# Department of
# Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary


February 11, 1999

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Melody Russo
Environmental Superintendent
Cargill Fertilizer, Inc.
3200 Highway 60 West
Bartow, Florida 33830

Re: DEP File No. 1050046-008-AC (PSD-FL-255)
No. 3 Fertilizer (MAP/DAP) Plant

Dear Ms. Russo:

Enclosed is one copy of the Draft Air Construction Permit for the No. 3 Fertilizer Plant located at Cargill Fertilizer, 3200 Highway 60 West near Bartow in Polk County. The Department's Intent to Issue Air Construction Permit and the "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT" are also included.

The "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT" must be published as soon as possible in a newspaper of general circulation in the area affected (Polk County). Proof of publication, i.e., newspaper affidavit, must be provided to the Department's Bureau of Air Regulation office within 7 (seven) days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit.

We responded to your preliminary comments in a separate letter. Please submit any additional written comments you wish to have considered concerning the Department's proposed action to A. A. Linero, P.E., Administrator, New Source Review Section at the above letterhead address. If you have any questions, please call John Reynolds at 850/921-9536.

Sincerely,

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

CHF/aal

Enclosures

# PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP File No. 1050046-008-AC (PSD-FL-255)

Cargill Bartow No. 3 Fertilizer (MAP/DAP) Plant
Polk County

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit pursuant to the requirements for the Prevention of Significant Deterioration (PSD) to Cargill Fertilizer, Inc. to increase production from the No. 3 Fertilizer Plant at its facility located on Highway 60 West near Bartow in Polk County. A Best Available Control Technology (BACT) determination was required for particulate matter ($PM/PM_{10}$), fluorides, and visible emissions pursuant to Rule 62-212.400, F.A.C. The applicant's name and address are: Cargill Fertilizer, Inc., 3200 Highway 60 West, Bartow, Florida 33830.

The No. 3 Fertilizer Plant manufactures granulated monoammonium and diammonium phosphate (MAP/DAP). Production capacity will be increased from 2,640 to 3,000 tons per day. The modification will consist of installing new fans and four new scrubbers for removal of particulate matter and gaseous fluoride emissions. Particulate emissions will be controlled to 0.18 pounds per ton of phosphate (lb/ton $P_2O_5$ input) by medium energy venturi scrubbers. Fluoride emissions will be controlled to 0.041 lb/ton $P_2O_5$ by packed scrubbers using cooling pond water. Visible emissions will be limited to 10 percent.

An air quality impact analysis was conducted. Emissions from the facility will not contribute to or cause a violation of any state or federal ambient air quality standards. The maximum predicted $PM_{10}$ PSD Class II increments consumed by all sources in the area, including this project, will be as follows:

| Averaging Time | Allowable Increment ($\mu g/m^3$) | Increment Consumed ($\mu g/m^3$) | Percent Consumed |
|---|---|---|---|
| 24-hour | 30 | 29.4 | 98 |
| Annual | 17 | 3.9 | 23 |

The project by itself has no significant impact on the PSD Class I Chassahowitzka National Wilderness Area.

The Department will issue the final permit with the attached conditions unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept requests for a public hearing (meeting) for a period of 14 (fourteen) days and written comments concerning the proposed permit issuance action for a period of 30 (thirty) days from the date of publication of "Public Notice of Intent to Issue Air Construction Permit." Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57 F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available in this proceeding.

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...plete ... and/... ...tional services.
...plete ... 3, 4a, and ...
...rint 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.

...the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Melody Russo, ES
Cargill Fertilizer
3200 Hwy 60 West
Bartow, Fl 33830

4a. Article Number
P 265 659 419

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

7. Date of Delivery
2-16-99

5. Received By: *(Print Name)*

8. Addressee's Address *(Only if requested and fee is paid)*
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6. Signature: *(Addressee or Agent)*
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PS Form **3811**, December 1994 102595-97-B-0179 Domestic Return Receipt

Thank you for using Return Receipt Service.

P 265 659 419

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

| | |
|---|---|
| Sent to Melody Russo | |
| Street & Number Cargill Fert. | |
| Post Office, State, & ZIP Code Bartow, 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 2-11-99 | |

PS Form **3800**, April 1995

1050046-CCE-AC
PSO-255

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station # 35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under Section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fourteen days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief; and (f) A demand for relief.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

A complete project file is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

| | | |
|---|---|---|
| Dept. of Environmental Protection<br>Bureau of Air Regulation<br>111 S. Magnolia Drive, Suite 4<br>Tallahassee, Florida 32301<br>Telephone: 850/488-0114<br>Fax: 850/922-6979 | Dept. of Environmental Protection<br>Southwest District Office<br>3804 Coconut Palm Drive<br>Tampa, Florida 33619-8218<br>Telephone: 813/744-6100<br>Fax: 813/744-6084 | Polk County Public Works Dept.<br>Natural Resources & Drainage Div.<br>4177 Ben Durrance Road<br>Bartow, Florida 33830<br>Telephone: 941/534-7377<br>Fax: 941/534-7377 |

The complete project file includes the Draft Permit, the application, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-0114, for additional information.

In the Matter of an
Application for Permit by:

Ms. Melody Russo
Cargill Fertilizer, Inc.
3200 Highway 60 West
Bartow, Florida 33830

DEP File No. 1050046-008-AC
Draft Permit No. PSD-FL-255
No. 3 Fertilizer (MAP/DAP) Plant
Polk County

/

## INTENT TO ISSUE AIR CONSTRUCTION PERMIT

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit (copy of DRAFT Permit attached) for the proposed project, as detailed in the application specified above and attached Technical Review and Preliminary determination, for the reasons stated below.

The applicant, Cargill Fertilizer, Inc. submitted a request on September 21, 1998 to the Department to increase the production rate of its No. 3 Fertilizer (MAP/DAP) Plant from 2,640 to 3,000 tons per day at its phosphate fertilizer facility located at 3200 Highway 60 West, Bartow in Polk County.

The Department has permitting jurisdiction under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Chapters 62-4, 62-210, and 62-212. The above actions are not exempt from permitting procedures. The Department has determined that an air construction permit, including a review for the Prevention of Significant Deterioration and a determination of Best Available Control Technology for the control of particulate matter, visible emissions and fluorides, is required to conduct the work.

The Department intends to issue this air construction permit based on the belief that reasonable assurances have been provided to indicate that operation of these emission units will not adversely impact air quality, and the emission units will comply with all appropriate provisions of Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297, F.A.C.

Pursuant to Section 403.815, F.S., and Rule 62-110.106(7)(a)1., F.A.C., you (the applicant) are required to publish at your own expense the enclosed "Public Notice of Intent to Issue Air Construction Permit." The notice shall be published one time only in the legal advertisement section of a newspaper of general circulation in the area affected. For the purpose of these rules, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. Where there is more than one newspaper of general circulation in the county, the newspaper used must be one with significant circulation in the area that may be affected by the permit. If you are uncertain that a newspaper meets these requirements, please contact the Department at the address or telephone number listed below. The applicant shall provide proof of publication to the Department's Bureau of Air Regulation, at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, Florida 32399-2400 (Telephone: 850/488-0114; Fax 850/ 922-6979). The Department suggests that you publish the notice within thirty days of receipt of this letter. You must provide proof of publication within seven days of publication, pursuant to Rule 62-110.106(5), F.A.C. No permitting action for which published notice is required shall be granted until proof of publication of notice is made by furnishing a uniform affidavit in substantially the form prescribed in section 50.051, F.S. to the office of the Department issuing the permit or other authorization. Failure to publish the notice and provide proof of publication may result in the denial of the permit pursuant to Rules 62-110.106(9) & (11), F.A.C.

The Department will issue the final permit with the attached conditions unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept requests for a public hearing (meeting) for a period of 14 (fourteen) days and written comments concerning the proposed permit issuance action for a period of 30 (thirty) days from the date of publication of "Public Notice of Intent to Issue Air Construction Permit." Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to sections 120.569 and 120.57 F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available for this action.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station # 35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under section 120.60(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fourteen days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief; and (f) A demand for relief.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by rule 28-106.301

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above

In addition to the above, a person subject to regulation has a right to apply for a variance from or waiver of the requirements of particular rules, on certain conditions, under Section 120.542 F.S. The relief provided by this state statute applies only to state rules, not statutes, and not to any federal regulatory requirements. Applying for a variance or waiver does not substitute or extend the time for filing a petition for an administrative hearing or exercising any other right that a person may have in relation to the action proposed in this notice of intent.

The application for a variance or waiver is made by filing a petition with the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000. The petition must specify the following information: (a) The name, address, and telephone number of the petitioner; (b) The name, address, and telephone number of the attorney or qualified representative of the petitioner, if any; (c) Each rule or portion of a rule from which a variance or waiver is requested; (d) The citation to the statute underlying (implemented by) the rule identified in (c) above; (e) The type of action requested; (f) The specific facts that would justify a variance or waiver for the petitioner; (g) The reason why the variance or waiver would serve the purposes of the underlying statute (implemented by the rule); and (h) A statement whether the variance or waiver is permanent or temporary and, if temporary, a statement of the dates showing the duration of the variance or waiver requested.

The Department will grant a variance or waiver when the petition demonstrates both that the application of the rule would create a substantial hardship or violate principles of fairness, as each of those terms is defined in Section 120.542(2) F.S., and that the purpose of the underlying statute will be or has been achieved by other means by the petitioner.

Persons subject to regulation pursuant to any federally delegated or approved air program should be aware that Florida is specifically not authorized to issue variances or waivers from any requirements of any such federally delegated or approved program. The requirements of the program remain fully enforceable by the Administrator of the EPA and by any person under the Clean Air Act unless and until the Administrator separately approves any variance or waiver in accordance with the procedures of the federal program.

Executed in Tallahassee, Florida.

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

## CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this INTENT TO ISSUE AIR CONSTRUCTION PERMIT (including the PUBLIC NOTICE, and DRAFT permit) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 2-11-99 to the person(s) listed:

Melody Russo, Cargill*
Gregg Worley, EPA
John Bunyak, NPS
Bill Thomas, DEP SWD
Joe King, Polk County
David Buff, P.E., Golder Associates

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.

Lynn Dorn 2-11-99
(Clerk) (Date)

# Technical Evaluation

# and

# Preliminary Determination

Cargill Fertilizer, Inc.
Bartow Facility
Polk County, Florida

No. 3 Fertilizer (MAP/DAP) Expansion

Construction Permit No. 1050046-008-AC
PSD-FL-255

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

February 11, 1999

# TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

## I. GENERAL INFORMATION

A. Name and Address of Applicant

Cargill Fertilizer, Inc.
P. O. Box 9002
Bartow, Florida 33831

B. Reviewing and Process Schedule

| | |
|---|---|
| Date of Receipt of Application: | September 21, 1998 |
| First Request for Additional Information: | October 15, 1998 |
| Application Completeness Date: | October 30, 1998 |

C. Facility Location

This facility is located at 3200 Highway 60 West, Bartow, Polk County, Florida. The UTM coordinates are Zone 17, 409.8 km east and 3086.7 km north.

Facility Identification Code (SIC): Major Group No. 28 Industry Group No. 2874

## II. TECHNICAL EVALUATION

A. Project Description

Cargill is proposing to increase monoammonium and diammonium phosphate (MAP/DAP) production from 2,640 to 3,000 TPD by making the following physical modifications to the existing No. 3 Fertilizer Plant:

1. Replace reactor/granulator acid scrubber with larger venturi-cyclonic scrubber. This unit will recover ammonia and dust from the reactor and equipment vents, and will be called the Reactor Vent (RV) acid scrubber.

2. Eliminate the intermediate reactor/granulator tailgas scrubber and dryer eject scrubber.

3. Replace the dryer acid scrubber with a larger venturi-cyclonic vessel.

4. Install new dryer dust cyclone.

5. Install new dryer tailgas scrubber to remove F emissions.

6. Install new dryer evacuation fan.

7. Convert the cooler/equipment vent acid scrubber to serve the rotary cooler only. This scrubber will use pond water as the scrubbing solution.

8. Convert the cooler/equipment vent dust cyclone to serve the equipment vents only.

9. Convert the dryer dust cyclone into a cooler dust cyclone.

10. Install a new venturi-cyclonic acid scrubber for the granulator.

B. Process Description

The No. 3 Fertilizer Plant manufactures MAP/DAP by reacting phosphoric acid with anhydrous ammonia in a reactor. The reactor slurry is fed to a granulator where granules of MAP/DAP are formed. The gases from the reactor and granulator are evacuated in individual ducting, but converge at the reactor/granulator acid venturi scrubber, where ammonia is recovered by spraying phosphoric acid into the unit. This solution is recovered and sent back to the reactor. The reactor/granulator acid scrubber is then evacuated into an intermediate tail gas scrubber and then into a final plant RGCV tailgas scrubber via a main blower fan and discharged into the plant common stack.

Moisture in the MAP/DAP material is driven off in the dryer using heated air. This air/vapor stream is evacuated to the dryer acid scrubber, where most of the entrained particulate and ammonia vapor is recovered and returned to the process. The dryer acid scrubber is evacuated through the dryer ejector scrubber and then through the plant tailgas scrubber. The fertilizer granules from the dryer are then sent through a series of screens where the desired product sized granule is separated from the oversized and undersized granules. These granules are then recycled with the oversized material crushed via chain mills. Dust from the screening operation is vented to the cooler/equipment vents scrubber.

The temperature of the product sized granules is lowered in an air cooled rotary cooler. The air in the rotary cooler and the equipment vents are evacuated through the cooler/equipment vent acid scrubber and then through the plant tailgas scrubber. From the rotary cooler, the fertilizer passes through a bulk cooler and is then sent to storage in the No. 3 Shipping Plant.

C. Project Emissions

The MAP/DAP reaction is carried out in a rotating cylindrical reactor-granulator. Fluoride emissions are evolved as a result of the chemical reaction. PM and $PM_{10}$ emissions result from the contact between the MAP/DAP material and the air passed through the granulator, dryer, and cooler, screens, and bucket elevators.

Fluoride-containing gases including hydrogen fluoride (HF) and silicon tetrafluoride ($SiF_4$) are evolved during the exothermic reaction between ammonia and phosphoric acid that occurs in the reactor and to a lesser extent in the granulator. Since the vent gases from the reactor and granulator contain ammonia in high concentrations, the first scrubbing stage uses a phosphoric acid stream as the scrubbing medium for recovery of ammonia so that it is recycled back to the process. A final stage of pond water scrubbing removes most of the fluoride evolved from the process as well as that which is stripped out of the phosphoric acid in the first stage scrubber.

Additional fluoride and ammonia emissions are generated in the dryer and are controlled by a separate two-stage scrubbing system as for the reactor and granulator. Gaseous fluoride and ammonia emissions from the cooler are relatively low and therefore do not require special controls.

Emission limits proposed by the Department in the BACT determination are presented below:

| POLLUTANT | EMISSION LIMIT | LIMIT BASIS |
|---|---|---|
| F | 2.5 lb/hr | 0.041 lb/ton $P_2O_5$ input |
| $PM/PM_{10}$ | 11.0 lb/hr | 0.18 lb/ton P2O5 input (1997 stack test) |
| VE | 10% opacity | 100% above 1997 stack tests |

## III. RULE APPLICABILITY

The proposed project is subject to preconstruction review under the applicable provisions of Chapter 403, Florida Statutes, Chapters 62-212 and 62-4, Florida Administrative Code (F.A.C.) and 40 CFR 60. This facility is located in an area designated attainment for all criteria pollutants in accordance with F.A.C. Rule 62-275.400.

The proposed project was reviewed under Rule 62-212.400(5), F.A.C., New Source Review (NSR) for Prevention of Significant Deterioration (PSD), because it will be a modification to a major stationary source resulting in a significant increase in particulate matter and fluoride emissions. This review consisted of a determination of Best Available Control Technology (BACT) and an analysis of the air quality impact of the increased emissions. The review also includes an analysis of the project's impacts on soils, vegetation and visibility, along with air quality impacts resulting from associated commercial, residential and industrial growth.

The emission units affected by this PSD permit shall comply with all applicable provisions of the Florida Administrative Code and, specifically, the following Chapters and Rules:

| | |
|---|---|
| Chapter 62-4 | Permits |
| Rule 62-204.220 | Ambient Air Quality Protection |
| Rule 62-204.240 | Ambient Air Quality Standards |
| Rule 62-204.260 | Prevention of Significant Deterioration Increments |
| Rule 62-204.360 | Designation of Prevention of Significant Deterioration Areas |
| Rule 62-204.800 | Federal Regulations Adopted By Reference |
| Rule 62-210.200 | Definitions |
| Rule 62-210.300 | Permits Required |
| Rule 62-210.350 | Public Notice and Comments |
| Rule 62-210.370 | Reports |
| Rule 62-210.550 | Stack Height Policy |
| Rule 62-210.650 | Circumvention |
| Rule 62-210.700 | Excess Emissions |
| Rule 62-210.900 | Forms and Instructions |
| Rule 62-212.300 | General Preconstruction Review Requirements |
| Rule 62-212.400 | Prevention of Significant Deterioration |
| Chapter 62-213 | Operation Permits for Major Sources of Air Pollution |
| Rule 62-296.320 | General Pollutant Emission Limiting Standards |
| Rule 62-297.310 | General Test Requirements |
| Rule 62-297.400 | Compliance Test Methods |

## IV. AIR QUALITY IMPACT ANALYSIS

### A. Introduction

According to the application, the proposed project will increase emissions of two pollutants in excess of PSD significant amounts: $PM_{10}$ and F. $PM_{10}$ is a criteria pollutant and has national and state ambient air quality standards (AAQS) and PSD increments defined for it. F is a non-criteria pollutant and has no AAQS or PSD increments defined for it; therefore, no air quality impact analysis was required for F. Instead, the BACT requirement will establish the F emission limit for this project. The PSD regulations require the following air quality analyses for this project:

- Significant impact analysis for $PM_{10}$
- Analysis of existing air quality for $PM_{10}$
- PSD increment analysis for $PM_{10}$
- Ambient Air Quality Standards (AAQS) analysis for $PM_{10}$
- Analysis of impacts on soils, vegetation, wildlife, visibility and growth-related air quality impacts.

Based on the required analyses, the Department has reasonable assurance that the proposed project, as described in this report and subject to the conditions of approval proposed herein, will not cause or significantly contribute to a violation of any AAQS or PSD increment. However, the following EPA-directed stack height language is included: "In approving this permit, the Department has determined that the application complies with the applicable provisions of the stack height regulations as revised by EPA on July 8, 1985 (50 FR 27892). Portions of the regulations have been remanded by a panel of the U.S. Court of Appeals for the D.C. Circuit in NRDC v. Thomas, 838 F. 2d 1224 (D.C. Cir. 1988). Consequently, this permit may be subject to modification if and when EPA revises the regulation in response to the court decision. This may result in revised emission limitations or may affect other actions taken by the source owners or operators." A discussion of the required analyses follows.

B. Analysis of Existing Air Quality and Determination of Background Concentrations

Preconstruction ambient air quality monitoring is required for all pollutants subject to PSD review unless otherwise exempted or satisfied. The monitoring requirement may be satisfied by using existing representative monitoring data, if available. An exemption to the monitoring requirement may be obtained if the maximum air quality impact resulting from the projected emissions increase, as determined by air quality modeling, is less than a pollutant-specific de minimus concentration. In addition, if EPA has not established an acceptable monitoring method for the specific pollutant, monitoring may not be required.

If preconstruction ambient monitoring is exempted, determination of background concentrations for PSD significant pollutants with established AAQS may still be necessary for use in any required AAQS analysis. These concentrations may be established from the required preconstruction ambient air quality monitoring analysis or from existing representative monitoring data. These background ambient air quality concentrations are added to pollutant impacts predicted by modeling and represent the air quality impacts of sources not included in the modeling.

The table below shows that predicted $PM_{10}$ impacts from the project are predicted to be above the de minimus level; therefore, preconstruction ambient air quality monitoring is required for this pollutant. However since there are existing monitoring data in the vicinity of the plant, the monitoring requirement can be satisfied by using these data. A $PM_{10}$ background concentration of 18 $ug/m^3$ for both the 24-hour and annual averaging times was established from these previously existing air quality data for use in the AAQS analysis required for $PM_{10}$.

**Maximum Project Air Quality Impacts for Comparison to De Minimus Ambient Levels**

| Avg. Time | Max Predicted Impact ($ug/m^3$) | De Minimus Level ($ug/m^3$) | Impact Above/ Below De Minimus |
|---|---|---|---|
| 24-hour | 11.1 | 10 | Above |

C. Models and Meteorological Data Used in the Air Quality Impact Analysis

The applicant and the Department used the EPA-approved Industrial Source Complex Short-Term (ISCST3) dispersion model to evaluate the pollutant emissions from the proposed project. The model determines ground-level concentrations of inert gases or small particles emitted into the atmosphere by point, area, and volume sources. The model incorporates elements for plume rise, transport by the mean wind, Gaussian dispersion, and pollutant removal mechanisms such as deposition. The ISCST3 model allows for the separation of sources, building wake downwash, and various other input and output features. A series of specific model features, recommended by the EPA, are referred to as the regulatory options. The applicant used the EPA recommended regulatory options. Direction-specific downwash parameters were used for all sources for which downwash was considered. The stacks associated with this project all satisfy the good engineering practice (GEP) stack height criteria.

Meteorological data used in the ISCST3 model consisted of a consecutive 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) stations at Tampa International Airport, Florida (surface data) and Ruskin, Florida (upper air data). The 5-year period of meteorological data was from 1987 through 1991. These NWS stations were selected for use in the study because they are the closest primary weather stations to the study area and are most representative of the project site. The surface observations included wind direction, wind speed, temperature, cloud cover, and cloud ceiling.

Since five years of data were used in ISCST3, the highest-second-high (HSH) short-term predicted concentrations were compared with the appropriate AAQS or PSD increments. For the annual averages, the highest predicted yearly average was compared with the standards. For determining the project's significant impact area in the vicinity of the facility and if there are significant impacts from the project on any PSD Class I area, both the highest short-term predicted concentrations and the highest predicted yearly averages were compared to their respective significant impact levels.

D. Significant Impact Analysis

Initially, the applicant conducts modeling using only the proposed project's emissions changes. If this modeling shows significant impacts, further modeling is required to determine the project's impacts on the AAQS or PSD increments. Concentrations were predicted for 324 regular and 146 discrete polar grid receptors located in a radial grid centered on the No. 4 Fertilizer Plant stack. This modeling origin has been used in previous PSD applications for the Cargill Bartow facility. Receptors were located in rings with 36 receptors per ring, spaced at 10° intervals and at distances along the fence line 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 6.0, 7.0 and 8.0 km from the No. 4 Fertilizer Plant stack location, which is located in a PSD Class II area. In addition receptors were located along the facility's property boundary Thirteen discrete receptors were set in the Chassahowitzka National Wilderness Area (CNWA) which is a PSD Class I area located approximately 118 km to the northwest of the project at its closest point. For each pollutant subject to PSD and also subject to PSD increment and/or AAQS analyses, this modeling compares maximum predicted impacts due to the project with PSD significant impact levels to determine whether significant impacts due to the

project are predicted in the vicinity of the facility or in the CNWA. The tables below show the results of this modeling. A significant impact was predicted in the Class II area in the vicinity of the project for both $PM_{10}$ averaging times. Therefore, further $PM_{10}$ AAQS and PSD increment analyses in the vicinity of the project were required for this project. However, there were no significant impacts predicted in the CNWA Class I area; therefore, no further analyses were required in the Class I area.

**Maximum Project Air Quality Impacts for Comparison to PSD Class II Significant Impact Levels in the Vicinity of the Facility**

| Averaging Time | Maximum Predicted Impact ($ug/m^3$) | Significant Impact Level ($ug/m^3$) | Significant Impact |
|---|---|---|---|
| Annual | 1.03 | 1 | Yes |
| 24-hour | 11.1 | 5 | Yes |

**Maximum Project Air Quality Impacts in the CNWA for Comparison to PSD Class I Significant Impact Levels**

| Averaging Time | Maximum Predicted Impact ($ug/m^3$) | Significant Impact Level ($ug/m^3$) | Significant Impact |
|---|---|---|---|
| Annual | 0.004 | 0.1 | No |
| 24-hour | 0.08 | 0.3 | No |

E. PSD Class II Increment Analysis

The PSD increment represents the amount that new sources in an area may increase ambient ground level concentrations of a pollutant from a baseline concentration which was established in 1977 (the baseline year was 1975 for existing major sources of $PM_{10}$) for $PM_{10}$. The emissions values that are input into the model for predicting increment consumption are based on actual emissions from increment-consuming facility sources and all other increment-consuming sources in the vicinity of the facility. The maximum predicted PSD Class II area $PM_{10}$ increments consumed by this project and all other increment-consuming sources in the vicinity of the facility are shown below.

**PSD Class II Increment Analysis**

| Averaging Time | Maximum Predicted Impact ($ug/m^3$) | Impact Greater Than Allowable Increment | Allowable Increment ($ug/m^3$) |
|---|---|---|---|
| Annual | 3.9 | No | 17 |
| 24-hour | 29.4 | No | 30 |

F. AAQS Analysis

For pollutants subject to an AAQS review, the total impact on ambient air quality is obtained by adding "background" concentrations to the maximum modeled concentrations for each pollutant and averaging time. The maximum modeled concentrations are based on the maximum allowable emissions from facility sources and all other sources in the vicinity of the facility. These "background" concentrations take into account all sources of a particular pollutant that are not explicitly modeled. The results of the AAQS analysis for $PM_{10}$ are summarized in the table below. As shown in this table, emissions from the proposed facility are not expected to cause or contribute to a violation of any AAQS.

**Ambient Air Quality Impacts**

| Averaging Time | Major Sources Impact ($ug/m^3$) | Background Conc. ($ug/m^3$) | Total Impact ($ug/m^3$) | Florida AAQS ($ug/m^3$) | Total Impact Greater Than AAQS |
|---|---|---|---|---|---|
| Annual | 13 | 18 | 31 | 50 | No |
| 24-hour | 102 | 18 | 120 | 150 | No |

G. Additional Impacts Analysis

*Impact Analysis Impacts On Soils, Vegetation, And Wildlife*

The maximum ground-level concentrations predicted to occur from $PM_{10}$ emissions as a result of the proposed project, including background concentrations and all other nearby sources, will be below the associated AAQS. The AAQS are designed to protect both the public health and welfare. As such, this project is not expected to have a harmful impact on soils and vegetation in the PSD Class II area. An air quality related values (AQRV) analysis was done by the applicant for the Class I area. No significant impacts on this area are expected.

*Impact On Visibility*

A regional haze analysis was used to assess the potential for a significant increase in regional haze in the Class I CNWA due to this source's projected increase in emissions. A regional haze analysis to determine visibility impacts in the Class I area was required by the National Park Service. The results indicate that the impact of this project on visibility in the Class I area is insignificant.

*Growth-Related Air Quality Impacts*

The proposed modification will not significantly change employment, population, housing or commercial/industrial development in the area to the extent that a significant air quality impact will result.

## V. CONCLUSION

Based on the foregoing technical evaluation of the application and additional information submitted by Cargill Fertilizer, Inc., the Department has made a preliminary determination that the proposed project will comply with all applicable state air pollution regulations provided that the Department's Best Available Control Technology Determination is implemented and certain conditions are met. The General and Specific Conditions are listed in the attached draft conditions of approval .

*Permit Engineer:* *John Reynolds*
*Meteorologist:* *Cleve Holladay*

*Reviewed and Approved by A. A. Linero, P.E.*

# Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

**DRAFT**

**PERMITTEE:**

Cargill Fertilizer, Inc.
3200 Highway 60 West
Bartow, Florida 33830

*Authorized Representative:*

Melody Russo
Environmental Superintendent

| | |
|---|---|
| **File No.** | 1050046-008-AC |
| **Permit No.** | PSD-FL-255 |
| **SIC No.** | 2874 |
| **Project:** | No. 3 Fertilizer Plant |
| **Expires:** | March 31, 2002 |

**PROJECT AND LOCATION:**

Permit for the construction/modification of the No. 3 Fertilizer Plant that produces monoammonium and diammonium phosphate (MAP/DAP). The project involves the replacement of air pollution control equipment and process modifications necessary to increase the production rate from 2,640 to 3,000 tons MAP/DAP per day (TPD). The project is located at the Cargill Fertilizer facility, 3200 Highway 60 West, Bartow, Polk County. UTM coordinates are Zone 17; 409.8 km E; 3086.7 km N.

**STATEMENT OF BASIS:**

This construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and the Florida Administrative Code (F.A.C.) Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297. 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).

**ATTACHED APPENDICES ARE MADE A PART OF THIS PERMIT:**

| | |
|---|---|
| Appendix BD | BACT Determination |
| Appendix GC | Construction Permit General Conditions |

Howard L. Rhodes, Director
Division of Air Resources
Management

## SECTION II - ADMINISTRATIVE REQUIREMENTS

### FACILITY DESCRIPTION

Cargill Fertilizer, Inc. operates a phosphate fertilizer manufacturing facility near Bartow, Polk County, Florida, producing sulfuric acid, wet-process phosphoric acid, and ammoniated phosphate fertilizers. The company has applied to increase the production rate from 2,640 TPD to 3,000 TPD at its No. 3 Fertilizer (MAP/DAP) Plant. The No. 3 Fertilizer Plant can produce DAP or MAP. The modifications will improve product quality in addition to increasing the maximum production rate. As a result of this production rate increase, increases in the actual particulate matter (PM), PM with an aerodynamic diameter of 10 microns or less ($PM_{10}$), sulfur dioxide ($SO_2$), fluoride (F) and other pollutant emissions including ammonia ($NH_3$) will occur.

### REGULATORY CLASSIFICATION

The No. 3 Fertilizer Plant is classified as a "Major or Title V Source" per Rule 62-210.200, F.A.C., because it has the potential to emit at least 100 tons per year of particulate matter when potential fugitive emissions are included with potential controlled emissions.

Phosphate rock processing 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 a regulated pollutant 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 given in Table 62-212.400-2, F.A.C. and the requirements of Rule 62-212.400, F.A.C., Prevention of Significant Deterioration (PSD) and Best Available Control Technology (BACT).

### PERMIT SCHEDULE:

- 09-21-98: Original Application Received
- 10-30-98: Revised Application Received
- 02-11-99: Issued Intent to Issue Permit

### RELEVANT DOCUMENTS:

The documents listed below are specifically related to this permitting action and form the basis of the permit. They are on file with the Department:

- Application received 09-21-98
- Department's incompleteness letter dated 10-15-98
- Applicant's submittal received 10-30-98
- National Park Service's letter received 10-28-98
- Technical Evaluation and Preliminary Determination dated 02-11-99
- Best Available Control Technology determination (issued concurrently with permit)

# AIR CONSTRUCTION PERMIT PSD-FL-255 (1050046-008-AC)

## SECTION II - 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's Southwest District Office, 3804 Coconut Palm Drive, Tampa, Florida 33619-8218. 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 Blair Stone Road, MS 5505, Tallahassee, Florida 32399-2400 (phone number 850/488-0114).
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. Terminology: The terms used in this permit have specific meanings as defined in the corresponding chapters of the Florida Administrative Code.
4. 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.]
5. Expiration: This air construction permit shall expire on March 31, 2001 [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]
6. 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.]
7. Permit Approval: Approval to construct shall become invalid if construction is not commenced within 18 months after receipt of such approval, or if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time. The Department may extend the 18-month period upon a satisfactory showing that an extension is justified. [40 CFR 52.21(r)(2)].
8. BACT Determination: In conjunction with extension of the 18 month periods to commence or continue construction, or extension of the permit expiration date, the permittee may be required to demonstrate the adequacy of any previous determination of best available control technology for the source. [40 CFR 52.21(j)(4)]
9. Annual Reports: Pursuant to Rule 62-210.370(2), F.A.C., Annual Operation Reports, the permittee is required to submit annual reports on the actual operating rates and emissions from this facility. Annual operating reports using DEP Form 62-210.900(4) shall be sent to the DEP's Southwest District office by March 1st of each year.
10. Stack Testing Facilities: Stack sampling facilities shall be installed in accordance with Rule 62-297.310(6), F.A.C.
11. Quarterly Reports: Quarterly excess emission reports, in accordance with 40 CFR 60.7 (a)(7) (c) (1997 version), shall be submitted to the DEP's Northwest District office.

## SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

The Specific Conditions listed in this section apply to the following emission units:

| EMISSION UNIT NO. | EMISSION UNIT DESCRIPTION |
|---|---|
| 001 | No. 3 Fertilizer (MAP/DAP) Plant |

1. Unless otherwise indicated, the modification and operation of the subject No. 3 Fertilizer Plant shall be in accordance with the capacities and specifications stated in the application or in updated submittals. **[Rule 62-210.300, F.A.C.]**
2. The subject emissions unit shall comply with all applicable provisions of the 40 CFR 60 New Source Performance Standards for Diammonium Phosphate Plants, Subpart V. **[Rule 62-204.800 F.A.C.]**
3. The No. 3 MAP/DAP Plant shall not produce more than 125 tons of MAP or DAP product per hour or process more than 60 tons of $P_2O_5$ input per hour for either product **[Rule 62-210.200, F.A.C.]**
4. The subject emission unit is allowed to operate continuously (8760 hours/year). **[Rule 62-210.200, F.A.C.]**
5. Total fluoride emissions shall not exceed 2.5 lb/hr and 10.95 TPY based on 0.041 lb F/ton of P2O5 input. **[Rule 62-212.400, F.A.C.]**
6. Particulate matter emissions shall not exceed 11.0 lb/hr and 48.2 TPY based on 0.18 lb/ton $P_2O_5$ input. **[Rule 62-212.400, F.A.C.]**
7. Visible emissions from the stack shall not exceed 10% opacity based on recent stack tests. **[Rule 62-212.400, F.A.C.]**
8. During periods of firing natural gas only, sulfur dioxide emissions from the stack shall be presumed as minimal and a sulfur dioxide compliance test shall be waived. No. 6 fuel oil with a maximum sulfur content of 1.5% sulfur by weight may be fired only during periods of natural gas curtailment or gas line/burner maintenance. The firing rate of either fuel shall not exceed 40 million BTU per hour. The permittee shall maintain records of the fuel oil supplier's sulfur content analysis. **[Rule 62-210.200(227), F.A.C.]**
9. All venturi scrubbers shall be operated at a minimum pressure drop of 15 inches $H_2O$. The permittee shall install, calibrate, operate and maintain monitoring devices that continuously measure and record the total pressure drop across each scrubbing system. Accuracy of the monitoring devices shall be $\pm$ 5% over the operating range. **[Rules 62-297.310, 62-296.800; 40 CFR 60.223(c), F.A.C.]**
10. Before this construction permit expires, and annually, the subject emissions units shall be tested for compliance with the above emission limits. For the duration of all tests the emission units shall be operating at permitted capacity. Permitted capacity is defined as 90-100 percent of the maximum operating rate allowed by the permit. If it is impracticable to test at permitted capacity, then the emission unit may be tested at less than permitted capacity (i.e., 90% of the maximum operating rate allowed by the permit); in this case, subsequent emission unit operation is limited to 110 percent of the test load until a new test is conducted. Once the emission unit is so limited, then operation at higher capacities is allowed for no more than 15 consecutive days for the purposes of additional compliance testing to regain the permitted capacity in the permit. **[Rule 62-297.310, F.A.C.]**
11. The Department's Southwest District office in Tampa shall be notified in writing at least 15 days prior to the compliance tests. Written reports of the test results shall be submitted to that office within 45 days of test completion. **[Rule 62-297.310, F.A.C.]**
12. The compliance test procedures shall be in accordance with EPA Reference Methods 1, 2, 3, 4, 5, 7E, 9 and 13A or 13B, as appropriate, as published in 40 CFR 60, Appendix A. 60, Appendix A. **[Rules 62-204.800 and 62-297.310(7)(c), F.A.C.]**

13. All measurements, records, and other data required to be maintained by this facility shall be retained for at least five (5) years following the date on which such measurements, records, or data are recorded. These data shall be made available to the Department upon request. **[Rule 62-4.070(3), F.A.C.]** The permittee shall install, calibrate, maintain, and operate a monitoring device which can be used to determine the mass flow of phosphorus-bearing feed material to the process. The monitoring device shall have an accuracy of ±5 percent over its operating range. The permittee shall maintain a daily record of equivalent $P_2O_5$ feed by first determining the total mass rate in metric tons/hour of phosphorus bearing feed using the flow monitoring device meeting the requirements of 40 CFR 60.223(a) and then by proceeding according to 40 CFR 60.224(b)(3). **[Rule 62-296.800, F.A.C.; 40 CFR 60.223(b)]**

14. 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.]**

15. No person shall circumvent any air pollution control device, or allow the emission of air pollutants without the applicable air pollution control device operating properly. **[Rule 62-210.650, F.A.C.]**

16. The subject emissions units shall be subject to the following:

    - Excess emissions resulting from startup, shutdown or malfunction of any source 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 Department for longer duration. **[Rule 62-210.700, F.A.C.]**

    - Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonably be prevented during startup, shutdown, or malfunction shall be prohibited. **[Rule 62-210.700, F.A.C.]**

    - Considering operational variations in types of industrial equipment operations affected by this rule, the Department may adjust maximum and minimum factors to provide reasonable and practical regulatory controls consistent with the public interest. **[Rule 62-210.700, F.A.C.]**

    - In case of excess emissions resulting from malfunctions, each source shall notify the Department or the appropriate Local Program in accordance with Rule 62-4.130, F.A.C. A full written report on the malfunctions shall be submitted in a quarterly report, if requested by the Department. **[Rule 62-210.700, F.A.C.]**

17. The permittee shall submit an Annual Operating Report using DEP Form 62-210.900(4) to the Department's Southwest District office by March 1 of the following year for the previous year's operation. **[Rule 62-210.370, F.A.C.]**

# APPENDIX BD
## BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

**Cargill Fertilizer, Inc.**
**No. 3 Fertilizer Plant (MAP/DAP) Plant Expansion**
**PSD-FL-255 / 1050046-008-AC**
**Bartow, Polk County**

Cargill Fertilizer, Inc. has applied to increase the production rate from 2,640 tons per day (TPD) to 3,000 TPD at its No. 3 Fertilizer (MAP/DAP) Plant near Bartow in Polk County, Florida. The No. 3 Fertilizer Plant can produce Diammonium Phosphate (DAP) or Monoammonium Phosphate (MAP). The modifications will improve product quality in addition to increasing the maximum production rate. As a result of this production rate increase, increases in the actual particulate matter (PM), PM with an aerodynamic diameter of 10 microns or less ($PM_{10}$), sulfur dioxide ($SO_2$), fluoride (F) and other pollutant emissions including ammonia ($NH_3$) will occur. Typically, $NH_3$ emissions from this process are not significant enough to be regulated since an acid scrubbing step is used to recover the $NH_3$ and return it to the process. $NH_3$ is not on the Department's list of hazardous air pollutants and its emissions are of concern primarily when accidental leaks occur during its storage or transport. .

The increases for $PM/PM_{10}$ and F emissions will exceed the significant levels listed in Table 212.400-2 of Rule 62-212.400, Florida Administrative Code (F.A.C.). The project is therefore subject to Prevention of Significant Deterioration (PSD) review for $PM/PM_{10}$ and F in accordance with Rule 62-212.400, F.A.C. A Best Available Control Technology (BACT) determination is part of the review required by Rules 62-212.400 and 62-296, F.A.C. Air pollution control equipment will consist of wet scrubbers for $PM/PM_{10}$ and F emissions.

## PROCESS EMISSIONS

The following table compares the current actual emissions to the applicant's proposed maximum emissions in tons/year:

| | PM | $PM_{10}$ | F | $SO_2$ | VOC | $NO_X$ | CO |
|---|---|---|---|---|---|---|---|
| Current Actual Emissions | | | | | | | |
| No. 3 Fertilizer plant | 7.9 (a) | 7.9 (a) | 5.47 (a) | 0.03 (b) | 0.13 (b) | 6.72 (b) | 1.68 (b) |
| No. 4 Phosphoric Acid Plant (c) | - | - | 1.47 | - | - | - | - |
| No. 3 Filter (d) | - | - | 1.26 | - | - | - | - |
| No. 5 Phosphoric Acid Plant (e) | - | - | 1.21 | - | - | - | - |
| No. 3 Shipping Plant (f) | 4.38 | 4.38 | - | - | - | - | - |
| Total | 12.38 | 12.38 | 9.41 | 0.03 | 0.13 | 6.72 | 1.68 |
| Proposed Maximum Emissions | | | | | | | |
| No. 3 Fertilizer Plant | 51.98 (g) | 51.98 (g) | 10.95 (g) | 39.64 (h) | 0.42 (h) | 24.52 (h) | 5.23 (h) |
| No. 4 Phosphoric Acid Plant (i) | - | - | 10.01 | - | - | - | - |
| No. 3 Shipping Plant (j) | 12.0 | 12.0 | - | - | - | - | - |
| Total | 63.98 | 63.98 | 20.96 | 39.64 | 0.42 | 24.52 | 5.23 |
| PSD Significant Emission Rate | 25 | 15 | 3 | 40 | 40 | 40 | 100 |

Notes: F = fluoride.
MMscf = million standard cubic feet.

a) Based on average hours of operation during 1996 and 1997 of 7,981.5 hours and 7,454.2 hours, respectively, and annual stack test results (two tests in 1997) as follows:
1996: PM = 1.63 lb/hr; F = 1.74 lb/hr 1997: PM = 2.52 lb/hr; F = 1.07 lb/hr
Emission Rate (TPY) = [(1996 lb/hr * 1996 hrs.) + (1997 lb/hr *1997 hrs.)]/ 2* 2000 lb/ton)

b) Based on average No. 3 Fertilizer plant natural gas usage during 1996 and 1997 of 98.1 MMscf and 94.0 MMscf, respectively, and AP-42. Refer to Table 2-3b.
c) Based on average hours-of operation during 1996 and 1997 of 8015 hours and 8277 hours, respectively, and annual stack test results (two tests in 1997) as follows:
1996: F = 0.319 lb/hr 1997: F = 0.402 lb/hr
Emission Rate (TPY) = [(1996 lb/hr * 1996 hrs) + (1997 lb/hr *1997 hrs)] / 2* 2000 lb/ton)
d) Based on average hours of operation for the No. 4 Phosphoric Acid Plant during 1996 and 1997 of 8015 hours and 8277 hours, respectively, and annual stack test results (two tests in 1997) as follows:
1996: F = 0.113 lb/hr 1997: F = 0.196 lb/hr
Emission Rate (TPY) = [(1996 lb/hr * 1996 hrs) + (1997 lb/hr *1997 hrs)] / 2 * 2000 lb/ton)
e) Based on average hours of operation during 1996 and 1997 of 8057 hours and 8313 hours, respectively, and annual stack test results (two tests in 1997) as follows:
1996: F = 0.337 lb/hr 1997: F = 0.254 lb/hr
Emission Rate (TPY) = [(1996 lb/hr * 1996 hrs.) + (1997 lb/hr *1997 hrs.)]/ 2 * 2000 lb/ton)
f) Based on average hours of operation during 1996 and 1997 of 2825.15 hours and 2942.5 hours, respectively, and annual stack test results as follows:
1996: PM = 3.1 lb/hr 1997: PM = compliance test waived due to the use of dust suppressant oil system
Emission Rate (TPY) = (1996 lb/hr * 1996 hrs.) / 2000 lb/ton)
g) Proposed emission rates are 11.6 lb/hr for PM; and 2.5 lb/hr for fluoride.
h) Based on a maximum heat input of 40 MMBtu/hr for 8760 hr/yr. Refer to Table 2-3.
i) Based on combined F emission limit for Nos. 4 and 5 Phosphoric Acid Plants of 2.29 lb/hr, from permit no. AC53-262532.
j) Based on PM/PM10 emission limit of 12 lb/hr, from permit no. AO53-185367.

## DATE OF RECEIPT OF COMPLETE BACT APPLICATION:

The original application received on September 21, 1998 was complete on October 30, 1998.

## BACT DETERMINATION PROCEDURE:

In accordance with Chapter 62-212.400, 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.

The air pollutant emissions from this facility can be grouped into categories based upon the control equipment and techniques that are available to control emissions from these emission units. Using this approach, the emissions can be classified as indicated below:

- ***Fluorides*** (HF and $SiF_4$). Controlled generally by scrubbing with pond water.
- ***Particulate Matter*** (PM, $PM_{10}$). Controlled generally by wet scrubbing or filtration.
- ***Combustion Products*** ($SO_2$, $NO_X$). $NO_X$ controlled generally by good combustion of clean fuels. $SO_2$ controlled generally by scrubbing when quantities are substantial.
- ***Products of Incomplete Combustion*** (CO, VOC). Controlled generally by proper combustion.

Grouping the pollutants in this manner facilitates the BACT analysis because it enables the pollutant control equipment and the corresponding energy, economic, and environmental impacts to be examined on a common basis. Although all of the pollutants addressed in the BACT analysis may be subject to a specific emission limiting standard as a result of PSD review, the control of "non-regulated" air pollutants is considered in imposing a more stringent BACT limit on a "regulated" pollutant (i.e., PM, $SO_2$, $H_2SO_4$, fluorides, etc.), if a reduction in "non-regulated" air pollutants can be directly attributed to the control device selected as BACT for the abatement of the "regulated" pollutants.

## BACT EMISSION LIMITS PROPOSED BY APPLICANT:

| POLLUTANT | EMISSION LIMIT | LIMIT BASIS | CONTROL TECHNOLOGY |
|---|---|---|---|
| F | 2.5 lb/hr | 0.041 lb/ton $P_2O_5$ input | Packed scrubbers using pond water |
| PM | 11.6 lb/hr | 0.19 lb/ton | Venturi Scrubbers |
| VE | 20% opacity | Permit AO53-169781 | Same as PM |

## BACT ANALYSIS

### GASEOUS FLUORIDES (F)

Fluoride-containing gases including hydrogen fluoride (HF) and silicon tetrafluoride ($SiF_4$) are evolved during the exothermic reaction between ammonia and phosphoric acid that occurs in the reactor and to a lesser extent in the granulator. Since the vent gases from the reactor and granulator contain ammonia in high concentrations, the first scrubbing stage uses a phosphoric acid stream as the scrubbing medium for recovery of ammonia so that it is recycled back to the process. A final stage of pond water scrubbing removes most of

the fluoride evolved from the process as well as that which is stripped out of the phosphoric acid in the first stage scrubber.

Additional fluoride and ammonia emissions are generated in the dryer and are controlled by a separate two-stage scrubbing system as for the reactor and granulator. Gaseous fluoride and ammonia emissions from the cooler are relatively low and therefore do not require special controls. The No. 3 Fertilizer Plant will be equipped with six scrubbers following the proposed modification. Four will be new scrubbers while two are existing. The scrubbers will be designed with the following operating parameters:

1. Reactor/Vents Acid Scrubber (new)

| | |
|---|---|
| Outlet Temperature | 185° F |
| Outlet Flow Rate | 72,700 ACFM |
| Pressure Drop | 15 in. $H_2O$ |
| Recovery Solution Flow Rate | 1,500 gpm |

2. Granulator Acid Scrubber (new)

| | |
|---|---|
| Outlet Temperature | 178° F |
| Outlet Flow Rate | 51,000 ACFM |
| Pressure Drop Recovery | 16 in $H_2O$ |
| Solution Flow Rate | 800 gpm |

3. Cooler Venturi-Cyclonic Scrubber (existing)

| | |
|---|---|
| Outlet Temperature | 86°F |
| Outlet Flow Rate | 38,500 ACFM |
| Pressure Drop | 15 in. $H_2O$ |
| Water Flow Rate | 660 gpm |

4. R.G.C.V. Tailgas Scrubber (existing)

| | |
|---|---|
| Outlet Temperature | 1390° F |
| Outlet Flow Rate | 152,900 ACFM |
| Pressure Drop | 4 in. $H_2O$ |
| Pond Water Flow Rate | 4,600 gpm |

5. Dryer Acid Scrubber (new)

| | |
|---|---|
| Outlet Temperature | 1700° F |
| Outlet Flow Rate | 70,300 ACFM |
| Pressure Drop | 16 in. $H_2O$ |
| Recovery Solution Flow Rate | 1,250 gpm |

6. Dryer Tailgas Scrubber (new)

| | |
|---|---|
| Outlet Temperature | 1570° F |
| Outlet Flow Rate | 70,000 ACFM |
| Pressure Drop | 5 in. H2O |
| Pond Water Flow Rate | 1,600 gpm |

The top-down BACT determination for fluorides identified the control technologies listed below starting with the most stringent:

1. Packed scrubber using once-through fresh water.
2. Packed scrubber using neutralized water from a dedicated pond (fresh water makeup).
3. Packed scrubber using process cooling pond water.

Use of once-through fresh water would achieve the highest level of fluoride removal but this option is not practical for operations where water conservation is required and plant water balance problems would be created.

Option 2 is possible, the main considerations being the cost of installing the pond and equipment and the cost of operating a lime treatment unit. Lime treatment to a pH level of 3.5 to 4.0 causes fluorides to precipitate out of solution, primarily as calcium fluoride. At this point the water would contain as low as 30-60 ppm fluoride. With second-stage lime treatment to a pH of 6.0 or more, the calcium compounds (mainly dicalcium phosphate) precipitate out along with additional calcium fluoride. Upon settling at a pH in the range of 6.5 to 8.8, the fluoride content of the clear neutralized water may be as low as 15 ppm, depending on the quality of the neutralization facility and the mixing efficiency.

Costs for Option 2 are based on data submitted by the applicant and information from other sources. These include Phosphates and Phosphoric Acid, by Pierre Becker, 2nd ed., 1989, and Development Document for Interim Final Effluent Limitations Guidelines and Proposed New Source Performance Standards, USEPA, 1975:

| | |
|---|---|
| Scrubber Pond with Liner (2 acres - spray cooling) | $ 75,000 |
| Tanks, Pumps and Equipment | 210,000 |
| Other Costs | 40,000 |
| Total Installed Cost (T.I.C.) | $ 325,000 |
| | |
| Raw Materials | $ 8,000 |
| Solid Waste Disposal | 10,000 |
| Operation & Maintenance (@ 8.4% of T.I .C.) | 27,000 |
| Depreciation & Financial Charges (@ 16.9% of T.I.C.) | 55,000 |
| Annual Cost | $ 100,000 |

Assuming that treatment of the scrubber water will result in a decrease in fluoride concentration from 5,500 ppm to below 50 ppm, the driving force for absorption will increase by an additional 1.0 to 2.0 mass transfer units (NTU) which should result in an additional 1.5 lb/hr of fluoride removed. This results in the following cost effectiveness:

F Removed = (1.5)(8760)/2000 = 6.6 tons/yr
Cost Effectiveness = $100,000/6.6 = $15,150/ton

This figure is sufficiently high to rule out Option 2. However, it should be noted that the low magnitude of fluoride emissions relative to their potential environmental impact justifies the consideration of higher fluoride cost effectiveness figures relative to the high tonnage pollutants such as sulfur dioxide and nitrogen oxides. Option 3, therefore, is determined by the top-down approach as the basis for the fluoride BACT emission limit. The BACT limit will be the same as proposed by the applicant, 0.041 lb F/ton $P_2O_5$ input. This limit allows a margin for compliance above the highest September 11, 1997 test result of 0.037 lb F/ton P2O5. It should be noted that the test data summary submitted for the September 11, 1997 test incorrectly reported the F emissions on a total product basis instead of $P_2O_5$.

## PARTICULATE MATTER ($PM/PM_{10}$) AND VISIBLE EMISSIONS (VE)

The sources of PM and VE, consisting primarily of DAP dust along with relatively small amounts of ammonium fluoride and other related compounds, are the granulator, dryer, cooler, screens and mills. These emissions are controlled by cyclones which remove most of the larger particles with the remainder controlled by wet scrubbers. The top-down approach for control of PM/PM10 and VE identified the following BACT options:

1. High-energy (>30 in. w.c.) venturi scrubber or ionizing wet scrubber.
2. Medium-energy (15-30 in.w.c.) venturi scrubber.

Characteristic of this process is that the first stage of scrubbing (acid scrubber) is primarily for ammonia recovery while the primary function of the second stage scrubber is fluoride removal, leaving $PM/PM_{10}$ control with a secondary priority from a design standpoint. Since recovery of ammonia takes place by chemical reaction with the acid scrubbing medium, the required removal can be effected using a medium energy scrubber which also removes up to 85% of the product dust escaping the cyclones. The tail gas scrubber is a low pressure drop device that removes fluorides by absorption. For these reasons, employment of a high energy, high efficiency device for $PM/PM_{10}$ removal has not been a design consideration for these plants.

If maximum $PM/PM_{10}$ removal is considered to be a design parameter, the cost effectiveness of adding high energy scrubbing to the existing system (Option 1) would likely be in the range of $50,000 - $75,000 per incremental ton of $PM/PM_{10}$ removed based on recent analyses for other projects. On a non-incremental basis, however, assuming replacement of the existing acid scrubbers with high energy ones, the cost effectiveness would drop to about $7,000 to $9,000 per ton for $PM/PM_{10}$ removal in the 98+% efficiency range. Due to the high costs of installing new ducts, pumps, fans, and instrumentation for retrofitting an existing system, and the high energy costs, Option 1 is not feasible for this project.

Option 2 is the feasible choice, and the BACT requirement will be satisfied by specifying the acid scrubber's normal operation at a minimum pressure drop of 15 in. w.c. Analysis of recent test data for these scrubbers confirms that there is an inordinate safety margin between actual and allowable PM emissions, average actuals being less than 20 percent of the allowables. Therefore, it is appropriate to reduce the allowables to a level consistent with typical margins for BACT limits. A margin of 100% above the average from the September 1997 stack test ($0.09 \times 2 = 0.18$ lb/ton $P_2O_5$) appears reasonable for the reactor/granulators and dryers. The existing emission limit bases (gr/SCF) for the coolers are sufficient for this BACT determination.

## BACT DETERMINATION BY THE DEPARTMENT:

Based on the information provided by the applicant and other information available to the Department, the following emission limits are established employing the top-down BACT approach.

| POLLUTANT | EMISSION LIMIT | LIMIT BASIS |
|---|---|---|
| F | 2.5 lb/hr | 0.041 lb/ton $P_2O_5$ input |
| $PM/PM_{10}$ | 11.0 lb/hr | 0.18 lb/ton P2O5 input (1997 stack test) |
| VE | 10% opacity | 100% above 1997 stack tests |

**COMPLIANCE**

Compliance with the fluoride limit shall be in accordance with the EPA Reference Method 13A or 13B as contained in 40 CFR 60, Appendix A.

Compliance with the $PM/PM_{10}$ limit shall be in accordance with the EPA Reference Method 5 as contained in 40 CFR 60, Appendix A.

Compliance with the visible emission limit shall be in accordance with the EPA Reference Method 9 as contained in 40 CFR 60, Appendix A.

## DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:

John Reynolds, Permit Engineer
Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road, MS 5505
Tallahassee, Florida 32399-2400

Recommended By:

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

Date:

Approved By:

Howard L. Rhodes, Director
Division of Air Resources Management

Date:

## REFERENCES

Pierre Becker. 1989. Phosphates and Phosphoric Acid. Marcel Dekker, Inc. New York.

Robert E. Treybal. 1980. Mass Transfer Operations. McGraw-Hill, Inc. New York.

Aaron J. Teller. Control of Gaseous Fluoride Emissions. Chemical Engineering Progress. March 1967. (Vol. 63 # 3)

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U.S. Environmental Protection Agency. 1978. Diagnosing Vegetation Injury Caused by Air Pollution. Prepared by Applied Sciences Associates, Inc. EPA-450/3-78-005. Research Triangle Park, NC.

U.S. Fish and Wildlife Service (USFWS). 1995. Air Quality Branch, Technical Review of Cargill Fertilizer PSD Application June 26, 1995.

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# Florida Department of Environmental Protection

**Memorandum**

TO: ~~Clair Fancy~~ ag for CHF

THRU: A. A. Linero ag 2/11

FROM: John Reynolds JR

DATE: February 11, 1999

SUBJECT: Cargill Fertilizer, No. 3 Fertilizer (MAP/DAP) Plant
DEP File No. 1050046-008-AC (PSD-FL-255)

Attached for your review is the Intent to Issue for the modification of the No. 3 Fertilizer Plant at Cargill Fertilizer in Bartow.

The permit involves an increase in production rate from 2,640 to 3,000 tons of monoammonium or diammonium phosphate (MAP/DAP) per day. The Best Available Control Technology Determination consists of packed scrubbers using cooling pond water to control fluorides and medium energy venturi scrubbers to control particulate matter. The BACT limits we propose are essentially the same as Cargill proposed except for the opacity. Test data showed that Cargill can meet 10% opacity whereas they requested 20%.

I recommend your approval and signature.

AAL/jr

# Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary


## P.E. Certification Statement

**Permittee:**

Cargill Fertilizer, Inc.
3200 Highway 60 West
Bartow, Polk County

**DEP File No.** 1050046-008-AC (PSD-FL-255)

**Project type:**

Project to increase monoammonium and diammonium phosphate (MAP/DAP) production from 2640 to 3,000 TPD by making the following physical modifications to the existing No. 3 Fertilizer Plant: replace reactor/granulator acid scrubber with larger venturi-cyclonic scrubber; eliminate the intermediate reactor/granulator tailgas scrubber and dryer eject scrubber; replace the dryer acid scrubber with a larger venturi-cyclonic vessel; install new dryer dust cyclone; install new dryer tailgas scrubber to remove F emissions; install new dryer evacuation fan; convert the cooler/equipment vent acid scrubber to serve the rotary cooler only; convert the cooler/equipment vent dust cyclone to serve the equipment vents only; convert the dryer dust cyclone into a cooler dust cyclone; and install a new venturi-cyclonic acid scrubber for the granulator.

Particulate emissions will be controlled to 0.18 pounds per ton of phosphate (lb/ton $P_2O_5$ input) by medium energy venturi scrubbers. Fluoride emissions will be controlled to 0.041 lb/ton $P_2O_5$ by packed scrubbers using cooling pond water. Visible emissions will be limited to 10 percent.

The project will not cause or contribute to violations of any ambient air quality standard or PSD increment.

***I HEREBY CERTIFY*** *that the engineering features described in the above referenced application and subject to the proposed permit conditions provide reasonable assurance of compliance with applicable provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 62-4 and 62-204 through 62-297. However, I have not evaluated and I do not certify aspects of the proposal outside of my area of expertise (including but not limited to the electrical, mechanical, structural, hydrological, and geological features).*

A. A. Linero, P.E. — Date 2/11
Registration Number: 26032


Bureau of Air Regulation
New Source Review Section
111 South Magnolia Drive, Suite 4
Tallahassee, Florida 32301
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aaL 2/11