

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF FINAL PERMIT

In the Matter of an
Application for Permit

Mr. Robert Stewart Sr., VP O&A
Piney Point Phosphates, Inc.
13300 US 41 North
Palmetto, Florida 34221

DEP File No. 0810002-004-AC
Permit No. PSD-FL-242
Manatee County

Enclosed is the FINAL Permit Number PSD-FL-242 to repair and restore to previous capacity, the existing sulfuric acid plant at Piney Point Phosphates fertilizer facility located at 13300 US Highway 41, near Palmetto, Manatee County. This permit is issued pursuant to Chapter 403, Florida Statutes and in accordance with Rules 62-212.400 and 410., F.A.C., Prevention of Significant Deterioration and Best Available Control Technology.

Any party to this order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, F.S., 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 Legal Office; 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 (thirty) days from the date this Notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.



C. H. Fancy, P.E., Chief
Bureau of Air Regulation


CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF FINAL PERMIT (including the FINAL permit) was sent by certified mail (*) and copies were mailed by US Mail before the close of business on 2-17-98 to the person(s) listed:

Robert Stewart Sr., PPPI *
Ivan Nance, PPPI
Brian Beals, EPA
John Bunyak, NPS
Bill Thomas, DEP SWD.
Jeffrey Brown, Esq., DEP OGC
John Koogler, P.E.
Karen Collins, Manatee Co.
Richard Moore, Esq., Amundsen & Moore
David Dee, Esq., Landers & Parson

Clerk Stamp

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


(Clerk)

2-17-98
(Date)

FINAL DETERMINATION
PINEY POINT PHOSPHATE
SULFURIC ACID PLANT PROJECT

The Department distributed a public notice package on January 8, 1998 for the project to repair and restore to its previous capacity, the Piney Point Sulfuric Acid Plant located on US 41 near Palmetto, Manatee County to its previous capacity. The Public Notice of Intent to Issue was published in the Bradenton Herald on January 13. No comments were received by the Department from the public, the EPA or the National Park Service.

Both Manatee County and the Applicant filed requests to extend the time requirement for filing petitions for an administrative hearing in accordance with Sections 120.569 and 120.57, F.S. These have since been withdrawn. Comments were received from the Applicant by letter dated January 23, 1998. These and the Department's responses follow.

COMMENTS FROM APPLICANT

General

The Applicant made a statement regarding Draft Permit Specific Condition 31. This is addressed with the other comments regarding SC 31 in Item 16 below. The Applicant made two other general comments which are addressed as Items 1 and 2 below, after which the Numeration corresponds to that used in Applicant's letter.

1. *Applicant tried to put SO₂ emissions from sulfuric acid plants and the Department's review into perspective. Applicant stated that the SO₂ emission rate of a plant is unique to that plant and cited 12 or more factors upon which sulfuric acid plant performance is based. Applicant maintains that "to cite the performance of one plant and state that another plant can operate similarly is fallacious."*

The Department appreciates the points and believes that its own evaluation of the reductions achievable at the Piney Point Plant, after repair and restoration to previous capacity, is cautious and conservative. The plants cited in the evaluation (General Chemical, Mississippi Phosphates, and PCS at White Springs), represent a diverse set of process variations and operating modes. The Department set a Best Available Control Technology (BACT) Determination higher than the rates achieved in practice by any of these plants. It is during major modifications or new construction that significant opportunities arise for achieving cost-effective emission reductions. The Department believes that it is not fallacious to cite from what is achieved in practice, what is available from vendors, the comments of other agencies, information provided by the Applicant, published literature, and the Department's own resources to make conclusions therefrom. The BACT Determination is a regulatory responsibility of the Department and not the Applicant.

2. *Applicant commented that its Agreement with Manatee County was to achieve a limit of 3.5 pounds of sulfur dioxide per ton of sulfuric acid (lb SO₂/ton) and that as a good faith effort Applicant agreed to use cesium catalyst in the final bed of the converter. Applicant asserts this was not based on a cost-effectiveness analysis and that the emission limit and catalyst use are independent points of the agreement.*

The Department independently concluded that SO₂ emission levels equal to or lower than 3.5 lb/ton are achievable in a cost-effective manner by use of cesium-promoted catalyst. This was discussed with the Applicant prior to its Agreement with the County. The Department approves of the technology chosen by the Applicant to achieve lower emissions of SO₂.

Public Notice

Applicant had no comment. The Department notes that the nitrogen oxides limit given as 0.15 pounds per ton of 100 percent sulfuric acid (lb/ton) should have been 0.12 lb/ton. All other documents gave the correct figure and it is noticed here for the record.

Technical Evaluation and Preliminary Determination

3. *Applicant pointed out that Figure 1 was revised by the Department to specify the type of catalyst and requests any references to Piney Point as the source of the drawing be removed.*

Figure 1 accurately reflects the process at Piney Point. The Department acknowledges that references to location of vanadium catalyst, cesium vanadium catalyst, the reaction equations and the title of the figure were added by the Department. A version of the Figure 1 without Piney Point's name on it is attached.

4. *Applicant states that the following sentence from Section 4, Process Description, regarding the effectiveness of cesium catalyst, is based on claims by suppliers and marketing literature aimed at "boosting sales." The Department's statement is "this catalyst is more effective than other ringed vanadium catalyst at lower temperatures, thus favoring more complete conversion of the reactants and possibly lower emissions of SO₂." The Applicant states that "the lower temperature at which the cesium enhanced catalyst becomes active also results in a slower reaction rate. Unless contact time is increased, the cesium enhanced catalyst might result in no change in SO₂ emissions or even an increase in emissions."*

The Department also relied on various published papers, including several presented at industry conferences. The "marketing" information appears more for the purpose of letting clients know that certain products are available rather than for "boosting sales." The reader is referred to the attachments to both the Draft and Final Best Available Control Technology (BACT) Determination. One attachment describes the "landmark developments and contributions to the industry" by Monsanto Enviro-Chem, the full service vendor for the Piney Point project. All of the other claims contained therein are readily acknowledged by the industry and the Department and, in view of the supporting technical papers, there seems to be no reason to doubt the claim regarding cesium catalyst. If the lower temperature impedes the reaction, it is noted that Haldor-Topsoe offers a cesium-promoted catalyst whose activity at 760 degrees is actually higher than its non-cesium counterpart at 800 degrees. Refer to the attachment on VK-69 in the Draft and Final BACT determinations. Further technical details are in the mentioned published papers.

5. *The applicant correctly pointed out and the Department acknowledges that the PSD-significant level for sulfuric acid mist (SAM) emissions should be 7 tons per year.*
6. *The applicant requested clarification that the Department and not the applicant or equipment supplier expects SAM emissions to be less than 0.1 lb/ton.*

Besides the information given in the documents referenced by the Department, the information submitted by the National Park Service and provided to the Applicant corroborates the Department's projection. According to the application, the Applicant originally expected to meet the NSPS limit of 0.15 lb SAM while using Monsanto Model CPH-P mist eliminators. The Applicant then agreed to install the higher efficiency, Model ES eliminators. According to the attachments to the Draft and Final BACT determination, the ES line incorporates the principle of Brownian Diffusion and extends high efficiency collection to the sub-micron particle size range.

The equipment supplier's information on its line of high efficiency mist eliminators indicates collection efficiency is approximately 100% for particles greater than 3 micron. For particles less than 3 microns, the collection efficiency ranges from 92-99.95%. For all particle sizes combined, the collection efficiency (on a mass basis) is on the order of 99.9%.

If emissions as high as 0.1 lb SAM/ton actually occur, the implication, based on collection efficiency, is that approximately 100 lb SAM/ton are removed by the mist eliminators servicing the final tower. This amount is equal to 5% of sulfuric acid production - a seemingly very large amount. A value of 5% is on the order of the sulfuric acid recovered by the final tower and it would be illogical to expect SAM from the final tower to the mist eliminator system to be that high. Therefore the Department's estimate of emissions, assuming 99.9% efficiency is the high side. Even at 99% efficiency, it would appear rather high.

Draft Permit

7. *Subsection A. The applicant requests that the last sentence in the Facility Description be eliminated to reflect that after one turnover or two years (whichever is longer), the Agreement with Manatee County does not require the Applicant to use cesium-promoted catalyst.*

See comment 2 above. The Department believes that the facility description reflects the project and is accurate. Minimum requirements from the Manatee County Agreement were included in the Department's specific conditions with the consent of both the County and the applicant. A change to non-cesium catalyst and switch to another SO₂ control strategy shall not occur without the Department's review and approval and shall require submittal of a permit modification request to revise the BACT determination.

The Applicant has not provided reasonable assurance as required by Rule 62-4.070, F.A.C. that any other technology or measure it would consider implementing will meet the BACT SO₂ emission limit.

8. *Subsection D. The applicant requests that the Agreement with Manatee County, (as one of several documents which are the basis of the permit and specifically related to this permitting action) take precedence if there is any conflict in wording with the permit.*

The Department was not a party to the Agreement and cannot allow it to take precedence over permit conditions, particularly those that are more stringent than the Agreement. The fact that the Agreement and other documents were mentioned as the basis for and are specifically related to the permit does not accord them precedence. Department Rules and Consent Agreements, Florida Statutes, Court Orders, etc. are accorded such status. For example, the Department does not accord precedence to the comments of EPA and the National Park Service which are also listed as documents which are the basis of the permit. The comments of these agencies suggest some conditions that are more stringent than either the Applicant or the Department have proposed.

9. *Section II, General and Administrative Requirement No. 6. The applicant requests that the construction permit expiration date be December 31, 2001, rather than December 31, 1999.*

The requested date is more representative of development of a greenfield site. The Application listed December 1, 1997 as the date of commencement of construction and December 1, 1999 as the projected date for completion of construction. The Department is not aware of any unforeseen delays since the application was received and understands the company is eager to complete the construction. The expiration date will be extended until June 30, 2000 to account for the time taken to process this application. The Applicant may submit an amendment request to extend the permit after the need becomes evident. [Rule 62-4.080(3), F.A.C].

10. *Section III, Specific Condition No. 3. The Applicant requests that the 3-hour SO₂ limit of 4 lb/ton, the SAM limit of 0.15 lb/ton, and the NO_x emission limit be referenced as BACT.*

The Department's BACT determination was 3.5 lb SO₂/ton on a 48-hr basis. The Department did not make a BACT determination for SO₂ on a short-term basis for this permit. The higher, short-term NSPS limit also applies, but the Department does not consider it as a BACT limit for this project. Similarly, the Department does not consider 0.15 lb SAM to represent BACT, but rather a limit satisfying the NSPS requirement. The Department believes the choice made by the Applicant to install mist eliminators exhibiting high collection efficiency in the small particle range represents BACT as discussed in comment 6 above. The NO_x limit is not a BACT limit. If any credit is given for past emissions from the plant, the NO_x emissions increase from the project will not be significant with respect to PSD (based on emission factors in the application).

11. *Specific Condition 6. The Applicant requests that the sulfuric acid production rate be measured on a 48-hour basis to make it consistent with the 48-hour SO₂ emission limit.*

By the same logic, it could be concluded that past daily production limits should have been based on the three-hour SO₂ limit for consistency. The limit included in the permit is on the same basis as the past operation and is based on the Department's understanding of the project. This is also consistent with the Agreement that indicates the capacity of the plant will not be increased to levels that are greater than 2000 tons per day.

12. *Specific Condition 7. The applicant requests that no changes be made in the present molten sulfur throughput limit contained in a separate permit.*

Based on the original 1990 application for the molten sulfur plant signed by Robert Mayko, PE for Royster, the hourly utilization rate for sulfur was given as 55,500 lb/hr. This equates to 666 short tons per day (TPD), not long TPD (LTPD). A letter dated November 6, 1990 from Suzanne Neupauer of Royster states that "based upon the maximum permitted production capacity of the sulfuric acid plant at 2000 TPD, daily throughput would be 666 tons (of sulfur)."

The front page of the molten sulfur system permit AC 41-176524 indicates a *throughput* rate of 667 TPD consistent with the application. The Department will change the sulfuric acid plant permit to reflect *utilization* by the sulfuric acid plant of 667 TPD as intended by the original molten sulfur system application. Additionally, the Department will adopt by reference the molten sulfur system permit, *including the more stringent visible emissions limit contained therein*, into the present permit with the correction of 667 LTPD *throughput* to 667 TPD *utilization*. This allows for inventory fluctuation, impurities, inaccuracies, wastage, etc.

13. *Specific Conditions 9 - 29. The Applicant requests removal from the permit of all Specific Conditions taken from the Agreement with Manatee County and contends the entire document is (automatically) part of the permit.*

Refer to comment 8 above. The Department cannot allow future changes by other parties to be automatically and perpetually incorporated into its permits. The Department clearly listed on the front page of the permit which documents comprise the permit. The Agreement is not one of them. Clearly the Department did not "approve" the Agreement, but relied on certain elements of it with the consent, if not at the specific request, of the parties.

14. *Specific Condition 11. Applicant requests deletion of reference to "Brownian Diffusion" as overprescriptive and irrelevant.*

The reference is very appropriate and relevant, because it describes a defining feature of the Best Available Control Technology for mist eliminators servicing a final absorption tower. Brownian Diffusion greatly increases the collection efficiency of mist eliminators for the smallest particle sizes. Together with "impaction" and "interception" it describes the mechanism by which the proposed eliminators operate. This should cause the applicant no problem because the Monsanto "ES" line chosen for the final tower meets the specification. The "CS" line, for example, does not. Specification

by the Department of the collection phenomenon is a better practice than specifying a manufacturer and its line.

15. *Specific Condition 12. The Applicant requests that the documents specified by the Agreement to be given to Manatee County, not also be submitted to the Southwest District.*

The information represents compliance data. At this time the local program does not represent the Department on compliance matters. It should also be supplied to the Department.

16. *Specific Condition 31. Applicant disagrees with Draft Permit Specific Condition 31 requirement to include emissions during shutdown, malfunction, and load change in calculating daily emission averages. Applicant stated that the requirement is in conflict with the December 18 Agreement it has with Manatee County and with the Department's rule for excess emissions.*

The applicant is partly correct in that the provisions for excess emissions applies to the 40 CFR 60.84 (Subpart K) monitoring for excess emissions. The compliance method in Subpart K is an annual stack test (Method 8) and continuous monitoring of SO₂ emissions is required in this Subpart to assure proper maintenance and operation of the acid plant throughout the rest of the year. The SO₂ standard under Subpart K is 4.0 lb/ton with a 3 hour averaging time. Excess emissions are authorized during startup for a period no longer than 3 hours provided the operators followed best operational practices in accordance with the industry's Best Operational Startup Practices for Acid Plants. Excess emissions during shutdown and malfunction may also be authorized in 62-210.700 F.A.C. with certain restrictions. Note that these provisions for excess emissions do not necessarily apply in cases where the compliance method is the CEMS as discussed in the following paragraph.

A second emission standard for SO₂ has been determined by the Best Available Control Technology (BACT) process. The Department has determined that a lower limit (3.5 lb/ton) is achievable and has specified compliance by CEM based on a 48 hour averaging time. The Department acknowledges that startup conditions may cause emissions above the BACT standard and has allowed the exclusion of emissions data which is above 3.5 lb/ton during the startup period for purposes of the 48 hour average calculation. Provided best operational practices are employed, these periods of high SO₂ emissions during startup are not considered out-of-compliance periods and are limited to no more than 3 hours for each startup. No exceptions to the BACT standard are authorized for malfunction or shutdown since the longer averaging time (16 times longer than the Subpart H averaging time) is sufficient to offset any short term excursions. The Department also expects that the worst case emissions of SO₂, i.e. full load operation, will be lower than the 3.5 lb/ton standard on a short term basis. The acid plant is more efficient in conversion of the process SO₂ gases to acid and therefore SO₂ emissions (lb/ton) are lower during reduced load operation. This means (reduced load operation following a malfunction) can be used to avoid emissions above the BACT standard during malfunction periods. The Department expects the acid plant operators to reduce load during periods of malfunctions in order to minimize emissions during these episodes. Shutdown periods should not result in SO₂ violations of the 48 hour standard since lower load operations, and therefore lower emissions rates, are part of the shut down procedure. Note that Rule 62-210.700 requires the use of best operational practices to minimize the extent and duration of emissions during upset periods.

The Department agrees Performance Specification 1 and 3 are not relevant on the condition that the applicant will conduct the Reich Test 3 times per day pursuant to 40CFR60.84.

17. *Table 1. Refer to comments 10 - 12 above.*

Best Available Control Technology Determination

18. *Emission Limits and BACT Determinations by EPA and States. Applicants recommends inclusion of term indicating that gas strength at General Chemical's sulfuric acid plants is less than gas strength at the Piney Point Plant.*

According to Department records, (General Chemical's PSD application), the gas strength at General Chemical varies from 8 to 12%. The Department's understanding is that the strength at the Piney Point plant is a little less than 12%. Therefore the statement requested by the applicant is not strictly correct and the Department's statement that the gas strength at the General Chemical plant is more variable than at the Piney Point plant is correct.

19. *Emission Limits and BACT Determinations by EPA and States. Applicant recommends inclusion of a statement that information on the Mississippi Phosphate Corporation plant design or operating parameters is not available.*

Sufficient information about the plant and the project is available to allow the Department to make the comments which it made. The Department did not state that the Mississippi Phosphates proposed limit is a BACT limit, but rather a limit to avoid PSD/BACT review.

20. *Determination by DEP. Applicant recommends indicating a dual SO₂ as 4 lb/ton on a 3-hour basis and 3.5 lb/ton on a 48-hr basis.*

The Applicant may have reviewed an earlier draft BACT Determination which was provided in advance as a courtesy prior to public distribution. According to the official version distributed, the Department made only a 48-hour BACT determination and did not make a 3-hour BACT determination. The 4 lb/ton limit is an NSPS requirement with which all sulfuric acid plants built since 1971 must comply. The Department will include both limits in the Final BACT Determination and specify them as BACT or NSPS limits as applicable.

21. *Determination Rationale, No. 1. Applicant may have reviewed an earlier version. Applicant recommends inclusion of a statement indicating that information on the Mississippi Phosphate Corporation plant design or operating parameters is not available.*

See 19 above.

22. *Determination Rationale, No. 2. The Applicant states "we do not agree with the Department's conclusion that PPPI will produce 2000 TPD of acid comfortably with lower emissions than in the past simply by screening and replacing the catalyst." Applicant states that "the amount of catalyst and hence the conversion activity associated with the catalyst will not change. Therefore, neither SO₂ emissions nor production are expected to change."*

The Department's precise statement was that the plant "will produce 2000 TPD of acid more comfortably than in the past simply by its plan to replace screened, *pelletized vanadium* catalyst in Converter 1 and *all catalyst* in Converter 2 with *low pressure drop, ring-shaped, vanadium* catalyst." The Department's statement has a much different meaning than the one ascribed to the Department by the Applicant. The official version contained no reference to SO₂. The Department reaffirms its statement.

According to Monsanto Enviro-Chem information attached to the Draft and Final BACT Determination, Type LP-120 and LP-110 ring catalyst produced converter pressure drops of 30-50% less than pellet. The implications are obvious. The Mississippi Phosphates project to replace the *pelletized* catalyst with *low pressure drop* ringed catalyst is their stated reason the plants can *increase* production. Obviously if Mississippi Phosphates did not increase production, it could continue to produce at the previous rate "more comfortably."

23. *Determination Rationale No. 4. Applicant states that evidence was also presented by PPPI experts in meetings with the Department that cesium catalyst does not reduce SO₂ emissions.*

See comment 4 above. The Department has no documented evidence obtained from meetings with PPPI experts. Mr. Friedman, an industry expert, expressed his doubts about cesium catalyst, but provided no evidence to the Department. The Department notes that Monsanto Enviro-Chem, Haldor-Topsoe, and BASF market cesium-promoted catalyst for various purposes, including reducing emissions of SO₂.

It is possible to imagine situations where an erroneous use of such a catalyst might accomplish nothing. However, in the opinion of the Department, the Piney Point project fits squarely into the category where the cesium-promoted catalyst should have a beneficial effect according to the suppliers, including the full service vendor for the project - Monsanto Enviro-Chem.

24. *Determination Rationale Nos. 6-11. Applicant asserts that the Department's "optimistic assumptions and projections regarding performance, costs and cost benefits are largely based on information provided by catalyst suppliers whose primary objective is boosting sales." Applicant states that "although PPPI has agreed with Manatee County to an SO₂ emission rate of 3.5 lb/ton (48-hr average) and to use cesium enhanced catalyst in the final converter bed, there was never a claim made by PPPI that the 3.5 lb/ton emission rate was the result of using the cesium enhanced catalyst. Therefore there is no foundation for the Department to perform a cost analysis attributing the SO₂ reduction to the cesium enhanced catalyst."*

The logic of this comment implies that emissions of SO₂ can be reduced by "agreement" with no specification of how the reduction will be effected. The Department would be interested to know the cost of the reduction agreed to by the Applicant and the County with or without use of cesium-promoted catalyst. The Department's rationale for estimating the costs of achieving the lower emissions is more logical. In fact, cost estimates were made before PPPI's Agreement with the County and discussed in general terms with the Applicant on December 1, 1997.

Much of the background information, including expert papers, came from the full-service vendor for the project - Monsanto Enviro-Chem. The additional cost of cesium-promoted vanadium catalyst (\$3.15/liter) was provided to the Department by Monsanto Enviro-Chem. The Department does not know the actual price charged to Piney Point Phosphates. The amount of catalyst required was given in the application. The typical replacement frequency and amount screened and replaced during turn-arounds for last pass catalyst, was derived from on a paper by Mr. Friedman - PPPI's expert consultant. Estimates of possible emission reductions came from or were inferred from Monsanto Enviro-Chem and Haldor-Topsoe papers. The Department made a reasonable cost estimate based on a modest reduction goal of 12.5%. If the most optimistic reductions inferred from the Monsanto Enviro-Chem and Haldor-Topsoe papers (up to 50%) had been relied upon, the cost-effectiveness figures would be even more compelling.

25. *Determination Rational No. 12. The Applicant recommends inclusion of a statement that information on the General Chemical plant design or operating parameters is not available.*

The Department has sufficient information about the plant to make the cautious statement which it made.

26. *Determination Rationale Nos. 15 and 16. The Applicant states that the Centaur process is not cost-effective for a 2000 TPD and larger plant, that the technology is not commercially demonstrated, and that the SO₂ emissions guarantee is identical to that of a double absorption plant.*

The Department already found good reasons to recommend against the Centaur process at this time. However the Department has no information regarding the cost-effectiveness of the Centaur process for plants of capacity greater than or equal to 2000 TPD and does not necessarily concur with the Applicant's statement. The Department has no written documentation in the present file on the guarantee for either process. We would appreciate any documents that the Applicants or its consultants have regarding the guarantees and conditions applicable to the Centaur Process, the Double Absorption Process, and the variation of the Double Absorption Process utilizing cesium catalyst in the final pass.

27. *Determination Rationale No. 17. Basically the same comment as in Comment 1 above.*
28. *Determination Rationale No. 18. Applicant suggests changing the wording in a statement from "the option of more frequent turn-arounds has a certain appeal" to "the option of more frequent turn-arounds has been reviewed."*

The Department appreciates the suggestion. The sentence will be revised to read "the option of more frequent turn-arounds was considered."

29. *Determination Rationale Nos. 19 through 21. Applicant points out that the discussion of sulfuric acid mist (SAM) in a section about the underpinnings of the SO₂ limit is not relevant. The Applicant states that the items are "overly prescriptive (relative to control equipment) and speculative (with regards to SAM emissions)" and requests they be deleted.*

The Department will separate the discussion of SAM from the discussion of SO₂. The Department does not believe the items on SAM control and emissions are overly prescriptive or speculative and directs the reader to Comment 6 above. A comment on NO_x emissions will be added as Determination Rationale No. 22, consistent with the response to Comment 10 above.

CONCLUSION

The Final action of the Department is to issue the permit with the minor changes described upon withdrawal by the County and the Applicant of their requests for extension of time to file for a petition.

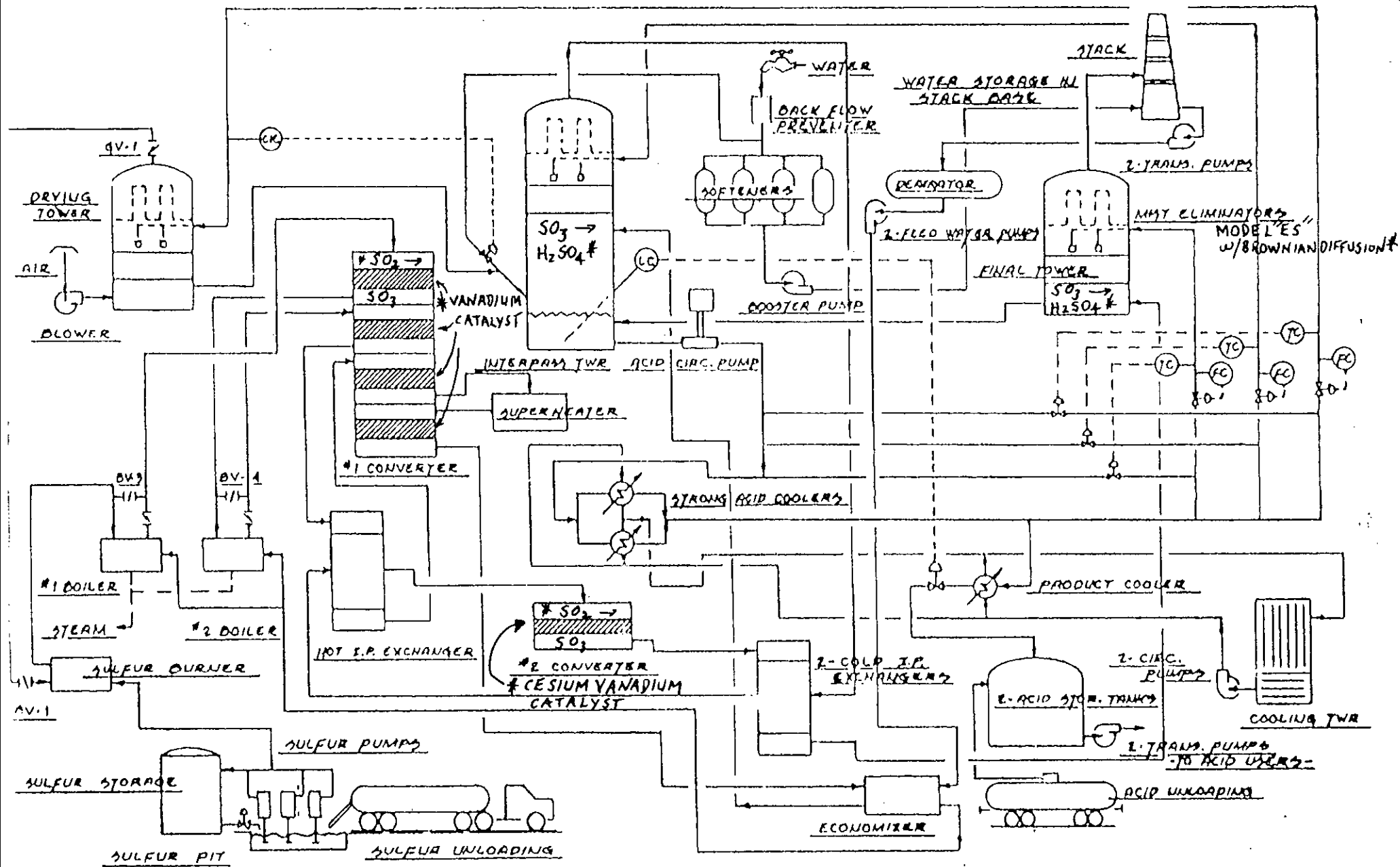


FIGURE 1 SULFURIC ACID PROCESS AT PINEY POINT
DOUBLE ABSORPTION - SULFUR BURNING

* DIAGRAM AMENDED
2/3/98 BY DEP
A.R. Lewis, P.E.



Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

PERMITTEE:

Piney Point Phosphates, Inc.
13300 US Highway 41 North
Palmetto, Florida 34221

File No.	0810002-004-AC
FID No.	0810002
SIC No.	2819
Permit No.	PSD-FL-242
Expires:	June 30, 2000

Authorized Representative:

Robert C. Stewart
Vice-President, Operations and Administration

PROJECT AND LOCATION:

Permit for the repair and restoration to previous capacity of a 2000 ton per day sulfur-burning, double absorption sulfuric acid plant and associated sulfur storage and handling equipment serving a phosphoric acid and diammonium phosphate fertilizer facility located nine miles north of Palmetto on US Highway 41 North, Manatee County. UTM coordinates are Zone 17; 348.5 km E ; 3057.3 km N.

STATEMENT OF BASIS:

This construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and Chapters 62-4, 62-204, 62-210, 62-212, 62-296 and 62-297 of the Florida Administrative Code (F.A.C.). The above named permittee is authorized to modify the facility in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department of Environmental Protection (Department).

Appendices and attachments made a part of this permit:

Table 1	Air Pollutant Standards and Terms
Appendix A	Best Operational Start-up Procedures for Sulfuric Acid Plants
Appendix BD	Best Available Control Technology Determination
Appendix CSC	Emission Unit(s) Common Specific Conditions
Appendix GC	Construction Permit General Conditions

Howard L. Rhodes, Director
Division of Air Resources
Management

AIR CONSTRUCTION PERMIT 0810002-004-AC

SECTION I. FACILITY INFORMATION

SUBSECTION A. FACILITY DESCRIPTION

The existing facility consists of a sulfuric acid plant and associated molten sulfur storage and handling equipment, a phosphoric acid plant, a diammonium phosphate fertilizer plant, a gypsum stack and process cooling ponds, rail and truck shipping and receiving facilities. This permit is for the repair and restoration to previous permitted capacity of the 2000 ton per day sulfur-burning, double absorption sulfuric acid plant and associated molten sulfur handling equipment. The project includes replacement of process towers, converter catalyst, heat transfer and other process equipment as well as repair of the sulfur burner, air compressor, the converters, and other key process equipment. Air pollution control equipment consists of the double absorption process, use of cesium-vanadium catalyst in the final converter, and high efficiency mist eliminators on the final tower.

EMISSION UNITS

This permit addresses the following emission units:

EMISSIONS UNIT NO.	SYSTEM	EMISSIONS UNITS DESCRIPTION
001	Process	Sulfuric Acid Plant
002	Raw Material	Molten Sulfur Storage and Handling

SUBSECTION B. REGULATORY CLASSIFICATION

The Piney Point Phosphates Inc. (PPPI) fertilizer facility is classified as a "Major or Title V Source" per Rule 62-210.200, F.A.C., Definitions, because emissions of at least one regulated air pollutant exceed 100 tons per year (TPY).

Sulfuric acid plants are listed as a Major Facility Category in Table 62-212.400-1, F.A.C., "Major Facility Categories." Therefore, stack and fugitive emissions of over 100 TPY of sulfur dioxide are sufficient to classify the installation as a "Major Facility" per the definitions in **Rule 62-210.200, F.A.C.**, subject to the Significant Emission Rates for sulfuric acid mist and nitrogen oxides given in Table 62-212.400-2, F.A.C. and the requirements of **Rules 62-212.400 and 410, F.A.C.**, Prevention of Significant Deterioration (PSD) and Best Available Control Technology (BACT).

The molten sulfur storage and handling equipment is subject to **Rule 62-212.600, F.A.C.**. The sulfuric acid plant is also subject to 40 CFR Subpart H, New Source Performance Standards (NSPS) for Sulfuric Acid Plants, incorporated by reference in **Rule 62-204.800, F.A.C.**

AIR CONSTRUCTION PERMIT 0810002-004-AC

SECTION I. FACILITY INFORMATION

SUBSECTION C. PERMIT SCHEDULE:

- 01/23/98 Received Time Extension Request from Manatee County to file Petition
- 01/22/98 Received Time Extension Request from Applicant to file Petition
- 01/13/98 Notice of Intent published in The Bradenton Herald
- 01/08/98 Distributed Intent to Issue Permit
- 01/07/98 Application deemed complete
- 10/31/97 Received Application

SUBSECTION D. RELEVANT DOCUMENTS:

The documents listed below are the basis of the permit. They are specifically related to this permitting action but do not supersede the conditions given in the permit. These documents are on file with the Department.

- Application received October 31, 1997
- Department's letters dated November 7, November 17, and November 26, 1997
- Comments from Manatee County's consultant, RTP Associates, dated November 21, 1997
- Comments from the National Park Service dated November 20 and December 15, 1997
- EPA's letter dated December 15, 1997
- Agreement between Manatee County and PPPI dated December 18, 1997
- Applicant's completeness responses dated December 26 and 30, 1997 and January 6, 1998
- Department's Intent to Issue dated January 8, 1998 and associated documents
- Applicant's comments dated January 23, 1998 on Department documents issued January 8, 1998
- Department's Final Determination accompanying permit

AIR CONSTRUCTION PERMIT 0250014-002-AC

SECTION II. EMISSION UNIT(S) GENERAL REQUIREMENTS

GENERAL AND ADMINISTRATIVE REQUIREMENTS

1. Regulating Agencies: All documents related to applications for permits to operate, reports, tests, minor modifications and notifications shall be submitted to the Department of Environmental Protection, Southwest District Office, 3804 Coconut Palm Drive, Tampa, Florida 33619-8218 (phone number: 813/744-6100). All applications for permits to construct or modify an emissions unit(s) *subject to the Prevention of Significant Deterioration or Nonattainment (NA) review requirements* should be submitted to the Bureau of Air Regulation (BAR), Florida Department of Environmental Protection (FDEP), 2600 Blairstone Road, Tallahassee, Florida 32399-2400 (phone number 850/488-1344).
2. General Conditions: The owner and operator is subject to and shall operate under the attached General Permit Conditions G.1 through G.15 listed in *Appendix GC* of this permit. General Permit Conditions are binding and enforceable pursuant to Chapter 403 of the Florida Statutes. [**Rule 62-4.160, F.A.C.**]
3. Emission Unit(s) Common Specific Conditions: The owner and operator is subject to and shall operate under the attached Emission Unit(s) Common Specific Conditions listed in *Appendix CSC* of this permit. The Emission Unit(s) Common Specific Conditions are binding and enforceable pursuant to Chapters 62-204 through 62-297 of the Florida Administrative Code.
4. Terminology: The terms used in this permit have specific meanings as defined in the corresponding chapters of the Florida Administrative Code.
5. Forms and Application Procedures: The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. [**Rule 62-210.900, F.A.C.**]
6. Expiration: This air construction permit shall expire on June 30, 2000 [**Rule 62-210.300(1), F.A.C.**]. The permittee may, for good cause, request that this construction permit be extended. Such a request shall be submitted to the Bureau of Air Regulation prior to 60 days before the expiration of the permit. However, the permittee shall promptly notify the Department's Southwest District Office of any delays in completion of the project which would affect the startup day by more than 90 days. [**Rule 62-4.090, F.A.C.**]
7. Application for Title V Permit: An application for a Title V operating permit, pursuant to Chapter 62-213, F.A.C., must be submitted to the Department's Southwest District Office. [**Chapter 62-213, F.A.C.**]

AIR CONSTRUCTION PERMIT 0810002-004-AC

SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS

SPECIFIC CONDITIONS - SULFURIC ACID PLANT AND MOLTEN SULFUR STORAGE AND HANDLING:

The following Specific Conditions apply to the following emission units:

EMISSIONS UNIT NO.	SYSTEM	EMISSIONS UNITS DESCRIPTION
001	Process	Sulfuric Acid Plant
002	Raw Material	Molten Sulfur Storage and Handling

- Emissions unit 001 shall comply with all applicable provisions of the 40 CFR 60, Standards of Performance for New Stationary Sources, Subpart H, Sulfuric Acid Plants. [Rule 62-204.800(7)(b)10., F.A.C]
- Emissions unit 001 shall also comply with all applicable requirements of 40 CFR 60, Standards of Performance for New Stationary Sources, Subpart A, General Provisions. These include:
 - 40 CFR 60.7, Notification and record keeping
 - 40 CFR 60.8, Performance tests
 - 40 CFR 60.11, Compliance with standards and maintenance requirements
 - 40 CFR 60.12, Circumvention
 - 40 CFR 60.13, Monitoring requirements
 - 40 CFR 60.19, General notification and reporting requirements
- Emissions of sulfur dioxide (SO₂), sulfuric acid mist (SAM), visible emissions (VE), and nitrogen oxides (NO_x) from the sulfuric acid plant shall not exceed the following limits: [Rules 62-204.800(7)(b)10; 62-210.200; 62-212.410, F.A.C.]

Pollutant	Pounds per Hour	Tons per Year	Limit Basis
SO ₂	291.7 ¹	1,277.5	3.5 lb/ton 100% H ₂ SO ₄ produced (BACT) ¹
SO ₂	333.3		4.0 lb/ton 100% H ₂ SO ₄ produced (NSPS)
SAM	12.5	54.8	0.15 lb/ton 100% H ₂ SO ₄ produced (NSPS)
VE	10% opacity		NSPS
NO _x	10.0 ²	43.8	0.12 lb/ton 100% H ₂ SO ₄ produced ²

- 48-hour rolling average based on CEMS data.
- Applicant's estimate. Required for initial compliance test only.
- The Specific Conditions given in in the construction permit for the Piney Point Terminal/Molten Sulfur Storage & Handling System, are adopted by reference into this permit, except that: Specific Condition 2 of the subject permit is replaced by Specific Condition 7 below. [Permit AC 41-176524, dated March 21, 1991]
- The design production capacity of the refurbished plant shall not exceed 2,000 tons per day (TPD) of 100 percent (%) sulfuric acid. [December 18, 1997 Agreement]
- The production rate shall not exceed 2000 TPD as 100% sulfuric acid on a 24-hour basis. [Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]

AIR CONSTRUCTION PERMIT 0810002-004-AC

SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS

7. The maximum molten sulfur utilization rate in the sulfuric acid plant shall neither exceed 667 TPD nor 243,100 tons per year. (Based on the maximum permitted sulfuric acid production rate of 2000 TPD of 100% sulfuric acid) [Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]
8. These emissions units are allowed to operate continuously (8760 hours/year) [Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]
9. The existing sulfuric acid plant shall cease operation and be permanently shut down when a new sulfuric acid plant commences commercial operations. [December 18, 1997 Agreement]
10. Prior to the initial plant startup, the permittee shall install approximately 115,000 liters of cesium-promoted catalyst in the final converter pass. The cesium catalyst shall be used for at least one plant turnaround cycle, or approximately two years, whichever is longer. [December 18, 1997 Agreement] A change to non-cesium catalyst and switch to another SO₂ control strategy shall not occur without the Department's review and approval and shall require submittal of a permit modification request to revise the Best Available Control Technology Determination. [Rules 62-4.070 and 62-212.410, F.A.C.]
11. The permittee shall install high efficiency mist eliminators incorporating "Brownian Diffusion" to minimize emissions of fine sulfuric acid mist from the final tower. [Rule 62-212.410, F.A.C.]
12. The permittee shall prepare and submit to the Department's Southwest District and Manatee County each calendar quarter: (a) compliance calculation worksheets for SO₂ emissions; (b) the hourly CEMS data; and (c) supporting information necessary to demonstrate compliance with the emission limitations. [December 18, 1997 Agreement]
13. The permittee shall implement and carry out at all times the safety program referred to in the agreement between Manatee County and the permittee. [December 18, 1997 Agreement]
14. The permittee shall implement and carry out at all times a risk management program that complies with 40 CFR Part 68 for Program 3. The permittee shall modify its analyses, if necessary, when pending EPA litigation of certain issues is resolved. [December 18, 1997 Agreement]
15. Before resuming operation of the sulfuric acid plant, the permittee shall meet with representatives of Manatee County's Emergency Response and Emergency Services Department to review the plans for complying with Specific Condition No. 8 above. If Manatee County recommends installation of a public alarm system around the perimeter of the permittee's facility, the permittee will work diligently to comply with the County recommendation. Any such alarm shall be controlled exclusively by the permittee. [December 18, 1997 Agreement]
16. The permittee shall inspect, operate and maintain all process and support equipment in accordance with the best management practices required under all applicable federal, state and local regulations. Any major deficiencies shall be reported to the Manatee County Emergency Response and Emergency Services Department and corrected immediately to ensure the safe operations of the facility. [December 18, 1997 Agreement]
17. Manatee County's building inspectors and/or environmental compliance officials shall have access to the facility, following reasonable notice, to confirm that the permittee is in compliance with all applicable codes, ordinances, laws and regulations. [December 18, 1997 Agreement]

AIR CONSTRUCTION PERMIT 0810002-004-AC

SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS

18. Manatee County shall be advised by the permittee as soon as the permittee has any knowledge of any scheduled or unscheduled visit by a representative of the Department, EPA, or the Occupational Health and Safety Administration, and the County shall be allowed to have one or two qualified observers accompany the agency inspectors during their visit to the facility. **[December 18, 1997 Agreement]**
19. Manatee County shall provide the permittee with a list of qualified County representatives for the plant visits mentioned above. The list may be updated from time to time. Unless requested by the inspecting agency, no other persons are authorized by this Agreement to accompany the agencies during their inspections of the facility. **[December 18, 1997 Agreement]**
20. Whenever a Manatee County representative visits the facility, such representative shall comply with the permittee's safety regulations and shall follow all reasonable instructions provided by the permittee to ensure his or her safety. The permittee shall provide a copy of its safety regulations to the County so that the County's representatives may review the safety regulations before visiting the facility. **[December 18, 1997 Agreement]**
21. The permittee and Manatee County promptly shall provide each other with any report, test result or other information that is received from any agency concerning an inspection of the facility. **[December 18, 1997 Agreement]**
22. If Manatee County wishes to collect any samples at the facility, Manatee County shall split the samples with the permittee, if requested, and promptly shall provide the permittee with the results of any tests performed on the samples. **[December 18, 1997 Agreement]**
23. During inspections of the facility, Manatee County's representatives shall notify the permittee's escort before they take any photographs of the facility. In this fashion, the County's representative shall give the permittee's representative an opportunity to view the conditions or area at the facility that is the subject of the photograph. If Manatee County takes any photograph of the facility, Manatee County promptly shall provide a copy of the photograph to the permittee. However, Manatee County shall not take photographs or any equipment or processes reasonably designated by the permittee as proprietary and confidential. Photographs shall be taken only for authorized regulatory purposes. **[December 18, 1997 Agreement]**
24. The permittee and Manatee County shall work together in a cooperative manner to ensure and confirm that the permittee is complying with all local, state, and federal regulations. If requested, the permittee shall provide a tour of the facility once each year for the Manatee Board of County Commissioners or the Board's designees. **[December 18, 1997 Agreement]**
25. The permittee shall provide Manatee County with a copy of any report or document that the permittee is required to provide to any state or federal agency, (unless such documents are confidential under state or federal law), including but not limited to: (a) routine reports to agencies concerning the facility's stack tests, air emissions, surface water discharges, or other discharges; (b) reports concerning excess emissions, upset conditions or emergencies at the facility; (c) reports and other information required under the provisions of 40 CFR Part 68 or Paragraph 14, above; and (d) reports or other information that must be submitted to the Department pursuant to Paragraph 1, above. These reports and other materials shall be provided to Manatee County at the same time that they are provided to the state or federal agency. Should the permittee determine that a report or portion thereof is confidential, the permittee shall take steps to redact the confidential information, or if this is not possible, notify the County of the report and the permittee's reasons for not providing it to the County. These reports and other materials

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SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS

submitted to the Director of the Manatee County Department of Environmental Management, P.O. Box 1000, Bradenton, Florida 34206-1000. [December 18, 1997 Agreement]

26. The permittee shall immediately notify Manatee County if there is an accident, malfunction or other event at the facility that poses a threat to human health or the environment in the areas located adjacent to the permittee's facility. Manatee County recognizes that, under such circumstances, the permittee may be required by law to provide notice to certain local, state, or federal agencies before the permittee provides notice to Manatee County. Minor exceedances authorized under Rule 62-210.700, F.A.C., are not subject to the notification requirements contained in this paragraph. [December 18, 1997 Agreement]
27. The permittee shall comply with all applicable requirements of the Department's sulfur storage and handling rule [Rule 62-296.411, F.A.C.]
28. No person shall cause, suffer, allow, or permit the discharge of air pollutants which cause or contribute to an objectionable odor. [Rule 62-296.320, F.A.C.]
29. In order to minimize excess emissions during startup/shutdown/malfunction these emissions units shall adhere to best operational practices. The provisions of the Memorandum of Understanding issued by the Department on November 21, 1989, are hereby added to this permit as Appendix A and shall be added to the Title V permit. [Rule 62-210.700, F.A.C., 40 CFR 60.7 and December 18, 1997 Agreement]
30. Plant and emission control equipment operating parameters determined during compliance testing and/or inspection that will establish the proper operation of each emissions unit shall be included in the Title V permit. [Rule 62-297.310, F.A.C. and 62-4.070(3), F.A.C.]
31. A continuous emissions monitoring system (CEMS) shall be installed, calibrated, maintained, operated, and used to determine compliance with the 48-hour emissions limit for SO₂. The CEMS shall be installed and certified before the initial performance test and operated in compliance with 40 CFR 60, Appendix F, Quality Assurance Procedures (1996 version) or other Department-approved QA plan; 40 CFR 60, Appendix B, Performance Specification 2 (1996 version).

The CEMS shall calculate and record emission rates in units of pounds of SO₂ per hour. Sulfuric acid production rate and sulfur feed rate shall be recorded continually. Each operating day, the average SO₂ emission rate for the previous 48 hours shall be calculated and recorded. Emissions shall be calculated in units of pounds per hour and pounds per ton of 100% acid produced using the method specified in 40 CFR 60.84(b). Averages are to be calculated as the arithmetic mean of each monitored operating hour from the previous 48 monitored operating hours. A monitored operating hour is each hour in which sulfur is burned in the unit and at least two emission measurements are recorded at least 15 minutes apart. Data taken during periods of startup, or when sulfur is not burned in the unit, or when the CEMS is out of control as defined in 40 CFR 60, Appendix F, Section 5.2 shall be excluded from the 48-hour average.

For compliance with the emission limits, the 48-hour average shall not include data from periods of startup, or when no sulfuric acid is being produced. Data recorded during periods of shutdown, malfunction, load change, and continuous operating periods shall be included in the daily calculation of the 48-hour average.

To the extent the monitoring system is available to record emissions data, the CEMS shall be operated and shall record data at all operating hours when sulfur is burned in the unit, including periods of startup, shutdown, load change, continuous operation and malfunction. Monitor downtimes and excess emissions based on 3-hour averages, which include startup emissions, shall be reported on a quarterly basis using the

AIR CONSTRUCTION PERMIT 0810002-004-AC

SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS

SUMMARY REPORT in 40 CFR 60.7. A detailed report of the cause, duration, magnitude, and corrective action taken or preventative measures adopted for each excess emission occurrence, and a listing of monitor downtime occurrences shall accompany the SUMMARY REPORT when the total duration of excess emissions is 1% or greater or if the monitoring system downtime is 5% or greater of the total monitored operating hours.

The monitoring device shall meet the applicable requirements of Chapter 62-204, F.A.C., 40 CFR 60, Appendix F, and 40 CFR 60.13, including certification of each CEMS in accordance with 40 CFR 60, Appendix B, Performance Specifications and 40 CFR 60.7(a)(5) Notification Requirements. Data on monitoring equipment specifications, manufacturer, type calibration and maintenance requirements, and the proposed location of each stack probe shall be provided to the Department for review at least 90 days prior to installation of a new CEMS. [Rule 62-4.070 (3) F.A.C and Rule 62-204.800, F.A.C.]

32. Compliance with the emission limits for SO₂, SAM, and NO_x shall be determined using the following reference methods as described in 40 CFR 60, Appendix A (1996, version), adopted by reference in Chapter 62-204, F.A.C.

Method 7E	Determination of Nitrogen Oxides from Stationary Sources.
Method 8	Determination of Sulfuric Acid Mist and Sulfur Dioxide Emissions from Stationary Sources. (for demonstrating compliance with 40 CFR 60, Subpart H)
Method 9	Visual Determination of the Opacity of Emissions from Stationary Sources.

These emissions units shall comply with all applicable requirements of Rule 62-297.310, F.A.C. General Test Requirements and 40 CFR 60.8 Performance Tests.

Testing of emissions shall be conducted with the emissions units operating at permitted capacity, which is defined as 90-100% of the maximum operating rate allowed by the permit. If it is impracticable to test at permitted capacity, then the unit may be tested at less than 90% of the maximum operating rate allowed by the permit; in this case, subsequent source operation is limited to 110% of the test load until a new test is conducted. Once the unit is so limited, then operation at higher capacities is allowed for no more than fifteen consecutive days for the purpose of additional compliance testing to regain the permitted capacity in the permit. [Rules 62-204.800, 62-297.310, 62-297.400, 62-297.401, F.A.C., and 40 CFR 60 Appendix A and 40 CFR 60.8, Subpart A].

33. This facility shall maintain a central file containing all measurements, records, and other data that are required to be collected pursuant to this permit. Operators shall keep a daily operation and maintenance log to include, at a minimum, calibration logs for all instruments, maintenance/repair logs for any work performed on equipment or instruments, all measurements, records, and any other data required to be maintained by the permittee shall be retained for at least five (5) years following the data on which such measurements, records, or data are recorded. These data shall be made available to Department staff upon request. The Department shall be notified in writing at least 15 days prior to any emissions testing or auditing of any instrument required to be operated by these specific conditions in order to allow witnessing by authorized personnel. [Rule 62-4.070(3), F.A.C.]

Table 1 Air Pollutant Standards and Terms.

FACILITY ID NUMBER: 0810002

Permittee:
Piney Point Phosphates, Inc.

Permit No.: 0810002-004-AC
Sulfuric Acid Plant and Molten Sulfur Handling and Storage
Repair and Restoration Project

Emission Units - Sulfuric Acid Plant, Molten Sulfur Handling/Storage

E.U. ID#	Description	Pollutant ID	Fuel(s) [2]	Allowable Emissions [2]		Equivalent Emissions [3]		Basis
				Permit limits	lb/hr [1]	TPY		
1	Sulfuric Acid Plant	SO ₂	molten sulfur	4 lb/ton acid (3-hr)	333			NSPS
1	Sulfuric Acid plant	SO ₂	molten sulfur	3.5 lb/ton acid (48-hr)	292	1278		BACT
1	Sulfuric Acid plant	SAM	molten sulfur	0.15 lb/ton acid	12.5	55		NSPS
1	Sulfuric Acid plant	NOX	molten sulfur	0.12 lb/ton acid	10	44		Application
1	Sulfuric Acid plant	VE	molten sulfur	10 % opacity				NSPS
2	Molten Sulfur Handling	VE		10 % opacity				AC 41-176524

ALLOWABLE OPERATING RATES

Hours of operation per year 8760
Molten Sulfur Utilization 667 tons per day [4]
Sulfuric Acid Production 2000 tons per day [4]

NOTES

- (1) At a maximum sulfuric acid production rate of 2000 TPD as 100 percent sulfuric acid.
- (2) Compliance Units. This facility shall demonstrate compliance based on these standards.
- (3) "Equivalent Emissions" are based on annual emissions at 8760 hrs/yr. The "Equivalent Emissions" are also listed for informational purpose and for PSD and recordkeeping tracking purposes.
- (4) Ton = 2000 pounds. Any data reported as Long Tons (1000 kg) must be converted to Tons to determine compliance.

APPENDIX A
BEST OPERATIONAL START-UP PRACTICES
FOR SULFURIC ACID PLANTS

1. Only one sulfuric acid plant at a facility should be started up and burning sulfur at a time. There are times when it will be acceptable for more than one sulfuric acid plant to be in the start-up mode at the same time, provided the following condition is met. It is not acceptable to initiate sulfur burning at one sulfuric acid plant when another plant at the same facility is emitting SO₂ at a rate in excess of the emission limits imposed by the permit or rule, as determined by the CEMs emission rates for the immediately preceding 20 minutes.
2. A plant start-up must be at the lowest practicable operating rate, not to exceed 70 percent of the designated operating rate, until the SO₂ monitor indicates compliance. Because production rate is difficult to measure during start-up, if a more appropriate indicator (such as blower pressure, furnace temperature, gas strength, blower speed, number of sulfur guns operating, etc.) can be documented, tested and validated, the Department will accept this in lieu of directly documenting of the suitable list of surrogate parameters to demonstrate and document the reduced operating rate on a plant-by-plant basis. Documentation that the plant is conducting start-up at the reduced rate is the responsibility of the owner or operator.
3. Sulfuric acid plants are authorized to emit excess emissions from start-up for a period of three consecutive hours provided best operational practices, in accordance with this agreement, to minimize emissions are followed. No plant shall be operated (with sulfur as fuel) out of compliance for more than three consecutive hours. Thereafter, the plant shall be shut down. the plant shall be shut down (cease burning sulfur) if, as indicated by the continuous emission monitoring system, the plant is not in compliance within three hours of startup. Restart may occur as soon as practicable following any needed repairs or adjustments, provided the corrective action is taken and properly documented.
4. Cold Start-Up Procedures.
 - a. Converter.
 - (1) The inlet and outlet temperature at the first two masses of catalyst shall be sufficiently high to provide immediate ignition when SO₂ enters the masses. In no event shall the inlet temperature to the first mass be less than 800°F or the outlet temperature to the first two masses be less than 700°F. These temperatures are the desired temperatures at the time the use of auxiliary fuel is terminated
 - (2) The gas stream entering the converter shall contain SO₂ at a level less than normal, and sufficiently low to promote catalytic conversion to SO₃.
 - b. Absorbing Towers.

The concentration., temperature and flow of circulating acid shall be as near to normal conditions as reasonably can be achieved. In no event shall the concentration be less than 96 percent H₂SO₄.

APPENDIX A
BEST OPERATIONAL START-UP PRACTICES
FOR SULFURIC ACID PLANTS

5. Warm Restart.

a. Converter

The inlet and outlet temperatures of the first two catalyst masses should be sufficiently high to ensure conversion. One of the following three conditions must be met:

- (1) The first two catalyst masses inlet and outlet temperatures must be at a minimum of 700°F; or.
- (2) Two of the four inlet and outlet temperatures must be greater than or equal to 800°F; or.
- (3) The inlet temperature of the first catalyst must be greater than or equal to 600°F and the outlet temperature greater than or equal to 800°F. Also, the inlet and outlet temperatures of the second catalyst must be greater than or equal to 700°F.

Failure to meet one of the above conditions, requires use of cold start-up procedures.

To allow for technologies improvements or individual plant conditions, alternative conditions will be considered by the Department in appropriate cases.

b. Absorbing Towers.

The concentration, temperature and flow of circulating acid shall be as near to normal conditions as reasonably can be achieved. In no event shall the concentration be less than 96 percent H₂SO₄.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

Sulfuric Acid Plant
Piney Point Phosphates Inc.
PSD-FL-242 and 0810002-004-AC
Palmetto, Manatee County

BACKGROUND

The applicant, Piney Point Phosphates Inc., proposes to repair, restore, and restart its existing 2000 ton per day (TPD) sulfuric acid plant (SAP) at its fertilizer manufacturing facility on US Highway 41 North at Piney Point, Palmetto, Manatee County. The proposed project will result in "significant increases" with respect to Table 62-212.400-2, Florida Administrative Code (F.A.C.) of emissions of sulfur dioxide (SO₂), sulfuric acid mist (SAM), and nitrogen oxides (NO_x). The project is therefore subject to review for the Prevention of Significant Deterioration (PSD) and a determination of Best Available Control Technology (BACT) in accordance with Rules 62-212.400 and 410, F.A.C.

Descriptions of the process, project, ambient air quality effects, and rule applicability are given in the separate Technical Evaluation and Preliminary Determination issued with the Department's Intent and Public Notice package.

DATE OF RECEIPT OF A BACT APPLICATION:

The application received on October 31, 1997 included a proposed BACT determination prepared by the applicant's consultant, Koogler and Associates.

REVIEW GROUP MEMBERS:

A. A. Linero, P.E.

BACT DETERMINATION REQUESTED BY THE APPLICANT:

<u>POLLUTANT</u>	<u>CONTROL TECHNOLOGY</u>	<u>PROPOSED BACT LIMIT</u>
Sulfur Dioxide	Double Absorption	4 pounds per ton 100% H ₂ SO ₄ (3-hr)
Sulfuric Acid Mist	Fiber Mist Eliminators	0.15 pounds per ton 100% H ₂ SO ₄
Visibility	As Above and Process Controls	10 percent
Nitrogen Oxides	None - Low Fuel Nitrogen, Combustion Temperature	0.12 pounds per ton 100% H ₂ SO ₄

The plant with the originally proposed controls and limits will emit approximately 1460 tons per year (TPY) of SO₂, 55 TPY of SAM, and 44 TPY of NO_x. The applicant initially proposed to use the same process and control technology as used in the past to achieve the proposed limits. These limits will be met by converting 99.7 percent of SO₂ produced into sulfur trioxide (SO₃), absorbing the SO₃ in circulating streams of sulfuric acid, and minimizing SAM formation and losses by process controls and high efficiency mist eliminators.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

BACT DETERMINATION PROCEDURE:

In accordance with Chapter 62-212, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

- Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.
- All scientific, engineering, and technical material and other information available to the Department.
- The emission limiting standards or BACT determination of any other state.
- The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically unfeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES:

The minimum basis for a BACT determination is the New Source Performance Standard (NSPS) for sulfuric acid plants built since 1971. This NSPS, promulgated by EPA as 40 CFR 60, Subpart H, was adopted by the Department by reference in Rule 62-204.800, F.A.C. It was re-affirmed in 1985 by EPA. The emission limits required by Subpart H are 4 pounds SO₂ per ton acid (lb SO₂/ton), 0.15 lb SAM/ton acid, and 10 percent visibility. Therefore the BACT proposed by the applicant is consistent with the NSPS. No National Emission Standard for Hazardous Air Pollutants exists for sulfuric acid plants.

EMISSION LIMITS AND BACT DETERMINATIONS BY EPA AND STATES:

Most sulfuric acid plant BACT determinations made to-date by EPA and the states, including the State of Florida, have been identical to the NSPS. Among the exceptions is General Chemical in Anacortes, Washington. In that case, Plant 3 undergoing a modification, was limited to the NSPS values for both SO₂ and SAM subject to subsequent testing. However, existing Plants 1 and 2 at the same facility and exhausting through the same stack, were limited to 1.159 lb SO₂/ton. An initial "BACT" limit was set for the combined stack emissions for the three units at 2.54 lb SO₂/ton and 0.105 lb SAM/ton.

The General Chemical plants are double absorption plants like the Piney Point plant. The feedstock at General Chemical is spent sulfuric acid and hydrogen sulfide whereas the feed at Piney Point is

APPENDIX BD

BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

elemental sulfur. Following scrubbing, cleaning, and drying, the gas stream introduced to the first pass at the General Chemical plant is similar to that entering the first pass at the Piney Point plant. The main distinction related to possible conversion and emissions control is that the gas strength of SO₂ going into the first pass at the General Chemical plants (8-12%) is more variable than the strength of SO₂ going into the first pass at Piney Point. Also the General Chemical plants are much smaller than the Piney Point plant. However no distinction was drawn or separate limits set in the preparation of the Subpart H standards which are equally applicable to both types of plants.

Recently, Mississippi Phosphates Corporation submitted an application to the State of Mississippi to increase production from 1650 TPD to 1786 TPD of acid at each of two plants. The increase will be attained by replacing pelletized vanadium (actually vanadium-containing) catalyst in the converters with low pressure drop, ring-shaped, vanadium catalyst. This will effectively debottleneck the plants with no other substantial changes. Mississippi Phosphates requested a limit of 3.25 lb SO₂/ton acid to avoid PSD review for SO₂. They proposed 0.15 lb SAM/ton acid and 10 percent opacity as BACT emission limits in satisfaction of PSD requirements. As of this date, the matter is under review by the State of Mississippi and EPA. These two plants use the same process as Piney Point. One of them is the oldest double absorption process plant in the country.

OTHER INFORMATION AVAILABLE TO THE DEPARTMENT:

Besides the information submitted by the applicant and that mentioned above, other information available to the Department consists of:

- Comments from the National Park Service received on November 24, and December 8, 1997
- Comments from EPA Region IV received on December 24, 1997
- Evaluation by RTP Associates on behalf of Manatee county received on November 24, 1997
- Further comments from RTP Associates received on November 26, 1997
- Papers written by Monsanto Enviro-Chem on sulfur dioxide emissions control
- Papers written by Monsanto Enviro-Chem on sulfuric acid processes
- Monsanto Enviro-Chem website information on technologies, catalysts, and pollution control
- Calgon Carbon/Monsanto Enviro-Chem joint press release on new SO₂ control technology
- Papers written by Haldor Topsoe on cesium catalysts and additional product information
- BASF website information on catalysts
- EPA background documents in support of NSPS and AP-42, Compilation of Emission Factors
- AWMA Air Pollution Control Manual
- Site visits to plants by Department staff

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

DETERMINATION BY DEP:

<u>POLLUTANT</u>	<u>CONTROL TECHNOLOGY</u>	<u>EMISSION LIMIT</u>
Sulfur Dioxide	Double Absorption	3.5 lb/ton 100% H ₂ SO ₄ (BACT, 48-hr) 4.0 lb/ton 100% H ₂ SO ₄ (NSPS, 3-hr)
Sulfuric Acid Mist	High Efficiency Mist Eliminators Including Brownian Diffusion	0.15 pounds per ton 100% H ₂ SO ₄ (NSPS)
Visibility	As Above and Process Controls	10 percent (NSPS)
Nitrogen Oxides	None - Low Fuel Nitrogen, Combustion Temperature	0.12 lb/ton 100% H ₂ SO ₄ Applicant Estimate

DETERMINATION RATIONALE:

A "Top-Down" BACT determination rapidly converges to variations of the established double absorption technology wherein the production process and the BACT are identical, thus eliminating the need for add-on control equipment. The applicant's BACT proposal for SO₂ is equivalent to the NSPS value and applies as a 3-hour standard notwithstanding the Department's BACT determination. The Department's BACT determination requires compliance with a 48-hour limit of 3.5 lb SO₂/ton acid. The 48-hour average SO₂ removal efficiency required by the Department is approximately 99.74 percent (%) versus the applicant's proposed value of 99.70%. The underpinnings for the Department's lower SO₂ values are:

1. The Department reviewed the application submitted by Mississippi Phosphates to the State of Mississippi. The scope of the project by Piney Point is greater than the project by Mississippi Phosphates, which proposed an emissions limit of 3.25 lb SO₂/ton acid to avoid PSD and BACT.
2. The Department believes that the applicant's plant will produce 2000 TPD of acid more comfortably than in the past simply by its plan to replace screened, pelletized, vanadium catalyst in Converter 1 and all catalyst in Converter 2 with low pressure drop, ring-shaped, vanadium catalyst. Information from Monsanto indicates that pressure drop across ring-shaped catalyst is 30-50% lower than across pelletized catalyst. The implications are obvious and present the opportunity for sustaining production capacity over a longer period of time during a turn-around cycle. The more modern towers and heat transfer equipment also provide opportunities for lower pressure drop across the plant.
3. The applicant expected the plant to emit 4 lb/ton SO₂ at 2000 TPD after the proposed project and considered all operational or add-on pollution control options to be unfeasible.
4. In the opinion of the Department, use of "cesium-promoted" vanadium catalyst in the fifth and final pass (Converter 2) can reduce SO₂ emissions by 20 to 40 percent (to between 3.2 and 2.4 lb/ton acid or 99.76 to 99.82% conversion efficiency) in a cost-effective manner. Attached are manufacturer summaries claiming even greater reductions under particular situations. This option provides a benchmark against which the applicant can weigh all the options available for SO₂ emissions reduction. The applicant and Manatee County recently agreed that cesium-vanadium catalyst will be installed in the final pass.

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BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

5. The Department's proposed SO₂ limit reflects a 12.5 percent reduction in average SO₂ emissions while still allowing a reasonable margin for compliance. The emission limit of 3.5 lb SO₂/ton acid can be achieved over an averaging time of 48 hours. This will allow the applicant to correct and compensate for 3-hour SO₂ emissions greater than 3.5 (but less than 4 lb/ton) by achieving emissions lower than 3.5 lb/ton during the rest of the 48-hour period.
6. Cesium-promoted vanadium ringed catalyst costs \$3.15 per liter (per Monsanto) more than standard vanadium ringed catalyst. Therefore 117,000 liters of cesium/vanadium catalyst will cost an additional \$370,000 over the cost of replacing the pelletized catalyst with non-cesium vanadium ringed catalyst as originally proposed by the applicant. The amortized cost over a period of 10 years is approximately \$50,000 per year.
7. Replacement of 10 percent of the catalyst every other turn-around cycle (i.e. every 3 years) over an extended period of time, results in additional annual costs of roughly \$12,300. Thus total additional annual costs are approximately \$62,300.
8. At 12.5 percent, SO₂ emissions reductions are about 180 TPY (0.125x1,460 TPY) for a Title V fee credit (@ \$25/ton SO₂) of approximately \$4,500. This amount of SO₂ recovered is equivalent to about 280 TPY of acid produced for a credit (@ \$35/ton of acid) of approximately \$9,800. Therefore the marginal cost efficiency between 3.5 and 4 lb/ton acid is approximately \$265 per ton of SO₂ removed [(\$62,300 - 4,500 - 9,800)/300 tons]. At the expected emission reduction between 20 and 40 percent, the marginal costs will be even lower.
9. In 1997 dollars, the above value is lower than the historical double absorption technology marginal cost effectiveness compared with single absorption technology, which was \$245 in 1985. It is lower than any add-on process analyzed by the applicant or reviewers. Therefore, it is not necessary to present a detailed cost-effectiveness analysis of add-on control options. The reader can refer to the application and comments by reviewers for those analyses.
10. The above estimate is conservatively high because a converter full of catalyst remains after all of the screenings and replacements over the period of amortization. Cesium-promoted catalyst achieves equivalent conversions at lower temperatures than the standard type. The reduction in heating requirements after the interpass absorption tower results in an energy benefit that the Department has not quantified.
11. Similar calculations can be performed using the most recent cesium/vanadium catalyst introduced by Haldor Topsoe in 1996. Though it is more expensive, it is more active than Topsoe's non-cesium line over the entire range of operating temperatures in the final pass. The Monsanto product, introduced in 1989, offers advantages over its own non-cesium line only at relatively low temperatures. The additional activity, daisy ring shape, and possibility of using less cesium catalyst indicate that the cost effectiveness of Haldor Topsoe's VK-69 catalyst would probably be at least as good as the comparable Monsanto product. BASF also makes a cesium/vanadium catalyst, but the Department has little information about it at this time.
12. Cesium/vanadium catalyst (Haldor Topsoe VK-58) was used in the upper portion of the first passes at the three previously-mentioned General Chemical plants in Anacortes. While the purpose was to

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BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

increase production, save startup time, and extend heat exchanger lifetime, the lower historical emissions encountered may have been partially due to the cesium/vanadium catalyst.

13. Control options involving production of by-products or wastes are not advisable at Piney Point. These needlessly require storage and handling of additional materials which unnecessarily complicates operations at a site of concern to and under close scrutiny by the public. Some of these processes were competitive prior to the development of the double absorption process. They have been phased out at many plants and are not seriously considered at any new or existing plants except where there is a market for the by-product (such as sodium sulfites used by to pulp and paper mills).
14. There is no indication that add-on control methods are competitive with those which result in production of additional sulfuric acid when all costs are considered. The cost estimates available to the Department indicate they are generally more expensive than the cesium/vanadium catalyst alternative. They remain available at the discretion of Piney Point (particularly if there is a use for the by-products) as alternatives to achieve the Department's BACT SO₂ limits.
15. The Centaur process, which uses low temperature wet carbon catalysis/adsorption in place of the standard final pass and absorption tower, is viable and was (according to Monsanto and Calgon Carbon statements) demonstrated on a pilot scale at a sulfur burning plant. A commercial sale incorporating Centaur for a 1000 TPD plant was made to Philippines Phosphate Fertilizer Corporation. It is licensed by Calgon Carbon and Monsanto Enviro-Chem. Emissions as low as 1 lb SO₂/ton acid are theoretically possible. However, the process has not yet been optimized and might result in a separate excess weak sulfuric acid stream (beyond plant water makeup needs) which might require treatment and disposal. Process optimization and building contingency treatment facilities would delay start up of the plant.
16. The Department does not recommend the Centaur process at Piney Point at this time. It remains an option that Piney Point can choose if it prefers it over other alternatives. The process may actually gain appeal in future plants and modifications for economic reasons once the potential problems are determined and minimized.
17. Department records indicate that emissions less than 4 lb SO₂/ton are commonly achieved throughout the entire turn-around cycle by several plants in Florida. In some cases, the lower levels may reflect existence of process bottlenecks, production permit limits, low production rates, or other considerations. Lower emissions may also be the result of progressive replacement of degraded pelletized vanadium catalyst with ringed vanadium catalyst without production increases over many turn-around cycles. For example, two plants at White Springs, Florida, typically emit 3.3 lb SO₂/ton throughout their entire turn-around cycles even after increasing production at each plant from 2000 to 2500 TPD several years ago.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

18. The option of more frequent turn-arounds was considered. Estimates of cost-effectiveness ranged from over \$25,000/ton SO₂ reviewed (by applicant) to a substantial increase in revenues (by Manatee County's consultant). Nine month turn-arounds were the norm some years ago. However, plants are capable of running longer between turn-arounds and it is the conclusion of the Department that the operator is in the best position to judge the appropriateness of shutdowns. More frequent turn-arounds make a theoretical difference in SO₂ emissions at some plants but not at others. This and any other operational option remains available at the discretion of the applicant in achieving the BACT limit.

The rationale for the other pollutants is as follows:

19. All mist eliminators at the SAP will be replaced with the most appropriate devices (Monsanto Enviro-Chem CS-IP Co-Knit, ES, and CSII-P mist eliminators) based on the required duty. Per the original application, the Model CSII-P ("Cost Saver"), which relies only on impaction to remove SAM, was to be used in the final tower (see attached manufacturer description). The applicant has since agreed to include 36 of the high efficiency Model ES ("Energy Saver") mist eliminators in the final tower. This design incorporates "Brownian Diffusion" which enhances collection of smaller particles. This replacement constitutes BACT for this project, which is to return an existing plant to its previous capacity.
20. According to the referenced EPA NSPS documents, SAM emissions ranged from a low of 0.004 to a high of 0.15 lb/ton at tested plants. The NSPS standard and Monsanto guarantee of 0.15 lb/ton together with replacement of the mist eliminators in the final tower with high efficiency models will likely result in SAM emissions less than 0.10 lb/ton.
21. The NSPS visibility limit of 10 percent opacity is consistent with the above discussion. There was no need to set a BACT opacity limit.
22. If any credit is given for NO_x emissions during past operation, the increase will not be significant with respect to PSD. The NO_x limit is based on information provided by the applicant and should insure that the increase will be small and not significant.

COMPLIANCE METHODOLOGY:

Demonstration of compliance with the NSPS limits shall be as required by Subpart H. These are EPA Reference Method 8 for SO₂ and SAM. EPA Methods 1, 2, and 3 shall be used to determine stack and flue gas properties. An initial compliance test for NO_x using EPA Method 7 or 7E is required to verify the low emission rate projected in the application.

SO₂ emissions must be continuously monitored as required by Subpart H. The monitoring shall also be used to demonstrate compliance with the Department BACT emission limit for SO₂ on a 48 hour rolling average.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:

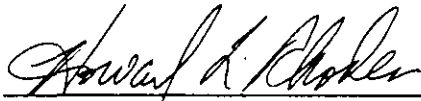
A. A. Linero, P.E., Administrator, New Source Review Section
Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended By:

Approved By:



C. H. Fancy, P.E., Chief
Bureau of Air Regulation



Howard L. Rhodes, Director
Division of Air Resources Management

2-12-98

Date:

2/16/98

Date:

APPENDIX CSC

EMISSION UNIT(S) COMMON SPECIFIC CONDITIONS

SUBSECTION 1.0 CONSTRUCTION REQUIREMENTS

- 1.1 Applicable Regulations: Unless otherwise indicated in this permit, the construction and operation of the subject emission unit(s) shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of Chapter 403, F.S and Florida Administrative Code Chapters 62-4, 62-103, 62-204, 62-210, 62-212, 62-213, 62-296, 62-297; and the applicable requirements of the Code of Federal Regulations Section 40, Part 60, adopted by reference in the Florida Administrative Code regulation [Rule 62-204.800 F.A.C.]. Issuance of this permit does not relieve the facility owner or operator from compliance with any applicable federal, state, or local permitting requirements or regulations. [Rule 62-210.300, F.A.C.]

SUBSECTION 2.0 EMISSION LIMITING STANDARDS

- 2.1 General Particulate Emission Limiting Standards. General Visible Emissions Standard: Except for emissions units that are subject to a particulate matter or opacity limit set forth or established by rule and reflected by conditions in this permit, no person shall cause, let, permit, suffer, or allow to be discharged into the atmosphere the emissions of air pollutants from any activity, the density of which is equal to or greater than that designated as Number 1 on the Ringelmann Chart (20% opacity). [Rule 62-296-320(4)(b)1, F.A.C.]
- 2.2 Unconfined Emissions of Particulate Matter [Rule 62-296.320(4)(c), F.A.C.]
- (a) The owner or operators shall not cause, let, permit, suffer or allow the emissions of unconfined particulate matter from any source whatsoever, including, but not limited to, vehicular movement, transportation of materials, construction, alteration, demolition or wrecking, or industrially related activities such as loading, unloading, storing or handling, without taking reasonable precautions to prevent such emission.
- (b) Any permit issued to a facility with emissions of unconfined particulate matter shall specify the reasonable precautions to be taken by that facility to control the emissions of unconfined particulate matter.
- (c) Reasonable precautions include the following:
- Paving and maintenance of roads, parking areas and yards.
 - Application of water or chemicals to control emissions from such activities as demolition of buildings, grading roads, construction, and land clearing.
 - Application of asphalt, water, oil, chemicals or other dust suppressants to unpaved roads, yards, open stock piles and similar activities.
 - Removal of particulate matter from roads and other paved areas under the control of the owner or operator of the facility to prevent reentrainment, and from buildings or work areas to prevent particulate from becoming airborne.

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EMISSION UNIT(S) COMMON SPECIFIC CONDITIONS

- Landscaping or planting of vegetation.
- Use of hoods, fans, filters, and similar equipment to contain, capture and/or vent particulate matter.
- Confining abrasive blasting where possible.
- Enclosure or covering of conveyor systems.

NOTE: Facilities that cause frequent, valid complaints may be required by the Permitting Authority to take these or other reasonable precautions. In determining what constitutes reasonable precautions for a particular source, the Department shall consider the cost of the control technique or work practice, the environmental impacts of the technique or practice, and the degree of reduction of emissions expected from a particular technique or practice.

2.3 General Pollutant Emission Limiting Standards: [Rule 62-296.320, F.A.C.]

- (a) The owner or operator shall not store, pump, handle, process, load, unload or use in any process or installation, volatile organic compounds or organic solvents without applying known and existing vapor emission control devices or systems.
- (b) No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor.

NOTE: An objectionable odor is defined as any odor present in the outdoor atmosphere which by itself or in combination with other odors, is or may be harmful or injurious to human health or welfare, which unreasonably interferes with the comfortable use and enjoyment of life or property, or which creates a nuisance. [F.A.C. 62-210.200(198)]

SUBSECTION 3.0 OPERATION AND MAINTENANCE

- 3.1 Changes/Modifications: The owner or operator shall submit to the Permitting Authority(s), for review any changes in, or modifications to: the method of operation; process or pollution control equipment; increase in hours of operation; equipment capacities; or any change which would result in an increase in potential/actual emissions. Depending on the size and scope of the modification, it may be necessary to submit an application for, and obtain, an air construction permit prior to making the desired change. *Routine maintenance of equipment will not constitute a modification of this permit.* [Rule 62-4.030, 62-210.300 and 62-4.070(3), F.A.C.]
- 3.2 Plant Operation - Problems: If temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by fire, wind or other cause, the owner or operator shall notify the Permitting Authority as soon as possible, but at least within (1) working day, excluding weekends and holidays. The notification shall include: pertinent information as to the cause of the problem; the steps being taken to correct the problem and prevent future recurrence; and where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from

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EMISSION UNIT(S) COMMON SPECIFIC CONDITIONS

any liability for failure to comply with the conditions of this permit and the regulations. [Rule 62-4.130, F.A.C.]

3.3 Circumvention: The owner or operator shall not circumvent the air pollution control equipment or allow the emission of air pollutants without this equipment operating properly. [Rules 62-210.650, F.A.C.]

3.4 Excess Emissions Requirements [Rule 62-210.700, F.A.C.]

(a) Excess emissions resulting from start-up, shutdown or malfunction of these emissions units shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized, but in no case exceed two hours in any 24 hour period unless specifically authorized by the Permitting Authority office for longer duration. [Rule 62-210.700(1), F.A.C.]

(b) Excess emissions that are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure that may reasonably be prevented during start-up, shutdown, or malfunction shall be prohibited. [Rule 62-210.700(4), F.A.C.]

(c) In case of excess emissions resulting from malfunctions, the owner or operator shall notify Permitting Authority within one (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the problem; and the corrective actions being taken to prevent recurrence. [Rule 62-210.700(6), F.A.C.]

3.5 Operating Procedures: Operating procedures shall include good operating practices and proper training of all operators and supervisors. The good operating practices shall meet the guidelines and procedures as established by the equipment manufacturers. All operators (including supervisors) of air pollution control devices shall be properly trained in plant specific equipment. [Rule 62-4.070(3), F.A.C.]

SUBSECTION 4.0 MONITORING OF OPERATIONS

4.1 Determination of Process Variables

(a) The permittee shall operate and maintain equipment and/or instruments necessary to determine process variables, such as process weight input or heat input, when such data is needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.

(b) Equipment and/or instruments used to directly or indirectly determine such process variables, including devices such as belt scales, weigh hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value. [Rule 62-297.310(5), F.A.C.]

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EMISSION UNIT(S) COMMON SPECIFIC CONDITIONS

SUBSECTION 5.0 TEST REQUIREMENTS

- 5.1 Test Performance Within 60 days after achieving the maximum production rate at which these emission units will be operated, but not later than 180 days after initial startup and annually thereafter, the owner or operator of this facility shall conduct performance test(s) pursuant to 40 CFR 60.8, Subpart A, General Provisions and 40 CFR 60, Appendix A. No other test method shall be used unless approval from the Department has been received in writing. Unless otherwise stated in the applicable emission limiting standard rule, testing of emissions shall be conducted with the emission unit(s) operating at permitted capacity pursuant to Rule 62-297.310(2), F.A.C. [Rules 62-204.800, 62-297.310, 62-297.400, 62-297.401, F.A.C.]
- 5.2 Test Procedures shall meet all applicable requirements of the Florida Administrative Code Chapter 62-297. [Rule 62-297.310, F.A.C.]
- 5.3 Test Notification: The owner or operator shall notify the Permitting Authority in writing at least (30) days (initial) and 15 days (annual) prior to each scheduled compliance test to allow witnessing. The notification shall include the compliance test date, place of such test, the expected test time, the facility contact person for the test, and the person or company conducting the test. The (30) or (15) day notification requirement may be waived at the discretion of the Department. Likewise, if circumstances prevent testing during the test window specified for the emission unit, the owner or operator may request an alternate test date before the expiration of this window. [Rule 62-297.310 and 40 CFR 60.8, F.A.C.]
- 5.4 Special Compliance Tests: When the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in Rule 62-204, 62-210, 62-212, 62-296 and 62-297, F.A.C. or in a permit issued pursuant to those rules is being violated, it may require the owner or operator of the facility to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions units and to provide a report on the results of said tests to the Permitting Authority. [Rule 62-297.310(7)(b), F.A.C.]
- 5.5 Stack Testing Facilities: The owner or operator shall install stack testing facilities in accordance with Rule 62-297.310(6), F.A.C..
- 5.6 Exceptions and Approval of Alternate Procedures and Requirements: An Alternate Sampling Procedure (ASP) may be requested from the Bureau of Air Monitoring and Mobile Sources of the Florida Department of Environmental Protection in accordance with the procedures specified in Rule 62-297.620, F.A.C.
- 5.7 Operating Rate During Testing: Unless otherwise stated in the applicable emission limiting standard rule, testing of emissions shall be conducted with the emissions unit operation at permitted capacity. Permitted capacity is defined as 90 to 100 percent of the maximum operation rate allowed by the permit. If it is impracticable to test at permitted capacity, an emissions unit may be tested at less than the minimum
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APPENDIX CSC

EMISSION UNIT(S) COMMON SPECIFIC CONDITIONS

permitted capacity; in this case, subsequent emissions unit operation is limited to 110 percent of the test load until a new test is conducted. Once the unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purpose of additional compliance testing to regain the authority to operate at the permitted capacity. [Rule 62-297.310(2) and (3), F.A.C.]

SUBSECTION 6.0 REPORTS AND RECORDS

- 6.1 Duration: All reports and records required by this permit shall be kept for at least (5) years from the date the information was recorded. [Rule 62-4.160(14)(b), F.A.C.]
- 6.2 Emission Compliance Stack Test Reports:
- (a) A *test report* indicating the results of the required compliance tests shall be filed with the Permitting Authority as soon as practical, but no later than 45 days after the last sampling run is completed. [Rule 62-297.310(8), F.A.C.]
 - (b) The *test report* shall provide sufficient detail on the tested emission unit and the procedures used to allow the Department to determine if the test was properly conducted and if the test results were properly computed. At a minimum, the test report shall provide the applicable information listed in Rule 62-297.310(8), F.A.C.
- 6.3 Excess Emissions Report: If excess emissions occur, the owner or operator shall notify the Permitting Authority within (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem. In addition, the Department may request a written summary report of the incident. Pursuant to the New Source Performance Standards, excess emissions shall also be reported in accordance with 40 CFR 60.7, Subpart A. [Rules 62-4.130 and 62-210.700(6), F.A.C.]
- 6.4 Annual Operating Report for Air Pollutant Emitting Facility: Before March 1st of each year, the owner or operator shall submit to the Permitting Authority this required report [DEP Form No. 62-210.900(5)], which summarizes operations for the previous calendar year. [Rule 62-210.370(3), F.A.C.]

SUBSECTION 7.0 OTHER REQUIREMENTS

- 7.1 Waste Disposal: The owner or operator shall treat, store, and dispose of all liquid, solid, and hazardous wastes in accordance with all applicable Federal, State, and Local regulations. This air pollution permit does not preclude the permittee from securing any other types of required permits, licenses, or certifications.

APPENDIX GC
GENERAL PERMIT CONDITIONS [F.A.C. 62-4.160]

- G.1 The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.
- G.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 or exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.
- G.3 As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey and vested rights or any exclusive privileges. Neither 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 is not a waiver 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.
- G.4 This permit conveys no title to land or water, does not constitute State recognition or acknowledgment 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.
- G.5 This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; 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.
- G.6 The permittee shall 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.
- G.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 and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:
- (a) Have access to and copy and records that must be kept under the conditions of the permit;
 - (b) Inspect the facility, equipment, practices, or operations regulated or required under this permit, and,
 - (c) Sample or monitor 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.
- G.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 provide the Department with the following information:
- (a) A description of and cause of non-compliance; and
 - (b) The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

APPENDIX GC
GENERAL PERMIT CONDITIONS [F.A.C. 62-4.160]

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 for revocation of this permit.

- G.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 involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.
- G.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.
- G.11 This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.
- G.12 This permit or a copy thereof shall be kept at the work site of the permitted activity.
- G.13 This permit also constitutes:
- (a) Determination of Best Available Control Technology (*X*);
 - (b) Determination of Prevention of Significant Deterioration (*X*); and
 - (c) Compliance with New Source Performance Standards (*X*)
- G.14 The permittee shall comply with the following:
- (a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.
 - (b) The permittee shall hold 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) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application or this permit. These materials shall be retained 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:
 - 1. The date, exact place, and time of sampling or measurements;
 - 2. The person responsible for performing the sampling or measurements;
 - 3. The dates analyses were performed;
 - 4. The person responsible for performing the analyses;
 - 5. The analytical techniques or methods used; and
 - 6. The results of such analyses.
- G.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 corrected promptly.

Sulphuric Acid Catalyst VK69^o of Final Determination and Rationale II of BACT.

Refer to Comment 4
of Final Determination
and Rationale II of BACT.

Activity of Caesium Catalyst (VK-69)
at 760°F is greater than
non-caesium catalyst (VK38) at 800°F.

New Options for Double-Absorption Plants

Since the introduction of the first VK38 catalyst more than 50 years ago, the VK Series has represented Topsøe's heritage and commitment to quality and innovation.

The introduction of the first caesium-promoted vanadium catalyst, VK58, in the late 1980's meant a tremendous step forward in reducing tail-gas emissions from single-absorption sulphuric acid plants through operation at hitherto unseen low temperatures.

Other application areas of caesium-promoted catalysts include:

- Handling of strong, oxygen-rich SO₂ gases
- Significant reduction in SO₂ emissions during start-up
- Savings in start-up time and extended autothermal restart time limits
- Overcoming plant constraints

VK69

* In 1996 Topsøe introduced VK69, a newly developed caesium-promoted catalyst, optimized for operation in the last pass of double-absorption sulphuric acid plants. At these conditions VK69 shows a very significant activity advantage compared to regular catalysts.

Features and Benefits

The improvement in activity has been brought about through physical as well as chemical changes compared to Topsøe's well-known VK58 caesium-promoted catalyst.

VK69, 9-mm mini-Daisy alongside 10-mm rings and 12-mm Daisy

Support

VK69 is manufactured by a special extrusion process resulting in a highly porous catalyst.

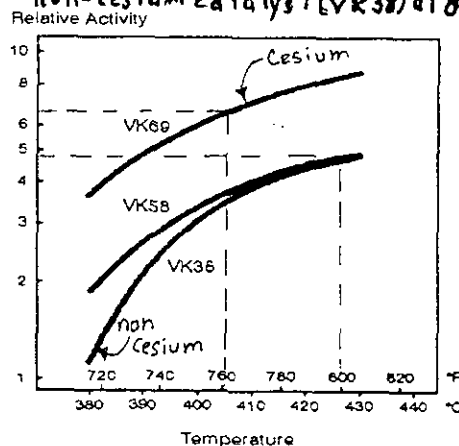
Shape

In gases with low concentrations of sulphur dioxide the rate of oxidation of sulphur dioxide is impeded by intra-particle diffusion. The size and shape of the catalyst particles are hence important for the efficiency of the catalyst.

Topsøe's new 9-mm mini-Daisy shape proves 20 % more efficient compared with smooth 10-mm rings without compromising a low pressure drop.

Chemical Composition

VK69 combines an increased vanadium content with a revised composition of the active phase. Caesium is used to stabilize the vanadium in its active state at low operating temperatures.



Outstanding Activity

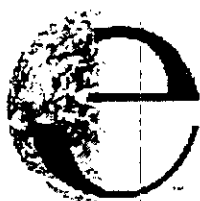
The revised support material, the optimum chemical composition, and the mini-Daisy shape together result in a 2-3 times higher activity for VK69 compared to other vanadium catalysts.

Improved Performance

The very high activity of VK69 offers significant performance improvements in terms of:

- Emissions from existing plants can be cut in half without increasing the catalyst volume
- Increased production rate by using higher-strength SO₂ gas without increasing emissions or plant pressure drop



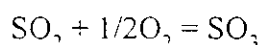


Enviro-Chem Systems

MONSANTO ENVIRO-CHEM SULFURIC ACID CATALYST

Monsanto has been manufacturing and marketing sulfuric acid catalyst since 1925. The catalyst is sold worldwide and Enviro-Chem provides high quality technical and commercial support before and after the sale. The vanadium-based catalyst is an extremely important "cog" in the many sulfuric acid technologies provided by Monsanto Enviro-Chem.

The sulfuric acid catalyst is used in the oxidation of sulfur dioxide (SO₂) as follows:



The sulfur trioxide (SO₃) is then reacted with water to form sulfuric acid (H₂SO₄). The main components of the Enviro-Chem catalyst include: SiO₂ (silica; as a support), vanadium (V), potassium (K) and/or cesium (Cs), and various binders and additives. The reaction shown above actually occurs within a molten salt consisting of potassium/cesium sulfates and vanadium sulfates, coated on the solid silica support. This unique catalyst has proven to be very stable and long-lived in the sulfuric acid production industry. Because of the unique chemistry of this molten salt system, the vanadium is present as a complex sulfated salt mixture and NOT as vanadium pentoxide (V₂O₅). Therefore, the catalyst is more correctly called a "vanadium-containing" catalyst rather than the commonly-used "vanadium pentoxide" catalyst.

Monsanto Enviro-Chem provides a wide variety of sulfuric acid catalyst products:

	Rings	LP-120	LP-110	LP-220
Application		First/Second Beds	Third/Fourth Beds	First/Second Beds
Outside Diameter (mm)		12.7	9.5	9.5
Inside Diameter (mm)		5.0	4.0	4.0
Average Ring Length (mm)		14.0	13.0	13.0
	Pellets	T-210	T-11	
Application		First/Second Beds	Third/Fourth Beds	
Diameter (mm)		5.5	5.5	
Crush Strength (kg)		12.0	12.0	
	Cesium-Promoted	Cs-120	Cs-110	Cs-210
Shape		Ring	Ring	Pellet
Application		First/Second Beds	Lower Beds	All Beds
Outside Diameter (mm)		12.7	9.5	5.5
Inside Diameter (mm)		5.0	4.0	

The **cesium-promoted catalyst** was developed specifically for lower temperature operations which can lead to greater SO₂ conversion and hence lower emissions to the atmosphere. The cesium salt promoter reduces the required operating temperature for the sulfuric acid catalyst by as much as 40

°C (70°F). Higher SO₂ conversion is possible at lower temperatures as long as the catalyst is "active"; the cesium-promoted catalysts are sufficiently active at these lower temperatures (390-410 °C/735-770°F) to take advantage of this conversion "opportunity." The cesium/vanadium catalyst can be used in the first bed to reduce the bed inlet temperature (saving energy and start-up time). The Cs-110 or Cs-210 catalyst can be used in the final catalyst bed (at a low inlet temperature) to maximize the SO₂ conversion and reduce emissions. This unique catalyst was introduced in the late 1980's and has been applied in a variety of situations with significant SO₂ emissions reductions. Although the cesium catalyst is more costly than the standard potassium/vanadium catalysts, many customers have justified the added expense by increased production, higher steam production, and reduced emissions.

Technical service is also a major part of the overall sulfuric acid catalyst story. Enviro-Chem provides catalyst engineering studies to assist the customer in determining the catalyst needs in a specific plant, activity analysis and hardness determinations for used catalyst samples, and on-site converter-heat exchanger testing (called *PeGASyS*) to fully characterize the sulfuric acid plant operations which assist the customer in maintenance planning. Enviro-Chem has a variety of commercial and inventory locations throughout the world. Technical service functions are centered in St. Louis, MO (U.S.A.) and in Brussels, Belgium.

^{Intro}Enviro-Chem Systems

* Some of our landmark developments and contributions to the industry include:

1920s -

Introduction in the US of a sulfuric acid **catalyst** based on vanadium, a superior catalyst to platinum in the contact sulfuric acid process.

1930 -

Monsanto process and plant engineering packages made available to industry through **Leonard Construction Company**

1960s -

Development of fiber bed mist eliminator to reduce mist emissions from phosphoric and sulfuric acid plants.

1963 -

Introduced Type 11 catalyst tailored for higher activity in lower converter passes.

1970 -

First US interpass absorption plant designed by Enviro-Chem goes on stream.

1978 -

Designed first stainless steel converter for 12% gas and introduced Monsanto's stainless steel anodically protected acid coolers to replace cast iron.

1980s -

Introduction of modern energy efficient design concepts which increased steam production by 20-25%.

1980 -

Developed low pressure drop ring catalyst.

1984 -

Patented the Heat Recovery System which produces steam for process or power generation from heat previously lost in acid cooling systems which increases net heat recovery on sulfur burning plants up to 90%.

1986 -

Introduced Sandvik SX™ stainless steel material to the marketplace to replace steel and brick and cast iron in acid systems, leading to greater safety for operators and longer on-stream times.

1987 -

Introduced DynaWave® gas scrubbers to replace venturis and open humidifiers for improved gas cleaning efficiency.

1988 -

Obtained NO_x and Nitric acid plant process technologies.

1989 -

* Introduced Cesium catalyst for lower temperature operation in new and existing plants, allowing increased capacity and conversion in existing plants, and lower capital cost of new plants which require exit emissions down to 100 ppm SO₂.

1990 -

Introduced the patented wet catalytic Monarch™ process further improving the energy recovery from acid plants

1992 -

Acquired technology for radial flow gas/gas heat exchanger which offers better layout and reduced

Enviro-Chem Systems

HISTORY


Today, Monsanto Enviro-Chem is a wholly-owned subsidiary of Monsanto Company. Monsanto Company has about Eight Billion Dollars per year sales.

Over 85 years ago Monsanto Company was a major user of sulfuric acid and built its first sulfuric acid plant in 1917.

The Contact process began to replace the Chamber process at that time and Monsanto commenced making vanadium catalyst in 1925, not only for its own use but for sale. Vanadium catalyst was recognized then as a quality product with low first cost, low replacement, good activity and long life.

Monsanto began to supply design services for the catalyst such as design of the converter vessel, and eventually expanded this to providing basic engineering to an engineering company in the USA who designed and constructed complete acid plants in 1930.

Eventually Monsanto bought the engineering and construction company in 1957, and has constructed all its own designed plants in the U.S.A. since that time. The engineering company name was changed finally to Enviro-Chem.

 Companies outside the U.S.A. were also licensed to design sulfuric acid plants using Monsanto technology starting with an English company in 1939. Since then a network of licensees has been established around the world.

Monsanto has contracted with licensees, clients, and local contractors to provide engineering and construction services using the latest available sulfuric acid technology which combines the most effective energy saving techniques with low cost, high quality design.

Significant developments that Monsanto has made in the industry include the following:

1925 - Manufacture of Type 210 catalyst.

1930 - Complete plant design and construction of sulfuric acid plants began.


1961 - Development of Brink®. Fiber Bed Mist Eliminator to reduce mist emissions from phosphoric and sulfuric acid plants.


1963 - Type 11 catalyst tailored for higher activity in lower passes was introduced.

1970 - Built the first U.S.A. interpass plant.

1978 - Designed first stainless steel converter for 12% gas.

1978 - Introduced Monsanto anodically-protected shell and tube coolers to replace cast iron.

 1980 - Introduced modern energy efficient design concepts which increased steam production by 20-25%.

 1980 - Type LP-120 and LP-110 ring catalyst produced converter pressure drops of 30-50% lower than pellet.

1984 - Patented the Heat Recovery System which produces steam for process or power generation from heat previously lost in acid cooling systems. This increases heat recovery on sulfur burning plants up to 90%.

1986 - Introduced Sandvik SX™ stainless steel material to the marketplace to replace steel and brick and cast iron in acid systems, leading to greater safety for operators and longer on-stream times.

1987 - Introduced DynaWave® Gas Scrubbers to the industry, to replace venturis and open humidifiers with high efficiency reverse jets and froth columns. In Spent plants these replace mist precipitators, for lower maintenance and cost. They are now used in major industrial applications such as metallurgical sites, namely INCO, Metaleurop, Kennecott Copper, and Magma. Other applications include sulfuric acid plants, titanium dioxide, and phosphoric acid recovery.

* 1989 - Introduced Cesium catalyst for lower temperature operation in new and existing plants. This allows increased capacity and conversion in existing plants, and lowers the capital cost of new plants which require exit emissions down to 100 ppm SO₂.

1991 - Made agreement on Russian Reverse Process for future introduction with weak gases. This process needs less equipment and has less operating cost than the conventional plant.

1992 - Sold first 8 radial flow gas/gas exchangers on 4 plant modifications to IPA in Tunisia. These exchangers offer better layout and reduced pressure drop.

1992 - Licensed DynaCycle® Regenerative Catalytic Oxidizer for the destruction of volatile organic compounds (VOCs).

1993 - Sold first radial flow SS converter using Cameron concept with internal radial flow heat exchanger to Outokumpu for new 2400 MTPD metallurgical plant.

1993 - Developed DynaZyme Biofilter for the removal of odorous compounds and VOCs.

1994 - Acquired Calvert technologies: Collision Scrubber to augment DynaWave Wet Scrubber business, Calvert Mist Scrubber for odor removal in municipal and industrial applications.

1994 - Developed Exosite Odor Control Chemicals.

1995 - Started up first major metallurgical smelter off gas acid plant guaranteed to emit no more than 100 ppm SO₂, and incorporating dual boiler HRS.

1995 - Licenced Odorgard technology.

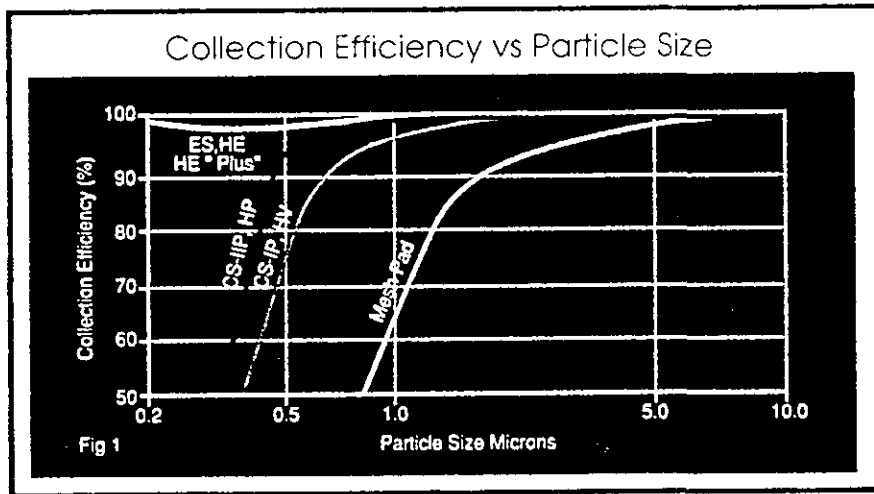
1996 - Licenced ECA (Electrochemical Activation) Technology.

Performance Summary

Model	Brownian Products			Impaction Products				
	ES Energy Saver	HE High Efficiency	HE "Plus" High Efficiency	CS-IP Cost Saver I	CS-IIP Cost Saver II	HP High Performance	HV High Velocity	
Mist Collection Mechanisms	Impaction, Interception, + Brownian Movement			Impaction Interception Only				
Reentrainment Control	Yes	No	Yes	Yes	Yes	No	No	
Efficiency on Mist & Particles >3 Micron	Approximately Equal to 100%							
Efficiency on Mist & Particles <3 Micron	92 to 99.95%			50 - 95%* (0.5μ - 3μ)	70 - 99%* (0.5μ - 3μ)	70 to 99%* (0.5μ - 3μ)	50 - 97%* (0.5μ - 3μ)	
Pressure Drop (inches w.c.)	4 to 20			4 to 5	7 to 9	10	8 to 12	

* At 1.8 Particle Specific Gravity

Performance Comparison

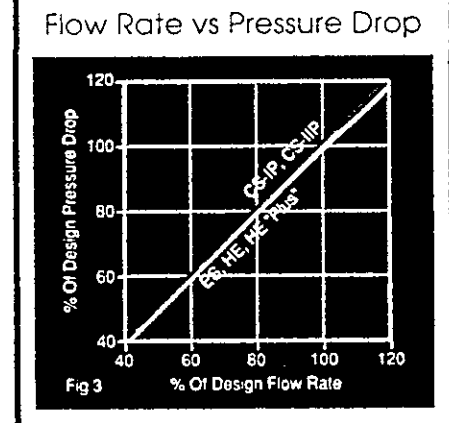
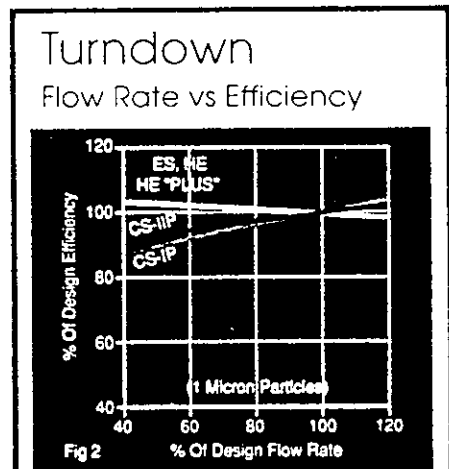


For the high efficiency Brownian Movement based products, (HE, HE "PLUS", and ES), collection efficiency actually increases with reduced flow rate.

For the impaction based products, (CS-IP, CS-IIP, HV), collection efficiency especially on small particles decreases with reduced flow rate. (Fig 2)

For all element types, pressure drop is linearly proportional to flow rate. (Fig 3)


Note: Data shown is expected performance based on particle specific gravity of 1.8.



Memorandum

Florida Department of Environmental Protection

TO: Howard L. Rhodes

FROM: Clair H. Fancy 

DATE: February 12, 1998

SUBJECT: Piney Point Phosphates Sulfuric Acid Plant
PSD-FL-242

Attached is the final permit package for the modification of Piney Point Phosphates' existing sulfuric acid plant. The project will restore the plant to its previous capacity of 2000 TPD. We have made a BACT determination of 3.5 lb SO₂/ton acid. The applicant has agreed to achieve that limit by using cesium-vanadium catalyst in the final pass per a separate agreement with Manatee County.

The Applicant had four main issues in its comments. These are addressed in detail in the Final Determination. The first and most important is to allow startups, etc. to be excluded from the 48-hour BACT SO₂ emission calculation. We have accommodated their request. The second is to allow them to take out the cesium catalyst after two years or one turnaround per their interpretation of the Agreement with the County. This is unacceptable for the reason that use of cesium-promoted catalyst is the only option for which we have reasonable assurance that the plant will meet the BACT SO₂ limit as required by Rule 62-4.070, F.A.C. The third is that the Agreement between Piney Point and Manatee County should take precedence over the Department's permit and that changes should be automatically and perpetually incorporated into the permit. This one is also unacceptable. The fourth is a request to average plant production over 48 hours. This one was denied as explained in the comments. The other issues are criticisms of our work and do not affect Piney Point.

I recommend your approval and signature.

AAI/aal

cc: Jeff Brown, OGC



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW
ATLANTA, GEORGIA 30303-8909

FEB 12 1998

RECEIVED

4APT-ARB

FEB 16 1998

Mr. Claire H. Fancy, P.E.
Chief
Bureau of Air Regulation
Florida Department of Environmental
Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

**BUREAU OF
AIR REGULATION**

SUBJ: Piney Point Phosphates, Inc., Palmetto, Florida (PSD-FL-242)

Dear Mr. Fancy:

This is to acknowledge receipt of the preliminary determination and draft Prevention of Significant Deterioration (PSD) permit for the above referenced facility submitted by a letter dated January 8, 1998, from your office. The permit is for the repair and restoration of an existing double absorption sulfuric acid plant and associated molten sulfur handling equipment. The permitted capacity of the plant will be equivalent to the previous production rate of 2,000 tons/day of 100 percent sulfuric acid. The sulfuric acid plant is subject to 40 CFR 60, Subpart H (Standards of Performance for Sulfuric Acid Plants).

As indicated in the State's best available control technology (BACT) analysis, SO₂ emissions from the sulfuric acid plant will be controlled by use of the double absorption process, and sulfuric acid mist emissions will be controlled by the use of fiber mist eliminators. Piney Point Phosphates will replace the degraded portion of the vanadium containing (VC) pelletized catalyst in Converter 1 with low pressure VC ring catalyst, and all pelletized VC catalyst in Converter 2 will be replaced with low pressure VC ring catalyst. As indicated in the draft permit, cesium-promoted VC catalyst will be installed in the final converter pass (Converter 2), and it will be used for at least one plant turnaround cycle, or approximately two years, whichever is longer. This will be the first required use of the catalyst to reduce SO₂ emissions. Since cesium-promoted catalyst is more effective than other ringed catalyst at lower temperatures, emissions of SO₂ should be reduced. The proposed BACT SO₂ emission limit is 3.5 lb per ton of 100 percent sulfuric acid produced (48 hour rolling average based on CEMS data). The Subpart H emission limit of 4.0 lb SO₂ per ton of 100 percent sulfuric acid produced (3 hour rolling average based on CEMS data) must also be met, and an annual

EPA Method 8 test will be required. The proposed sulfuric acid mist emission limit is 0.15 lb per ton of 100 percent sulfuric acid produced. We have reviewed the preliminary determination and draft permit and do not have any adverse comments.

Thank you for the opportunity to review and comment on the draft permit and supporting information. If you have any questions regarding our review, please contact Keith Goff of my staff at (404)562-9137.

Sincerely yours,

A handwritten signature in cursive script that reads "R. Douglas Neeley".

R. Douglas Neeley
Chief
Air and Radiation Technology
Branch
Air, Pesticides, and Toxics
Management Division

Is your RETURN ADDRESS completed on the reverse side?

SENDER:

- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):

- 1. Addressee's Address
- 2. Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
 Robert Stewart Sr, VP
 Percy Paint Phosphates
 13300 US 41 North
 Palmetto, FL 34221

4a. Article Number
 P 265 659 298

4b. Service Type
 Registered Certified
 Express Mail Insured
 Return Receipt for Merchandise COD

7. Date of Delivery
 2/19/95

5. Received By: (Print Name)
 Lisa Crane

8. Addressee's Address (Only if requested and fee is paid)

6. Signature: (Addressee or Agent)
 X Lisa Crane

PS Form 3811, December 1994

Domestic Return Receipt

Thank you for using Return Receipt Service.

P 265 659 298

US Postal Service
Receipt for Certified Mail
 No Insurance Coverage Provided.
 Do not use for International Mail (See reverse)

Sent to	Robert Stewart
Street & Number	Percy Paint
Post Office, State, & ZIP Code	Palmetto, FL
Postage	\$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	\$
Postmark or Date	2-17-95
	OE1CCG2-24-AC PSD-FL-242

PS Form 3800, April 1995