

P.O. Drawer L.  
Plant City, Florida 33564-9007  
Telephone: 813/782-1591



**CF Industries, Inc.**  
Plant City Phosphate Complex

April 8, 2004

RECEIVED

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BUREAU OF AIR REGULATION

Syed Arif  
Permit Engineer  
Permitting South Section  
Department of Environmental Protection  
Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, FL 32399-2400

Subject: DEP File No. 0570005-019-AC; PSD-FL-339  
Sulfuric Acid Production Increase, Plant City Phosphate Complex

Dear Mr. Arif:

The information requested in your March 29, 2004, letter regarding the CF Industries January 19, 2004 permit application for a sulfuric acid production rate increase is attached. This submittal includes the required responsible official certification and professional engineer's certification.

Please communicate any questions as they arise to Bob May (813-364-5603), Tom Edwards (813-364-5608), or David Buff, Golder Associates, (352-336-5600 ext. 545).

Sincerely,

Herschel E. Morris  
Vice President Phosphate Operations and  
General Manager

cc: G. Worley, EPA  
J. Bunyak, NPS  
J. Kissel, DEP-SWD  
J. Campbell, EPCHC

D. Buff, Golder Associates  
J.S. Alves, HGS  
J.G. Sampson, CFI  
T.A. Edwards, CFI

**APPLICATION INFORMATION**

**Owner/Authorized Representative Statement**

**Complete if applying for an air construction permit or an initial FESOP.**

1. Owner/Authorized Representative Name :
Herschel E. Morris, Vice President Phosphate Operations/General Manager
2. Owner/Authorized Representative Mailing Address...
Organization/Firm: CF Industries, Inc.
Street Address: P.O. Drawer L
City: Plant City State: FL Zip Code: 33564
3. Owner/Authorized Representative Telephone Numbers...
Telephone: (813) 782-1591 ext. Fax: (813) 788-9126
4. Owner/Authorized Representative Email Address: hmorris@cfifl.com
5. Owner/Authorized Representative Statement:
<i>I, the undersigned, am the owner or authorized representative of the facility addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other requirements identified in this application to which the facility is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit.</i>
<u>Herschel E. Morris</u> Signature
<u>4/8/04</u> Date

**APPLICATION INFORMATION**

**Professional Engineer Certification**

1. Professional Engineer Name: <b>David A. Buff</b> Registration Number: <b>19011</b>
2. Professional Engineer Mailing Address... Organization/Firm: <b>Golder Associates Inc.**</b> Street Address: <b>6241 NW 23<sup>rd</sup> Street, Suite 500</b> City: <b>Gainesville</b> State: <b>FL</b> Zip Code: <b>32653-1500</b>
3. Professional Engineer Telephone Numbers... Telephone: <b>(352) 336 - 5600</b> ext. Fax: <b>(352) 336 - 6603</b>
4. Professional Engineer Email Address: <b><u>dbuff@golder.com</u></b>
5. Professional Engineer Statement: <i>I, the undersigned, hereby certify, except as particularly noted herein*, that:</i> <i>(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and</i> <i>(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.</i> <i>(3) If the purpose of this application is to obtain a Title V air operation permit (check here <input type="checkbox"/>, if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.</i> <i>(4) If the purpose of this application is to obtain an air construction permit (check here <input checked="" type="checkbox"/>, if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here <input type="checkbox"/>, if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.</i> <i>(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here <input type="checkbox"/>, if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.</i>  <i>David A. Buff</i> _____ Signature: Date: <u>4/08/04</u>  (seal)

\* Attach any exception to certification statement.

\*\* Board of Professional Engineers Certificate of Authorization #00001670

RESPONSES TO MARCH 29, 2004 DEP INFORMATION REQUESTS

CF INDUSTRIES, INC., PLANT CITY PHOSPHATE COMPLEX

SULFURIC ACID PRODUCTION RATE INCREASE

1. The approaches used in the economic analysis for BACT are flawed. Two approaches were utilized, first was a reduction in DAP production rate necessary to meet the lower limits in the sulfuric acid plants and the second approach compares the cost of sulfuric acid purchased to makeup the loss in sulfuric acid production. The Department would like to see an economic analysis whereby the applicant sets 2,750 TPD of sulfuric acid production with a 3.5 lb/ton SO<sub>2</sub> emission as a base case and looks at additional cost of adding more cesium catalyst in different converter passes to achieve 3.0 lb/ton of SO<sub>2</sub> emissions or lower. The \$/ton of SO<sub>2</sub> removed using this approach will be more meaningful to the Department.

Response: The proposed project for C and D Sulfuric Acid Plants will replace 100% of the catalyst in beds 4A and 4B with cesium promoted vanadium catalyst. This volume of catalyst, approximately 165,000 liters, represents the maximum catalyst capacity available in these two beds.

The opportunity to use additional cesium catalyst in other converter beds is extremely limited. The only other application for cesium promoted catalyst is in bed 1 to reduce startup emissions. Since C and D Sulfuric Acid Plants operate with monthly operating factors typically greater than 99%, this option is not beneficial to reducing operating emissions. Haldor Topsoe or Monsanto EnviroChem does not recommend the use of cesium catalyst in beds 2 and 3.

CF Industries, Inc. has selected Haldor Topsoe to provide the cesium promoted catalyst for C Sulfuric Acid Plant. The cesium catalyst product is a VK69 12mm daisy design product. Attachment 1 is a letter from Haldor Topsoe describing the expected catalyst

performance at 2750 TPD of sulfuric acid production during the course of a normal turnaround cycle. The expected emissions range from 3.12 to 3.43 lb of SO<sub>2</sub>/ton. Considering these emissions and the fact that no additional cesium catalyst can be added to the converter, the option to reduce the proposed permitted emissions to less than 3.5 lb/ton SO<sub>2</sub> is not available.

2. **The economic analysis was done using Enviro-Chem's SCX-2000 super cesium catalyst. Please provide the Department with similar analysis as outlined in Item 1 above utilizing Haldor Topsoe's VK69 or newer generation cesium-promoted vanadium catalyst.**

CF Industries, Inc. has selected Haldor Topsoe to provide the cesium promoted catalyst for C Sulfuric Acid Plant. Please refer to the response to Question 1 for details.

It should be noted that CF Industries, Inc. reserves the option to utilize other catalyst vendors and products if they can guarantee equal or better performance than the Topsoe product.

3. **Please provide annual change in SO<sub>2</sub> emissions due to ammonia scrubbing for C and D Sulfuric acid Plants.**

The expected reduction in SO<sub>2</sub> emissions resulting from adding ammonia scrubbing to C and D Sulfuric Acid Plants is 2672 tons per year, assuming that emissions would be reduced to 0.5 lb ton SO<sub>2</sub>.

#### **SUPPLEMENTAL INFORMATION**

CF has identified an additional incidental modification to the C and D sulfuric Acid Plants that will be needed in addition to those previously identified in permit correspondence. The main blower silencer will be modified to reduce pressure drop in order to achieve the requested production rates.



# HALDOR TOPSOE, INC.

GENERAL OFFICES • 17629 El Camino Real, 3rd Floor, Houston, Texas 77058  
(281)228-5000 • Telefax (281) 228-5019

April 7, 2004

Mr. Bob May  
Manager, Engineering  
CF Industries, Inc  
Plant City Phosphate Complex  
P.O. Drawer L  
Plant City, FL 33564

Dear Mr. May,

Thank you for your interest in our VK69 cesium promoted catalyst. I have performed numerous simulations of your C & D sulfuric acid plants using Haldor Topsoe's proprietary modeling software. The results of the modeling indicated that when operating at a 2750 STPD production rate and a 12.0% SO<sub>2</sub> gas strength inlet to the first bed of the converter there should be 90.23% conversion of SO<sub>2</sub> to SO<sub>3</sub> after the first three beds of the converter. This will result in a gas composition entering the 4<sup>th</sup> bed of 1.4% SO<sub>2</sub>.

The 4A and 4B beds of the C & D sulfuric acid plants have a combined capacity of 165,000 liters of catalyst. I have evaluated the possible installation of 165,000 liters of Haldor Topsoe's VK69, 12mm daisy shaped cesium catalyst in these plants. Our modeling indicates that with 165,000 liters of VK69 cesium catalyst installed in the 4A and 4B converter beds the emissions at the start of run immediately after a turnaround would be 3.12 lbs of SO<sub>2</sub> per ton of acid produced and after 3 years at the end of a turnaround cycle the emissions would be 3.43 lbs of SO<sub>2</sub> per ton of acid produced. These emissions are based on operating the plants at a production rate of 2750 STPD, 12.0% gas strength inlet to the 1<sup>st</sup> bed, 1.4% SO<sub>2</sub> inlet to the 4<sup>th</sup> bed of the converter and the 4<sup>th</sup> bed inlet temperature optimized to yield the best performance.

I also evaluated the possible installation of our VK59 cesium promoted catalyst in the upper beds of the converter to further reduce emissions. The minor emission reductions from this approach would not be economically feasible. The best approach to reduce emissions in the C & D plants is to replace all of the 4A and 4B catalyst with our VK69 cesium promoted catalyst.

Sincerely,

HALDOR TOPSOE, INC.

Patrick Polk  
Sales & Technical Service Engineer  
Sulfuric Acid Catalyst

WPP/mcc/07/Apr04