837	124	17.49	.0371	30.68

0.069 #/T

APPLIC LIST LOWER CFM

The average sulfur dioxide removal efficiency of scrubber was 77.42%, ash contribution to total scrubber loading from COM combustion was 83.22 lbs./hour. Attached you will find scrubber water analyses of samples collected during a stack test conducted on February 18, 1982; at which time pebble was being dried and #6 fuel oil was the source of combustion. Comparatively, the analyses of scrubber water samples collected on February 22, 1982; during first COM test burn showed an appreciable increase in solids of scrubber discharge water. This would indicate effective scrubbing of ash, given similarities of the two tests and if feed quality was relatively similar.

1ST TEST

George Townsend

George Townsend

GT/rit

cc: Mr. H. P. Mott
Mr. S. R. Sandrik
Mr. R. S. Swanson
Mr. G. P. Uebelhoer

737 Executive Park, Louisville, Kentucky 40207
(502) 893-0106

COALIQUID, INC.

FUEL ANALYSIS SHEET

SAMPLE # 8223040M

DATE FEB. 26 1982

CUSTOMER Amax Phosphate

COAL USED

0.24 Chlorine

Seam: Blue Gem
Source: G&G Coal, London Ky
BTU/Lb.: 13,951
Ash (%): 3.75
Sulfur (%): 0.78
Moisture (%): 3.99
Hardness: 46
Fusion(Ash): 2500+
Volatiles (%): 40.17
Fixed Carbon (%): 52.09
Percent Passing 200 Mesh: 90.3

OIL USED

Type: Fuel 0.16
Source: Amax Phosphate
BTU/Lb.: 17,737
Ash (%): 0.24
Sulfur (%): 2.33
B. S. & W: <0.1
Sp. Grav.: 0.995
API: 10.71
Lb./Gal.: 8.29
Viscosity (@ 122°F): 200 cps
Flash: 248°F
Chlorine .013

COM

Coal (%): 50.13 } 1.35 %S ~ 1.23% (±0)
Oil (%): 41.11 }
Water (%): 8.76
BTU/Lb.: 14,704
Sulfur: 1.54
Ash (%): 1.86
Sp. Grav.: 1.13
Lb./Gal.: 9.3
Flash: 257°F
Viscosity (@ 122°F): 16,500 cps
Chlorine 0.11

Percentages are by weight

BROOKFIELD VISCOSITY (COM)

Temp. (f)	Centipoise	Temp. (F)	Centipoise
50	100,000+	140	8,410
60	100,000+	150	6320
70	100,000+	160	3950
80	80,000	170	1440
90	56,000	180	810
100	42,000	190	600
110	33,600	200	475
120	18,800	220	350
130	11,450	240	185

Name William L Brown

Position Quality Control Mgr

4,140 Gallons

EMISSION RATE CALCULATIONS

PROPOSED ACTUAL

PARTICULATE MATTER

= 300 tons/hr x 0.06 lb/ton
= 18.00 lb/hr
x 8760/2000
= 78.8 tpy

SULFUR DIOXIDE

PROPOSED EMISSION LIMIT
=(1.1 lb SO_2/10^6 BTU)(118×10^6 BTU/hr)
= 129.80 lb/hr
x 8760/2000
= 568.5 tpy

Uncontrolled with 0.7% Sulfur fuel oil
= (115×10^6 BTU/hr)(1/149500 BTU/gal)(8.08 lb/gal)
x (0.007 x 2 lb SO_2/lb fuel)
= 87.0 lb/hr
< 129.8 lb/hr; therefore no SO_2 sorption is necessary to meet the proposed emission limiting standard

Uncontrolled with 2.5 % Sulfur fuel oil
= (118×10^6 BTU/hr)(1/147095 BTU/gal)(8.29 lb/gal)
x (0.025 x 2 lb SO_2/lb fuel)
= 332.6 lb/hr
Absorption necessary to meet proposed std
= (332.6 - 129.8) x 100/332.6
= 61.0 %

Uncontrolled with 2.00 % Sulfur COM
= (109 x 10^6 BTU/hr)(1/135870 BTU/gal)(9.3 lb/gal)
x (0.025 x 2 lb SO_2/lb fuel)
= 373.0 lb/hr
Absorption necessary to meet proposed std
= (373.0 - 129.8) x 100/373.0
= 65.2 %

Nitrogen Oxides

In error?

For fuel oil combustion an NO_x stack gas concentration of 61 ppm was assumed (PSD-FL-088; Brewster). For coal combustion this concentration was increased by a factor equal to the AP-42 coal NO_x emission factor divided by the AP-42 oil NO_x emission factor. For COM the NO_x emission factor was calculated as:

(Oil NO_x factor)(0.45) + (Coal NO_x factor)(0.55)

NO_x from Coal - AP-42

= 18 lb / ton
x (1/2000 lb/ton)(1/13350 BTU/lb)(10^6)
= 0.671 lb NO_x / 10^6 BTU

NO_x from Oil - AP-42

= 60 lb / 1000 gal
x (1/1000)(1/147040 BTU/gal)(10^6)
= 0.41 lb NO_x / 10^6 BTU

NO_x emissions from Oil (same as present)

= 19.83 lb/hr

NO_x emissions from Coal (by ratio)

= 19.83 (0.67 / 0.41)
= 32.41 lb / hr

NO_x emissions from COM

= 19.83 (0.45) + 32.41 (0.55)
= 26.75 lb/hr
x 8760/2000
= 117.2 tpy

CARBON MONOXIDE

CO from Coal - AP-42

= 1 lb / ton

x (1/2000 lb/ton)(1/13350 BTU/lb)(10^6)

= 0.037 lb CO / 10^6 BTU

CO from Oil - AP-42 (Same as present)

= 4.18 lb/hr @ 125 x 10^6 BTU/hr

= 0.033 lb CO / 10^6 BTU

CO emissions from COM

= 4.18 (0.45) + 4.18 (0.037/0.033)(0.55)

= 4.46 lb/hr

x 8760/2000

= 19.5 tpy

HYDROCARBONS

HC from Coal - AP-42

= 0.3 lb / ton

x (1/2000 lb/ton)(13350 BTU/lb)(10^6)

= 0.011 lb HC / 10^6 BTU

HC from Oil - AP-42 (Same as present)

= 0.84 lb/hr @ 125 x 10^6 BTU / hr

= 0.007 lb HC / 10^6 BTU

HC emissions from COM

= 0.84 (0.45) + 0.84 (0.011/0.007)(0.55)

= 1.14 lb/hr

x 8760/2000

= 5.0 tpy

Proposed Uncontrolled

Particulate Matter - Based on 97% efficiency determined by test data

= 18.00 (1/[1-0.97])
= 600 lb/hr (average)
x 8760/2000

= 2626 tpy

Sulfur Dioxide

= 373.0 lb/hr - from previous section
x 8760/2000

= 1634 tpy

NO_x

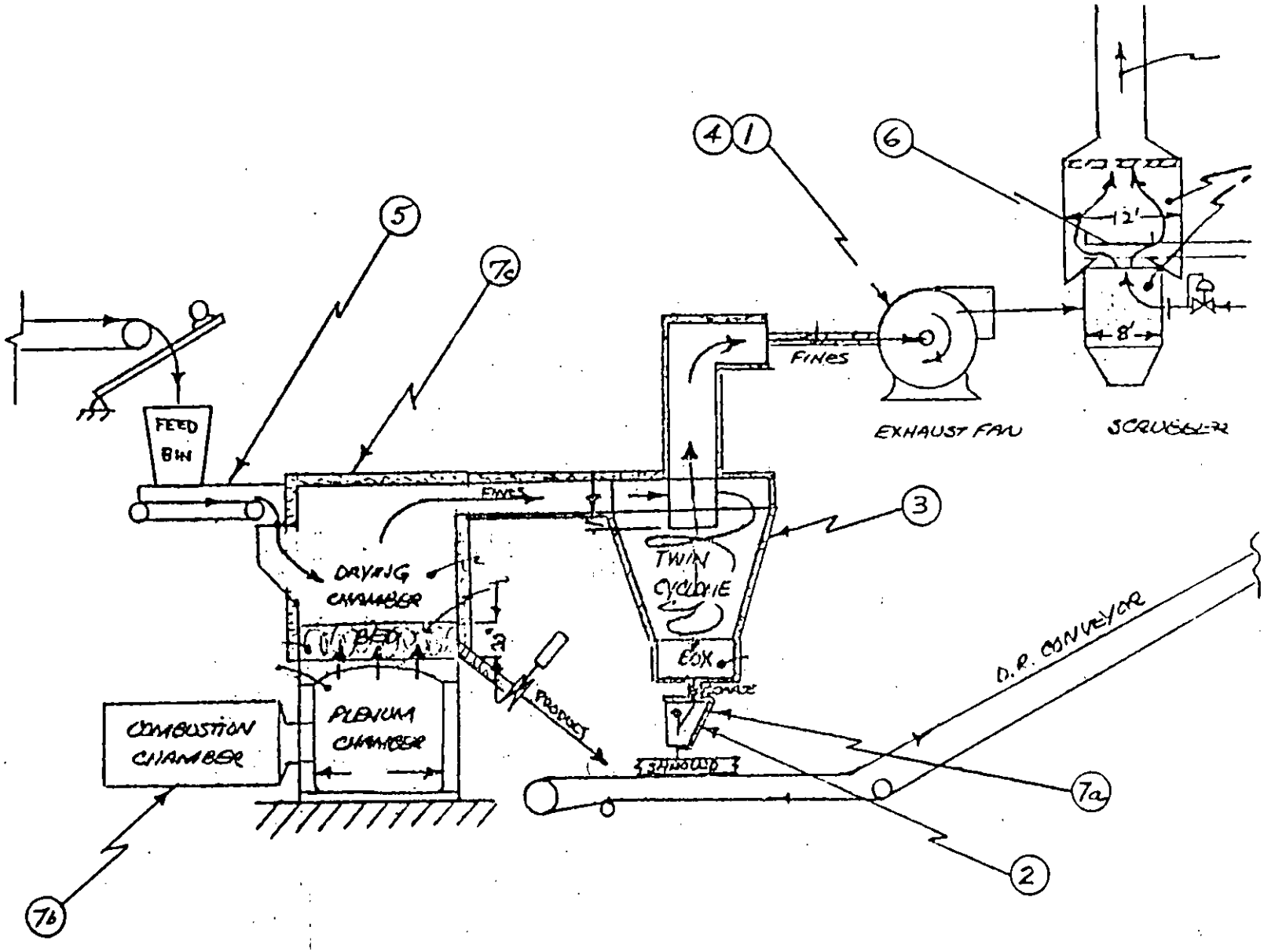
= 26.7 lb/hr and 117.2 tpy
(Same as Actual)

CO

= 4.5 lb/hr and 19.5 tpy
(Same as Actual)

HC

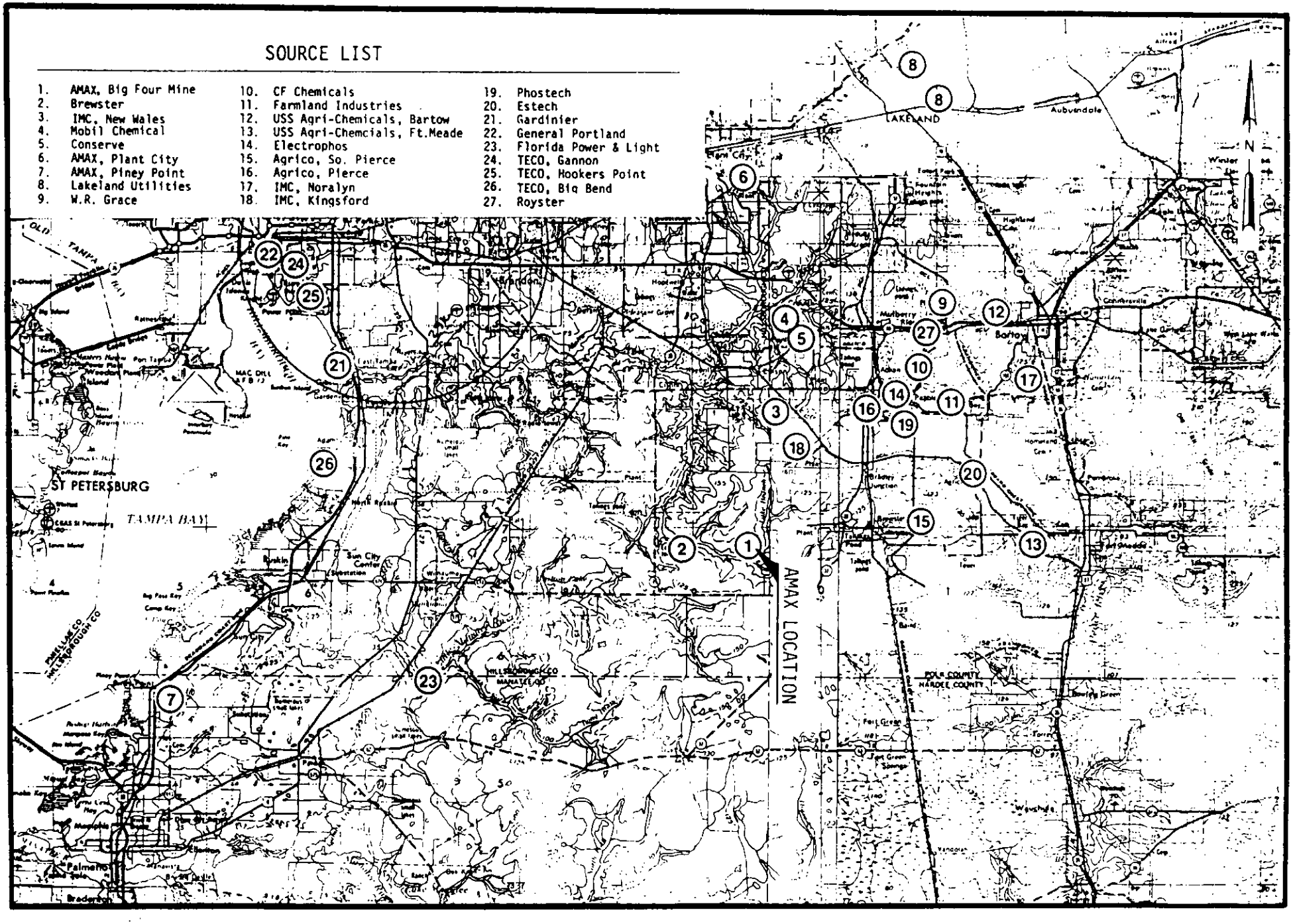
= 1.1 lb/hr and 5.0 tpy
(Same as Actual)



SCHEMATIC DRYER ARRANGEMENT

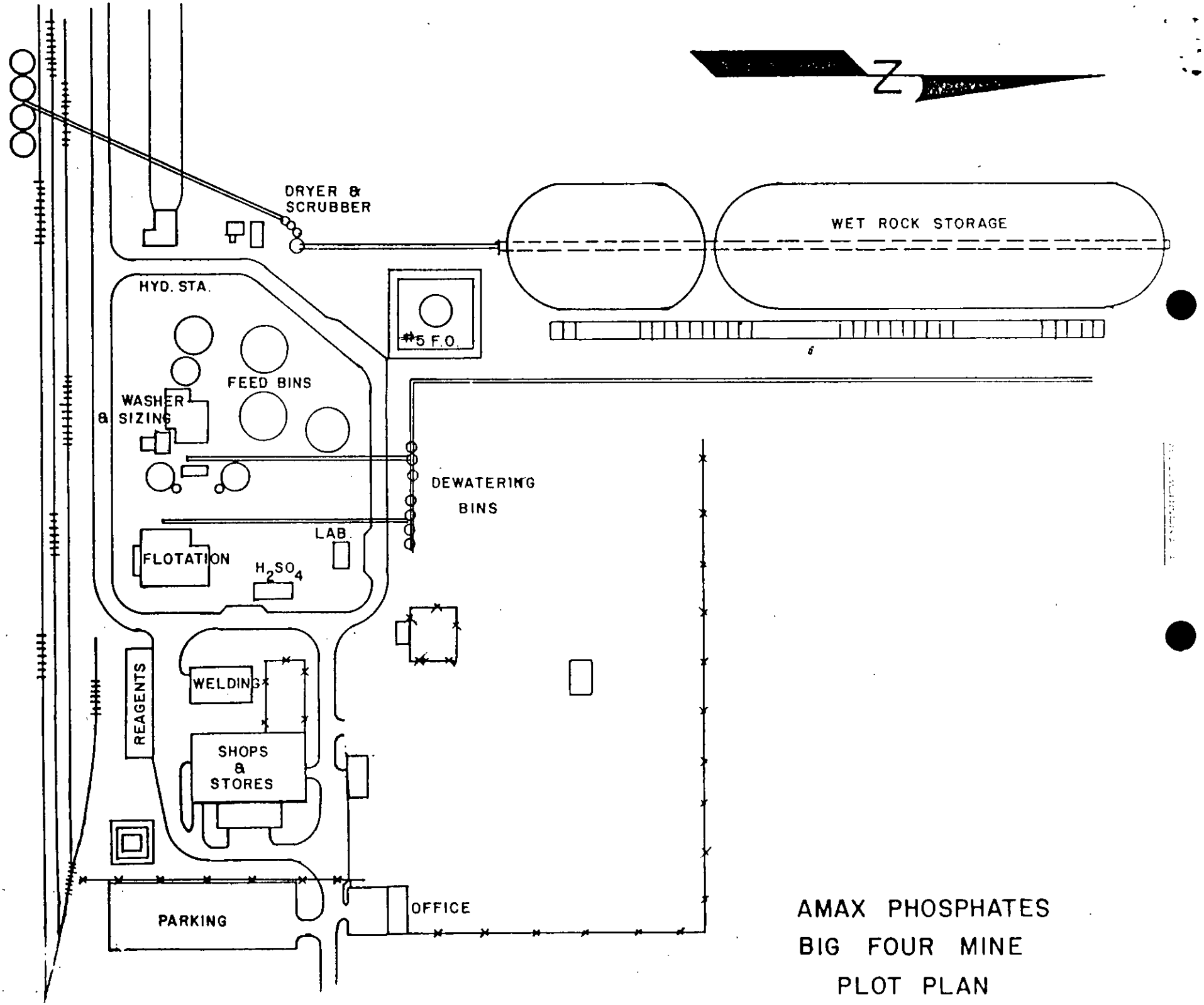
6

ATTACHMENT D



ATTACHMENT E

SHOLTES & KOOGLER



AMAX PHOSPHATES
BIG FOUR MINE
PLOT PLAN