Eunice Snow

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

BOB GRAHAM
GOVERNOR

JACOB D. VARN
SECRETARY

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

October 15, 1980

Mr. L. L. Lahman, Plant Manager
Agrico Chemical Company
P. O. Box 1969 SPCW
Bartow, Florida 33830

Dear Mr. Lahman:

The Department has received four applications for permits to construct a DAP plant, DAP storage and shipping, a sulfuric acid plant and to modify a phosphoric acid plant from Agrico Chemical Company. Based on the initial review of your applications, it has been determined that additional information is needed before we can process the applications.

Phosphoric Acid Plant Application.

1. Give a general description of the present phosphoric acid plant and proposed changes to it.

2. Give estimates of the average and maximum emission rates of particulate and fluoride emissions from each stack.

3. Give a description of the fluoride and particulate emission control methods for the storage area and any other process equipment that emits fluoride but is not vented through the scrubbers.

4. Are any modifications being made to the existing scrubbers? We note the process input rate is increasing 49 percent (681 to 1,015 TPH) while the scrubber efficiency remains constant (99.6 percent).

5. Give information on scrubber operation parameters, such as pressure drop, capacity, GPM, pressure on nozzles, etc.

6. Will the maximum operating time be 7,445 hour per year?

Sulfuric Acid Plant Application:

1. Give information on any auxiliary boiler used with the sulfuric acid plant. What is its operation permit number? Any new or existing auxiliary boiler needs a permit to construct or operate.

2. Give information on any alternate pollution control equipment considered (See VI.E.).

DAP Plant Application:

1. Give a general description of the proposed process.

2. Give a description of the emission controls used on all the process equipment (reactors, granulators, dryers, coolers, screens, mills, conveying and transfer equipment).

3. Give an estimate of the ammonia emission.

4. Will the maximum operating time be 7,143 hours per year?

5. Give the design operating parameters of the scrubber system, such as pressure drop, capacity, etc.

6. Is the maximum sulfur content of the fuel oil 2.25%?

DAP Storage and Shipping

1. List a cyclone collector and its efficiency on Section III.D if one will be used before the scrubber.

2. Give the information required by Section V4 and V5, which should include design details for all pollution control systems.

3. Give a legible drawing for Attachment 1 (the drawing attached is not clear).

4. Give a description of fugitive emission control from the building.

5. Is there any other phosphate fertilizer product, such as NSP or TSP, stored with DAP in the storage building?

For the complex, we need the following information.

1. Will any existing unit be shut down when the proposed plants begins operation?

2. What are the total fluoride emissions (lb F^-/ton P_2O_5) from the complex before and after the proposed modifications?

If you have any questions on the data requested, please contact Willard Hanks (904) 488-1344 from this office. We will resume processing your applications as soon as this information is received.

Sincerely,

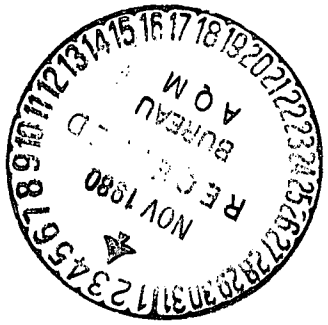
D. L. Thomas

for Steve Smallwood, Chief
Bureau of Air Quality Management

SS:caa

cc: DER, Tampa

SS:caa



Agrico
ONE OF THE WILLIAMS COMPANIES

October 30, 1980

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

Dear Mr. Smallwood:

Enclosed please find the additional information that was requested in your October 15th letter.

If you have any additional questions, please feel free to contact me at 813-428-1423, Extension 220.

Yours truly,

Edward E. Mayer

Edward E. Mayer
Environmental Engineer

cc: L. C. Lahman
B. Trusty
B. Curtis
V. Snow
J. Foster
F. Hughes
R. Rhodes, Jr.
J. Koogler

EEM/lgm

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

PHOSPHORIC ACID PLANT APPLICATION

1. Give a general description of the present phosphoric acid plant and proposed changes to it.

Answer:

The phosphoric acid production process at South Pierce is basically to extract phosphoric acid from phosphate rock by means of adding the rock to sulfuric acid, filtering the "slurry" and concentrating the phosphoric acid to desired strengths. This is known as the wet process. A more detailed explanation of the process is included in the supplement to the permit application.

The present phosphoric acid production at South Pierce consists of two trains, A and B. They are each permitted for 23.81 tons per hour P_2O_5 for 21 hrs./day, 7 days/week and 50 weeks/year. This is approximately 350,000 tons P_2O_5 per year. The D.E.R. air permits are A053-4531 for A Train and A053-4525 for B Train, both dated 5 Oct 1977.

In April of 1977 State and Federal permits were applied for an expansion of production. The expansion consisted of increasing the filtering capacity of the B Train and adding a new evaporator. This would result in increase of production to approximately 430,000 tons per year P_2O_5. The construction of this expansion is in progress at this time. It was permitted under D.E.R. construction permit AC53-18923 dated 27 June 1979 and E.P.A., P.S.D. permit PSD-FL-035 dated 22 Jan 1980. The expansion should be completed by March of 1981.

The new proposed expansion will further increase the production to 625,000 TPY P_2O_5. This will consist of constructing two more evaporation units and increasing the wet rock feed by adding a new ball mill.

2. Give estimates of the average and maximum emission rates of particulate and fluoride emissions from each stack.

Answer:

Both A and B Train processes will meet the New Source Performance Standards of .02 lbs. of F^- per ton of P_2O_5 input.

At the 625,000 TPY Production rate, both A and B Trains will be operating at similar rates. The maximum total hourly rate would be 2.22 lbs. of F^- as computed in the permit application. This would result in 1.11 lbs. of F^- per hour out each stack. The average hourly emission for each stack would be approximately .93 lbs. of F^-.

Wet rock will be used for phosphoric acid production and there will be no particulate matter emissions.

PHOSPHORIC ACID PLANT APPLICATION

3. Give a description of the fluoride and particulate emission control methods for the storage area and any other process equipment that emits fluoride but is not vented through the scrubbers.

Answer:

All process equipment that emits fluorides are vented through the scrubbers. The expansion does not include any new or additional tanks for storage. All present tanks have enclosed tops.

4. Are any modifications being made to the existing scrubbers? We note the process input rate is increasing 49 percent (681 to 1,015 TPH) while the scrubber efficiency remains constant (99.6 percent).

Answer:

The A Train, Phos. Acid Plant has a cross-flow scrubber that was modified in 1978 to meet the New Source Performance Standards of .02 lbs of F^- per ton of P_2O_5 input. It is Agrico's opinion that this scrubber will meet the N.S.P.S. at the higher expansion production rates. This is based on the fact that the unit has met the standards while scrubbing the combined fumes from both A and B Trains.

A new scrubber is in the process of being constructed for the 430,000 TPY expansion. This scrubber has been designed to accomodate the additional fumes on the B Train side from the 625,000 TPY expansion. The old B Train spray chamber scrubbers have been removed. The new scrubber will be a cross-flow type with a spray chamber and Kimre packing. The 99.6 percent efficiency rate refers to the higher production tonnage.

5. Give information on scrubber operation parameters, such as pressure drop, capacity, GPM, pressure on nozzles, etc.

Answer:

A-Train - See attached drawing 35-30-00-100C Phos. Acid "A" Train Fume Scrubber Water and Fume Flow Schematic.

B-Train - See attached specifications for fume scrubber, Item No. GK-201.

6. Will the maximum operating time by 7,445 hours per year?

Answer:

Goal for maximum operating time is 7,884 hours per year.

SULFURIC ACID PLANT APPLICATION

1. Give information on any auxiliary boiler used with the sulfuric acid plant. What is its operation permit number? Any new or existing auxiliary boiler needs a permit to construct or operate.

   Answer:

   A new package boiler was recently constructed at South Pierce. This 165 MMBTU/hr unit replaced a smaller Babcock and Wilcox boiler, which was demolished.

   A D.E.R. construction permit (AC53-27465) was obtained in March of 1980. After start up an operation permit was applied for, but it has not been received as of this date.

   The permit application specified operation of approximately four days per year. It will use #2 diesel oil with .5 percent sulfur. The emission rate will be approximately 84 lbs. of SO_2 per hour. A visible emission test conducted after start up indicated zero opacity in accordance with E.P.A. Method 9.

2. Give information on any alternate pollution control equipment considered. (See VI. E.)

   Answer:

   There was not any other pollution control equipment considered. Double absorption for the control of SO_2 and high efficiency mist eliminators for the control of acid mist is the accepted N.S.P.S. and B.A.C.T. for the control of these pollutants. See 'A Review of Standards of Performance for New Stationary Sources - Sulfuric Acid Plants', U.S. E.P.A. - 450/3-79-003, January 1979.

DAP PLANT APPLICATION

1. Give a general description of the proposed process.

2. Give a description of the emission controls used on all the process equipment (reactors, granulators, dryers, coolers, screens, mills, conveying and transfer equipment).

Answer:

The manufacture of DAP fertilizer starts in the reactor system where phosphoric acid is neutralized with ammonia. Phosphoric acid is metered continuously into the reactor and the scrubber seal tank. Liquid ammonia is metered continuously to maintain the proper mole ratio in the reactor. The resulting fertilizer slurry from the reactor is pumped continuously to the granulator. Here the slurry is distributed over a large recycle stream of dry solids. The slurry wets the fine particles which are coated and rolled together to produce the larger fertilizer granules needed in the product. Ammonia is introduced continuously under the rolling bed in the granulator to maintain the desired mole ratio. The wet granules overflow directly into the dryer. Here they are dried by direct contact with a cocurrent hot air stream. The dry particles are elevated to the screens. A lump breaker at the dryer outlet protects the conveying equipment and the screens. Double-deck product screens divert the oversize product to the mills for size reduction and the fines flow by gravity directly to the recycle conveyor. The mills discharge to the recycle conveyor. The product-size material enters the product surge bin for product removal and the excess overflows to the recycle conveyor. Product fed continuously from this bin is cooled to about $120^{o}F$ in a rotary cooler. From the cooler the finished product leaves the building for storage.

To minimize product losses through dust, the dryer and cooler exhaust gases together with all the vent streams from the conveyors and elevators are sent to cyclones where the dust is separated and returned to the recycle conveyor. The off gases pass through the liquid scrubbers to recover the gaseous chemicals and to minimize air pollution from these gases prior to venting to the atmosphere.

The gases from the reactor contain a large amount of steam which is removed and condensed in the scrubbers. The mole ratio in the reactor is maintained at 1.45 or below to ensure that no appreciable ammonia loss occurs. Gases from the granulator and dryer are scrubbed in the scrubbers to recover their chemical content. A phosphoric acid solution is circulated in the scrubbers to recover any ammonia and dust in the gas stream. The excess from the scrubber seal tank is returned continuously to the reactor and the recovered chemicals, together with the phosphoric acid, used for the production of more fertilizer. The gaseous effluents of the scrubbers are vented through the tail gas scrubber to the atmosphere.

This Plant will also be utilized for the production of M.A.P.

DAP PLANT APPLICATION

3. Give an estimate of the ammonia emission.

Answer:

Plant will be operated to minimize ammonia emissions from the reactor, granulator, and dryer. Exhaust gases from all three units will be scrubbed with low mole ratio (low pH) solutions in venturi scrubbers to recover all ammonia. All exhaust gases will then pass to cross-flow or counter-flow packed tail gas scrubber where water from the nitrogen pond will be used as a scrubbing liquid. Ammonia removal from the gas stream should be substantially complete. Estimated maximum ammonia emission will be 100 lbs/hour.

4. Will the maximum operating time be 7,143 hours per year?

Answer:

Goal for maximum operating time is 7,884 hours per year.

5. Give the design operating parameters of the scrubber system, such as pressure drop, capacity, etc.

Answer:

Final design of the plant and scrubber system has not been completed and Agrico has not firmly decided on the total scrubber package and does not have actual design data in hand at this time.

6. Is the maximum sulphur content of the fuel oil 2.25%?

Answer:

Present and forseeable future fuel oil supply is at 2.25% sulphur. A major world upset relative to oil supplies could increase this sulphur level to 2.5-2.6%.

DAP STORAGE AND SHIPPING APPLICATION

1. List a cyclone collector and its efficiency on Section III D if one will be used before the scrubber.

   Answer:

Name & Type	Contaminate	Efficiency
Cyclone Collector	Dust	85%

2. Give the information required by Section V4 and V5 which should include the design details for all pollution control systems.

   Answer:

   Final design of the plant and scrubber system has not been completed and Agrico has not firmly decided on the total scrubber package and does not have actual design data in hand at this time.

3. Give a legible drawing for Attachment 1 (the drawing attached is not clear).

   Answer:

   See Attachment.

4. Give a description of fugitive emission control from the buildings.

   Answer:

   Product entering the building will be clean and substantially dust free. Fugitive dust generated in the handling of product to loading and shipping will be contained by recovery at all transfer points where dust emissions might occur. Special efforts will be made to avoid spillage in payloader path. However, floor will be cleaned routinely to eliminate any and all spillage and to control dust generation.

5. Is there any other fertilizer product, such as NSP or TSP, stored with DAP in the storage building?

   Answer:

   There will be no NSP or TSP stored in this building. The building will be used solely for the storage of N-P products derived from phosphoric acid and ammonia, with DAP as the primary product. A MAP product could be stored in this building if market demand made sale of this product attractive.

TOTAL COMPLEX

1. Will any existing unit be shut down when the proposed plants begin operation?

   Answer:

   No unit will be shut down.

2. What are the total fluoride emissions (lb F^-/ton P_2O_5) from the complex before and after the proposed modifications?

   Answer:

Source	Before Expansion	After Expansion
GTSP Production	5.0 LB/HR	5.0 LB/HR
A Train Phos. Acid	* .75 LB/HR	* 1.11 LB/HR
B Train Phos. Acid	* .75 LB/HR	* 1.11 LB/HR
Fluoride Plant	1.0 LB/HR	1.0 LB/HR
South Building Scrubber	5.0 LB/HR	5.0 LB/HR
North Building Scrubber	5.0 LB/HR	5.0 LB/HR
DAP Plant	-	* 2.9 LB/HR
TOTAL	17.5 LB/HR	21.12 LB/HR
P_2O_5 Input (Avg Hourly Rate)	470,600 LB/HR Rock x .285 TPA = 67 TPH P_2O_5	653,612 LB/HR Rock x .285 TPA = 93 TPH P_2O_5
Total Facility F^- Emissions	17.5/67 = .26 LB/TON	21.12/93 = .23 LB/TON

* Assumed

GULF DESIGN DIVISION

BADGER AMERICA, INC.

A Raytheon Company

TAMPA, FLORIDA

SPECIFICATION

FOR

FUME SCRUBBER

ITEM NO. GK-201

Reference Drawings
8001-337-1, 2, & 3

AGRICO CHEMICAL CO.
PHOSPHORIC ACID EXPANSION
SOUTH PIERCE, FLORIDA

ISSUE	DATE	DESCRIPTION	CH'K'D	APP'D
II	MAR 17 '80	CERTIFIED FOR PURCHASE	JWS	
I	12/5/79	FOR QUOTATION (INTERNALS)	JWS	

CERTIFIED
ENG. _____ DATE 3-2-80
_____ DATE 2-25-80
CLIENT _____ DATE 3-13-80

SHEET 1 OF 4 | SPE-8001-G-201

FORM QUE(I)-3-1 Rev. 1/76

GAS SCRUBBER SPECIFICATION

This specification describes the gas scrubbing requirements for the removal of gaseous and/or particulate contaminates from process vent gases.

Service: Vent gases from wet-process phosphoric acid plant.
Number of Scrubbers required: One

1.0 Process Data

1.1 Gas Stream No.:	1	2
Source:	Reactor	Filter Hood etc.
Gas Flow, ACFM:	25,000	43,000
Temperature, ^{o}F		
Dry Bulb :	140	115
Wet Bulb : (or % RH):	100%	85%
Inlet Pressure, inches W.G.:	-3	-3
Fluoride Loading (SiF_4 & HF) as Fluorine		
Lbs. F/day :	16,000	2,000
Grains F/ACFM:	3.1	0.23

1.2 Scrubbing Medium: Contaminated Pond Water

Soluble Fluorides: 7100 ppm F (wt.)
Temperature: 95^{o}F max.
Pressure : 40 PSIG at grade

1.3 Allowable Emissions: 16 Lb. F/day, TOTAL

2.0 Design Data

2.1 Quench Section

Stream No. 1 (Reaction Vapors) enters the void spray-quench section where it is contacted by duct inlet sprays followed by three banks of counter-current sprays.

Design Gas Velocity: 6 fps

Inlet Duct Sprays - Number: 10
Type : Hollow Cone, Bete 1/2" TF24N, PVC
Total GPM: 200
Pressure Required: 40 psig

Quench Sprays - Number: 45
Type : Hollow Cone, Bete 3/8" TF20N, PVC
Total GPM: 750
Pressure Required: 40 psig

2.2 Packed Section

Gases leaving the quench section are mixed with Stream No. 2 entering at Nozzle No.J2 before passing through three packed scrubbing stages followed by a mist eliminator.

Design Gas Velocity: 8 fps
Packed Area Required: 142 Sq. Ft./Stage.

2.2.1 Packed Stages

Spray nozzles are BETE, Full Cone square pattern, constructed of PVC.

Stage	No. Of Sprays	GPM, Total	PSIG Req'd	Model No.
1st	18	450	23	1¼" NCM1214MSQ
2nd	18	525	23	1½" NCM1516MSQ
3rd	18	600	25	2" NCM2017MSQ

Packing: Kimre Polypropylene Kon-Tane

Stage	No. Of Layers	Style
1st	6	37/97
2nd	6	37/94
3rd	6	16/97

2.2.2 Demister (polypropylene)

Area Required: 142 Sq. Ft.

4 Layers of Kimre Style 37/94 and
4 Layers of Kimre Style 16/97.

Intermittent Sprays for washdown

Number Of Sprays: 18
Type: Full cone - square pattern, BETE 1¼" NCM1214MSQ (PVC)
Total GPM: 450
Pressure Required: 23

2.3 Pressure Drop

Three packed states + B_GON Mist Eliminator (clean): 3 inches W.C.

Total allowed for scrubber (clean): 5" W.C.

Design maximum (dirty): 8" W.C.

3.0 Responsibility Of Packing Vendor

Following are the scope of supply and services to be supplied by Kimre Inc.

3.1 Provide the scrubber packing and demister (as specified in Section 2.2), pre-cut for installation as required and indicated by the referenced vessel drawings.

3.2 Approve mechanical design as per this specification and referenced vessel drawings.

3.3 Guarantee process design for maximum emissions of gaseous or particulate fluorides for conditions as outlined in Section 1.0.

Emissions shall not exceed 16 pounds fluorine per day.