NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF AIR QUALITY
PERMITTING SECTION

PREVENTION OF SIGNIFICANT DETERIORATION
PRE-CONSTRUCTION REVIEW AND PRELIMINARY DETERMINATION

FOR

PCS PHOSPHATE COMPANY, INC.
BEAUFORT COUNTY
AURORA, NORTH CAROLINA

THIS REVIEW WAS PERFORMED BY THE
DIVISION OF AIR QUALITY
IN ACCORDANCE WITH NCDAQ REGULATION FOR PREVENTION
OF SIGNIFICANT DETERIORATION OF AIR QUALITY
15A NCAC 2D .0530 AND 2Q .0100

April 2005

Mailing List

NEWSPAPER	Washington Daily News Ms. Brenda Foster Legal Classified Department P.O. Box 1788 Washington, North Carolina 27889 (252) 946-2144 FAX: (252) 946-9797	Public Notice w/Cover Letter
OFFICIALS	County Manager Donald Davenport 121 W 3rd Street; Washington, NC 27889 (252) 946-0079	Public Notice w/ Cover Letter
SOURCE	Mr. Bill Cooper Vice President, Phosphate Operations PCS Phosphate Company, Inc. P.O. Box 48 Aurora, North Carolina 27806 (252) 322-8262	Preliminary Determination
NATIONAL PARK SERVICE	Mr. Bud Rolofson National Park Service Policy, Planning, and Permit Review Air Resources Division Air Quality Branch P.O. Box 25287 Denver CO 80225-0287 (303) 969-2804	Preliminary Determination & Application
EPA	Mr. R. Douglas Neely, Chief Air and Radiation Technology Branch Air, Pesticides and Toxic Management Division U.S. EPA, Region IV Atlanta Federal Building 100 Alabama Street, SW Atlanta, Georgia 30303-3104 (404) 562-9097	Preliminary Determination & Application

<u>Mailing List</u> (continued)

EPA	Mr. Bob Blaszczak BACT/LAER Clearinghouse OAQPS, MD-13 RTP, N.C. 27711	BACT Input Summary Sheet
WASHINGTON REGIONAL OFFICE	Mr. Vic Copelan NCDAQ Vic Copelan Regional Supervisor 943 Washington Square Mall Washington, NC 27889 (252) 946-6481 Fax (252) 975-3716	Preliminary Determination & Application

TABLE OF CONTENTS

Facts Sheet

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- URS Corporation, on behalf of PCS Phosphate Company, Inc., submitted a Prevention of Significant Deterioration (PSD) application to the North Carolina Division of Air Quality (NCDAQ), Permitting Section (AQS) on February 22, 2005.

- ***The application was deemed complete for review purposes pursuant to 40 CFR 51.166 (q) and 15A NCAC 2D .0530 (o) on March 17, 2005.***

- As part of a previous PSD application (June 2001), the applicant proposed to modify the existing phosphoric acid (PA) plants 1 and 2 to increase green acid production and to modify existing superphosphoric acid (SPA) plants No. 3 and 4 to an alternative blend of amber acid and raffinate. Although an increase in sulfur dioxide emissions from the PA plants was predicted, it alone was not great enough to trigger PSD review. It was not believed at the time that the SPA modification would result in any increase in sulfur dioxide emissions. Subsequent stack testing of the modified SPA plants has indicated that an increase in sulfur dioxide emissions did occur. When summed with the PA plants sulfur dioxide emissions, the PSD significant increase is exceeded. This addendum modification is to provide a BACT review for sulfur dioxide as should have been performed when the project was originally proposed. No other changes to the original review are considered. The changes are at the PCS Phosphate Aurora facility, highway 306 North, Beaufort County, North Carolina. The approximate UTM coordinates are 338.1 km E and 3915.95 km N (Zone 17).

- The facility is a major source under the definition contained in 40 CFR 51.166. The proposed modification results in a significant modification and therefore is subject to a preconstruction PSD review. The modification addendum is major for sulfur dioxide.

The facility is proposing the use of existing scrubbers in both the PA and SPA areas as BACT. The following table presents a summary of the sources, compounds triggering PSD and the proposed BACT.

- **Best Available Control Technology**

Phosphoric Acid (PA) Trains Nos. 1 and 2 (Emission ID Nos. 401 and 404)

Regulated Compound	Emission and Operating Limits	Compliance Method	Proposed Control
Sulfur dioxide	486 pounds per day (each)	Stack Test	Scrubber

Superphosphoric Acid (SPA) Nos. 3 and 4 (Emission ID No. 332)

Regulated Compound	Emission and Operating Limits	Compliance Method	Proposed Control
Sulfur dioxide	400 pounds per day	Stack test	scrubber

1.0 INTRODUCTION

PCS Phosphate Company, Inc., through URS Corporation, has submitted to the North Carolina Division of Air Quality (NCDAQ) a Prevention of Significant Deterioration (PSD) permit application to amend the 2001 application for the construction of an the purified acid plant (PAP) No. 2 at its phosphoric acid production facility in Aurora, North Carolina. To provide additional green phosphoric acid for the PAP No. 2 plant the permittee sought to update the equipment on Phosphoric Acid (PA) Nos. 1 and 2, and to adjust the mixture of green acid and raffinate used in the Superphosphoric Acid (SPA) plants 3 and 4. At the time appropriate reviews were conducted for all pollutants with the exception of sulfur dioxide. An increase in sulfur dioxide emissions was anticipated from modifications at the PA lines, but this increase alone was not sufficient to trigger PSD review. It was not believed at the time that the change in the mixture of green acid and raffinate used in the SPA plants would result in an increase in sulfur dioxide emissions. However, subsequent stack tests have shown an increase in sulfur dioxide emissions from the SPA plants since the modification took place. It is now believed that the processing of the raffinate in the SPA plants releases dissolved sulfur dioxide into the atmosphere. If these additional sulfur dioxide emissions had been considered at the time of the original application, then a BACT review of sulfur dioxide would have been triggered. This current application is an addendum to perform a BACT review of sulfur dioxide emissions as would have been done originally if the full extent of increased sulfur dioxide emissions had been recognized.

The facility converts phosphate rock into various grades of phosphoric acid and phosphate fertilizers. Sulfuric acid along with the phosphate rock are used in the production of phosphoric acid. The facility falls under the Standard Industrial Classification (SIC) codes of 1475 for mining, 2819 for purified acid production, and 2874 for phosphate fertilizers and phosphoric acid production.

In order to supply the green acid to PAP No. 2 plant, PCS Phosphate proposed to increase the production in the existing PA Trains 1 and 2 by approximately 171,000 tons per year.

This raised the production of green acid in Trains 1 and 2 to approximately 750,000 tons of acid per year (815,217 tons of P_2O_5 feed). This increase in production was accomplished by modifying the existing tilting pan (Bird) filter No. 1 (Equipment ID 421-000) on PA Train No. 1 by replacing the existing pans with newer technology pans and a newer technology central valve that is capable of providing more efficient operations. In addition, the existing tilting pan (Bird) filter No. 2 (Equipment ID 422-000) was modified by replacing the existing central valve with a more efficient central valve. Furthermore, piping for three of the evaporators (No. 12 through No. 14) then being used by PA Trains 3 and 4 were modified for use by either the green or amber acid trains. Also, miscellaneous modifications and/or routine maintenance, routine repairs, or routine replacements were made within the PA plant as part of this project such as the following:

Reactor

- Increase reactor solids
- Improve sulfuric dilution
- De-sulfation outside of reactor system
- Optimize crystallization within reactor system
- Improve sulfuric monitoring/control
- Increase front-end temperature in reactor
- Improve circulation and mixing in the front end of the green attack system
- Improve flocculent addition and filter feed distribution
- Modify No. 1 and No. 2 Bird and belt filter feed pump
- Utilize hydrocyclones for classifying filter feed
- Install low level flash cooler
- Install intercoolers to flash cooler barometric
- Optimize rock addition to the attack system

Filters

- High pressure spray wash system

Evaporators

- Install steam ejectors for No. 6 through No. 9 evaporators
- Install AFD product pumps
- Install automated level control
- Install automated dual feedlines and wash system to include improved tank suctions and AFD feed pumps
- Optimize evaporator feed
- Increase water flow to No. 8 and No. 9 evaporators

Rock Feed Conveyors

- Increase belt speed of PA plant rock feed conveyors No. 70-1, No. 70-2, No. GS-103 and GS-203

A result of the modifications in this addendum will be an increase in air emissions of sulfur dioxide which will exceed the significance thresholds of the New Source Review (NSR) requirements under the provisions of the Prevention of Significant Deterioration (PSD) limitations. Thus, the proposed project, the PAP No. 2 train No. 4 plant as well as the sources proposed to be modified in the PA Plant Train 3, and the DAP Production area, is subject to review and processing under the North Carolina Administrative Code, Title 15A, Sub-Chapter 2D, Section .0530 "Prevention of Significant Deterioration". The project must also comply with other specific NCDAQ air pollution regulations where applicable.

Pursuant to the Federal Register notice on February 23, 1982, North Carolina has full authority by the Environmental Protection Agency (EPA) to implement the PSD regulations in the State effective May 25, 1982. Accordingly, the NCDAQ will conduct a full PSD review and process the PSD permit for the proposed facility.

1.1 Preliminary Determination

PCS Phosphate's PSD application has been reviewed by the NCDAQ, Permits Section staff to determine compliance with the requirements of all NCDAQ air pollution regulations. New Source Review of the application was performed for the following categories:

- Prevention of Significant Deterioration (PSD) including determination of Best Available Control Technology (BACT) with consideration of non-PSD regulated toxic pollutants, an air quality impact analysis, and an additional impact analysis on soils, vegetation, and visibility;

- Compliance with the North Carolina Environmental Management Commission regulations Title 15A, North Carolina Administrative Code.

The NCDAQ, Permits Section staff has conducted its preconstruction review of the application and made a preliminary determination that the proposed project will comply will all applicable North Carolina Environmental Management Commission air pollution regulations including the PSD requirements. Therefore, the NCDAQ proposes to issue an air permit for the modifications to PA Trains 1 and 2 and the change to green acid/raffinate mix in the SPA 3 and 4 plants with specific permit conditions and emission limits. Preliminary preconstruction approval under the PSD requirements was contingent upon the following findings:

- A demonstration that neither allowable PSD ambient air increments nor National Ambient Air Quality Standards (NAAQS) will be violated as a result of emissions from the proposed project.

- A demonstration that air emissions resulting from the proposed facility will not adversely impact any PSD Class I area.

- A demonstration that Best Available Control Technology is applied to each modified emission unit that will emit any amount of a significant compound, including a demonstration that emission of air toxics will not exceed the acceptable ambient levels (AAL's) as regulated by the NCDAQ, and

- A demonstration that emissions from the proposed project will neither cause adverse impacts to soils and vegetation nor cause degradation of visibility, and that economic growth associated with the project will not cause a significant increase in regional air pollutant levels.

The remainder of this report contains a review by NCDAQ of the requested demonstration and analyses presented by PCS Phosphate Company, Inc. Sections 2 and 3 of this report present a general description of the proposed project and a description of the site location. Section 4 presents a regulatory analysis of the North Carolina and Federal air pollution regulations that apply to the project construction and operation. Section 5 contains the BACT analysis and Section 6 presents the results of the air quality analysis. The NCDAQ draft air permit is contained in Appendix A.

In addition to the regulatory analysis, the application must undergo adequate public participation. The NCDAQ solicits and encourages participation by the general public, industry, and other affected persons impacted by the proposed project. Specific public notice requirements and a thirty (30) day public comment period are required before the NCDAQ takes final action on this application. Appendix B contains a copy of the public notice.

2.0 - GENERAL DESCRIPTION

2.1 Process Description

The PCS Phosphate Company, Inc. operates a mining and production facility in Aurora, North Carolina. Phosphate rock is mined and processed with sulfuric acid to produce phosphoric acid and phosphate fertilizers. The new PAP No. 2 plant uses phosphoric acid produced on site to manufacture purified acid. The primary raw materials for manufacturing purified acid are green phosphoric acid and methyl isobutyl ketone (MIBK).

2.2 Pollution Control Methods

Sulfur dioxide emissions from both the PA lines 1 and 2 and the SPA plants 3 and 4 will be controlled by scrubbers.

A summary of controlled emissions facility wide is shown below.

Facility Emissions Summary

Regulated Compound	Modification Related Increases (tpy)	PSD Significant Levels	PSD Review Required
Sulfur Dioxide (SO_2)	109.17	40	YES

3.0 REGIONAL DESCRIPTION

3.1 Project Description

The PCS Phosphate facility is located near Aurora, North Carolina in Beaufort County. Beaufort County is located in eastern North Carolina. The PCS Phosphate site is located approximately 7 kilometers (km) north of Aurora, North Carolina along the Pamlico River. The approximate UTM coordinates are Zone 17, 338.1 km east and 3915.95 km north at an elevation of approximately 10 feet above mean sea level. The largest city near the site is New Bern, North Carolina. Aurora is approximately 40 kilometers northeast of New Bern and 160 kilometers southeast of Raleigh, North Carolina. The Aurora area is located in the coastal area of North Carolina and the terrain surrounding the site is predominantly flat with terrain elevations changing only a few feet within a few kilometers of the plant site. Based on area classification systems recognized by EPA, the facility is located in a rural section of the state.

3.2 Area Classification

Air Quality near Aurora, North Carolina is classified with respect to the National Ambient Air Quality Standards (NAAQS) as listed below:

Pollutant	**Attainment Status**
PM_{10}	Attainment
Sulfur Dioxide	Attainment
Nitrogen Dioxide	Attainment
Carbon Monoxide	Attainment
Ozone	Attainment

The nearest PSD Class I areas are the Swanquarter National Wildlife Refuge in North Carolina located 32 kilometers east of PCS Phosphate, and the Cape Romain National Refuge in South Carolina, located approximately 340 kilometers southwest of PCS Phosphate.

4.0 REGULATORY ANALYSIS

The following discussion pertains to the regulatory requirements that must be met for the modification of the PCS Phosphate facility. These requirements include both federal Prevention of Significant Deterioration (PSD) regulations and State air quality regulations.

4.1 PSD Applicability

The basic goal of the PSD regulations is to ensure that the air quality in clean (i.e. attainment) areas does not significantly deteriorate while maintaining a margin for future industrial growth. The PSD regulations focus on industrial facilities, both new and modified, that create significant increases in the emission of certain pollutants. Effective March 25, 1982, the North Carolina Division of Air Quality (NCDAQ) received full authority from the EPA to implement PSD regulations in the State.

Under PSD requirements all major new or modified stationary sources of air pollutants regulated and listed in this section of the Clean Air Act must be reviewed and approved prior to construction by the permitting authority. A "major stationary source" is defined as any one of 28 named source categories that has the potential to emit 100 tons per year of any regulated pollutant, or any other stationary source which has the potential to emit 250 tons per year of any PSD regulated pollutant. The modified PCS Phosphate facility is a "major stationary source" for PSD purposes, therefore the emission increases as a result of construction of the PAP Plant No. 2 train No. 4 as well as the proposed modifications to PA Trains No. 3 and DAP Production Area must be compared to the "significance levels" as listed in 40 CFR 51.166(b)(23)(i) to determine which compounds must undergo a PSD review.

Because the proposed modification is considered a major modification, each compound with a "potential to emit" greater than its significance level is subject to PSD review and must meet certain review requirements. PCS Phosphate performed the following reviews and analyses related to PSD for each subject compound:

1) A Best Available Control Technology (BACT) determination, including an evaluation of unregulated pollutants such as toxic air pollutants,

2) An Air Quality Impact Analysis including monitoring and air modeling to determine extent and significance of any potential air quality impact.

3) An Additional Impacts Analysis including effects on soils, vegetation, and visibility.

Under PSD regulations, the determination of the necessary emission control equipment is developed through a Best Available Control Technology review. BACT is defined, in pertinent part, in the Federal Register [40 CFR 51.166 (b)(12)] as:

An emissions limitation... based on the maximum degree of reduction for each pollutant... which would be emitted from any proposed major stationary source or major modification which the reviewing authority, on a case-by-case basis, taking into account energy, environment, and economic impacts and other costs, determines is achievable... for control of such a pollutant.

The BACT requirements are intended to ensure that the control systems incorporated in the design of the proposed facility reflect the latest control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the facility. The BACT analysis must consider the impacts of noncriteria pollutants and unregulated toxic air pollutants when making the BACT decision for regulated pollutants. The pollutants initially subject to PSD review for PCS Phosphate's Purified Acid Plant (PAP) No. 2 Plant project are: carbon monoxide (CO), nitrogen

oxides (NO_x), sulfur dioxide (SO_2), total suspended particulates, particulates less than 10 microns in diameter(PM10), volatile organic compounds (VOC) and total fluorides. All pollutants other than sulfur dioxide were correctly treated during the initial review process. A discussion of the BACT determination of sulfur dioxide can be found in Section 5 of this document.

4.2 NCDAQ Air Pollution Regulations

In addition to the PSD requirements, the NCDAQ has promulgated air pollution control requirements under Title 15A NCAC Subchapters 2D and 2Q. Under the BACT requirements of the PSD regulations, all BACT emission limits must, at a minimum, comply with any applicable standard of performance under 40 CFR Parts 60 (New Source Performance Standards) and Parts 61 (National Emission Standards for Hazardous Air Pollutants), and the North Carolina State Implementation (SIP) plan.

The NCDAQ air quality regulations (15A NCAC) as well as Federal regulations that affect the proposed facility are summarized below. PCS Phosphate Corporation is in compliance with these regulations:

Regulation	Affected Pollutant(s) or Emission Source	Regulatory Requirements
2Q .0101	All emissions sources	A permit is required for all sources of air emissions not specifically exempted
2D .0515	Total Suspended Particulates	Particulate emissions limited as determined from miscellaneous sources by formula from throughput weight

2D .0521	Opacity	Applies to all fuel-burning sources and to other processes that may have visible emissions.
2D .0522	Sources of odorous emissions	Applies to all operations that produce odorous emissions.
2D .0524	Wet process phosphoric acid plants	These sources shall comply with all the standards and requirements of 40 CFR 60 Subpart T.
	Tanks	These sources shall comply with all the standards and requirements of 40 CFR 60 Subpart Kb.
2D .0530	All PSD affected sources and and PSD Pollutants	PSD review as a major modification is required.
2D .0534	Wet process phosphoric acid plants	0.02 pounds of fluoride total emissions per ton of P_2O_5 feed.
2D .0535	All emission sources	Emissions in excess of established permit limits that last for more than 4 hours require notification of the Director within 24 hours.

2D .1100	Toxic emission sources	Not to exceed established acceptable ambient levels of listed toxic air pollutants
2Q .0711	Toxic emission sources	Not to exceed established acceptable emission rates of listed toxic air pollutants
40 CFR 63 Subpart AA	Wet phosphoric acid plants	0.02 pounds of total fluoride emissions per ton of P_2O_5 feed.
40 CFR 63 Subpart AA	purified acid plants	leak detection and repair as well as 30-day average daily stripped acid stream MIBK concentration ≤ 20 ppm, 30-day average daily raffinate stream MIBK concentration ≤ 30 ppm and Daily average chiller stack exit gas stream temperature ≤ 50 °F.

4.2.1 15A NCAC 2Q .0101 - Required Air Quality Permits

This regulation requires the owner or operator of all sources for which there is an ambient air quality or emission control standard, that is not exempted from permit requirements, to apply for an air quality permit. The owner or operator of a source required to have a permit shall not begin construction or operation of the source without first obtaining a permit. The proposed PCS Phosphate modification is not an exempted source, and thus, is required to file an air permit application and obtain a permit prior to any construction of the source. PCS Phosphate, Inc. has submitted the required application and information sufficient to obtain an air quality permit, including all information required pursuant to 15A NCAC 2D .0530 "Prevention of Significant Deterioration".

4.2.2 15A NCAC 2D .0515 - Particulates from Miscellaneous Industrial Processes

This regulation limits total particulates emissions based on a formula related to the weight of process throughput. “E” equals the allowable emission rate for particulate matter in pounds per hour and “P” equals the process weight rate in tons per hour then the formula is:

$E = 4.10(P)^{0.67}$ when P is less than or equal to 30,

And

$E = 55.0\ (P)^{0.11} - 40$ when P is greater than 30.

4.2.3 15A NCAC 2D .0521 - Control of Visible Emissions

A visible emission standard is applicable to fuel burning operations and other industrial processes where an emission can be reasonably expected to occur, except during start-ups made in accordance with procedures approved by the Commission. For installations established after July 1, 1971, visible emissions shall not be more than 20 percent opacity when averaged over a six-minute period except that six-minute period averaging no more than 87 percent opacity may occur not more than once in any hour nor more than four times in a 24-hour period.

4.2.4 15A NCAC 2D .0522 - Control and Prohibition of Odorous Emissions

Under this regulation, no facility shall operate without employing suitable measures for the control of odorous emissions.

4.2.5 15A NCAC 2D .0524 – New Source Performance Standards

Under this regulation, the State of North Carolina has adopted by reference the federal New Source Performance Standards (NSPS) (40 CFR Part 60). Specific NSPS regulations that apply to PCS Phosphate are Subpart T and Subpart Kb.

The 40 CFR 60 Subpart T regulations for wet phosphoric acid plants limit total fluorides to 0.02 pounds per ton of equivalent P_2O_5 feed (lb./ton P_2O_5 feed). The 40 CFR 60, Subpart Kb regulations for volatile organic liquid storage vessels apply to each storage vessel with a capacity greater than 40 m^3 (10,567 gallons) used to store volatile organic liquids. In the case of PCS Phosphate, the only requirement is that the facility must maintain readily accessible records showing the dimensions and capacity of the storage vessel.

4.2.6 15A NCAC 2D .0530 - Prevention of Significant Deterioration

Because the plant is located in Beaufort County, an attainment area for all NAAQS, the planned modification and its emissions are required to be assessed in light of PSD requirements. The PAP Plant No. 2 project is subject to PSD review for nitrogen oxides, carbon monoxide, total suspended particulate, particulates less than 10 microns in diameter and volatile organic compounds (VOC) and Total Fluorides.

4.2.7 15A NCAC 2D .0535 - Excess Emissions Reporting and Malfunctions

This regulations applies to all permitted facilities and outlines the procedures of reporting excess emissions as a result of malfunctions or operational upsets. The facility owner/operator must notify the appropriate regional office of any excess emissions that last for greater than four hours. This report must be made within 24 hours of becoming aware of the occurrence.

4.2.8 15A NCAC 2D .1100 and 15A NCAC 2Q .0711 - Control of Toxic Emissions

Pursuant to the State Air Toxic program, any new or modified source that emits air toxic in quantities greater than the toxic permitting exemption rates (listed in 15A NCAC 2Q .0711) must demonstrate compliance with the ambient concentrations listed in 15A NCAC 2D .1104(a). For a modification, only those toxic air pollutants emitted from the new processes need to be assessed for compliance. For each toxic air pollutant emitted from the new processes, PCS Phosphate has estimated toxic emission levels and for those pollutants whose emissions are expected to be greater than de minimis has demonstrated compliance through requested permit limitations.

4.3 Federal Air Pollution Regulations

40 CFR Part 63, Subpart AA – National Emission Standards for Hazardous Air Pollutants (NESHAP) for wet process phosphoric acid plants limits total fluorides to 0.020 lb./ton of P_2O_5 feed for existing plants and 0.01350 lb./ton P_2O_5 feed for new plants. For Purified Acid Plants, the NESHAP requires implementation of a leak detection and repair (LDAR) program. The NESHAP also specifies process-specific limits for existing and new Purified Acid Plants. These limits include a 30-day average daily stripped acid stream methyl isobutyl ketone (MIBK) concentration of less than or equal to 20 parts per million by weight (ppmw); a 30-day average daily raffinate stream MIBK concentration of less than or equal to 30 ppmw; and a daily average chiller stack exit gas stream temperature of less than or equal to 50°F.

5.0 BEST AVAILABLE CONTROL TECHNOLOGY

5.1 Introduction

Under PSD regulations, the basic control technology requirement is the evaluation and application of BACT. Under the Clean Air Act (CAA), BACT is defined as:

> ***An emissions limitation...based on the maximum degree of reduction for each pollutant... which would be emitted from any proposed major stationary source or major modification which the reviewing authority, on a case-by-case basis, taking into account energy, environment, and economic impacts and other costs, determines is achievable... for control of such a pollutant.***

As evidenced by the statutory definition of BACT, this technology determination must include a consideration of numerous factors. The structural and procedural framework upon which a decision should be made is not prescribed by Congress under the Act. This void in procedure has been filled by what is commonly referred to as the EPA BACT "top-down" approach. While the EPA Environmental Appeals Board recognizes the top-down approach for delegated state agencies,[1] this procedure has never undergone rulemaking. As such, the top-down process is not binding on fully approved states, including North Carolina.[2] The Division makes their BACT determinations based on an evaluation of the statutory factors contained in the definition of BACT in the Clean Air Act. North Carolina is concerned that the application of the top-down process in many cases results in decisions which are inconsistent with the Congressional intent of PSD and BACT. The following are passages from the legislative history of the Clean Air Act and provide valuable insight for state agencies when making BACT decisions.

[1] See, http://es.epa.gov/oeca/enforcement/envappeal.html for various PSD appeals board decisions including standard for review.

[2]North Carolina has full authority to implement the PSD program, 40 CFR Sec. 52.1770

> The decision regarding the actual implementation of best available technology is a key one, and the committee places this responsibility with the State, to be determined on a case-by-case judgement. It is recognized that the phrase has broad flexibility in how it should and can be interpreted, depending on site.
>
> In making this key decision on the technology to be used, the State is to take into account energy, environmental, and economic impacts and other costs of the application of best available control technology. The weight to be assigned to such factors is to be determined by the State. Such a flexible approach allows the adoption of improvements in technology to become widespread far more rapidly than would occur with a uniform Federal standard. The only Federal guidelines are the EPA new source performance and hazardous emissions standards, which represent a floor for the State's decision.
>
> This directive enables the State to consider the size of the plant, the increment of air quality which will be absorbed by any particular major emitting facility, and such other considerations as anticipated and desired economic growth for the area. This allows the States and local communities judge how much of the defined increment of significant deterioration will be devoted to any major emitting facility. If, under the design which a major facility proposes, the percentage of increment would effectively prevent growth after the proposed major facility was completed, the State or local community could refuse to permit construction, or limit its size. This is strictly a State and local decision; this legislation provides the parameters for that decision.
>
> One of the cornerstones of a policy to keep clean areas clean is to require that new sources use the best available technology available to clean up pollution. One objection which has been raised to requiring the use of the best available pollution control technology is that a technology demonstrated to be applicable in one area of the country in not applicable at a new facility in another area because of the differences in feedstock material, plant configuration, or other reasons. For this and other reasons the Committee voted to permit emission limits based on the best available technology **on a case-by-case judgement at the State level.** [**emphasis added**]. This flexibility should allow for such differences to be accommodated and still maximize the use of improved technology.

A discussion of the potential applicability of each control alternative and the BACT selected for each source follows.

5.2 BACT for sulfur dioxide

The following emission sources contributing to sulfur dioxide emissions are subject to a BACT review as a result of the modifications associated with the addition of the PAP No. 2 plant and other modifications described in Section 1.

Source No	Source Description
401 and 404	PA plants 1 and 2
332	SPA 3 and 4

5.2.1 BACT for PA plants 1 and 2

A review of the RBLC database found no previous determinations for sulfur dioxide emissions from PA plants. PCS Phosphate has evaluated two options for the operation of PA plants 1 and 2 to control sulfur dioxide emissions:

1. 10 ppmv based on addition of a caustic scrubber, and
2. 100 ppmv based on continued use of existing wet scrubber.

These control options were evaluated based on engineering knowledge and contacts with vendors. To accomplish the more stringent option, the exhaust from the existing phosphoric acid plant Trains Nos. 1 and 2 crossflow scrubbers would be vented to two separate, new caustic scrubbers. A new stack and fan would also be necessary for each train. The total capital cost for one system was estimated to be $2,650,215. The annual cost of operation for the most stringent option was estimated to be approximately $808,899 and the sulfur dioxide reduction obtained is estimated to be 79.8 tons per year compared to the baseline, thus resulting in a cost effectiveness of $10,133/ton of sulfur dioxide controlled. Because of the new fans and other items there would be an energy impact of 522,797 kWh/yr. There would also be a solid waste to be disposed of resulting in an environmental impact. This option has not been selected as BACT because of the high cost effectiveness and other impacts. Thus, the continued use of the existing wet

scrubbing system is proposed as BACT for PA Plants Nos. 1 and 2. The following Table summarizes the economic, energy and environmental impacts.

					Economic Impacts			Energy Impacts	Non-Air Environmental Impacts
Control Options		Emissions (ton/yr)	Control Efficiency (%)	Emissions Reduction (ton/yr)	Total Capital Cost	Annual Cost	Cost Effectiveness over baseline ($/ton)	Power Required (kWH/yr)	Adverse Environmental Impacts (Yes/No)
1	Caustic scrubber	8.9	90%	79.8	$2,650,125	$808,899	$10,133	522,797	Solid waste and waste water disposal
2	Existing crossflow packed scrubbers	88.7	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline

Note: Option 2 has been selected as BACT

5.2.2 BACT for SPA 3 and 4

A review of the RBLC data base showed no determinations for sulfur dioxide from SPA manufacture. Currently, the offgas from the evaporator product tank and hot well tank of each plant is combined and treated in one venturi scrubber using cooling pond water. PCS Phosphate has evaluated two options for the operation of the SPA plants 3 and 4 as follows:

3. 40 pounds per day based on addition of a caustic scrubber, and
4. 400 pounds per day based on continued use of existing venturi scrubber.

These control options were evaluated based on engineering knowledge and contacts with vendors. To accomplish the more stringent option, the exhaust from the existing SPA plants 3 and 4 venturi scrubber would be vented to a separate, new caustic scrubber. A new stack and fan would also be necessary. The total capital cost for the system was estimated to be $249,774. The annual cost of operation for the most stringent option was estimated to be approximately $257,742 and the sulfur dioxide reduction obtained is estimated to be 65.7 tons per year compared to the baseline, thus resulting in a cost

effectiveness of $3923/ton of sulfur dioxide controlled. Because of the new fans and other items there would be an energy impact of 71,885 kWh/yr. There would also be a solid waste to be disposed of resulting in an environmental impact. This option has not been selected as BACT because of the high cost effectiveness and other impacts. Thus, the continued use of the existing wet scrubbing system is proposed as BACT for SPA Plants Nos. 3 and 4. The following Table summarizes the economic, energy and environmental impacts.

					Economic Impacts			Energy Impacts	Non-Air Environmental Impacts
Control Options		Emissions (ton/yr)	Control Efficiency (%)	Emissions Reduction (ton/yr)	Total Capital Cost	Annual Cost	Cost Effectiveness over baseline ($/ton)	Power Required (kWH/yr)	Adverse Environmental Impacts (Yes/No)
1	Caustic scrubber	7.3	90%	65.7	$249,774	$257,742	$3923	71,885	Solid waste and waste water disposal
2	Existing crossflow packed scrubbers	73.0	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline

Note: Option 2 has been selected as BACT

PSD regulations [40 CFR 51.166(k)] require an applicant to perform an ambient impact analysis to demonstrate, 1) that no National Ambient Air Quality Standard (NAAQS) will be exceeded at any location and during any time period where the proposed new source or modification will have significant impact; and 2) that the proposed new source or modification, in combination with other increment-affecting sources, will not cause any allowable PSD increment to be exceeded. PSD regulation 40 CFR 51.166(m) requires the establishment of ambient air quality in the impact area of the proposed source or modification for all pollutants (including those for which no NAAQS exist) with emissions increases in significant [40 CFR 51.166(b)] quantities.

6.0 AIR QUALITY IMPACT ANALYSIS

Analysis overview

The PCS Phosphate facility is located near Aurora, North Carolina in Beaufort County, which is located in the eastern coastal plain of North Carolina. The PCS phosphate site is located approximately 7 kilometers north of Aurora, North Carolina along the Pamlico River. Terrain surrounding the site is predominantly flat with terrain elevations only changing slightly over the plant site. The land classification surrounding the facility is rural based both on a land use type and population type.

PCS Phosphate, Inc. (PCS) is proposing to modify their 2001 PSD permit to alternative acid in the super phosphoric acid (SPA) plants No 3 and 4 and to modify Phosphoric

Acid Trains No. 1 and 2. The combination of these two actions will increase SO_2 emissions at the facility by approximately 109 tons per year (tpy).

6.1 POTENTIAL EMISSIONS

The SO_2 increases, per source, are listed in Table 6.0-1 below and in Table 3-1 of the Application.

Table 6.0-1 PCS Phosphate Company, Inc Modification (tpy)

Source	Source Description	SO_2
201-206	Calciners No. 1 through 6	3.43
332	SPA No. 3 and 4	71.49
401	PA No. 1 Cross flow Scrubber Stack	18.41
404	PA No. 2 Cross flow Scrubber Stack	15.84
Total Increase		109.17
PSD Review		Yes

6.1 Criteria Pollutant Impact Analysis

Model and Meteorological data

The ISCST3 model was used to model all sources (Application tables, 5-10, 5-11 and 5-14 for all offsite and onsite sources) using a five-year meteorological data set (one year (1998) of PCS Phosphate on-site surface and 4 years (1999-2002) Newport (Morehead city) surface data and five years (1998-2002) Newport upper-air data meteorological data). To determine the location of the maximum impact, URS developed both a polar and Cartesian receptor grid layout. First, receptors were placed at the property boundary at 100-meter intervals and then extending outwards at 100-meter intervals to 1 kilometer, 200-meters out to 3 kilometers, 500-meters out to 5 kilometers and finally 1000 meters

out to 10 kilometers. Discrete receptors were placed along the Pamlico River and and N.C. Highway No.306.

Table 5-10 of the Application shows the facility wide emission sources that were modeled. The latest available ambient background concentrations, representative of the area, were provided by DAQ for the analysis and are listed in Table 5-8 of the Application. An offsite inventory, Table 5-11, was also supplied to URS for inclusion in the modeling. This offsite source inventory included all major and minor sources within the impact area, and all other sources within 50 kilometers of the impact area that are significant.

AIR DISPERSION MODELING RESULTS

The modeling results below showed that this facility modification would not cause or contribute to a violation of the NAAQS or PSD Increment.

Table 6.1-1 NAAQS Modeling Results (ug/m^3)

Pollutant	Avg Period	Facility Impact /offsite	Background	Total Impact	NAAQS	Percent of NAAQS
SO_2	3-hour	768.4/4.4	73.7	846.5	1300	65
	24-hour	326.2/2.4	22.8	351.4	365	96
	Annual[1]	38.5/6.7	6.5	51.7	80	65

Table 6.1-2 Class II Increment Modeling Results (ug/m^3)

Pollutant	Avg Period	Facility Impact	Offsite source	Total Impact	Increment	Percent of Increment
SO_2	3-hour	171.8	.01	171.8	512	34
	24-hour	24.3	.8	25.1	91	28
	Annual	<0	<0	<0	20	<0

Note: No background values are used for increment modeling.

6.2 Non Regulated Pollutant Impact Analysis (North Carolina Toxics)

A toxic pollutant impact analysis was **not** performed since the only pollutant that increased was SO_2.

6.3 Additional Impact Analysis

GROWTH ANALYSIS

The growth analysis includes the projection of the associated industrial, commercial and residential source emissions that will occur in the area due to the source. The evaluation looked at the local work force increase and assessed secondary emission sources that potentially will build in the area to support the PCS facility.

It was determined that employment will not increase at the facility with this modification, thus the impact on additional emissions from growth will be negligible.

Soils and Vegetation

The PCS phosphate area is located in the eastern North Carolina coastal plain. The surrounding terrain is characterized by coastal marshlands interspersed with potholes, creeks, tidal drains and islands, woodlands and open waters. The marshlands are dominated with species such as black needlerush, saltmeadow cordgrass, groundsel bush and saltgrass. The local forest areas contain large stands of loblolly pine intermixed with small patches of baldcypress, sweetgum, and red maple with some baldcypress trees in the area. A review of local soils indicates that they are characterized by poorly drained, deep soils formed in thick beds of organic material. PH ranges of slightly acid to moderately alkaline also characterize the soils.

Since the impacts predicted are well below the primary and secondary NAAQS standards there will be no adverse impacts.

Class II Visibility Impairment Analysis

The Class II visibility impairment analysis is distinct from the Class I impact in that it is concerned with visibility within the surrounding area (impact region) of the proposed new source or modification. Since the facility is within 50 kilometers of a Class I area (Swanquarter National Wildlife Refuge), a Class II analysis will be incorporated and addressed in the Class I analysis.

6.4 Class I Increment/VISCREEN Visibility Impact Analysis

Class I Increment

The air dispersion modeling was accomplished using the same models and assumptions as the Class II analysis in section 6.0 except the sources modeled are sources that triggered the 1978 baseline date for Beaufort county in 1978 for both PM_{10} and SO_2. Sources and emission rates modeled are listed in Tables 5-15/16 of the Application. Table 6.4-1 below shows that impacts at the Federal Class I area (Swanquarter National wildlife Refuge) will not exceed the Class I increment and thus no further Class I air dispersion modeling is required.

Table 6.4-1 Class I Increment Modeling Analysis (ug/m3)

Pollutant	Ave Period	Facility Impact	Offsite source	Total Impact	Class I Increment	Percent of Increment
SO_2	Annual	<0.0	0	0	2	0
	24-hour	0.4	2.57	2.97	5	59
	3-hour	3.3	10.54	13.84	25	55

VISCREEN MODELING ANALYSIS

Swanquarter is 32 kilometers from the PCS Phosphate facility. Since the facility is within 50 kilometers of PCS Phosphate, a VISCREEN modeling analysis was conducted

in place of the more extensive CALPUFF long-range (greater then 50 kilometers) regional haze modeling analysis. The VISCREEN modeling is a conservative approach to near field visibility change by assessing particulates (PM/PM_{10}), nitrate (NOx) and sulfate emissions (SO_2). To assess the impacts, the Level I screening analysis assumed a background ozone concentration of .04 parts-per-million (ppm), a background visual range of 62 kilometers, plume source observer angle of 11.25 degrees, stability Class F (moderately stable) and a wind speed of 1.0 m/s. The modeling showed that the maximum plume contrast and maximum plume perceptibility (Delta E) values would be exceeded and thus a level 2 VISCREEN analyses was required.

A more refined level II VISCREEN modeling analysis was accomplished that incorporated more representative location wind speed, direction and stability class parameters. A review of the local onsite meteorological data shows that the stability class will be Class D (neutral) and the wind speed increase to 4.0 m/s. With the more representative neutral stability and higher average wind speed, the maximum plume contrast value of .021 does not exceed the screening value of .05 and the Plume perceptibility (Delta E) value of 1.976 does not exceed the screening threshold value of 2.0. With these results, no further visibility analysis is required.

6.5 Non-attainment Analysis

There are no designated non-attainment areas impacted by this project.

6.6 Source Impact Analysis Conclusion

Based on the ambient impact analysis, the PCS facility modification stated above will not cause or contribute to any violation of the Class II NAAQS, PSD Increment, Class I Increment, or any Federal Land Manager (FLM) AQRV's.