CARGILL FERTILIZER, INC.

P.O. Box 9002 • Bartow, Florida 33831 • Telephone 941-534-9610 • FAX 941-534-9680

June 26, 2000
Federal Express Delivery
8121 1148 9505

RECEIVED

JUN 27 2000

BUREAU OF AIR REGULATION

Al Linero, P.E.
New Source Review Section
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Linero,

RE: CARGILL FERTILIZER – BARTOW FACILITY
TITLE V PERMIT NO. 1050046-003-AV PSD-FL-295
NO. 4 PHOSPHORIC ACID PLANT FILTER MODIFICATION
PERMIT APPLICATION **RESUBMITTAL WITH MODELING**

Enclosed please find 6 copies of an Application for Air Permit – Title V Source (Form 62-210.900(1)) and PSD Report for the No. 4 Phosphoric Acid Plant Filter at Cargill Fertilizer's Bartow facility. Also included in this submittal is Section 6.0 – Air Quality Impacts Analysis and Section 7.0 – Additional Impacts Analysis and appendices that were not included in our June 21, 2000 package.

If you have any questions please call me at (863) 534-9615 or email Debra_Waters@Cargill.com.

Sincerely,

Debra R. Waters

Debra R. Waters
Environmental Superintendent

Xc: Jellerson
Edgemon
File 60-07-05A
G. Reynolds
C. Holladay
SWD
EPA
NPS

recycled paper

RECEIVED
JUN 27 2000
BUREAU OF AIR REGULATION

PSD PERMIT APPLICATION FOR MODIFICATION OF THE PHOSPHORIC ACID PLANT CARGILL FERTILIZER, INC. BARTOW PLANT

Prepared For:

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

Prepared By:

Golder Associates Inc.
6241 NW 23rd Street, Suite 500
Gainesville, Florida 32653-1500

June 2000
0037539Y/F1

DISTRIBUTION:

8 Copies - Cargill - Bartow
2 Copies - Golder Associates Inc.

TABLE OF CONTENTS

Part A - Application for Air Permit

Part B - PSD Report

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

IN ORDER
FOLLOWING
PAGE 37

LIST OF TABLES

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

Application for Air Permit

Department of
Environmental Protection

Division of Air Resources Management

APPLICATION FOR AIR PERMIT - TITLE V SOURCE

See Instructions for Form No. 62-210.900(1)

I. APPLICATION INFORMATION

Identification of Facility

1. Facility Owner/Company Name: **Cargill Fertilizer, Inc.**	
2. Site Name: **Bartow Facility**	
3. Facility Identification Number: **1050046**	[ ] Unknown
4. Facility Location: Street Address or Other Locator: **3200 Highway 60 West** City: **Bartow** County: **Polk** Zip Code: **33830**	
5. Relocatable Facility? [ ] Yes [X] No	6. Existing Permitted Facility? [X] Yes [ ] No

Application Contact

1. Name and Title of Application Contact: **Debra Waters, Environmental Superintendent**
2. Application Contact Mailing Address: Organization/Firm: **Cargill Fertilizer, Inc.** Street Address: **PO Box 9002** City: **Bartow** State: **FL** Zip Code: **33831**
3. Application Contact Telephone Numbers: Telephone: (**941**) **534-9615** Fax: (**941**) **534-9680**

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	
2. Permit Number:	
3. PSD Number (if applicable):	
4. Siting Number (if applicable):	

Purpose of Application

Air Operation Permit Application

This Application for Air Permit is submitted to obtain: (Check one)

[ ] Initial Title V air operation permit for an existing facility which is classified as a Title V source.

[ ] Initial Title V air operation permit for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.

Current construction permit number:______________________________

[ ] Title V air operation permit revision to address one or more newly constructed or modified emissions units addressed in this application.

Current construction permit number:______________________________

Operation permit number to be revised:______________________________

[ ] Title V air operation permit revision or administrative correction to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application. (Also check Air Construction Permit Application below.)

Operation permit number to be revised/corrected:______________________

[ ] Title V air operation permit revision for reasons other than construction or modification of an emissions unit. Give reason for the revision; e.g., to comply with a new applicable requirement or to request approval of an "Early Reductions" proposal.

Operation permit number to be revised:______________________________

Reason for revision:____

Air Construction Permit Application

This Application for Air Permit is submitted to obtain: (Check one)

[X] Air construction permit to construct or modify one or more emissions units.

[ ] Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.

[ ] Air construction permit for one or more existing, but unpermitted, emissions units.

Owner/Authorized Representative or Responsible Official

1.	Name and Title of Owner/Authorized Representative or Responsible Official: **Debra Waters, Environmental Superintendent**
2.	Owner/Authorized Representative or Responsible Official Mailing Address: Organization/Firm: **Cargill Fertilizer, Inc.** Street Address: **PO Box 9002; 3200 Hwy 60 West** City: **Bartow** State: **FL** Zip Code: **33830**
3.	Owner/Authorized Representative or Responsible Official Telephone Numbers: Telephone: (**941**) **534-9615** Fax: (**941**) **534-9680**
4.	Owner/Authorized Representative or Responsible Official Statement: *I, the undersigned, am the owner or authorized representative*(check here [X], if so) or the responsible official (check here [ ], if so) of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.* Debra R. Waters — Signature 6/26/00 — Date

* Attach letter of authorization if not currently on file.

Professional Engineer Certification

1.	Professional Engineer Name: **Scott A. McCann** Registration Number: **54172**
2.	Professional Engineer Mailing Address: Organization/Firm: **Golder Associates Inc.** Street Address: **6241 NW 23rd Street, Suite 500** City: **Gainesville** State: **FL** Zip Code: **32653-1500**
3.	Professional Engineer Telephone Numbers: Telephone: (**352**) **336-5600** Fax: (**352**) **336-6603**

4. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

If the purpose of this application is to obtain a Title V source air operation permit (check here [ ], if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.

If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [X], if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [ ], if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Signature: [signature] Date: 6/23/00

(seal)

* Attach any exception to certification statement.

Scope of Application

Emissions Unit ID	Description of Emissions Unit	Permit Type	Processing Fee
010	Phosphoric Acid Plant	AC1F	7,500

Application Processing Fee

Check one: [X] Attached - Amount: $: 7,500 [ ] Not Applicable

Construction/Modification Information

1. Description of Proposed Project or Alterations: **Modernization of the Phosphoric Acid Plant by replacing the No. 4 Phosphoric Acid Filter with a more efficient (greater recovery of P205) unit.**	
2. Projected or Actual Date of Commencement of Construction:	
3. Projected Date of Completion of Construction:	

Application Comment

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates: Zone: **17** East (km): **409.8** North (km): **3086.7**			
2. Facility Latitude/Longitude: Latitude (DD/MM/SS): **27 / 52 / 22** Longitude (DD/MM/SS): **81 / 54 / 59**			
3. Governmental Facility Code: **O**	4. Facility Status Code: **A**	5. Facility Major Group SIC Code: **28**	6. Facility SIC(s): **2874, 2819**
7. Facility Comment (limit to 500 characters):			

Facility Contact

1. Name and Title of Facility Contact:
   Debra Waters, Environmental Superintendent

2. Facility Contact Mailing Address:
   Organization/Firm: **Cargill Fertilizer, Inc**
   Street Address: **PO Box 9002**
   City: **Bartow** State: **FL** Zip Code: **33831**

3. Facility Contact Telephone Numbers:
   Telephone: (**941**) **534-9615** Fax: (**941**) **534-9680**

Facility Regulatory Classifications

Check all that apply:

1. [ ] Small Business Stationary Source?	[ ] Unknown
2. [X] Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)?	
3. [ ] Synthetic Minor Source of Pollutants Other than HAPs?	
4. [ ] Major Source of Hazardous Air Pollutants (HAPs)?	
5. [ ] Synthetic Minor Source of HAPs?	
6. [X] One or More Emissions Units Subject to NSPS?	
7. [X] One or More Emission Units Subject to NESHAP?	
8. [ ] Title V Source by EPA Designation?	
9. Facility Regulatory Classifications Comment (limit to 200 characters):	

List of Applicable Regulations

Not Applicable	

B. FACILITY POLLUTANTS

List of Pollutants Emitted

1. Pollutant Emitted	2. Pollutant Classif.	3. Requested Emissions Cap lb/hour	tons/year	4. Basis for Emissions Cap	5. Pollutant Comment
PM	**A**				**Particulate Matter - Total**
PM_{10}	**A**				**Particulate Matter - PM_{10}**
SO_2	**A**				**Sulfur Dioxide**
FL	**A**				**Fluorides – Total**
NO_X	**A**				**Nitrogen Oxides**
SAM	**A**				**Sulfuric Acid Mist**

C. FACILITY SUPPLEMENTAL INFORMATION

Supplemental Requirements

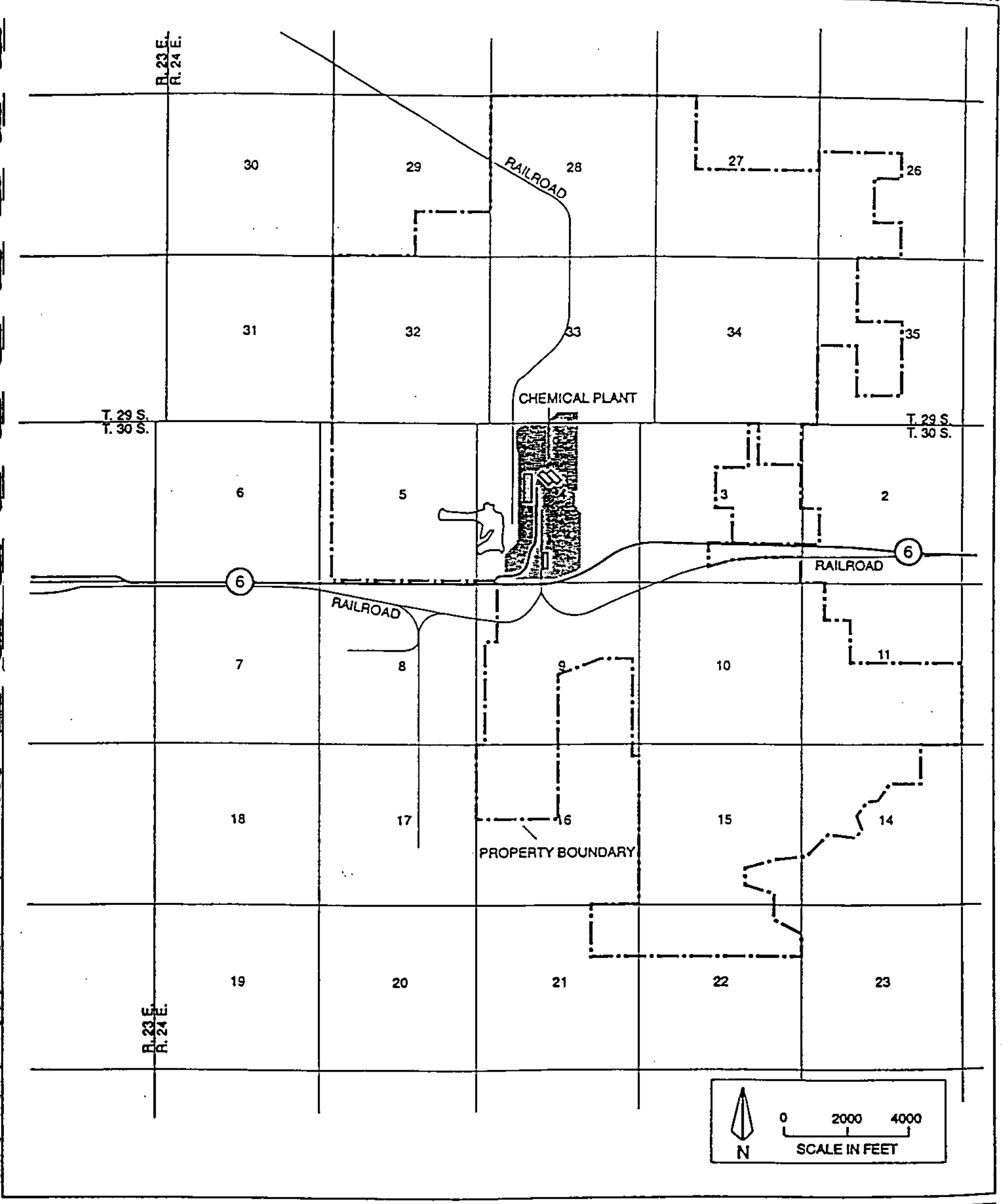
1. Area Map Showing Facility Location: [X] Attached, Document ID: CB-FI-C1 [ ] Not Applicable [ ] Waiver Requested
2. Facility Plot Plan: [X] Attached, Document ID: CB-FI-C2 [ ] Not Applicable [ ] Waiver Requested
3. Process Flow Diagram(s): [X] Attached, Document ID: CB-FI-C3 [ ] Not Applicable [ ] Waiver Requested
4. Precautions to Prevent Emissions of Unconfined Particulate Matter: [ ] Attached, Document ID: ______ [X] Not Applicable [ ] Waiver Requested
5. Fugitive Emissions Identification: [ ] Attached, Document ID: ______ [X] Not Applicable [ ] Waiver Requested
6. Supplemental Information for Construction Permit Application: [ ] Attached, Document ID: ______ [X] Not Applicable
7. Supplemental Requirements Comment:

Additional Supplemental Requirements for Title V Air Operation Permit Applications

8. List of Proposed Insignificant Activities: [ ] Attached, Document ID:________ [ ] Not Applicable
9. List of Equipment/Activities Regulated under Title VI: [ ] Attached, Document ID:________ [ ] Equipment/Activities On site but Not Required to be Individually Listed [ ] Not Applicable
10. Alternative Methods of Operation: [ ] Attached, Document ID:________ [ ] Not Applicable
11. Alternative Modes of Operation (Emissions Trading): [ ] Attached, Document ID:________ [ ] Not Applicable
12. Identification of Additional Applicable Requirements: [ ] Attached, Document ID:________ [ ] Not Applicable
13. Risk Management Plan Verification: [ ] Plan previously submitted to Chemical Emergency Preparedness and Prevention Office (CEPPO). Verification of submittal attached (Document ID:________) or previously submitted to DEP (Date and DEP Office:________________) [ ] Plan to be submitted to CEPPO (Date required:________________) [ ] Not Applicable
14. Compliance Report and Plan: [ ] Attached, Document ID:________ [ ] Not Applicable
15. Compliance Certification (Hard-copy Required): [ ] Attached, Document ID:________ [ ] Not Applicable

ATTACHMENT CB-FI-C1

AREA MAP

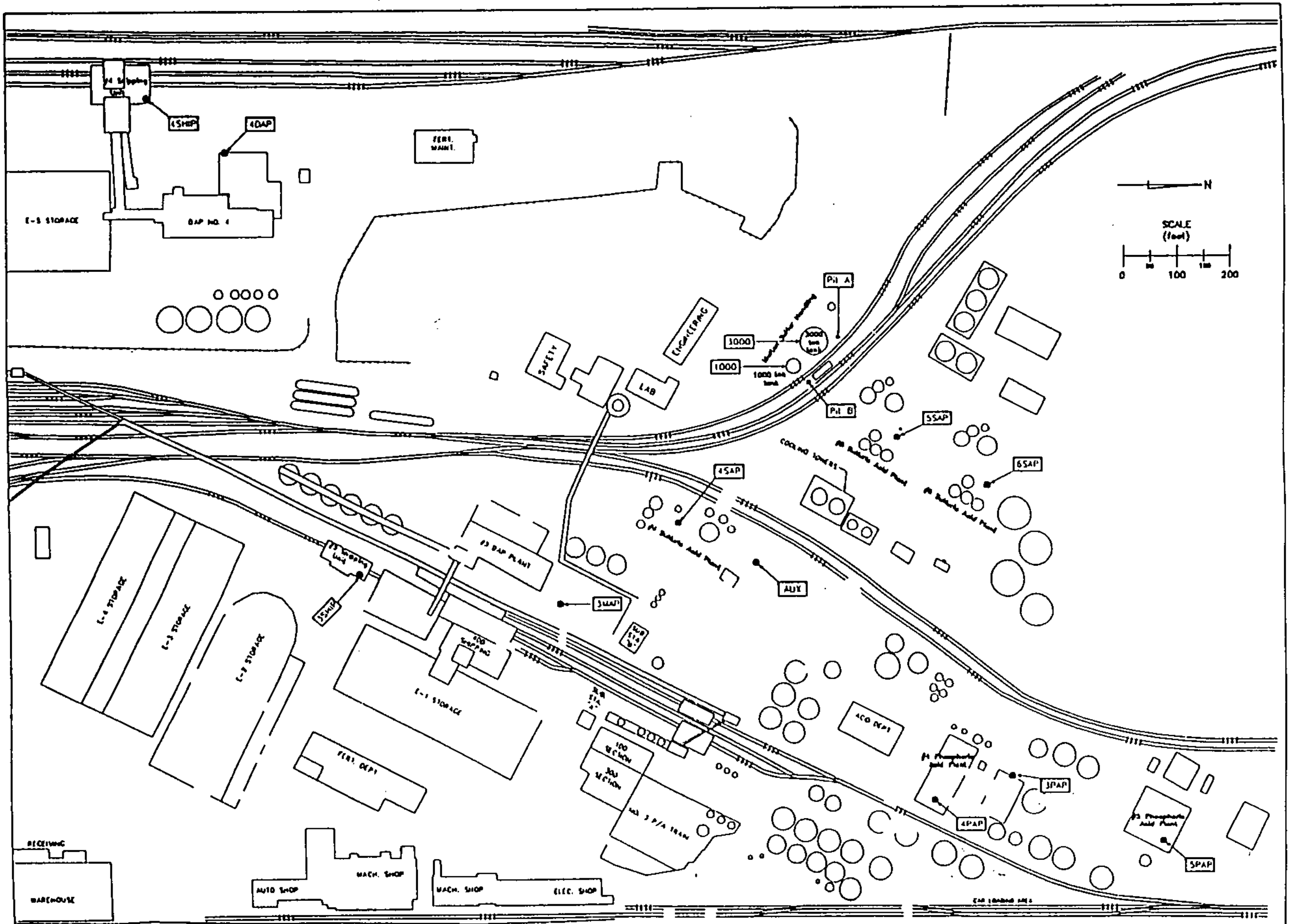


Attachment CB-FI-C1
Area Map Showing Facility Location

Golder Associates

ATTACHMENT CB-FI-C2

FACILITY PLOT PLAN



Attachment CB-FI-C2

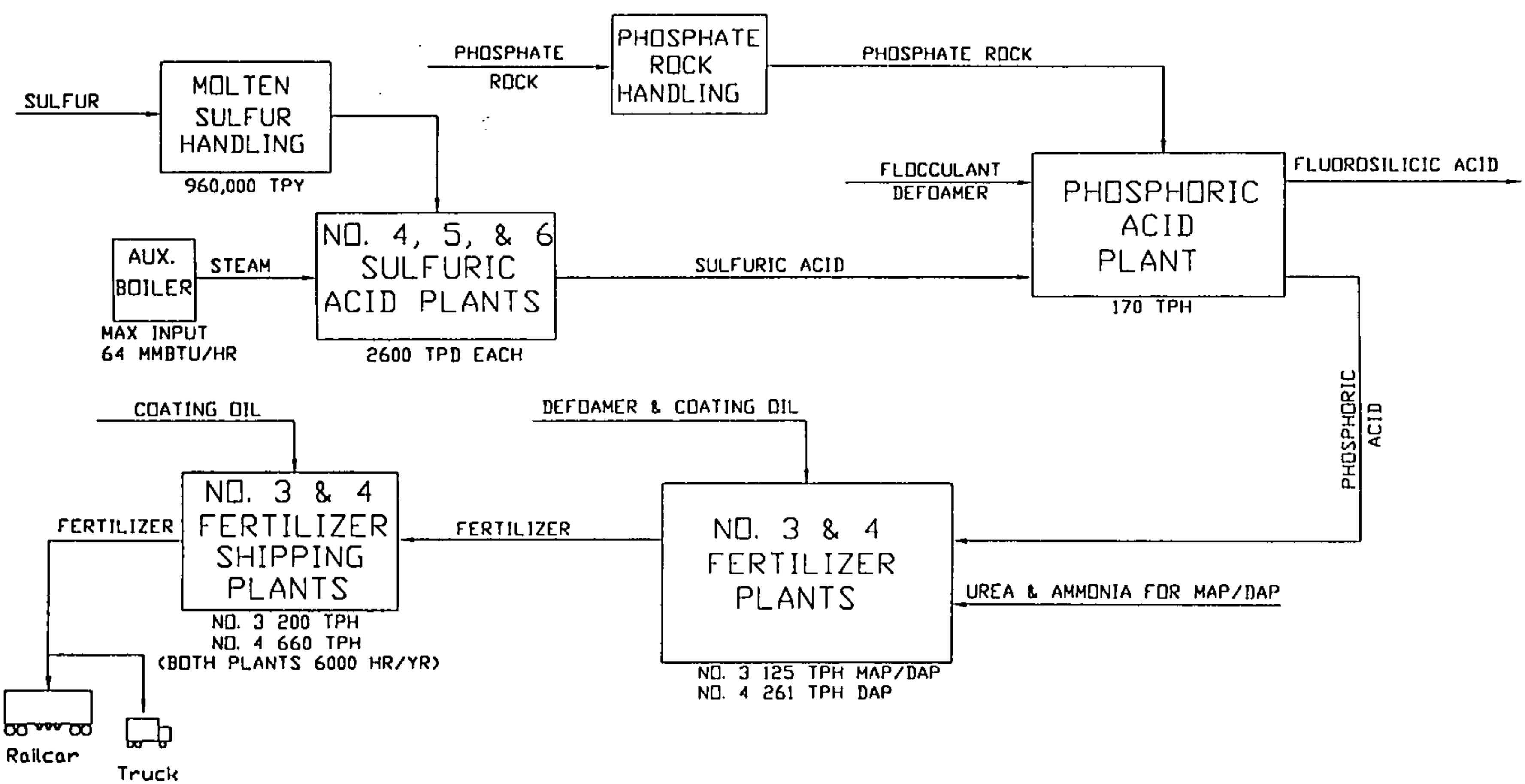
Facility Plot Plan

Golder Associates

ATTACHMENT CB-FI-C3

PROCESS FLOW DIAGRAM

OVERALL PROCESS OF FERTILIZER MANUFACTURING



CARGILL FERTILIZER, INC.

FERTILIZER PRODUCTION PROCESS DIAGRAM

KEN WOOTEN

Attachment CB-FI-C3

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

A. GENERAL EMISSIONS UNIT INFORMATION
(All Emissions Units)

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in This Section: (Check one)

[X] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Regulated or Unregulated Emissions Unit? (Check one)

[X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

Phosphoric Acid Plant

4. Emissions Unit Identification Number: [ ] No ID
ID: **010** [ ] ID Unknown

5. Emissions Unit Status Code:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
A		**28**	[ ]

9. Emissions Unit Comment: (Limit to 500 Characters)

See Attachment CB-EU1-A6

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method): **Cross flow scrubbers (2)** **Venturi Scrubber**	
2. Control Device or Method Code(s): **50, 53**	

Emissions Unit Details

1. Package Unit: Manufacturer:	Model Number:	
2. Generator Nameplate Rating:	MW	
3. Incinerator Information: Dwell Temperature: Dwell Time: Incinerator Afterburner Temperature:		 °F seconds °F

B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Operating Capacity and Schedule

1. Maximum Heat Input Rate:				mmBtu/hr
2. Maximum Incineration Rate:		lb/hr		tons/day
3. Maximum Process or Throughput Rate:			170	TPH P205
4. Maximum Production Rate:				
5. Requested Maximum Operating Schedule:				
	24	hours/day	7	days/week
	52	weeks/year	8,760	hours/year
6. Operating Capacity/Schedule Comment (limit to 200 characters): **Maximum Production Rate = 170 TPH as 100% P205 input.**				

C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

List of Applicable Regulations

40 CFR 60.11(a)
40 CFR 60.11(d)
40 CFR 60.11(f)
40 CFR 60.12
40 CFR 60.13(a)
40 CFR 60.13(b)
40 CFR 60.13(e)
40 CFR 60.13(f)
40 CFR 60.19
40 CFR 60.222 – Standards for Fluorides
40 CFR 60.223 – Monitoring of Operation
40 CFR 60.224 – Test Methods and Procedures
40 CFR 60.7
40 CFR 60.8
62-204.800(7)26.
62-297.310 – Compliance Testing
62-297.401 – Compliance Test Methods

D. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram? **3PAP, 4PAP, 5PAP**	2. Emission Point Type Code: **3**
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point):	
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:	

5. Discharge Type Code: **V**	6. Stack Height: **144** feet	7. Exit Diameter: **4** feet
8. Exit Temperature: **100** °F	9. Actual Volumetric Flow Rate: **40,500** acfm	10. Water Vapor: %

11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet
13. Emission Point UTM Coordinates: Zone: East (km): North (km):	
14. Emission Point Comment (limit to 200 characters): **Actual Exit Diameter – 3.92 feet. Stack parameters are for the No. 4 PAP reactor.**	

E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type) (limit to 500 characters): **Chemical Manufacturing; Phosphoric Acid: Wet Process Reactor**		
2. Source Classification Code (SCC): **3-01-016-01**	3. SCC Units: **Tons Phosphate Rock**	
4. Maximum Hourly Rate: **586.2**	5. Maximum Annual Rate: **5,135,172**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment (limit to 200 characters): **Represents No. 4 and No. 5 Phosphoric Acid Units Combined. Based on 29% P205 in the rock. 170 TPH (daily average) ÷ 0.29 = 586.2 TPH phosphate rock.**		

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type) (limit to 500 characters):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment (limit to 200 characters):		

F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
FL	050	053	EL

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **FL**	2. Total Percent Efficiency of Control: %
3. Potential Emissions: **2.29** lb/hour **10.01** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: **2.29 lb/hr** Reference: **Permit 1050046-003AV**	7. Emissions Method Code: **0**
8. Calculation of Emissions (limit to 600 characters): **2.29 lb/hr x 8,760 hr/yr ÷ 2,000 lb/ton = 10.01 TPY**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:	4. Equivalent Allowable Emissions: **2.29** lb/hour **10.01** tons/year
5. Method of Compliance (limit to 60 characters): **Annual Stack Test using EPA Method 13A or 13B**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on BACT**	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **FL**	2. Total Percent Efficiency of Control: %
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8. Calculation of Emissions (limit to 600 characters):	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **0.02 lb/ton P205**	4. Equivalent Allowable Emissions: **2.29** lb/hour **10.01** tons/year
5. Method of Compliance (limit to 60 characters): **Annual Stack Test Using EPA Method 13A or 13B**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on NSPS, 40 CFR 60, Subpart T. Emissions limited to lesser of 0.02 lb/ton and 2.29 lb/hr.**	

H. VISIBLE EMISSIONS INFORMATION
(Only Regulated Emissions Units Subject to a VE Limitation)

Visible Emissions Limitation: Visible Emissions Limitation ______ of ______

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: [ ] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment (limit to 200 characters):	

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor ______ of ______

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters):	

J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)

Supplemental Requirements

1.	Process Flow Diagram [X] Attached, Document ID: CB-EU1-J1 [ ] Not Applicable [ ] Waiver Requested
2.	Fuel Analysis or Specification [ ] Attached, Document ID:______ [X] Not Applicable [ ] Waiver Requested
3.	Detailed Description of Control Equipment [X] Attached, Document ID: See Part B [ ] Not Applicable [ ] Waiver Requested
4.	Description of Stack Sampling Facilities [ ] Attached, Document ID:______ [X] Not Applicable [ ] Waiver Requested
5.	Compliance Test Report [ ] Attached, Document ID:______ [ ] Previously submitted, Date:______ [X] Not Applicable
6.	Procedures for Startup and Shutdown [ ] Attached, Document ID:______ [X] Not Applicable [ ] Waiver Requested
7.	Operation and Maintenance Plan [ ] Attached, Document ID:______ [X] Not Applicable [ ] Waiver Requested
8.	Supplemental Information for Construction Permit Application [X] Attached, Document ID:______ [X] Not Applicable
9.	Other Information Required by Rule or Statute [ ] Attached, Document ID:______ [X] Not Applicable
10.	Supplemental Requirements Comment:

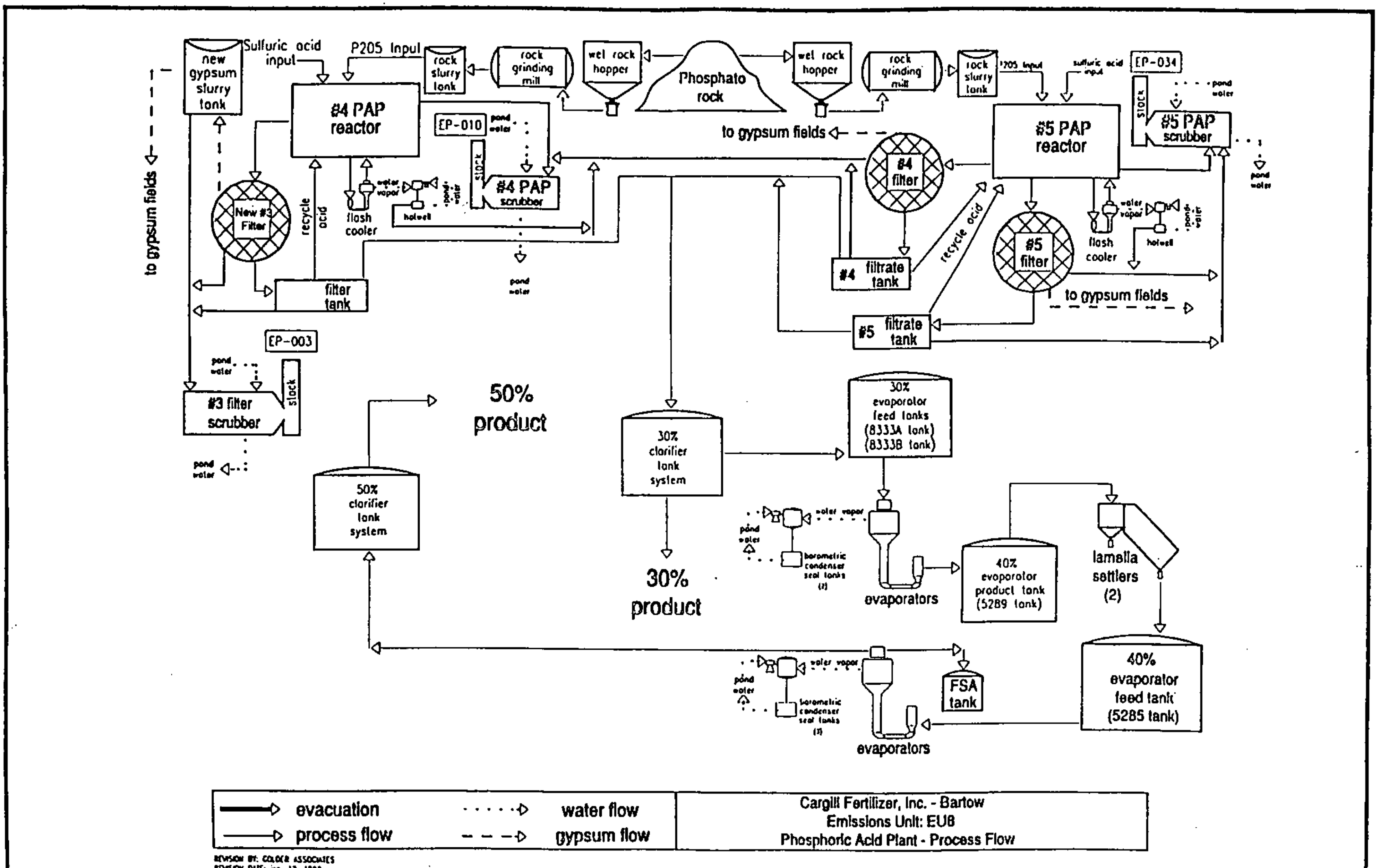
Additional Supplemental Requirements for Title V Air Operation Permit Applications

11. Alternative Methods of Operation [ ] Attached, Document ID:________ [X] Not Applicable
12. Alternative Modes of Operation (Emissions Trading) [ ] Attached, Document ID:________ [X] Not Applicable
13. Identification of Additional Applicable Requirements [ ] Attached, Document ID:________ [X] Not Applicable
14. Compliance Assurance Monitoring Plan [ ] Attached, Document ID:________ [X] Not Applicable
15. Acid Rain Part Application (Hard-copy Required) [ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a)) Attached, Document ID:________ [ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) Attached, Document ID:________ [ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.) Attached, Document ID:________ [ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) Attached, Document ID:________ [ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) Attached, Document ID:________ [ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) Attached, Document ID:________ [X] Not Applicable

ATTACHMENT CB-EU1-J1

PROCESS FLOW DIAGRAM

EMISSION UNIT



Attachment CB-EU1-J1

PSD Report

1.0 INTRODUCTION

Cargill Fertilizer, Inc., operates a phosphate fertilizer manufacturing facility located west of Bartow in Polk County, Florida (refer to Figure 1-1). As part of the overall manufacturing process, phosphoric acid is produced in the Phosphoric Acid Plant (PAP). Phosphoric acid is then reacted with anhydrous ammonia to produce either monoammonium phosphate (MAP) or diammonium phosphate (DAP) elsewhere in the facility.

Currently, the PAP consists of the Nos. 4 and 5 Phosphoric Acid Reactors, the Nos. 3, 4, and 5 Phosphoric Acid Filters, and associated material handling and pollution control equipment. Cargill is proposing to replace existing Phosphoric Acid Filter No. 4. with a new filter capable of recovering more of the P_2O_5 received from Phosphoric Acid Reactor No. 5. The improved P_2O_5 recovery efficiency will result in increased phosphoric acid production without increasing the permitted maximum P_2O_5 feed rate to the reactors or increasing maximum permitted fluoride emission rates.

Based on the difference between actual annual fluoride emission from the existing PAP and potential fluoride emissions from the PAP after replacement of No. 4 Phosphoric Acid Filter, as well as potential debottlenecking of other emission units at the facility, the proposed project will constitute a major modification to a major stationary source under current federal and state air quality regulations. This report addresses the requirements of new source review under the prevention of significant deterioration (PSD) rules and regulations implementing the Clean Air Act Amendments of 1977. The Florida Department of Environmental Protection (FDEP) has PSD review and approval authority in Florida. Based on the PSD source applicability analysis, a PSD review is indicated for PM_{10} (particulate matter with an aerodynamic diameter less than 10 microns) and fluoride emissions.

This application contains six additional sections. A complete description of the project, including air emission rates, is presented in Section 2.0. The air quality review requirements and new source review applicability of the project are discussed in Section 3.0.

Ambient monitoring requirements under PSD are addressed in Section 4.0. The best available control technology (BACT) analysis is presented in Section 5.0. The air quality impact analysis and impacts on soils, vegetation and visibility required as part of the PSD permitting process are addressed in Sections 6.0 and 7.0, respectively.

2.0 PROJECT DESCRIPTION

Cargill Fertilizer Inc., operates a phosphate fertilizer facility located west of Bartow, Florida (see Figure 1-1). Cargill is proposing to modify the existing Phosphoric Acid Plant (PAP) by replacing the No. 4 Phosphoric Acid Filter with a new filter capable of more efficient (higher recovery of P_2O_5) operation.

The existing PAP is currently operating under Permit No. 1050046-003-AV, issued October 6, 1998. The location of the PAP at Cargill is shown in Figure 2-1, which is a plot plan of the Bartow facility.

2.1 DESCRIPTION OF EXISTING PROCESS

Currently, the PAP consists of the Nos. 4 and 5 Phosphoric Acid Reactors, the Nos. 3, 4, and 5 Phosphoric Acid Filters, along with associated material handling and pollution control equipment. In the PAP, sulfuric acid is combined with ground phosphate rock in the reactors. The reactors produce a slurry of phosphoric acid and gypsum. The No. 4 Phosphoric Acid Reactor discharges to the No. 3 Phosphoric Acid Filter. The No. 5 Phosphoric Acid Reactor discharges to the No. 4 and No. 5 Phosphoric Acid Filters. The filters separate the phosphoric acid from the gypsum. The phosphoric acid, which is about 30 percent strength at this point, is sent to the filtrate tanks, to a clarifier, and then to evaporators where the strength of the acid is increased to 40 percent. From the evaporators, the 40 percent strength acid is pumped to the evaporator storage tank, to the two lamella settlers, and then to the 40 percent evaporator feed tank. A second evaporator is used to further concentrate the acid to a strength of 50 percent, after which it is again clarified and stored as the final product from the PAP.

Fluoride emissions from the existing gypsum slurry tank, the No. 3 Phosphoric Acid Filter, and the filtrate tank serving the No. 4 Phosphoric Acid Reactor, are controlled by the No. 3 Phosphoric Acid Filter Scrubber. Fluoride emissions from the No. 4 Phosphoric Acid Reactor, the No. 4 Filtrate Tank, and the No. 4 Phosphoric Acid Filter are controlled by the No. 4 PAP Scrubber. Fluoride emissions from the No. 5 Phosphoric Acid Reactor, the No. 5 Phosphoric Acid Filter, and the No. 5 Filtrate Tank are controlled by the No. 5 PAP Scrubber.

The existing No. 4 Phosphoric Acid Filter consists of a rotating filter table approximately 52.5 ft in diameter. The filter table is divided into 24 pie-shaped compartments. A slurry of phosphoric acid and gypsum from the reactor is discharged into each compartment as it passes the discharge point. A fixed hood (does not rotate with the filter table), covering approximately a 90 degree sector of the filter starting at the slurry discharge point, is used to capture fluoride emissions which evolve from the surface of the filter table. As the filter rotates, gypsum is filtered out and phosphoric acid is collected below in the No. 4 Filtrate Tank. The rate of rotation of the filter is adjusted to allow for sufficient recovery of phosphoric acid. As each compartment completes its cycle, the gypsum accumulated on the top of the filter is discharged. The compartment is then ready to receive a new batch of slurry.

2.2 DESCRIPTION OF PROPOSED MODIFICATION

Cargill is proposing to modify the existing PAP by replacing the existing No. 4 Phosphoric Acid Filter. The design of the proposed phosphoric acid filter will be similar to the existing No. 4 Phosphoric Acid Filter except the diameter of the filter table will be increased slightly, resulting in additional filter surface area. The larger surface area of the proposed filter will allow Cargill to recover phosphoric acid that is currently lost in the void space of the gypsum.

A new hood covering approximately a 104 degree sector of the proposed filter table will be used to capture fluoride emissions which will be vented to the existing No. 4 PAP Scrubber. Although the proposed project will increase the actual production of phosphoric by increasing recovery of phosphoric acid from the slurry, Cargill is not requesting to increase the currently permitted P_2O_5 feed rate to the PAP of 170 tons per hour (TPH), based on 586 TPH phosphate rock at 29% P_2O_5. As described above, the purpose of the project is to enhance P_2O_5 recovery.

2.3 EMISSIONS AND STACK PARAMETERS

The PAP is currently subject to a fluoride emission limit of 2.29 lb/hr as specified in Operating Permit No. 1050046-003-AV. The current operating permit further limits the capacity of the existing PAP to 170.0 TPH of equivalent P_2O_5 feed rate. Although, the proposed project will likely result in an increase in the production of P_2O_5, the increase is due to better recovery of P_2O_5 and not an increase in the amount of P_2O_5 feed rate. Since there is a finite amount of fluoride in phosphate rock, and the amount of phosphate rock fed to the modified PAP will not change as a result of this project, potential fluoride emissions from the modified PAP are not expected increase as a result of this project. As such, Cargill is not requesting to increase the fluoride emission rate currently permitted for the PAP.

3.0 SOURCE APPLICABILITY

3.1 PSD REVIEW

3.1.1 POLLUTANT APPLICABILITY

The Cargill Bartow facility is considered to be an existing major stationary facility because potential emissions of certain regulated pollutants exceed 100 TPY (for example, potential PM emissions currently exceed 100 TPY). As a result, PSD review is required for the proposed modification for each pollutant for which the net increase in emissions exceeds the PSD significant emission rates (i.e., a major modification; see Table 3-1).

The proposed project includes replacement of the No. 4 Phosphoric Acid Filter. As a result of the proposed project, actual annual fluoride emissions from the PAP may increase (based on the difference between potential fluoride emissions and average of fluoride emissions reported for the PAP in Annual Operating Reports for 1998 and 1999 operations).

A PSD applicability analysis is presented in Table 3-1. The increase in annual emissions due to the proposed project, changes in annual emissions due to potential debottlenecking of upstream and downstream sources associated with the proposed project, and contemporaneous emission changes occurring over the last 5 years, are shown in Table 3-1.

Sulfuric acid is used in the production of phosphoric acid. Sulfuric acid is produced at three sulfuric acid plants at the Bartow facility. Significant amounts of sulfuric acid are also purchased from outside sources. Although the proposed project will result in the production of additional phosphoric acid (P_2O_5), this increase is a result of better recovery of the P_2O_5 in the phosphoric acid and not a result of processing of additional phosphate rock. No additional sulfuric acid will be needed as a result of this project. Therefore, the sulfuric acid plants will not be affected by the proposed project.

Several emission units at the Bartow facility located downstream from the PAP. These emission units include the Nos. 3 and 4 Fertilizer Plants and the Nos. 3 and 4 Shipping

Plants. Production of additional P_2O_5 could allow these downstream emission units to increase production.

The No. 3 Fertilizer Plant is currently under a PSD construction permit to increase MAP/DAP production from 2,640 tons per day (TPD) to 3,000 TPD. This construction permit was issued April 21, 1999, but has not yet been implemented by Cargill. As such, there is no operational history on which to base actual annual emissions. In accordance with FDEP/EPA PSD rules, actual emissions can be assumed to be equal to potential emissions for the No. 3 Fertilizer Plant in such a case. Based on this discussion, the proposed project does not affect emissions from the No. 3 Fertilizer Plant.

Only the MAP/DAP produced in the No. 3 Fertilizer Plant is sent to the No. 3 Shipping Plant. The debottlenecking analysis presented in the previous PSD application for the for the No. 3 Fertilizer Plant already addressed potential emission resulting from additional MAP/DAP handling in the No. 3 Shipping Plant. Since the No. 3 Fertilizer Plant is unaffected by this project, and emissions that might result from handling additional MAP/DAP in the shipping plant were addressed in the previous PSD application and permit, the No. 3 Shipping Plant is also not affected by this project.

The No. 4 Fertilizer and No. 4 Shipping Plant may be affected by the proposed project. Therefore these emissions units were included in the PSD source applicability analysis. Actual annual fluoride and PM_{10} emissions from the No. 4 Fertilizer Plant and the Nos. 3 and 4 Shipping Plants were based on the average of emissions reported in Cargill's 1998 and 1999 Annual Operating Reports for the Bartow facility. The annual average emission rates for these sources are presented in Table 3-2.

PSD regulations require that contemporaneous emission changes at a facility, occurring during the previous 5 years, be included the PSD source applicability analysis. The results of the contemporaneous emissions evaluation for Cargill's Bartow facility are presented in Table 3-2. Four projects resulting in contemporaneous emission changes over the last five years are listed in the table. Three of these projects triggered PSD review for one or more pollutants. Per EPA guidance, when PSD is triggered for a particular pollutant, the slate is "wiped clean" and there is no further consideration of past, contemporaneous emission changes for that pollutant.

Based on the net increase in emissions due to the modification and contemporaneous emission changes over the past 5 years, PSD new source review is required for SO_2, PM_{10}, and F. PM_{10} is defined as PM with an aerodynamic particle size diameter of 10 micrometers or less. Under PSD new source review requirements, a proposed modification that results in a significant net emissions increase must undergo the following reviews:

1. BACT evaluation,
2. Air quality impact analysis,
3. Ambient monitoring analysis, and
4. Additional impact analysis.

These requirements are addressed in Sections 4.0 through 7.0.

3.1.2 AMBIENT MONITORING

Based on the increase in emissions from Cargill's proposed project, a PSD preconstruction ambient monitoring analysis is required for SO_2, PM_{10} and F. However, if the increase in impacts of a pollutant is less than the *de minimis* monitoring concentration, then an exemption from the preconstruction ambient monitoring requirement may be granted for that pollutant. In addition, if an acceptable ambient monitoring method for the pollutant has not been established by EPA, monitoring is not required.

For SO_2, the maximum 24-hour impact due to the proposed project is 4.1 micrograms per cubic meter ($\mu g/m^3$) (refer to Section 6.0). The increase in ambient impact due to the project is less than the *de minimis* monitoring concentration of 13 $\mu g/m^3$. As a result, the proposed modification can be exempted from the preconstruction monitoring requirements for SO_2.

For PM_{10}, the maximum 24-hour impact due to the proposed expansion is 11.34 $\mu g/m^3$ (refer to Section 6.0). The increase in impacts is above the *de minimis* monitoring concentration of 10 $\mu g/m^3$. As a result, the proposed modification cannot be exempted from the preconstruction monitoring requirements for PM_{10}.

There is no *de minimis* monitoring concentration for F. As a result, preconstruction monitoring is not required for fluorides.

3.1.3 GEP STACK HEIGHT ANALYSIS

The GEP stack height regulations allow any stack to be at least 65 m (213 ft) high. All stack heights at the Bartow facility are less than 213 ft. Therefore, all stacks at Cargill's Bartow facility are in compliance with GEP stack height regulations.

3.1.4 BEST AVAILABLE CONTROL TECHNOLOGY

The federal PSD regulations as promulgated in 40 CFR 52.21(j)(3) states that BACT is applied only to those emission units that are being physically modified, or for which there is a change in the method of operation, due to the proposed project. The rule quote is provided below:

> "A major modification shall apply best available control technology for each pollutant subject to regulation under the Act for which it would result in a significant net emissions increase at the source. This requirement applies to each proposed emissions unit at which a net emissions increase in the pollutant would occur as a result of a physical change or change in the method of operation in the unit."

Florida's PSD rules (Rule 62-212.400) were designed to be equivalent to EPA's rules. Therefore, BACT review only applies to the modification to the PAP. A BACT determination is not required for affected sources upstream or downstream of the PAP, even though they are required to be included in the PSD source applicability determination, since these emissions units are not undergoing a physical or operational change.

3.2 NON-ATTAINMENT REVIEW

The Cargill facility is located in Polk county, which has been designated as an attainment area for SO_2, PM_{10} and F. As a result, non-attainment review does not apply to the proposed project.

3.3 NEW SOURCE PERFORMANCE STANDARDS

Federal NSPS have been promulgated for new and modified PAP plants (40 CFR 60, Subpart T). The NSPS currently applies to the PAP, and will continue to apply in the future. The NSPS limit for F emissions is 0.02 lb/ton of P_2O_5. Cargill's current operating permit for the PAP limits production of P_2O_5 to 170 TPH and fluoride emissions to 2.29 lb/hr. Using these permit limits, fluoride emissions are calculated to be 0.0135 lb/ton of P_2O_5, which is well below the NSPS limit of 0.02 lb/ton of P_2O_5

4.0 AMBIENT MONITORING ANALYSIS

4.1 INTRODUCTION

In accordance with requirements of 40 CFR 52.21(m) and Rule 62-212.400(5)(f), F.A.C., any application for a PSD permit must contain an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility or major modification. For a new major facility, the affected pollutants are those that the facility potentially would emit in significant amounts. For a major modification, the pollutants are those for which the net emissions increase exceeds the significant emission rate.

Ambient air monitoring for a period of up to 1 year is generally appropriate to satisfy the PSD monitoring requirements. A minimum of 4 months of data is required. Existing data from the vicinity of the proposed source may be used if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered. Guidance in designing a PSD monitoring network is provided in EPA's Ambient Monitoring Guidelines for Prevention of Significant Deterioration (EPA, 1987).

An exemption from the preconstruction ambient monitoring requirements is also available if certain criteria are met. If the predicted increase in ambient concentrations due to the proposed modification is less than specified *de minimis* concentrations, then the modification can be exempted from the preconstruction air monitoring requirements for that pollutant.

The PSD *de minimis* monitoring concentration for PM_{10} is 10 $\mu g/m^3$, 24-hour average. The PSD *de minimis* monitoring concentration for SO_2 is 13 $\mu g/m^3$, 24-hour average. The predicted increase in PM_{10} and SO_2 concentrations due to the proposed modification only are presented in Section 6.0. The predicted 24-hour average, PM_{10} and SO_2 impacts from the proposed project are 11.34 and 4.1 $\mu g/m^3$, respectively. Since the predicted increase of PM_{10} impacts due to the proposed modification to the PAP are greater than the *de minimis* monitoring concentration for that pollutant, a preconstruction air monitoring analysis is required PM_{10}. A preconstruction air monitoring analysis is not required for SO_2, because the predicted increase in impact due to the project is less than the *de minimis* monitoring concentration.

4.2 PM_{10} AMBIENT MONITORING BACKGROUND CONCENTRATIONS

The PSD ambient monitoring guidelines allow the use of existing data to satisfy preconstruction review requirements and to develop background concentrations. "Background concentrations" are defined as concentrations due to sources other than those specifically included in the modeling analysis. For PM_{10}, background would include other point sources not included in the modeling (i.e., faraway sources or small sources), fugitive emission sources, and natural background sources.

Presented in Table 4-1 is a summary of existing ambient PM/PM_{10} data for monitors located in the vicinity of Cargill's Bartow facility. Data are presented for 1998 and 1999. As shown in Table 4-1, these PM_{10} monitors were in operation in the vicinity of Cargill's Bartow facility during this period.

The monitoring data shows that ambient PM_{10} concentrations were well below the ambient air quality standards of 150 $\mu g/m^3$, maximum 24-hour average, and 50 $\mu g/m^3$, annual average. For purposes of an ambient PM_{10} background concentration for use in the modeling analysis, the annual average PM_{10} concentration of 22 $\mu g/m^3$, measured in 1999 at both monitoring locations, was used. This concentration was utilized for both the 24-hour and annual average background PM_{10} concentrations in the air quality impact analysis since this monitor is impacted by sources explicitly included in the modeling.

5.0 BACT ANALYSIS

5.1 REQUIREMENTS

The 1977 Clean Air Act Amendments established requirements for the approval of preconstruction permit applications under the PSD program. One of these requirements is that the best available control technology (BACT) be installed for all applicable pollutants emitted by new or modified emissions units. BACT determinations must be made on a case-by-case basis considering technical, economic, energy, and environmental impacts for various BACT alternatives. To bring consistency to the BACT process, the EPA developed the so called "top-down" approach to BACT determinations. This approach has been challenged in court and a settlement agreement reached that requires EPA to initiate formal rulemaking on the "top-down" approach. However, EPA has not yet promulgated rules which address this approach. Nonetheless, in the absence of formal rules related to this approach, the "top-down" approach is followed in the Cargill BACT analysis.

The first step in a "top-down" BACT analysis is to determine, for each applicable pollutant, the most stringent control alternative available for a similar source or source category. If it can be shown that this level of control is not feasible on the basis of technical, economic, energy, or environmental impacts for the source in question, then the next most stringent level of control is identified and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any technical, economic, energy, or environmental consideration.

In the case of the proposed project at Cargill, annual emissions of PM/PM_{10}, SO_2, and fluoride are above significant emissions rates triggering PSD review for these pollutants. However, the proposed project involves physical modification of just the phosphoric acid plant which is a source of fluoride emissions only. Emissions of PM/PM_{10} and SO_2 will only increase as a result of debottlenecking or contemporaneous emission increases at emission units that will not be physically modified as a result of this project. As such, this BACT analysis only addresses control of fluoride emissions.

5.2 PROPOSED FLUORIDE CONTROL TECHNOLOGY

Fluoride emissions from the existing PAP are currently controlled by three scrubbers. A description of these scrubbers is presented below:

Scrubber Manufacturer	Sources Controlled	Scrubber Type
Wellman-Lord	No. 4 Reactor/Hotwell	Cross-Flow Packed Scrubber
	No. 4 Filter	
	No. 4 Filtrate Tank	
	Nos. 1- 4 Evaporator Seal Tanks	
Wellman-Lord	No. 5 Reactor/Hotwell	Cross-Flow Packed Scrubber
	No. 5 Filter	
	No. 5 Filtrate Tank	
	30% Evaporator Feed Tank	
	40% Evaporator Product Tanks	
	Lamella Settlers	
	40% Evaporator Feed Tank	
VESCOR Replica	No. 3 Filter	Venturi/Demister
	Gypsum Slurry Tank	
	No. 3 Filtrate Tank	

Fluoride emissions from the entire PAP are limited by Operation Permit 1050046-300-AV to 2.29 lb/hr and 10.01 TPY. Currently, the existing scrubber system is achieving lower fluoride emission rates than required by the Operation Permit The results of the last two compliance tests for the facility are summarized in Table 5-1. As shown in Table 5-1, actual fluoride emission rates for the existing PAP measured during the 1998 and 1999 compliance tests were 0.49 lb/hr (0.0032 lb/ton of P_2O_5) and 0.37 lb/hr (0.0025 lb/ton P_2O_5), respectively.

A summary of recent BACT determinations for fluoride emissions from phosphoric acid plants is presented in Table 5-2. The source of the BACT determinations presented in Table 5-2 is USEPA's RACT/BACT/LAER Clearinghouse web site. The two most recent and stringent BACT determinations are for the PAP at Cargill's facility located in Riverview, Fl and the PAP at Bartow that is the subject of this application. However, the BACT determination presented in the RACT/BACT/LAER Clearinghouse document for the existing PAP at this facility is incorrectly presented as 0.012 pounds of F per ton of P_2O_5. As part of a BACT determination for a previous project modifying the existing PAP at the Bartow facility, FDEP concluded that BACT for a new facility would be 0.012 pounds of F per ton of P_2O_5 , but BACT for the existing facility was 0.0135 pounds of F per ton of P_2O_5.

Since there is a finite amount of fluoride in phosphate rock and Cargill is not requesting to increase the hourly rate phosphate rock processed, no increase in emissions is anticipated. However, given the uncertainties associated with operation of a new filter table, the benefit to the environment (increased P_2O_5 recovery without an increase in the amount of rock processed and associated F emissions at a substantial capital cost to Cargill), and that no more stringent control alternatives have been implemented than those already in place, Cargill is proposing their current emissions limits, based on 0.0135 pounds of F per ton of P_2O_5, as BACT.

6.0 AIR QUALITY IMPACT ANALYSIS

6.1 SIGNIFICANT IMPACT ANALYSIS

The general modeling approach followed EPA and FDEP modeling guidelines for determining compliance with AAQS and PSD increments. For all criteria pollutants that will be emitted in excess of the PSD significant emission rate due to a proposed project, a significant impact analysis is performed to determine whether the emission and/or stack configuration changes due to the project alone will result in predicted impacts that are in excess of the EPA significant impact levels at any location beyond the plant property boundaries.

Generally, if the facility undergoing the modification also is within 150 kilometers of a PSD Class I area, then a significant impact analysis is also performed for the PSD Class I area. The maximum predicted PSD Class I impacts are compared to EPAs proposed significant impact levels for PSD Class I areas. The recommended levels have not been promulgated as rules.

If the project's impacts are above the significant impact levels, then a more detailed air modeling analysis that includes background sources is performed. Current FDEP policies stipulate that the highest annual average and highest short-term (i.e., 24 hours or less) concentrations are to be compared to the applicable significant impact levels. Based on the screening modeling analysis results, additional modeling refinements with a denser receptor grid are performed, as necessary, to obtain the maximum concentration. Modeling refinements are performed with a receptor grid spacing of 100 meters (m) or less.

6.2 AAQS/PSD MODELING ANALYSIS

For each pollutant for which a significant impact is predicted, a refined impact analysis is required. This analysis must consider other nearby sources and background concentrations and predict concentrations for comparison to ambient standards. In general, when 5 years of meteorological data are used in the analysis, the highest annual and the highest, second-highest (HSH) short-term concentrations are compared to the applicable AAQS and allowable PSD increments. The HSH concentration is calculated for a receptor field by:

1. Eliminating the highest concentration predicted at each receptor,
2. Identifying the second-highest concentration at each receptor, and
3. Selecting the highest concentration among these second-highest concentrations.

This approach is consistent with air quality standards and allowable PSD increments, which permit a short-term average concentration to be exceeded once per year at each receptor. However, for PM_{10}, the highest, sixth-highest (H6H) for all five years is used to compare to AAQS. Using the H6H concentration is consistent with the AAQS for PM_{10} which permit a short-term average concentration to be exceeded five times over a five-year period at each receptor.

To develop the maximum short-term concentrations for the proposed project, the modeling approach was divided into screening and refined phases to reduce the computation time required to perform the modeling analysis. For this study, the only difference between the two modeling phases is the density of the receptor grid spacing employed when predicting concentrations. Concentrations are predicted for the screening phase using a coarse receptor grid and a 5-year meteorological data record.

If the original screening analysis indicates that the highest concentrations are occurring in a selected area(s) of the grid and, if the area's total coverage is too vast to directly apply a refined receptor grid, then an additional screening grid(s) will be used over that area. The additional screening grid(s) will employ a greater receptor density than the original screening grid, so refinements can be performed if necessary.

Refinements of the maximum predicted concentrations are typically performed for the receptors of the screening receptor grid at which the highest and/or HSH concentrations occurred over the 5-year period. Generally, if the maximum concentration from other years in the screening analysis are within 10 percent of the overall maximum concentration, then those other concentrations are refined as well. Typically, if the highest and HSH concentrations are in different locations, concentrations in both areas are refined.

Modeling refinements are performed for short-term averaging times by using a denser receptor grid, centered on the screening receptor to be refined. The angular spacing between radials is 2 degrees and the radial distance interval between receptors is 100 m. Annual modeling refinements employ an angular spacing between radials of 2 degrees and a distance interval from 100 to 300 m, depending on the concentration gradient in the vicinity of the screening receptor to be refined. If the maximum screening concentration is located on the plant property boundary, additional plant boundary receptors are input, spaced at a 2 degree angular interval and centered on the screening receptor. The domain of the refinement grid will extend to all adjacent screening receptors. The air dispersion model is then executed with the refined grid for the entire year of meteorology during which the screening concentration occurred. This approach is used to ensure that a valid HSH concentration is obtained. A more detailed description of the model, along with the emission inventory, meteorological data, and screening receptor grids, is presented in the following sections.

6.2.1 MODEL SELECTION

The Industrial Source Complex Short-term (ISCST3, Version 99155) dispersion model (EPA, 1997) was used to evaluate the pollutant impacts due to the proposed project in areas within 50-km of the proposed facility. This model is maintained by the EPA on its Internet website, Support Center for Regulatory Air Models (SCRAM), within the Technical Transfer Network (TTN). A listing of ISCST3 model features is presented in Table 6-1. The ISCST3 model is designed to calculate hourly concentrations based on hourly meteorological data (i.e., wind direction, wind speed, atmospheric stability, ambient temperature, and mixing heights). The ISCST3 model is applicable to sources located in either flat or rolling terrain where terrain heights do not exceed stack heights. These areas are referred to as simple terrain. The model can also be applied in areas where the terrain exceeds the stack heights. These areas are referred to as complex terrain.

In this analysis, the EPA regulatory default options were used to predict all maximum impacts. The ISCST3 model can run in the rural or urban land use mode that affects stability dispersion coefficients, wind speed profiles, and mixing heights. Land use can be characterized based on a scheme recommended by EPA (Auer, 1978). If more than 50 percent land use within a 3-km radius around a project is classified as industrial or commercial, or high-density residential, then the urban option should be selected. Otherwise, the rural option is appropriate. Based on the land-use within a 3-km radius of the proposed plant site (see Figure 1-1), the rural dispersion coefficients were used in the modeling analysis.

The ISCST3 model was used to provide maximum concentrations for the annual and 24-, 8-, 3-, and 1-hour averaging times.

For predicting maximum impacts at the Chassahowitzka NWA, a PSD Class I area, the California Puff (CALPUFF) model was used. CALPUFF, Version 5.2 (11/99), is a Lagrangian puff model that is the recommended by FDEP for predicting the pollutant impacts at receptor distances beyond 50 km. For this project, CALPUFF was used in a refined mode using the FDEP's CALMET-developed wind field. A more detailed discussion of CALPUFF and the CALMET wind field is provided in Appendix B.

6.2.2 METEOROLOGICAL DATA

Meteorological data used in the ISCST3 model to determine air quality impacts consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) stations at the Tampa International Airport in Tampa, Florida, and at Ruskin, Florida, respectively. The 5-year period of meteorological data was from 1987 through 1991. The NWS station at Tampa is located approximately 69 km to the northwest of the Cargill Riverview plant site. The surface meteorological data from Tampa are assumed to be representative of the project site because both the project site and the weather station are located in similar topographical areas and are situated in west central Florida to experience similar weather conditions, such as frontal passages.

Meteorological data used with the CALPUFF model consisted of a CALMET wind field, developed by the FDEP. A detailed description of the CALMET wind field is provided in Appendix B.

6.2.3 EMISSION INVENTORY

Significant Impact Analysis

The emission rate increases and the physical and operational stack parameters for the PAP and other Cargill sources affected by this project are summarized in Table 6-2. All sources were modeled at locations relative to the No. 4 Fertilizer Plant stack, which is the modeling origin that has been used in previous PSD applications for the Cargill Bartow facility.

AAQS Analysis

An inventory of future Cargill PM_{10} emitting sources and their locations relative to the origin is provided in Table 6-3. Note that potential and permitted emissions from these sources will not change as a result of this project. Non-Cargill, PM emitting facilities, within 150 km of the Cargill facility that were considered in the air modeling analysis are presented in Table 6-4. An inventory is not presented for non-Cargill, SO_2 emitting sources, since the increase in SO_2 impacts from the proposed project were determined to be below significant impact concentrations for SO_2. (see Section 6.3.1).

All PM_{10} emitting facilities were evaluated using the North Carolina screening technique. Based on this technique, facilities with maximum annual emissions in tons per year less than the quantity 20 x (D-SIA), where D is the distance in km from the facility to Cargill-Bartow, and SIA is the proposed project's significant impact distance for PM/PM_{10}, were eliminated from the modeling analysis. The facilities that were eliminated from consideration are shown in Table 6-4.

A summary of the detailed source data that was used for the AAQS analysis for PM_{10} is presented in Appendix A, Table A-1.

PSD Class II Analysis

A summary of Cargill's PM_{10} emitting sources for the PSD baseline year (1974) are provided in Table 6-5. These sources were used with Cargill's future sources from Table 6-3 to determine the PSD increment consumption by the proposed project.

Non-Cargill PM_{10} PSD sources were obtained from several sources including FDEP and other recent PSD permit applications (i.e., US AgriChem, Cargill Riverview and Cargill Bartow PSD analyses). The detailed source data used in the PSD analysis for PM_{10} is presented in Appendix A, Table A-2. Again, an SO_2 inventory of non-Cargill sources is not presented, because the results of the significant impact analysis described in Section 6.6.1 demonstrated that the increase in SO_2 impacts from the proposed project are below significant impact levels for SO_2.

PSD Class I Analysis

Because the proposed project's maximum air impacts do not exceed the EPA proposed significant impact levels for PM_{10} or SO_2 at the Chassahowitzka NWA PSD Class I area, a PSD Class I increment consumption modeling assessment is not required. However, the proposed project's emissions of PM_{10}, SO_2, and F were evaluated at the Class I area to support the air quality related values (AQRV) analysis, and emissions of SO_2, PM_{10}, and NO_x were evaluated at the Class I area in support of the regional haze analysis. The increase in SO_2 and NO_x emissions, for use in the AQRV analysis, due to the proposed project, are presented in Table 6-6. The air quality related values (AQRV) analysis is presented in Section 7.0.

6.2.4 RECEPTOR LOCATIONS

Site Vicinity

To determine the PM_{10} significant impact area for the proposed project, concentrations were predicted for 324 regular and 141 discrete polar grid receptors located in a radial grid centered on No. 4 Fertilizer Plant stack. Receptors were located in "rings" with 36 receptors per ring, spaced at 10 degree intervals and at distances of the 4, 6, 8, 10, 12, 14, 16, 18 and 20 km from the No. 4 Fertilizer Plant stack location. Discrete receptors included 36 receptors that are located on the plant property boundary at 10 degree intervals, plus 105 additional off-property receptors at distances of 1.5, 2.0, 2.5, 3.0, and 3.5 km from the No. 4 Fertilizer Plant stack to cover the area between the property boundary and the closest regular receptor grid distance (i.e., 4.0 km). The 36 property boundary receptors used for the screening analysis are presented in Table 6-7. Based on the results of the PM_{10} significant impact analysis, a maximum receptor distance of 4.0 km was used for the screening grid for the AAQS and PSD Class II analysis. Based on the results of the SO_2 significant impact analysis, the project was determined to not be significant for SO_2. Therefore, AAQS and PSD Class II analyses are not required for this pollutant.

Class I Area

Maximum PM_{10}, F, SO_2 and AQRV impacts for the Chassahowitzka NWA were predicted using with the CALPUFF model at 13 discrete receptors located along the border of the PSD Class I area. Impacts for the proposed project were compared to the proposed EPA PSD Class I significance levels. A listing of Class I receptors is provided in Table 6-8.

6.2.5 BACKGROUND CONCENTRATIONS

To estimate total air quality concentrations in the site vicinity, a background concentration must be added to the modeling results. The background concentration is considered to be the air quality concentration contributed by sources not included in the modeling evaluation.

The derivation of the PM_{10} background concentrations for the modeling analysis was presented in Section 4.0. Based on this analysis, the PM_{10} background concentration was determined to be 22 $\mu g/m^3$ for the 24-hour and annual averaging periods. This background concentration was added to model-predicted concentrations to estimate total air quality levels for comparison to AAQS.

6.2.6 BUILDING DOWNWASH EFFECTS

All significant building structures within Cargill's existing plant area were determined by a site plot plan. The plot plan of the proposed project was presented in Section 2.0. A total of 10 building structures were evaluated. All building structures were processed in the EPA Building Input Profile (BPIP, Version 95086) program to determine direction-specific building heights and projected widths for each 10-degree azimuth direction for each source that was included in the modeling analysis. A listing of dimensions for each structure is presented in Table 6-9.

6.3 MODEL RESULTS

6.3.1 SIGNIFICANT IMPACT ANALYSIS

A summary of the results of the significant impact analysis for PM_{10} and SO_2 are presented in Table 6-10. The maximum predicted 24-hour average PM_{10} impact was 11.8 $\mu g/m^3$, which is above the significant impact level of 5 $\mu g/m^3$. The maximum predicted annual average PM_{10} impact of 1.34 $\mu g/m^3$ is above the significant impact level of 1.0 $\mu g/m^3$. Since the proposed project was determined to be significant, a complete modeling analysis, including off-site sources PM_{10}, is necessary. It was further determined that the PM_{10} significant impact area for the proposed modification extends out approximately 4.0 km from the Cargill facility, based on the maximum 24-hour impact.

The maximum predicted SO_2 impacts from the screening analysis were below significant impact levels for all averaging periods. However, since the maximum predicted 24-hour average impact of 3.95 $\mu g/m^3$ was close to the significance level of 5.0 $\mu g/m^3$, a refined analysis was conducted. The maximum predicted 24-hour average SO_2 impact, determined from the refined analysis, was 4.12 $\mu g/m^3$. Since the results of the refined analysis were below the 24-hour average significant impact level for SO_2, a complete modeling analysis, including off-site SO_2 sources, was not required.

6.3.2 AAQS ANALYSIS

A summary of the maximum annual and sixth-highest (H6H) 24-hour PM_{10} concentrations predicted for all sources for the screening analysis is presented in Table 6-11. Based on the screening analysis results, modeling refinements were performed. The results of the refined modeling analysis are presented in Table 6-12. The maximum predicted annual and H6H 24-hour PM_{10} concentrations are 39.7 and

126 $\mu g/m^3$, respectively, which includes an ambient non-modeled background concentration of 22 $\mu g/m^3$. The maximum PM_{10} concentrations are less than the AAQS of 50 and 150 $\mu g/m^3$, respectively.

6.3.3 PSD CLASS II ANALYSIS

A summary of the maximum PM_{10} PSD Class II increment consumption predicted for all sources for the screening analysis is presented in Table 6-13. The maximum predicted annual PSD Class II increment consumption is 0.03 $\mu g/m^3$ which is well below the allowable PSD Class II increment of 17 $\mu g/m^3$. The allowable 24-hour PSD Class II increment of 30 $\mu g/m^3$ was predicted to be exceeded in an area to the south of and 4 km from the Cargill Bartow facility. A refined analysis was performed, therefore, to determine whether Cargill's proposed project would significantly impact any day for which the allowable PSD increment is exceeded. The results of the refined modeling analysis are summarized in Table 6-14. The proposed project's maximum 24-hour contribution on any day is 0.47 $\mu g/m^3$. This value is well below the significant impact level of 5 $\mu g/m^3$.

6.3.4 PSD CLASS I ANALYSIS

Maximum PM_{10} concentrations predicted for the proposed project alone at the Chassahowitzka NWA PSD Class I area are compared with the EPA's proposed PSD Class I significance levels in Table 6-15. The maximum annual and 24-hour impacts are 0.0018 and 0.03 $\mu g/m^3$, respectively. As the proposed project's maximum impacts are below the Class I significant impact levels, a full PSD Class I increment analysis is not required. As part of the AQRV analysis, maximum SO_2 and NO_2 concentrations were also determined for the proposed project. These concentrations were also well below the proposed PSD Class I significant impact levels.

6.3.5 FLUORIDE IMPACTS

Maximum fluoride (F) concentrations due to the future Cargill Bartow plant in the site vicinity and at the Chassahowitzka Class I area are presented in Tables 6-16 and 6-17, respectively. There are no AAQS or PSD increments for fluorides. However, fluoride impacts are required for the additional impact analysis and AQRV analysis for the Class I area, presented in Section 7.0.

At the site vicinity, the maximum predicted annual, 24-, and 8-hour F concentrations are 0.32, 2.8, and 4.9 $\mu g/m^3$, respectively. The maximum predicted annual, 24-, 8-, 3-, and 1-hour F concentrations at the Chassahowitzka NWA PSD Class I area are 0.00092, 0.013, 0.03, 0.41 and 0.053 $\mu g/m^3$, respectively.

7.0 ADDITIONAL IMPACT ANALYSIS

7.1 INTRODUCTION

Cargill is proposing to modify its existing facility in Bartow, Florida. The facility is subject to the PSD new source review requirements for PM_{10}, SO_2, and fluoride. The additional impact analysis and the Class I area analysis addresses these pollutants.

The analysis addresses the potential impacts on vegetation, soils, and wildlife of the surrounding area and the nearest Class I area due to Cargill's proposed modification. The nearest Class I area is the Chassahowitzka National Wilderness Area (NWA), located approximately 118 kilometers (km) northwest of the Cargill Bartow plant. In addition, potential impacts upon visibility resulting from the proposed modification are assessed.

The analysis will demonstrate that the increase in impacts due to the proposed increase in emissions is extremely low. Regardless of the existing conditions in the vicinity of the site or in the Class I areas, the proposed project will not cause any significant adverse effects due to the predicted low impacts upon these areas.

7.2 SOIL, VEGETATION, AND AQRV ANALYSIS METHODOLOGY

In the foregoing analysis, the maximum air quality impacts predicted to occur in the vicinity of the Cargill plant and in the Class I area due to the increase in emissions are used. These impacts were presented in Section 6.0. The analysis involved predicting worst-case maximum short- and long-term concentrations of pollutants in the vicinity of the plant and in the Class I areas and comparing the maximum predicted concentrations to lowest observed effect levels for AQRVs or analogous organisms. In conducting the assessment, several assumptions were made as to how pollutants interact with the different matrices, i.e., vegetation, soils, wildlife, and aquatic environment.

A screening approach was used to evaluate potential effects which compared the maximum predicted ambient concentrations of air pollutants of concern with effect threshold limits for both vegetation and wildlife as reported in the scientific literature. A literature search was conducted which specifically addressed the effects of air contaminants on plant species reported to occur in the vicinity of the plant and the

Class I area. It was recognized that effects threshold information is not available for all species found in the Chassahowitzka NWA, although studies have been performed on a few of the common species and on other similar species which can be used as models.

7.3 IMPACTS TO SOILS, VEGETATION, AND VISIBILITY IN THE VICINITY OF THE CARGILL PLANT

7.3.1 IMPACTS TO SOILS

Soils in the vicinity of the Cargill site are primarily mapped as Arents-Hydraquents-Neihurst (Ford et al., 1990). Many of the soils in the region and a large portion of the site have been disturbed and altered by industrial activities, including phosphate mining and facility development.

These soils will not be affected by the additional PM_{10}, NO_2, SO_2, and fluoride concentrations resulting from the proposed modification, because the underlying substrate is neutral to alkaline and would neutralize any acidifying effects of deposition. The poorly drained sands in the area are already strongly acidic. Normal liming practices currently used on soils in the vicinity of Cargill by agricultural interests will effectively mitigate the small effects of any increased deposition resulting from the increased PM_{10} emissions from the proposed project. Only very small quantities of particulate deposition may occur; therefore, no measurable soil accumulation of fluorides will occur from the proposed fluoride emissions. As a result, the impact of the proposed emissions upon soils will not be significant. Maximum predicted concentrations of PM_{10}, NO_2, SO_2, and fluoride in the vicinity of the project site are at least an order of magnitude lower than the EPA Class II significant impact levels (see Table 6-4); therefore, no significant impacts associated with facility operations are expected.

7.3.2 IMPACTS TO VEGETATION

Vegetation Analysis

In general, the effects of air pollutants on vegetation occur primarily from SO_2, NO_2, O_3, and PM. Effects from minor air contaminants such as fluoride, chlorine, hydrogen chloride, ethylene, ammonia, hydrogen sulfide, CO, and pesticides have also been reported in the literature. The effects of air pollutants are dependent both on the concentration of the contaminant and the duration of the exposure. The term "injury," as opposed to damage, is commonly used to describe all plant responses to air contaminants and will be used in the context of this analysis. Air contaminants are thought to interact primarily with plant foliage, which is considered to be the major pathway of exposure. For purposes of this analysis, it was assumed that 100 percent of each air contaminant of concern is accessible to the plants.

Injury to vegetation from exposure to various levels or air contaminants can be termed acute, physiological, or chronic. Acute injury occurs as a result of a short-term exposure to a high contaminant concentration and is typically manifested by visible injury symptoms ranging from chlorosis (discoloration) to necrosis (dead areas). Physiological or latent injury occurs as the result of a long-term exposure to contaminant concentrations below that which results in acute injury symptoms. Chronic injury results from repeated exposure to low concentrations over extended periods of time, often without any visible symptoms, but with some effect on the overall growth and productivity of the plant. In this assessment, 100 percent of the particular air pollutant in the ambient air was assumed to interact with the vegetation. This is a conservative approach.

The response of vegetation and wildlife to atmospheric pollutants is influenced by the concentration of the pollutant, duration of exposure, and frequency of exposures. The pattern of pollutant exposure expected from the facility is that of a few episodes of relatively high ground-level concentration which occur during certain meteorological conditions interspersed with long periods of extremely low ground-level concentrations. If there are any effects of stack emissions on plants and animals they will be from the short-term, higher doses. A dose is the product of the concentration of the pollutant and duration of the exposure.

<u>Vegetation in the Vicinity of Cargill</u>

Cut-over pine flatwoods and mixed forest comprise the natural vegetation in the vicinity of the Cargill site. Winter vegetables and pasture grasses are also cultivated in the area.

Maximum predicted concentrations of PM_{10}, NO_2, SO_2, and fluoride in the vicinity of the project site are well below EPA Class II significant impact levels (see Table 6-10 and 6-16); therefore, no significant impacts associated with facility operations are expected. The predicted concentrations are an order of magnitude less than the AAQS. Since the AAQS are designed to protect the public welfare, including effects on vegetation, no detrimental effects on vegetation should occur in this area.

7.3.3 IMPACTS UPON VISIBILITY

No new emission sources will be created by the proposed filter table replacement. Current sources are and will be controlled by scrubbers and, therefore, the visible plume characteristics from this source will not change. Cargill has a number of similar type sources already in operation at Bartow. All these sources are in compliance with opacity regulations and should remain in compliance after the modification. As a result, no adverse impacts upon visibility in the vicinity of the plant are expected.

7.3.4 IMPACTS DUE TO ASSOCIATED POPULATION GROWTH

There will be a small, temporary increase in the number of workers during the construction period. There will be no significant increase in permanent employment at Cargill as a result of the proposed project. Therefore, there will be no anticipated permanent impacts on air quality caused by associated population growth.

7.4 CLASS I AREA IMPACT ANALYSIS

7.4.1 IDENTIFICATION OF AQRVS AND METHODOLOGY

An AQRV analysis was conducted to assess the potential risk to AQRVs of the Chassahowitzka NWA due to the proposed modification of from the Cargill Bartow facility. The U.S. Department of the Interior in 1978 administratively defined AQRVs to be:

> All those values possessed by an area except those that are not affected by changes in air quality and include all those assets of an area whose vitality, significance, or integrity is dependent in some way upon the air environment. These values include visibility and those scenic, cultural, biological, and recreational resources of an area that are affected by air quality. Important attributes of an area are those values or assets that make an area significant as a national monument, preserve, or primitive

area. They are the assets that are to be preserved if the area is to achieve the purposes for which it was set aside (Federal Register 1978).

Except for visibility, AQRVs have not been specifically defined by the U.S. Fish and Wildlife Service (USFWS) for Chassahowitzka NWA. However, odor, soil, flora, fauna, cultural resources, geological features, water, and climate generally have been identified by land managers as AQRVs. Since specific AQRVs have not been identified for the Chassahowitzka NWA, this AQRV analysis evaluates the effects of air quality on general vegetation types and wildlife found in the Chassahowitzka NWA.

Vegetation type AQRVs and their representative species types have been defined as:

Marshlands - black needlerush, saw grass, salt grass, and salt marsh cordgrass

Marsh Islands - cabbage palm and eastern red cedar

Estuarine Habitat - black needlerush, salt marsh cordgrass, and wax myrtle

Hardwood Swamp - red maple, red bay, sweet bay, and cabbage palm

Upland Forests - live oak, scrub oak, longleaf pine, slash pine, wax myrtle, and saw palmetto

Mangrove Swamp - red, white, and black mangrove

Wildlife AQRVs have been identified as endangered species, waterfowl, marsh and waterbirds, shorebirds, reptiles, and mammals.

A screening approach was used that compared the maximum predicted ambient concentration of air pollutants of concern in the Chassahowitzka NWA with effect threshold limits for both vegetation and wildlife as reported in the scientific literature. A literature search was conducted that specifically addressed the effects of air contaminants on plant species reported to occur in the NWA. While the literature search focused on such species as cabbage palm, eastern red cedar, lichens, and species of the hardwood swamplands and mangrove forest, no specific citations that addressed these species were found. It is recognized that effect threshold information is not available for all species found in the Chassahowitzka NWA, although studies have been performed on a few of the common species and on other similar species that can be used as indicators of effects.

7.4.2 VEGETATION

General

As stated earlier, the effects of contaminants are dependent both on the concentration of the contaminant and the duration of the exposure. The term "injury," as opposed to damage, is commonly used to describe all plant responses to air contaminants and will be used in the context of this analysis. Air contaminants are thought to interact primarily with plant foliage, which is considered to be the major pathway of exposure. For purposes of this analysis, it is assumed that 100 percent of each air contaminant of concern is accessible to the plants.

Injury to vegetation from exposure to various levels of air contaminants can be termed acute, physiological, and chronic. Acute injury occurs as a result of a short-term exposure to a high contaminant concentration and is typically manifested by visible injury symptoms ranging from chlorosis (discoloration) to necrosis (dead areas). Physiological or latent injury occurs as the result of a long-term exposure to contaminant concentrations below that which results in acute injury symptoms. Chronic injury results from repeated exposure to low concentrations over extended periods of time, often without any visible symptoms but with some effect on the overall growth and productivity of the plant.

Particulate Matter Exposure

Although information pertaining to the effects of particulate matter on plants is scarce, some concentrations are available (Mandoli and Dubey, 1988). Ten species of native Indian plants were exposed to levels of particulate matter that ranged from 210 to 366 $\mu g/m^3$ for an 8-hour averaging period. Damage in the form of a higher leaf area/dry weight ratio was observed at varying degrees for most plants tested. Concentrations of particulate matter lower than 163 $\mu g/m^3$ did not appear to be injurious to the tested plants.

By comparison of these published toxicity values for particulate matter exposure (i.e., concentrations for an 8-hour averaging time), the possibility of plant damage in the

Chassahowitzka NWA can be determined. The maximum predicted incremental 8-hour, 24-hour, and annual PM_{10} concentrations, due to the project are 0.070, 0.031, 0.0018 $\mu g/m^3$ (see Table 7-1). These values are well below the NPS recommended Class 1 Significance Levels and the proposed EPA Class 1 Significance Levels. Therefore, no effects to vegetative AQRVs are expected from the project.

Nitrogen Dioxide

NO_2 can injure plant tissue with symptoms usually appearing as irregular white to brown collapsed lesions between the leaf veins and near the margins. Conversely, non-injurious levels of NO_2 can be absorbed by plants, enzymatically transformed into ammonia, and incorporated into plant constituents such as amino acids (Matsumaru et al., 1979).

Plant damage can occur through either acute (short-term, high concentration) or chronic (long-term, relatively low concentration) exposure. For plants that have been determined to be more sensitive to NO_2 exposure than others, acute (1, 4, 8 hours) exposure caused 5 percent predicted foliar injury at concentrations ranging from 3,800 to 15,000 $\mu g/m^3$ (Heck and Tingey, 1979). Chronic exposure of selected plants (some considered NO_2-sensitive) to NO_2 concentrations of 2,000 to 4,000 $\mu g/m^3$ for 213 to 1,900 hours caused reductions in yield of up to 37 percent and some chlorosis (Zahn, 1975).

The 8-hour average NO_2 concentration for the Project in the Class I area is predicted to be 0.01 $\mu g/m^3$ (Table 7-1). This concentration is less than 0.01 percent of the levels that cause foliar injury in acute exposure scenarios. By comparison of published toxicity values for NO_2 exposure to long-term (annual averaging time) modeled concentrations, the possibility of plant damage in the Class I areas can be examined for chronic exposure situations. For a chronic exposure, the maximum annual average NO_2 concentration due to the Project in the Class I area is 0.0001 $\mu g/m^3$, which is less than 0.01 percent of the levels that caused minimal yield loss and chlorosis in plant tissue.

Sulfur Dioxide

Sulfur is an essential plant nutrient usually taken up as sulfate ions by the roots from the soil solution. When sulfur dioxide in the atmosphere enters the foliage through pores in the leaves, it reacts with water in the leaf interior to form sulfite ions. Sulfite ions are highly toxic. They interact with enzymes, compete with normal metabolites, and interfere with a variety of cellular functions (Horsman and Wellburn, 1976). However, within the leaf, sulfite is oxidized to sulfate ions, which can then be used by the plant as a nutrient. Small amounts of sulfite may be oxidized before they prove harmful.

SO_2 gas at elevated levels has long been known to cause injury to plants. Acute SO_2 injury usually develops within a few hours or days of exposure, and symptoms include marginal, flecked, and/or intercostal necrotic areas that appear water-soaked and dullish green initially. This injury generally occurs to younger leaves. Chronic injury usually is evident by signs of chlorosis, bronzing, premature senescence, reduced growth, and possible tissue necrosis (EPA, 1982). Observed SO_2 effect levels for several plant species and plant sensitivity groupings are presented in Tables 7-2 and 7-3, respectively.

Many studies have been conducted to determine the effects of high-concentration, short-term SO_2 exposure on natural community vegetation. Sensitive plants include ragweed, legumes, blackberry, southern pine, and red and black oak. These species are injured by exposure to 3-hour average SO_2 concentrations of 790 to 1,570 $\mu g/m^3$. Intermediate plants include locust and sweetgum. These species are injured by exposure to 3-hour average SO_2 concentrations of 1,570 to 2,100 $\mu g/m^3$. Resistant species (injured at concentrations above 2,100 $\mu g/m^3$ for 3 hours) include white oak and dogwood (EPA, 1982).

A study of native Floridian species (Woltz and Howe, 1981) demonstrated that cypress, slash pine, live oak, and mangrove exposed to 1,300 $\mu g/m^3$ SO_2 for 8 hours were not visibly damaged. This finding support the levels cited by other researchers on the effects of SO_2 on vegetation. A corroborative study (McLaughlin and Lee, 1974) demonstrated that approximately 20 percent of a cross-section of plants ranging from sensitive to tolerant was visibly injured at 3-hour average SO_2 concentrations of 920 $\mu g/m^3$.

Jack pine seedlings exposed to SO_2 concentrations of 470 to 520 μg/m^3 for 24 hours demonstrated inhibition of foliar lipid synthesis; however, this inhibition was reversible (Malhotra and Kahn, 1978). Black oak exposed to 1,310 μg/m^3 SO_2 for 24 hours a day for 1 week demonstrated a 48 percent reduction in photosynthesis (Carlson, 1979).

Two lichen species indigenous to Florida exhibited signs of SO_2 damage in the form of decreased biomass gain and photosynthetic rate as well as membrane leakage when exposed to concentrations of 200 to 400 μg/m^3 for 6 hours/week for 10 weeks (Hart et al., 1988).

The maximum predicted 24-hour average SO_2 concentration in the Class I area due to the project is 0.0091 μg/m^3 (Table 7-1), which is much lower than those concentrations known to cause damage to test species. The maximum 24-hour average SO_2 concentrations predicted for the Project at the Class I area are less than 0.01 percent of those that caused damage to the most sensitive lichens. The modeled annual incremental increase in SO_2 adds slightly to background levels of this gas and poses only a minimal threat to area vegetation.

Fluoride Exposure

Fluoride is an inhibitor of plant metabolism. As fluoride accumulates in plants, it causes an inhibition of plant metabolism and chlorosis (a yellowing of the leaf). With further increases in accumulation of fluoride, the cells die and necrosis is observed. Leaf tips and margins accumulate the highest concentrations of fluoride and are the sites of initial visible injury. Gaseous fluoride is taken up primarily through the stomata of transpiring plants. There is negligible contribution to leaf fluoride content by uptake by roots (Applied Sciences Associates, Inc., 1978).

The sensitivity of plants varies widely. Gladiolus are considered the most sensitive. Visible symptoms are reported to occur when gladiolus have been exposed to concentrations >0.5 μg/m^3 for 5 to 10 days. More tolerant fruit tree species and conifers first showed symptoms at around 1 μg/m^3 at 10-day exposures (Treshow and Anderson, 1989). Plant sensitivities can range from 16 $\mu g/m^3$ of fluoride in sensitive plants to 500 $\mu g/m^3$ of fluoride in tolerant plants for 3-hour exposures. The lowest observed effect levels for sensitive plants are reported to be as follows (Applied Sciences Associates, Inc., 1978):

<50 $\mu g/m^3$ for 1-hour exposures

<16 $\mu g/m^3$ for 3-hour exposures

<1.6 $\mu g/m^3$ for 24-hour exposures

The ingestion of excessive amounts of fluoride can lead to an animal disease called fluorosis. Fluorosis is a skeletal and dental disease resulting in softening of bone and dental tissue that can lead to injury and other health problems. In general, forage plants with over 30 ppm of fluoride which are regularly ingested by animals such as cattle and deer can result in mild fluorosis. A number of states (but not Florida) have fluoride standards. These range from 25 to 40 parts per million (ppm) of fluoride as a maximum annual average (Newman, 1984).

Data suggest that a fluoride accumulation factor might be calculated under fumigation conditions with an uncertainty factor of less than 2. One study indicated that hydrogen fluoride concentrations of 0.3 $\mu g/m^3$ would lead to an accumulation of up to 20 ppm of fluoride in conifer foliage after 2 years of exposure (Treshow and Anderson, 1989).

The predicted maximum 8-hour, 24-hour, and annual fluoride concentrations in the Chassahowitzka NWA due to the project are 0.03, 0.013, and 0.00092 $\mu g/m^3$, respectively (Table 7-1). These predicted values are well below the lowest observed effect levels for sensitive vegetation. No significant adverse effects are predicted to occur to the vegetative AQRVs of Chassahowitzka NWA. Since the predicted annual concentration is very low, no measurable accumulation of fluoride will occur in vegetation that would be the prime forage of wildlife. Therefore, no significant adverse effects to wildlife AQRVs will occur.

7.4.3 WILDLIFE

The major air quality risk to wildlife in the United States is from continuous exposure to pollutants above the National AAQS. This occurs in non-attainment areas, e.g., Los Angeles Basin. Risks to wildlife also may occur for wildlife living in the vicinity of an emission source that experiences frequent upsets or episodic conditions resulting from malfunctioning equipment, unique meteorological conditions, or startup operations (Newman and Schreiber, 1988). Under these conditions, chronic effects (e.g., particulate contamination) and acute effects (e.g., injury to health) have been observed (Newman, 1981).

A wide range of physiological and ecological effects to fauna has been reported for gaseous and particulate pollutants (Newman, 1981; Newman and Schreiber, 1988). The most severe of these effects have been observed at concentrations above the secondary ambient air quality standards. Physiological and behavioral effects have been observed in experimental animals at or below these standards. The ingestion of excessive amounts of fluoride can lead to an animal disease called fluorosis. Fluorosis is a skeletal and dental disease resulting in softening of bone and dental tissue that can lead to injury and other health problems. In general, forage plants with over 30 ppm of fluoride which are regularly ingested by animals such as cattle and deer can result in mild fluorosis. A number of states (excluding Florida) have fluoride standards. These range from 25 to 40 parts per million (ppm) of fluoride as a maximum annual average (Newman, 1984).

For impacts on wildlife, the lowest threshold values of NO_2, PM_{10}, and SO_2 which are reported to cause physiological changes are shown in Table 7-4. These values are up to orders of magnitude larger than maximum concentrations predicted from the Cargill Project in the Class I area. No effects on wildlife AQRVs from NO_2, PM_{10}, SO_2 or fluoride are expected. The proposed project's contribution to cumulative impacts is negligible.

7.4.4 SOILS

The majority of the soil in the Class I area is classified as Weekiwachee-Durbin muck. This is an euic, hyperthermic type sufihemist that is characterized by high levels of sulfur and organic matter. This soil is flooded daily with the advent of high tide and the pH ranges between 6.1 and 7.8. The upper level of this soil may contain as much as 4 percent sulfur (USDA, 1991).

Any particulate deposition from the proposed project would be neutral or alkaline in nature. Although ground deposition was not calculated, it is evident that the effect of any dust deposited would be inconsequential in light of the existing soil pH. The regular flooding of these soils by the Gulf of Mexico regulates the pH and any change in acidity in the soil would be buffered by this activity.

7.5 IMPACTS ON VISIBILITY

7.5.1 INTRODUCTION

A change in visibility is characterized by either a change in the visual range, defined as the greatest distance that a large dark object can be seen, or by a change in the light-extinction coefficient (b_{ext}). The b_{ext} is the attenuation of light per unit distance due to the scattering and absorption by gases and particles in the atmosphere. A change in the extinction coefficient produces a perceived visual change that is measured by a visibility index called the deciview. The deciview (dv) is defined as:

$$dv = 10 \ln (1 + b_{exts} / b_{extb})$$

where

b_{exts} is the extinction coefficient calculated for the source, and

b_{extb} is the background extinction coefficient

The source extinction coefficient is determined from NO_x, SO_2, and PM_{10} emission's increase from the proposed project. The background extinction coefficient s for each area evaluated are based on existing ambient monitoring data. Based on predicted SO_4, NO_3, and PM_{10} concentrations, the increase in the project's emissions were compared a 5 percent change in light extinction of the background levels. This is equivalent to a change in deciview of 0.5.

7.5.2 ANALYSIS METHODOLOGY

Following the recommendations of the Interagency Workgroup on Air Quality Modeling (IWAQM) Phase II report, a level II refined analysis was performed using the CALPUFF long-range transport model, along with a CALMET wind field developed by the FDEP. A more detail description of the CALPUFF model and the CALMET wind field used for this project is provided Appendix B. The CALPUFF postprocessor model CALPOST was used to summarize the maximum concentrations of SO_4, NO_3, and PM_{10} that were predicted with the CALPUFF model.

CALPUFF used in a manner recommended by the IWAQM Phase 2 Summary Report (EPA, 12/98). A summary of the parameter settings that were used in the CALPUFF model is presented in Table A-1 along with the IWAQM Phase 2 recommended parameter settings. The recommended parameter settings are presented in Appendix B of the IWAQM Phase II Summary Report.

The following CALPUFF settings/values were implemented in the Level II refined analysis:

- Use of six pollutant species of SO2, SO4, NOx, HNO3, NO3 , and PM10.
- Use of MESOPUFF II scheme for chemical transformation with CALPUFF default background concentrations
- Include both dry and wet deposition and plume depletion
- Use Agricultural, unirrigated land use; minimum mixing height of 50 m
- Use transitional plume rise, stack-tip downwash, and partial plume penetration
- Use puff plume element dispersion, PG /MP coefficients, rural mode, and ISC building downwash scheme
- Use of partial plume path adjustment terrain effects
- Use highest predicted 24-hour species concentrations in 1990, the year of the CALMET wind field, for comparison to the maximum percent change in extinction

7.5.3 EMISSION INVENTORY

Based on recommendations of the IWAQM Phase II Report, the regional haze analysis considered only the maximum 24-hour increase in emissions due to the proposed Cargill Bartow Plant modification. The emission rates and source parameters for the affected sources are presented in Chapter 2.0.

7.5.4 BUILDING WAKE EFFECTS

The air modeling analysis included the same building structure dimensions to account for the effects of building-induced downwash as was used in the ISCST3 modeling analysis. Dimensions for all significant building structures were processed with the Building Profile Input Program (BPIP), Version 95086, and were included in the CALPUFF model.

7.5.5 RECEPTOR LOCATIONS

Receptors for the refined analysis included 13 discrete receptors located at the Chassahowitzka PSD Class I area. Because the area's terrain is flat, all receptors were assumed to be at zero elevation.

7.5.6 BACKGROUND VISUAL RANGES AND RELATIVE HUMIDITY FACTORS

The background extinction coefficient was based on data representative of the mean of the top 20-percentile air quality days. For the Chassahowitzka NWA, a background extinction coefficient of 0.0602 km^{-1} was used, equating to a background visual range of 65 km. This background value was provided by the U.S. Fish and Wildlife Service/National Park Service Air Modeling Branch.

7.5.7 METEOROLOGICAL DATA

A CALMET wind field for the Tampa Bay domain was used for the analysis. The year of data is 1990. A detailed description of the data used to develop the wind field is presented in Appendix B.

7.5.8 CHEMICAL TRANSFORMATION

The air modeling analysis included all chemical transformation processes that occur for the emitted species.

7.6 RESULTS

The highest predicted 24-hour species concentrations are summarized in Table 7-5. The maximum predicted SO_2 concentration occurred on Julian day 228 and the maximum predicted PM_{10} and NO_3 concentrations occurred on Julian day 33. The highest 24-hour species' concentrations for each day are presented in Table 7-5. The average daily relative humidity factors for these days are presented in Table 7-6. The predicted change in visibility for these three days is summarized in Table 7-7. The maximum predicted change in visibility is due to the proposed project is predicted to be 0.22 percent. As this percentage is well below the criteria value of 5 percent, it is concluded that the proposed project will not adversely impact the background visibility levels at the Chassahowitzka NWA PSD Class I area.

REFERENCES

Darley, E.F. and Middleton, J.T. 1966. Problems in Air Pollution in Plant Pathology. Ann. Rev. Phytopath., 4:103-118.Golder Associates Inc. 1996.

PSD Application for Animal Feed Ingredient Plant, Cargill Fertilizer, Inc., Riverview, Florida.

Krause, G.H.M. and Kaiser, H. 1977. Plant Response to Heavy Metals and Sulphur Dioxide. Environ. Pollut., 12:63-71.

Mandoli, B.L. and P.S. Dubey. 1988. The Industrial Emission and Plant Response at Pithampur (M.P.). Int. J. Ecol. Environ. Sci. 14:75-79.

National Park Service (NPS). July 10, 1995. Regional Haze Analysis Calculation Worksheet, Facsimile from B. Rolofson, NPS to S. Marks, KBN.

NPS. Personal Communication between B. Nolofson and Robert McCann, Golder Associates Inc.

Newman, J.R. 1984. Fluoride Standards Predicting Wildlife Effects. Fluoride 17: 41-47.

Newman, J.R., and R.K. Schreiber. 1988. Air Pollution and Wildlife Toxicology: An Overlooked Problem. Environmental Toxicology and Chemistry, 7-381-390.

Treshow, M. and F.K. Anderson. 1989. Plant Stress from Air Pollution. John Wiley and Sons, New York.

U.S. Department of Agriculture and Soil Conservation Service. 1991. Soil Survey of Hillsborough County, Florida.

U.S. Department of Agriculture, 1991. Surveys of Hernando and Citrus Counties, Florida.

USDA Soil Conservation Service in cooperation with University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations, and Soil Science Department.

U.S. Environmental Protection Agency. 1995. User's Guide for the Industrial Source Complex (ISC3) Models. EPA-454/3-95-003a.

U.S. Environmental Protection Agency. 1988. EPA's User's Network for Applied Modeling of Air Pollution (UNAMAP), Version 6, Change 3, January 4, 1988. Research Triangle Park, North Carolina.

U.S. Environmental Protection Agency. 1987. Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD).

REFERENCES

U.S. Environmental Protection Agency. 1985. BACT/LAER Clearinghouse - A Compilation of Control Technology Determinations.

U.S. Environmental Protection Agency. 1980. Workbook for Estimating Visibility Impairment. Office of Air, Noise and Radiation, Office of Air Quality Planning and Standards.

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

Table 3-1. Contemporaneous and Debottlenecking Emissions Analysis and PSD Applicability

Source Description	Pollutant Emission Rate (TPY)						
	SO_2	NO_x	CO	PM/PM10	VOC	Fluoride	H_2SO_4 Mist
Potential Emissions From Modified/New/Affected Sources							
A. Proposed Modification to the Phosphoric Acid Plant	--	--	--	--	--	10.0	--
B. No. 4 Fertilizer Plant[a]	37.8	27.2	6.0	96.9	0.60	23.4	--
C. No. 4 Shipping Plant[a]	--	--	--	31.6	--	--	--
Total Potential Emission Rates	37.8	27.2	6.0	128.5	0.60	33.4	0.0
Actual Emissions from Current Operations[b]							
A. Existing Phosphoric Acid Plant	--	--	--	--	--	5.1	--
B. No. 4 Fertilizer Plant	0.034	5.9	4.6	21.3	0.03	9.2	--
C. No. 4 Shipping Plant	--	--	--	0.41	--	--	--
Total Actual Emission Rates	0.034	5.9	4.6	21.7	0.03	14.3	0.0
TOTAL CHANGE DUE TO THE PROPOSED PROJECT	37.8	21.3	1.4	106.8	0.57	19.1	0.0
Contemporaneous Emission Changes							
A. Phosphoric Acid Plant Production Rate Increase (August 1995)	--	--	--	--	--	c	--
B. Sulfuric Acid Plant Production Rate Increase (November 1995)	c	c	--	--	--	--	c
C. No. 3 Fertilizer Plant Expansion (April 1999)	39.6	17.8	3.6	c	0.29	c	--
D. Phosphoric Acid Reactor Modification (April 1999)[d]	--	--	--	--	--	--	--
Total Contemporaneous Emission Changes	39.6	17.8	3.6	0.00	0.29	0.00	0.00
TOTAL NET CHANGE	77.4	39.1	5.0	106.8	0.86	19.1	0.00
PSD SIGNIFICANT EMISSION RATE	40	40	100	15	40	3	7
PSD REVIEW TRIGGERED?	Yes	No	No	Yes	No	Yes	No

Footnotes:

[a] Debottlenecking analysis revealed that actual emissions from these sources could potenitally increase as part of the proposed project.

[b] Average annual actual emissions based on Annual Operating Reports for 1998 and 1999.

[c] Denotes that PSD review was triggered for this pollutant; therefore any previous contemporaneous increases/decreases are wiped clean.

[d] Project was determined to not result in an increase in emissions of any pollutant.

Table 3-2. Summary of Actual Emissions From Cargill Bartow Based on 1998 and 1999 Annual Operating Reports

EU ID	EMISSION UNIT DESCRIPTION	SCC CODE	YEAR	ANNUAL EMISSIONS CO (TPY)	F (TPY)	NO_x (TPY)	PM[a] (TPY)	PM_{10}[b] (TPY)	SO_2 (TPY)	VOC (TPY)	SAM (TPY)	TRS (TPY)
001	Ammonium Phosphate Fertilizer Plant	1-03-004-04	1998	--	--	--	--	--	--	--	--	--
		3-01-030-02	1998	--	5.00	--	11.54	--	--	--	--	--
		3-90-006-89	1998	1.25	--	4.98	0.18	--	0.021	0.10	--	--
		TOTAL FOR 1998:		**1.25**	**5.00**	**4.98**	**11.72**	**0**	**0.021**	**0.10**	**0**	**0**
		1-03-004-04	1999	0	0	0	0	0	0	--	--	--
		3-01-030-02	1999	--	2.81	--	12.63	12.63	--	--	--	--
		3-90-004-99	1999	0	0	0	0	0	0	0	--	--
		3-90-006-89	1999	0	0	0	0	0	0	0	--	--
		3-90-006-99	1999	1.73	0	2.06	0.16	0.16	0.012	0.11	--	--
		TOTAL FOR 1999:		**1.73**	**2.81**	**2.06**	**12.78**	**12.78**	**0.012**	**0.11**	**0**	**0**
		1998/1999 AVERAGE:		**1.49**	**3.90**	**3.52**	**12.25**	**6.39**	**0.017**	**0.11**	**0**	**0**
002	No. 4 Fertilizer Shipping Plant	3-05-105-97	1998	--	--	--	0.54	--	--	--	--	--
		3-01-030-03	1998	--	--	--	--	--	--	--	--	--
		TOTAL FOR 1998:		**0**	**0**	**0**	**0.54**	**0**	**0**	**0**	**0**	**0**
		3-05-105-97	1999	--	--	--	0.29	0.29	--	--	--	--
		TOTAL FOR 1999:		**0**	**0**	**0**	**0.29**	**0.29**	**0**	**0**	**0**	**0**
		1998/1999 AVERAGE:		**0**	**0**	**0**	**0.41**	**0.14**	**0**	**0**	**0**	**0**
004	No. 3 Fertilizer Shipping Plant	3-05-105-97	1998	--	--	--	--	--	--	--	--	--
		3-01-030-03	1998	--	--	--	--	--	--	--	--	--
		TOTAL FOR 1998:		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		3-05-105-97	1999	--	--	--	0	--	--	--	--	--
		TOTAL FOR 1999:		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		1998/1999 AVERAGE:		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table 3-2. Summary of Actual Emissions From Cargill Bartow Based on 1998 and 1999 Annual Operating Reports

EU ID	EMISSION UNIT DESCRIPTION	SCC CODE	YEAR	ANNUAL EMISSIONS CO (TPY)	F (TPY)	NO_x (TPY)	PM [a] (TPY)	PM_{10} [b] (TPY)	SO_2 (TPY)	VOC (TPY)	SAM (TPY)	TRS (TPY)
010	Wet Process Phosphoric Acid Plant	3-01-016-01	1998	--	2.13	--	--	--	--	--	--	--
		TOTAL FOR 1998:		**0**	**2.13**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		3-01-016-01	1999	--	8.04	--	--	--	--	--	--	--
		TOTAL FOR 1999:		**0**	**8.04**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		1998/1999 AVERAGE:		**0**	**5.0844**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
012	No. 4 Sulfuric Acid Plant	3-01-023-01	1998	--	--	43.33	--	--	1466.67	--	11.36	--
		3-90-006-99	1998	0.009	--	0.035	0.0013	--	0.0015	0.00070	--	--
		TOTAL FOR 1998:		**0.009**	**0**	**43.37**	**0.0013**	**0**	**1466.67**	**0.0007**	**11.36**	**0**
		3-01-023-01	1999	--	--	49.52	--	--	1568.26	--	90.79	--
		3-90-006-99	1999	--	--	0	0	0	0	--	--	--
		TOTAL FOR 1999:		**0**	**0**	**49.52**	**0**	**0**	**1568.26**	**0**	**90.79**	**0**
		1998/1999 AVERAGE:		**0.0045**	**0**	**46.44**	**0**	**0**	**1517.47**	**0**	**51.08**	**0**
021	Diammonium Phosphate Fertilizer Plant	1-03-004-04	1998	--	--	--	--	--	--	--	--	--
		3-01-030-02	1998	--	14.62	--	23.31	--	--	--	--	--
		3-90-006-89	1998	0.32	--	1.26	0.045	--	0.0054	0.025	--	--
		TOTAL FOR 1998:		**0.32**	**14.62**	**1.26**	**23.36**	**0**	**0.0054**	**0.025**	**0**	**0**
		1-03-004-04	1999	0	0	0	0	0	0	0	--	--
		3-01-030-02	1999	--	3.70	--	18.50	18.50	--	--	--	--
		3-90-004-99	1999	0	0	0	0	0	0	0	--	--
		3-90-006-89	1999	0	0	0	0	0	0	0	--	--
		3-90-006-99	1999	8.83	0	10.52	0.80	0.80	0.063	0.58	--	--
		TOTAL FOR 1999:		**8.83**	**3.70**	**10.52**	**19.30**	**19.30**	**0.063**	**0.58**	**0**	**0**

Table 3-2. Summary of Actual Emissions From Cargill Bartow Based on 1998 and 1999 Annual Operating Reports

				ANNUAL EMISSIONS								
EU ID	EMISSION UNIT DESCRIPTION	SCC CODE	YEAR	CO (TPY)	F (TPY)	NO_x (TPY)	PM [a] (TPY)	PM_{10} [b] (TPY)	SO_2 (TPY)	VOC (TPY)	SAM (TPY)	TRS (TPY)
		1998/1999 AVERAGE:		**4.57**	**9.16**	**5.89**	**21.33**	**9.65**	**0.034**	**0.30**	**0**	**0**
032	No. 6 Sulfuric Acid Plant	3-01-023-01	1998	--	--	47.63	--	--	1613.59	--	5.05	--
		3-90-006-99	1998	0.035	--	0.14	0.0050	--	0.0060	0.0028	--	--
		TOTAL FOR 1998:		**0.035**	**0**	**47.77**	**0.0050**	**0**	**1613.60**	**0.0028**	**5.05**	**0**
		3-01-023-01	1999	--	45.98	--	--	--	1379.34	--	7.66	--
		3-90-006-99	1999	0.019	--	0.045	0.0036	0.0036	0.00029	--	0	--
		TOTAL FOR 1999:		**0.019**	**45.98**	**0.045**	**0.0036**	**0.0036**	**1379.34**	**0**	**7.66**	**0**
		1998/1999 AVERAGE:		**0.027**	**22.99**	**23.91**	**0.0043**	**0.0018**	**1496.47**	**0.0014**	**6.36**	**0**
033	No. 5 Sulfuric Acid Plant	3-01-023-01	1998	--	--	51.34	--	--	1582.21	--	8.09	--
		3-90-006-99	1998	0.0088	--	0.035	0.0013	--	0.00015	0.00070	--	--
		TOTAL FOR 1998:		**0.0088**	**0**	**51.38**	**0.0013**	**0**	**1582.21**	**0.00070**	**8.09**	**0**
		3-01-023-01	1999	--	--	47.42	--	--	1422.63	--	43.54	--
		3-90-006-99	1999	0.019	--	0.045	0.0036	0.0036	0.00029	--	--	--
		TOTAL FOR 1999:		**0.019**	**0**	**47.47**	**0.0036**	**0.0036**	**1422.63**	**0**	**43.54**	**0**
		1998/1999 AVERAGE:		**0.014**	**0**	**49.42**	**0.0025**	**0.0018**	**1502.42**	**0.00035**	**25.815**	**0**
034	Phosphoric Acid Plant No.5 w/ Wellman-Lord Scrubber	3-01-016-01	1998	Included in EU ID 010								
		3-01-016-01	1999	Included in EU ID 010								
045	Molten Sulfur System Stack 45 from West 200 ton molten sulfur	3-05-104-08	1998	--	--	--	3.98	--	10.19	7.26	--	4.89
		TOTAL FOR 1998:		**0**	**0**	**0**	**3.98**	**0**	**10.19**	**7.26**	**0**	**4.89**
		3-01-999-99	1999	--	--	--	2.68	2.68	6.84	4.88	--	3.28
		3-05-104-08	1999	Emissions included under unit 3-05-104-08								

Table 3-2. Summary of Actual Emissions From Cargill Bartow Based on 1998 and 1999 Annual Operating Reports

EU ID	EMISSION UNIT DESCRIPTION	SCC CODE	YEAR	CO (TPY)	F (TPY)	NO_x (TPY)	PM [a] (TPY)	PM_{10} [b] (TPY)	SO_2 (TPY)	VOC (TPY)	SAM (TPY)	TRS (TPY)
		TOTAL FOR 1999:		0	0	0	2.68	2.68	6.84	4.88	0	3.28
		1998/1999 AVERAGE:		0	0	0	3.33	1.34	8.52	6.07	0	4.09
046	Molten Sulfur System Vent 44 from 1,000 ton tank	3-05-104-08	1998	--	--	--	0.040	--	0.040	0.040	--	0.040
		TOTAL FOR 1998:		0	0	0	0.040	0	0.040	0.040	0	0.040
		3-01-999-99	1999	--	--	--	--	--	--	--	--	--
		TOTAL FOR 1999:		0	0	0	0	0	0	0	0	0
		1998/1999 AVERAGE:		0	0	0	0.020	0	0.020	0.020	0	0.020
047	Molten Sulfur System Vent from 3,000 ton surge tank	3-01-999-99	1998	--	--	--	0.040	--	0.040	0.040	--	--
		TOTAL FOR 1998:		0	0	0	0.040	0	0.040	0.040	0	0
		3-01-999-99	1999	--	--	--	--	--	--	--	--	--
		TOTAL FOR 1999:		0	0	0	0	0	0	0	0	0
		1998/1999 AVERAGE:		0	0	0	0.020	0	0.020	0.020	0	0
048	Molten Sulfur System 3,000 ton surge tank, two inlets	3-01-999-99	1998	--	--	--	0	0	0	0	--	--
		TOTAL FOR 1998:		0	0	0	0	0	0	0	0	0
049	Molten Sulfur System Inlet from 3,000 ton tank	3-01-999-99	1998	--	--	--	0	0	0	0	--	--
		TOTAL FOR 1998:		0	0	0	0	0	0	0	0	0
050	300 Ton Molten Sulfur Pit for railcar unloading	3-01-999-99	1998	--	--	--	0.55	--	1.41	1.00	--	0.68
		TOTAL FOR 1998:		0	0	0	0.55	0	1.41	1.00	0	0.68
		3-01-999-99	1999	--	--	--	2.68	2.68	6.84	4.88	--	3.28

Table 3-2. Summary of Actual Emissions From Cargill Bartow Based on 1998 and 1999 Annual Operating Reports

				ANNUAL EMISSIONS								
EU ID	EMISSION UNIT DESCRIPTION	SCC CODE	YEAR	CO (TPY)	F (TPY)	NO_x (TPY)	PM [a] (TPY)	PM_{10} [b] (TPY)	SO_2 (TPY)	VOC (TPY)	SAM (TPY)	TRS (TPY)
		TOTAL FOR 1999:		0	0	0	2.68	2.68	6.84	4.88	0	3.28
		1998/1999 AVERAGE:		0	0	0	1.61	1.34	4.13	2.94	0	1.98
051	Cleaver Brooks Package Watertube Boiler	1-02-004-04	1998	--	--	--	--	--	--	--	--	--
		1-02-006-02	1998	1.6	--	6.4	0.63	--	0.028	0.11	--	--
		TOTAL FOR 1998:		1.6	0	6.4	0.63	0	0.028	0.11	0	0
		1-02-004-04	1999	0	--	0	0	0	0	0	--	--
		1-02-006-02	1999	2.64	--	3.14	0.24	0.24	0.019	0.17	--	--
		TOTAL FOR 1999:		2.64	0	3.14	0.24	0.24	0.019	0.17	0	0
		1998/1999 AVERAGE:		2.12	0	4.77	0.43	0.12	0.023	0.14	0	0

References: 1998 and 1999 Annual Operating Permits, Cargill Fertilizer, Inc.

Footnotes:

[a] 1998 PM emissions include PM_{10} emissions.

[b] PM10 emissions for 1999 are calculated as 100% of PM emissions.

Table 4-1. Summary of PM_{10} Monitoring Data Collected Near Cargill's Bartow Facility

					Reported Concentration (µg/m³)		
County	Station ID	Monitor Location	Year	Number of Observations	Highest 24-Hour	Second-Highest 24-Hour	Annual
Polk	12-105-0010	Anderson & Pine Crest Road, Mulberry	1998	58	54	48	24
			1999	53	45	42	22
Polk	12-105-2006	NW 4th Circle, Mulberry	1998	317	108	91	25
			1999	326	50	47	22

Table 5-1. Summary of 1998 and 1999 Stack Test Data for Fluoride Emissions from Cargill's Phosphoric Acid Plant

Test Date	Unit	PAP Process Rate (TPH P_2O_5)	Measured Emission Rate (lb/hr)	Measured Emission Rate (lb/ton P_2O_5)	Allowable PAP Process Rate (TPH P_2O_5)	Allowable Emission Rate (lb/hr)	Allowable Emission Rate (lb/ton P_2O_5)
July 10, 1998	No. 3 Filter Scrubber		0.13				
	No. 4 Reactor/Filter Scrubber		0.14				
	No. 5 Reactor/Filter Scrubber		0.22				
	Total	150	0.49	0.0032	170	2.29	0.0135
July 10, 1998	No. 3 Filter Scrubber		0.04				
	No. 4 Reactor/Filter Scrubber		0.11				
	No. 5 Reactor/Filter Scrubber		0.22				
	Total	146	0.37	0.0025	170	2.29	0.0135

Table 5-2. Summary of BACT Determination for Fluoride Emission From Phosphoric Acid Plants

Company	State	RBLC ID	Permit Issue Date	Process Rate	Emission Rate	Control Equipment	% Efficiency
Cargill Fertilizer, Inc. (Bartow)	FL	FL-0106	8/24/95	170 TPH P_2O_5	0.012[a] lb/ton P_2O_5	Packed Scrubber	--
Cargill Fertilizer, Inc. (Riverview)	FL	FL-0112	8/27/96	170 TPH P_2O_5	0.0135 lb/ton P_2O_5	Packed Scrubber Using Pond Water	--
IMC Fertilizer, Inc.	FL	FL-0066	8/2/93	2500 TPD	0.02 lb/ton P_2O_5	Crossflow Scrubber	--

Reference: RACT/BACT/LAER Clearinghouse on EPA's web page, 2000.

Footnotes:

[a] The information contained in the RACT/BACT/LAER Clearinghouse database is incorrect based on AC53-262532 (PSD-FL-224). Although FDEP determined that 0.012 pounds F per ton P_2O_5 to be BACT for a new facility, they concluded that 0.0135 pounds F per ton of P_2O_5 was BACT for modification of this existing facility.

Table 6-1. Major Features of the ISCST3 Model

ISCST3 Model Features
• Polar or Cartesian coordinate systems for receptor locations
• Rural or one of three urban options which affect wind speed profile exponent, dispersion rates, and mixing height calculations
• Plume rise due to momentum and buoyancy as a function of downwind distance for stack emissions (Briggs, 1969, 1971, 1972, and 1975; Bowers, et al., 1979).
• Procedures suggested by Huber and Snyder (1976); Huber (1977); and Schulman and Scire (1980) for evaluating building wake effects
• Procedures suggested by Briggs (1974) for evaluating stack-tip downwash
• Separation of multiple emission sources
• Consideration of the effects of gravitational settling and dry deposition on ambient particulate concentrations
• Capability of simulating point, line, volume, area, and open pit sources
• Capability to calculate dry and wet deposition, including both gaseous and particulate precipitation scavenging for wet deposition
• Variation of wind speed with height (wind speed-profile exponent law)
• Concentration estimates for 1-hour to annual average times
• Terrain-adjustment procedures for elevated terrain including a terrain truncation algorithm for ISCST3; a built-in algorithm for predicting concentrations in complex terrain
• Consideration of time-dependent exponential decay of pollutants
• The method of Pasquill (1976) to account for buoyancy-induced dispersion
• A regulatory default option to set various model options and parameters to EPA recommended values (see text for regulatory options used)
• Procedure for calm-wind processing including setting wind speeds less than 1 m/s to 1 m/s.

Note: ISCST3 = Industrial Source Complex Short-Term.
Source: EPA, 1995.

Table 6-2. Summary of Stack Parameters and Emission Rate Increase for Project Affected Sources Included in the Significant Impact Analysis

Source	Stack/Vent Release Height (ft)	Stack/Vent Diameter (ft)	Exhaust Gas Exit Temperature (Deg. F)	Exhaust Gas Velocity (ft/sec)	PM/PM_{10} Emission Rate (lb/hr)			SO_2 Emission Rate (lb/hr)			Fluoride Emission Rate (lb/hr)		
					Allowable	Actual	Increase	Allowable	Actual	Increase	Allowable	Actual	Increase
Phosphoric Acid Plant													
No. 3 Filter Table Scrubber	120	5.00	110	32.0	--	--	--	--	--	--	0.43[a]	0.085[b]	0.35
No. 4 Reactor/Filter Scrubber	144	3.90	114	31.1	--	--	--	--	--	--	1.03[a]	0.13[b]	0.90
No. 5 Reactor/Filter Scrubber	99	5.00	109	29.0	--	--	--	--	--	--	0.87[a]	0.22[b]	0.65
				Total	--	--	--	--	--	--	2.29	0.116	1.90
No. 4 Fertilizer Plant													
Material Handling/Dryer Scrubber	140	11.00	329	42.1	22.80	5.01	17.79	8.89	0.008	8.88	5.51	2.16	3.35
No. 4 Shipping Plant													
Material Handling Scrubber	128	4.90	305	38.0	10.54	0.14	10.40	--	--	--	--	--	--

Footnotes:
[a] Relative to the location of the No. 4 DAP stack location.
[b] The Title V Permit actually limits total fluoride emissions from the entire PAP to 2.29 lb/hr. The individual emissions presented were the basis of the emission limit.

Table 6-3. Summary of Stack Parameters and Emission Rates for Future Cargill Sources

Source	Relative Location[a] (ft) X	Relative Location[a] (ft) Y	Stack/Vent Release Height (ft)	Stack/Vent Diameter (ft)	Exhaust Gas Exit Temperature (Deg. F)	Exhaust Gas Velocity (ft/sec)	Allowable PM/PM_{10} Emission Rate (lb/hr)	Allowable SO_2 Emission Rate (lb/hr)	Allowable Fluoride Emission Rate (lb/hr)
Phosphoric Acid Plant									
No. 3 Filter Table Scrubber	1378	1460	120	5.00	110	32.0	--	--	0.43[b]
No. 4 Reactor/Filter Scrubber	1332	1299	144	3.90	114	31.1	--	--	1.03[b]
No. 5 Reactor/Filter Scrubber	1394	1657	99	5.00	109	29.0	--	--	0.87[b]
						Total	--	--	2.29
No. 4 Fertilizer Plant									
Material Handling/Dryer Scrubber	0	0	140	11.00	329	42.1	22.80	8.89	5.51
No. 4 Shipping Plant									
Material Handling Scrubber	-161	220	128	4.90	305	38.0	10.54	--	--

Footnotes:

[a] Relative to the location of the No. 4 DAP stack location.

[b] The Title V Permit actually limits total fluoride emissions from the entire PAP to 2.29 lb/hr. The individual emissions presented were the basis of the emission limit.

Table 6-4. Screening Analysis for PM Emitting Facilities in the Vicinity of Cargill - Bartow

Facility ID	Facility Name	Source Location East (km)	Source Location North (km)	Relative Location[a] X (km)	Relative Location[a] Y (km)	Relative Location[a] Distance (km)	Relative Location[a] Direction (deg.)	PM Emissions Rate (TPY)	Q Emissions Threshold [(Dist. - SIA) X 20]	Included in Modeling Analysis? AAQS	Included in Modeling Analysis? PSD Class II
1050097	CUSTOM CHEMICALS CORPORATION	408.00	3085.50	-1.8	-1.2	2.2	236	2	SIA	Yes	No[b]
1050146	PAVEX CORPORATION	413.00	3086.20	3.2	-0.5	3.2	99	14	SIA	Yes	No[b]
1050048	MULBERRY PHOSPHATES, INC.	406.80	3085.10	-3.0	-1.6	3.4	242	131	SIA	Yes	No[b]
1050050	U S AGRI-CHEMICALS - BARTOW	413.20	3086.30	3.4	-0.4	3.4	97	268	SIA	Yes	No[b]
1050052	CF INDUSTRIES, INC. - BARTOW PHOSPHATE COMPLEX	408.30	3082.50	-1.5	-4.2	4.5	200	567	9	Yes	Yes[c]
1050148	ABB SERVICE, INC.	404.90	3084.10	-4.9	-2.6	5.5	242	1	31	No	No[b]
1050312	MASTER CONTAINERS, INC.	404.25	3085.60	-5.6	-1.1	5.7	259	2	33	No	No[b]
1050056	IMC-AGRICO CO.(PRAIRIE)	402.90	3087.00	-6.9	0.3	6.9	272	568	58	Yes	No[b]
1050053	FARMLAND - GREEN BAY PLANT	410.30	3079.70	0.5	-7.0	7.0	176	410	60	Yes	Yes[c]
1050064	FLORIDA ROCK INDUSTRIES, INC. - BARTOW	416.80	3085.80	7.0	-0.9	7.1	97	2	61	No	No[b]
1050217	POLK POWER PARTNERS, L.P. -MULBERRY	413.60	3080.60	3.8	-6.1	7.2	148	35	64	No	Yes[c]
1050229	PARALLEL PRODUCTS OF FLORIDA, INC.	413.85	3080.70	4.1	-6.0	7.2	146	32	65	No	No[b]
1050157	PURINA MILLS, INC.	402.00	3087.00	-7.8	0.3	7.8	272	22	76	No	No[b]
1050211	GENERAL PLASTICS DIVISION OF PMC, INC.	413.50	3093.80	3.7	7.1	8.0	28	2	80	No	No[b]
1050182	GEOLOGIC RECOVERY SYSTEMS	401.80	3085.80	-8.0	-0.9	8.1	264	20	81	No	No[b]
1050066	KAISER ALUMINUM & CHEM. CORP.	401.50	3086.50	-8.3	-0.2	8.3	269	23	86	No	No[b]
1050319	CLARK ENVIRONMENTAL INC	401.20	3086.60	-8.6	-0.1	8.6	269	13	92	No	No[b]
1050128	RIDGE PALLETS, INC.	418.60	3084.10	8.8	-2.6	9.2	106	8	104	No	No[b]
1050181	RGM OF GEORGIA LTD	419.00	3085.50	9.2	-1.2	9.3	97	43	106	No	No[b]
1050045	PASCO PROCESSING, LLC	418.70	3083.60	8.9	-3.1	9.4	109	191	108	Yes	No[b]
1050231	ORANGE COGENERATION LIMITED PARTNERSHIP	418.70	3083.00	8.9	-3.7	9.6	113	48	113	No	No[b]
1050047	AGRIFOS, L.L.C. - NICHOLS	398.70	3085.30	-11.1	-1.4	11.2	263	557	144	Yes	Yes[c]
1050151	CENTRAL FLORIDA HOT-MIX, INC.	412.50	3097.70	2.7	11.0	11.3	14	45	147	No	No[b]
0570448	NORTH STAR RECYCLING	398.30	3086.69	-11.5	0.0	11.5	270	11	150	No	No[b]
1050196	O. K. WEST & SON	411.50	3098.20	1.7	11.5	11.6	8	1	152	No	No[b]
1050057	IMC-AGRICO CO.(NICHOLS)	398.40	3084.20	-11.4	-2.5	11.7	258	-1,514	153	No	Yes[c]
1050145	BARTOW ETHANOL, INC.	418.75	3078.84	8.9	-7.9	11.9	131	281	158	Yes	No[b]
1050100	SHELL EPOXY RESINS LLC	410.70	3098.90	0.9	12.2	12.2	4	31	165	No	No[b]
1050073	RINKER MATERIALS CORPORATION	412.50	3099.00	2.7	12.3	12.6	12	38	172	No	No[b]
1050081	QUIKRETE OF FLORIDA, INC.(PRE-MIX INDUS)	412.80	3099.00	3.0	12.3	12.7	14	30	173	No	No[b]
1050198	PALEX, INC.	419.10	3078.10	9.3	-8.6	12.7	133	97	173	No	No[b]
1050316	MCGEE TIRE STORES, INC.	413.68	3098.81	3.9	12.1	12.7	18	5	174	No	No[b]
1050220	MACLAN CORPORATION	410.90	3099.60	1.1	12.9	12.9	5	1	179	No	No[b]
1050127	JUICE BOWL PRODUCTS	409.40	3099.90	-0.4	13.2	13.2	358	1	184	No	No[b]
1050244	SUNBELT FOREST PRODUCTS CORP.	422.08	3092.05	12.3	5.4	13.4	66	4	188	No	No[b]
1050234	FLORIDA POWER CORPORATION - HINES	414.34	3073.91	4.5	-12.8	13.6	160	91	191	No	Yes[c]
1050106	SUN PAC FOODS, INC.	422.70	3092.60	12.9	5.9	14.2	65	91	204	No	No[b]
1050297	POLK CO ANIMAL SERVICES	418.37	3098.35	8.6	11.7	14.5	36	2	209	No	No[b]
1050059	IMC-AGRICO CO. (NEW WALES)	396.70	3079.40	-13.1	-7.3	15.0	241	1,500	220	Yes	No[b]
1050055	IMC-AGRICO CO. (SOUTH PIERCE)	407.50	3071.40	-2.3	-15.3	15.5	189	777	229	Yes	Yes[c]
1050199	VIGIRON	420.40	3075.20	10.6	-11.5	15.6	137	88	233	No	No[b]
1050240	INTERNATIONAL BEVERAGE SYSTEMS, INC.	398.00	3097.00	-11.8	10.3	15.7	311	1	233	No	No[b]
1050003	LAKELAND ELECTRIC LARSEN	408.90	3102.50	-0.9	15.8	15.8	357	631	237	Yes	Yes[c]
1050034	IMC-AGRICO CO. (CFMO)	398.20	3075.70	-11.6	-11.0	16.0	227	1,969	240	Yes	No[b]
1050120	CEMENT PRODUCTS & SUPPLY CO., INC.	405.50	3102.20	-4.3	15.5	16.1	344	1	242	No	No[b]
1050213	FLORIDA FAVORITE FERTILIZER COMPANY	403.50	3101.70	-6.3	15.0	16.3	337	3	245	No	No[b]
1050009	FLORIDA TILE INDUSTRIES, INC.	405.40	3102.40	-4.4	15.7	16.3	344	69	246	No	No[b]
1050137	MONIER, INC.	414.00	3102.50	4.2	15.8	16.3	15	44	247	No	No[b]
1050139	MAXPAK CORPORATION	402.00	3102.00	-7.8	15.3	17.2	333	16	263	No	No[b]
1050177	PUBLIX SUPER MARKETS	400.80	3101.50	-9.0	14.8	17.3	329	2	266	No	No[b]
1050272	LAKEVIEW CREMATORY	419.85	3100.98	10.1	14.3	17.5	35	4	269	No	No[b]
1050095	LAKELAND REGIONAL MEDICAL CENTER	406.40	3104.30	-3.4	17.6	17.9	349	4	279	No	No[b]
1050015	FLORIDA JUICE PARTNERS, LTD.	399.00	3101.80	-10.8	15.1	18.6	324	140	291	No	No[b]
1050026	ALCOA ALUMINA AND CHEMICALS, L.L.C.	416.80	3069.50	7.0	-17.2	18.6	158	69	291	No	No[b]
1050223	FLORIDA POWER CORPORATION -TIGER BAY	416.30	3069.30	6.5	-17.4	18.6	160	39	291	No	Yes[c]
0570075	CORONET INDUSTRIES, INC.	393.80	3096.30	-16.0	9.6	18.7	301	570	293	Yes	No[b]
1050051	U.S. AGRI-CHEMICALS - FT. MEADE	416.00	3069.00	6.2	-17.7	18.8	161	137	295	No	No[b]
1050208	LAKELAND DRUM SERVICE, INC.	418.80	3103.60	9.0	16.9	19.1	28	12	303	No	No[b]
1050230	BREED TECHNOLOGIES INCORPORATED	396.31	3100.30	-13.5	13.6	19.2	315	2	303	No	No[b]
1050174	PEPPERIDGE FARM, INC	403.30	3104.80	-6.5	18.1	19.2	340	1	305	No	No[b]
1050200	J. H. HULL, INC.	399.10	3070.60	-10.7	-16.1	19.3	214	26	307	No	No[b]
1050004	LAKELAND ELECTRIC - MCINTOSH	409.00	3106.20	-0.8	19.5	19.5	358	3,924	310	Yes	Yes[c]
1050143	THE CITY OF LAKELAND	403.70	3105.30	-6.1	18.6	19.6	342	3	311	No	No[b]
1050221	AUBURNDALE POWER PARTNERS, LP	420.80	3103.30	11.0	16.6	19.9	34	46	318	No	No[b]
1050096	FLORIDA DISTILLERS - AUBURNDALE	421.40	3102.90	11.6	16.2	19.9	36	1	318	No	No[b]
0570220	SOUTHERN CULVERT	391.50	3095.00	-18.3	8.3	20.1	294	19	322	No	No[b]
7770037	COUCH CONSTRUCTION, L.P.	392.61	3097.30	-17.2	10.6	20.2	302	22	324	No	No[b]
1050175	ENNIS DRUM SERVICE, INC.	422.50	3102.50	12.7	15.8	20.3	39	15	325	No	No[b]
1050227	CENTRAL FLORIDA CREMATORY OF POLK CO.	405.00	3106.50	-4.8	19.8	20.4	346	2	327	No	No[b]
1050158	HIGH PERFORMANCE SYSTEMS, INC.	428.11	3096.05	18.3	9.4	20.6	63	1	331	No	No[b]
1050142	BALIMOY MANUFACTURING	422.80	3102.80	13.0	16.1	20.7	39	4	334	No	No[b]
1050023	CUTRALE CITRUS JUICES USA,INC(WAS COCA C	421.60	3103.70	11.8	17.0	20.7	35	170	334	No	No[b]
1050233	TAMPA ELECTRIC COMPANY - POLK POWER STATION	402.45	3067.35	-7.4	-19.3	20.7	201	222	334	No	Yes[c]
1050007	OWENS-BROCKWAY GLASS CONTAINER INC.	423.40	3102.80	13.6	16.1	21.1	40	105	342	No	No[b]
1050017	PURSELL INDUSTRIES, INC.	427.98	3097.43	18.2	10.7	21.1	59	65	342	No	No[b]
1050037	SFE CITRUS PROCESSORS, L.P., LTD	421.70	3104.20	11.9	17.5	21.2	34	148	343	No	No[b]
1050076	INTERNATIONAL PAPER - AUBURNDALE	421.70	3104.30	11.9	17.6	21.2	34	26	345	No	No[b]
0570388	HARDEE MANUFACTURING COMPANY, INC.	392.20	3099.70	-17.6	13.0	21.9	306	2	358	No	No[b]
1050216	RIDGE GENERATING STATION, L.P.	427.01	3100.33	17.2	13.6	22.0	52	9	359	No	No[b]
0571016	CONSOLIDATED FABRICATING, INC.	392.40	3100.10	-17.4	13.4	22.0	308	6	359	No	No[b]
0570474	T-R DRUM & FREIGHT CO.	389.00	3094.00	-20.8	7.3	22.0	289	1	361	No	No[b]

Table 6-4. Screening Analysis for PM Emitting Facilities in the Vicinity of Cargill - Bartow

Facility ID	Facility Name	Source Location East (km)	Source Location North (km)	Relative Location[a] X (km)	Relative Location[a] Y (km)	Relative Location[a] Distance (km)	Relative Location[a] Direction (deg.)	PM Emissions Rate (TPY)	Q Emissions Threshold [(Dist. - SIA) X 20]	Included in Modeling Analysis? AAQS	Included in Modeling Analysis? PSD Class II
0570124	RINKER MATERIALS CORPORATION	392.20	3100.00	-17.6	13.3	22.1	307	4	361	No	No[b]
1050122	BORAL MATERIAL TECHNOLOGIES, INC. - AUBURNDALE	423.50	3104.60	13.7	17.9	22.5	37	5	371	No	No[b]
0570318	SOUTHDOWN, INC.	390.20	3098.30	-19.6	11.6	22.8	301	1	376	No	No[b]
0570460	JAMES HARDIE BUILDING PRODUCTS INC,	387.06	3089.52	-22.7	2.8	22.9	277	5	378	No	No[b]
1050082	APAC-FLORIDA, INC., MACASPHALT DIVISION	423.10	3105.50	13.3	18.8	23.0	35	81	381	No	No[b]
1050099	AOC, L.L.C.	401.00	3108.50	-8.8	21.8	23.5	338	18	390	No	No[b]
1050067	SOUTHDOWN, INC.	428.10	3102.00	18.3	15.3	23.9	50	6	397	No	No[b]
0570370	PARADISE, INC.	388.50	3099.00	-21.3	12.3	24.6	300	2	412	No	No[b]
0571115	REDMAN HOMES, INC.	387.04	3097.35	-22.8	10.7	25.1	295	15	423	No	No[b]
0570468	GATSBY SPAS INC.	387.07	3097.59	-22.7	10.9	25.2	296	15	424	No	No[b]
1050091	FLORIDA ROCK IND. - WINTER HAVEN	428.00	3105.20	18.2	18.5	26.0	45	2	439	No	No[b]
0570249	ALCOA EXTRUSIONS	385.60	3097.00	-24.2	10.3	26.3	293	40	446	No	No[b]
0571021	DUNCO ROCK & GRAVEL INC	386.20	3098.70	-23.6	12.0	26.5	297	5	450	No	No[b]
0570374	SOUTHERN GROUTS & MORTARS	386.00	3098.70	-23.8	12.0	26.7	297	5	453	No	No[b]
0570230	FLORIDA BRICK & CLAY CO	384.90	3097.10	-24.9	10.4	27.0	293	3	460	No	No[b]
0570320	DART CONTAINER CORPORATION OF FLORIDA	384.90	3098.20	-24.9	11.5	27.4	295	1	469	No	No[b]
	IMC - FORT LONESOME	389.60	3067.90	-20.2	-18.8	27.6	227	76	472	No	Yes[c]
1050090	FLORIDA DISTILLERS	428.00	3108.10	18.2	21.4	28.1	40	2	482	No	No[b]
0490015	HARDEE POWER PARTNERS,LTD	404.80	3057.40	-5.0	-29.3	29.7	190	182	514	No	Yes[c]
1050002	CITRUS WORLD, INC.	441.10	3087.30	31.3	0.6	31.3	89	502	546	No	No[b]
1050263	POLK CORRECTIONAL INSTITUTION	423.00	3118.20	13.2	31.5	34.2	23	12	603	No	No[b]
0490017	SINGLETARY CONCRETE PRODUCTS INC	418.53	3053.46	8.7	-33.2	34.4	165	8	607	No	No[b]
1050166	SCANAMERICAN HOLDINGS CORPORATION	430.10	3115.40	20.3	28.7	35.2	35	3	623	No	No[b]
1050276	YTONG FLORIDA, LTD.	440.30	3106.20	30.5	19.5	36.2	57	1	644	No	No[b]
0570005	CF INDUSTRIES, INC., PLANT CITY PHOSP	388.00	3116.00	-21.8	29.3	36.5	323	957	650	Yes	No[b]
1010076	PLAZA MATERIALS CORPORATION	388.44	3120.11	-21.4	33.4	39.7	327	6	713	No	No[b]
0570180	FECP/CAST CRETE DIVISION	371.90	3099.20	-37.9	12.5	39.9	288	11	718	No	No[b]
1050113	STANDARD SAND & SILICA COMPANY - LAKE WALES	450.20	3085.40	40.4	-1.3	40.4	92	151	728	No	No[b]
0570259	EWELL INDUSTRIES, INC.	368.60	3092.10	-41.2	5.4	41.6	277	6	731	No	No[b]
1050001	CITROSUCO NORTH AMERICA, INC.	451.60	3085.50	41.8	-1.2	41.8	92	126	756	No	No[b]
7770380	KEARNEY DEVELOPMENT COMPANY	368.70	3094.80	-41.1	8.1	41.9	281	1	758	No	No[b]
0570069	INDUSTRIAL GALVANIZERS AMERICA, INC.	368.50	3094.50	-41.3	7.8	42.0	281	13	761	No	No[b]
0570261	HILLSBOROUGH CTY. RESOURCE RECOVERY FAC.	368.20	3092.70	-41.6	6.0	42.0	278	92	761	No	No[b]
0570076	DELTA ASPHALT	372.10	3105.40	-37.7	18.7	42.1	296	37	762	No	No[b]
0490043	IPS AVON PARK CORPORATION	408.75	3044.50	-1.1	-42.2	42.2	181	82	764	No	No[b]
1050019	CARGILL CITRO-AMERICA, INC.	447.90	3068.30	38.1	-18.4	42.3	116	208	766	No	No[b]
1050061	HOLLY HILL FRUIT PRODUCTS	441.00	3115.40	31.2	28.7	42.4	47	91	768	No	No[b]
0570025	TRADEMARK NITROGEN CORP	367.30	3092.60	-42.5	5.9	42.9	278	1,463	778	Yes	No[b]
0570280	EWELL INDUSTRIES, INC.	367.10	3092.70	-42.7	6.0	43.1	278	11	782	No	No[b]
0570240	EWELL INDUSTRIES	367.00	3092.80	-42.8	6.1	43.2	278	15	785	No	No[b]
1050249	EWELL INDUSTRIES, INC.	441.08	3117.06	31.3	30.4	43.6	46	4	792	No	No[b]
0570260	GAYLORD CONTAINER CORPORATION	366.30	3092.30	-43.5	5.6	43.9	277	6	797	No	No[b]
0570405	GOODYEAR TIRE & RUBBER COMPANY	366.40	3093.20	-43.4	6.5	43.9	279	10	798	No	No[b]
0570279	FLORIDA ROCK INDUSTRIES, INC.	365.80	3085.00	-44.0	-1.7	44.0	268	22	801	No	No[b]
0570061	TAMPA ARMATURE WORKS	365.60	3091.70	-44.2	5.0	44.5	276	4	810	No	No[b]
0570409	CONIGLIO CONSTRUCTION AND DEMOLITION DEB	368.90	3104.20	-40.9	17.5	44.5	293	24	810	No	No[b]
0570241	RINKER MATERIALS CORPORATION	364.90	3084.40	-44.9	-2.3	45.0	267	3	819	No	No[b]
0570321	MANTUA MANUFACTURING CO.	364.70	3092.50	-45.1	5.8	45.5	277	1	829	No	No[b]
0570364	MANNA PRO CORPORATION	364.70	3092.60	-45.1	5.9	45.5	277	11	830	No	No[b]
0570119	GULF COAST METALS	364.70	3093.60	-45.1	6.9	45.6	279	4	832	No	No[b]
0570401	FLORIDA MEGA-MIX, INC.	364.50	3093.40	-45.3	6.7	45.8	278	8	836	No	No[b]
0570373	CITY OF TAMPA, DEPT OF SANITARY SEWERS	364.00	3089.50	-45.8	2.8	45.9	273	52	838	No	No[b]
7771101	WOODRUFF AND SONS INC	364.33	3093.18	-45.5	6.5	45.9	278	13	839	No	No[b]
0570057	GULF COAST RECYCLING, INC.	364.00	3093.50	-45.8	6.8	46.3	278	26	846	No	No[b]
7775052	WOODRUFF & SONS, INC.	363.64	3092.27	-46.2	5.6	46.5	277	13	850	No	No[b]
0570163	GRIFFIN INDUSTRIES	364.10	3096.40	-45.7	9.7	46.7	282	4	854	No	No[b]
0570317	JANET & CHARLIES WOOD RECYCLING FACILITY	363.10	3085.30	-46.7	-1.4	46.7	268	100	854	No	No[b]
0570223	COUCH CONSTRUCTION, L.P.	364.30	3098.10	-45.5	11.4	46.9	284	14	858	No	No[b]
0570150	DRAVO LIME COMPANY	362.90	3084.70	-46.9	-2.0	46.9	268	15	859	No	No[b]
0570344	POPS PAINTING, INC.	362.80	3087.90	-47.0	1.2	47.0	271	38	860	No	No[b]
0570238	KEYS CONCRETE INDUSTRIES, INC.	363.20	3093.30	-46.6	6.6	47.1	278	7	861	No	No[b]
0570008	CARGILL FERTILIZER, INC. - RIVERVIEW	362.90	3082.50	-46.9	-4.2	47.1	265	383	862	No	Yes
0570121	EWELL INDUSTRIES, INC.	364.00	3075.00	-45.8	-11.7	47.3	256	33	865	No	No[b]
0490003	THE MANCINI PACKING COMPANY	421.40	3040.80	11.6	-45.9	47.3	166	25	867	No	No[b]
0570029	NITRAM, INC.	362.50	3089.00	-47.3	2.3	47.4	273	222	867	No	No[b]
0570459	BAUSCH&LOMB PHARMACEUTICALS	366.38	3105.74	-43.4	19.0	47.4	294	1	868	No	No
0570033	CSX TRANSPORTATION, INC.	362.39	3088.99	-47.4	2.3	47.5	273	242	869	No	No[b]
0570097	W R BONSAL CO	363.60	3098.10	-46.2	11.4	47.6	284	12	872	No	No[b]
0570086	GAF MATERIALS CORPORATION	362.20	3087.20	-47.6	0.5	47.6	271	40	872	No	No[b]
0570224	REED MINERALS DIVISION	362.20	3085.50	-47.6	-1.2	47.6	269	32	872	No	No[b]
0571242	NATIONAL GYPSUM COMPANY	363.30	3075.60	-46.5	-11.1	47.8	257	99	876	No	Yes
0570436	PALLET MANAGEMENT GROUP	362.80	3096.10	-47.0	9.4	47.9	281	9	879	No	No[b]
0570185	RINKER MATERIALS CORPORATION	363.20	3098.10	-46.6	11.4	48.0	284	15	879	No	No[b]
0570087	CORESLAB STRUCTURES(TAMPA),INC.	363.20	3098.40	-46.6	11.7	48.0	284	2	881	No	No[b]
0570299	PREMDOR INC.	362.10	3092.50	-47.7	5.8	48.1	277	8	881	No	No[b]
0570106	RINKER	362.80	3097.00	-47.0	10.3	48.1	282	21	882	No	No[b]
0570039	TAMPA ELECTRIC COMPANY - BIG BEND	363.15	3074.91	-46.7	-11.8	48.1	256	7,586	882	Yes	Yes
0570136	VERLITE CO	363.00	3098.10	-46.8	11.4	48.2	284	30	883	No	No[b]
0550035	SUNPURE, LIMITED	448.34	3057.60	38.5	-29.1	48.3	127	77	886	No	No[b]
0570125	WISE RECYCLING, LLC	362.70	3097.50	-47.1	10.8	48.3	283	8	886	No	No[b]
0570024	IMC-AGRICO CO.(PORT SUTTON TERMINAL)	361.48	3087.49	-48.3	0.8	48.3	271	383	887	No	No[b]

Table 6-4. Screening Analysis for PM Emitting Facilities in the Vicinity of Cargill - Bartow

Facility ID	Facility Name	Source Location East (km)	Source Location North (km)	Relative Location[a] X (km)	Relative Location[a] Y (km)	Relative Location[a] Distance (km)	Relative Location[a] Direction (deg.)	PM Emissions Rate (TPY)	Q Emissions Threshold [(Dist. - SIA) X 20]	Included in Modeling Analysis? AAQS	Included in Modeling Analysis? PSD Class II
0571151	WEYERHAEUSER COMPANY	362.80	3098.30	-47.0	11.6	48.4	284	9	888	No	No[b]
0570003	CF INDUSTRIES, INC.	362.80	3098.40	-47.0	11.7	48.4	284	8	889	No	No[b]
0570079	EWELL INDUSTRIES, INC.	362.80	3098.40	-47.0	11.7	48.4	284	10	889	No	No[b]
0570052	FLORIDA ROCK INDUSTRIES	362.30	3097.50	-47.5	10.8	48.7	283	21	894	No	No[b]
0570094	IMC-AGRICO CO. (BIG BEND)	362.10	3076.10	-47.7	-10.6	48.9	257	76	897	No	No[b]
0570473	CONRAD YELVINGTON DISTRIBUTORS	361.78	3096.90	-48.0	10.2	49.1	282	27	902	No	No[b]
0570255	LEHIGH PORTLAND CEMENT COMPANY	360.70	3086.80	-49.1	0.1	49.1	270	11	902	No	No[b]
1050242	FLORIDA MINING & MATERIALS - LOUGHMAN	442.00	3124.00	32.2	37.3	49.3	41	1	906	No	No[b]
0570292	GARDNER ASPHALT CORP	360.80	3093.30	-49.0	6.6	49.4	278	3	909	No	No[b]
0570014	EASTERN ASSOCIATION TERMINAL ROCK PORT	360.20	3088.90	-49.6	2.2	49.6	273	266	913	No	No[b]
0571217	SEA 3 OF FLORIDA, INC.	360.10	3087.10	-49.7	0.4	49.7	270	1	914	No	No[b]
0570442	GULF MARINE REPAIR	360.30	3091.90	-49.5	5.2	49.8	276	9	915	No	No[b]
0570040	TAMPA ELECTRIC COMPANY - GANNON	360.00	3087.50	-49.8	0.8	49.8	271	6,267	916	Yes	No[b]
0570413	KIMMINS RECYCLING CORPORATION	360.40	3093.10	-49.4	6.4	49.8	277	15	916	No	No[b]
0570127	MCKAY BAY REFUSE-TO-ENERGY FACILITY	360.20	3092.21	-49.6	5.5	49.9	276	172	918	No	Yes[c]
0571209	APAC-FLORIDA, INC.	359.86	3088.09	-49.9	1.4	50.0	272	38	919	No	No[b]
0570077	VERLITE COMPANY	360.20	3093.00	-49.6	6.3	50.0	277	11	920	No	No[b]
0570032	FLORIDA MINING AND MATERIALS CORP	360.10	3092.20	-49.7	5.5	50.0	276	18	920	No	No[b]
0570466	BULK INTERMODAL SERVICES	360.08	3093.20	-49.7	6.5	50.1	277	15	923	No	No[b]
0570229	GENERAL CHEMICAL CORP	359.90	3092.30	-49.9	5.6	50.2	276	22	924	No	No[b]
0571102	FLORIDA CRUSHED STONE COMPANY	359.50	3086.95	-50.3	0.3	50.3	270	89	926	No	No[b]
0570031	HOLNAM INC.	359.50	3087.30	-50.3	0.6	50.3	271	72	926	No	No[b]
0570252	SOUTHDOWN, INC.	359.30	3087.10	-50.5	0.4	50.5	270	53	930	No	No[b]
0570160	BALL METAL BEVERAGE CONTAINER CORP.	362.00	3103.20	-47.8	16.5	50.6	289	1	931	No	No[b]
0570006	STROH BREWERY COMPANY (THE)	362.00	3103.20	-47.8	16.5	50.6	289	20	931	No	No[b]
0570461	BLACKLIDGE EMULSIONS INCORPORATED	359.50	3093.20	-50.3	6.5	50.7	277	1	934	No	No[b]
0570051	CF INDUSTRIES	359.10	3089.80	-50.7	3.1	50.8	273	15	936	No	No[b]
0570054	SCRAP-ALL, INC.	359.40	3093.10	-50.4	6.4	50.8	277	9	936	No	No[b]
0570281	SOUTHERN REDI-MIX CONCRETE, INC.	363.07	3065.96	-46.7	-20.7	51.1	246	4	943	No	No[b]
0570010	TAMPA CITY WATER DEPT	364.50	3110.60	-45.3	23.9	51.2	298	11	944	No	No[b]
0570009	CITY OF TAMPA WATER DEPARTMENT	360.00	3099.40	-49.8	12.7	51.4	284	9	948	No	No[b]
0570408	UNOCAL CHEMICAL DIVISION	358.40	3088.40	-51.4	1.7	51.4	272	15	949	No	No[b]
0570377	TAMPA BAY STEVEDORES, INC	358.30	3088.60	-51.5	1.9	51.5	272	1	951	No	No[b]
0571100	CHEMICAL LIME COMPANY OF ALABAMA INC	358.20	3088.30	-51.6	1.6	51.6	272	67	952	No	No[b]
0550016	JAHNA CONCRETE, INC.	450.10	3054.30	40.3	-32.4	51.7	129	28	954	No	No[b]
0570286	TAMPA BAY SHIPBUILDING & REPAIR CO.	358.00	3089.00	-51.8	2.3	51.9	273	19	957	No	No[b]
0570290	E.A. MARIANI ASPHALT CO.	358.20	3092.00	-51.6	5.3	51.9	276	4	957	No	No[b]
0570038	TAMPA ELECTRIC COMPANY - HOOKERS POINT	358.00	3091.00	-51.8	4.3	52.0	275	1,536	960	Yes	No[b]
0570021	INTERNATIONAL SHIP	358.03	3092.75	-51.8	6.1	52.1	277	147	962	No	No[b]
0570018	LAFARGE CORP.	357.70	3090.60	-52.1	3.9	52.2	274	323	965	No	No[b]
0570001	JOHNSON CONTROLS BATTERY GROUP, INC	359.90	3102.50	-49.9	15.8	52.3	288	127	967	No	No[b]
0570251	CONAGRA	357.00	3092.50	-52.8	5.8	53.1	276	100	982	No	No[b]
0580024	HIGHLANDS CREMATORY, INC.	450.70	3052.80	40.9	-33.9	53.1	130	3	982	No	No[b]
0970014	FLORIDA POWER CORPORTATION - INTERCESSION CITY	446.30	3126.00	36.5	39.3	53.6	43	1,265	993	Yes	Yes[c]
	FLORIDA POWER & LIGHT - MANATEE	367.20	3054.10	-42.6	-32.6	53.6	233	40,765	993	Yes	Yes[c]
0570289	THE TRIBUNE COMPANY	356.30	3091.70	-53.5	5.0	53.7	275	6	995	No	No[b]
1010045	FUNERAL SERVICES ACQUISITION GROUP, INC.	383.30	3133.60	-26.5	46.9	53.9	331	3	997	No	No[b]
0570272	SEAMCO LABORATORIES	354.80	3091.60	-55.0	4.9	55.2	275	4	1,024	No	No[b]
0550012	MACASPHALT	451.13	3050.00	41.3	-36.7	55.3	132	31	1,025	No	No[b]
0570013	SOUTHDOWN, INC.	357.80	3107.50	-52.0	20.8	56.0	292	10	1,040	No	No[b]
0570360	CHAPMAN CONTRACTING COMPANY	356.80	3068.40	-53.0	-18.3	56.1	251	2	1,041	No	No[b]
0970007	QUAKER OATS COMPANY	451.10	3125.80	41.3	39.1	56.9	47	1	1,057	No	No[b]
0570089	ST JOSEPHS HOSPITAL	353.30	3095.90	-56.5	9.2	57.2	279	9	1,065	No	No[b]
0970034	CARGILL, INC.	452.50	3125.00	42.7	38.3	57.4	48	13	1,067	No	No[b]
0970043	KISSIMMEE UTILITY AUTHORITY	449.81	3127.90	40.0	41.2	57.4	44	191	1,069	No	No[b]
1010071	PASCO COGEN LIMITED	385.06	3139.00	-24.7	52.3	57.9	335	22	1,077	No	Yes[c]
0970028	FLORIDA ROCK INDUSTRIES	453.60	3125.40	43.8	38.7	58.4	49	4	1,089	No	No[b]
1010002	LYKES PASCO, INC.	383.50	3139.20	-26.3	52.5	58.7	333	619	1,094	No	No[b]
1010024	EWELL INDUSTRIES	383.10	3140.10	-26.7	53.4	59.7	333	231	1,114	No	No[b]
0570198	HILLSBOROUGH CREMATORY	350.80	3096.00	-59.0	9.3	59.7	279	18	1,115	No	No[b]
0570171	SPEEDLING, INC.	354.10	3062.20	-55.7	-24.5	60.9	246	15	1,137	No	No[b]
0970032	SOIL TREATMENT SERVICES, INC.	455.50	3127.10	45.7	40.4	61.0	49	21	1,140	No	No[b]
0570099	SULPHURIC ACID TRADING COMPANY	349.00	3081.50	-60.8	-5.2	61.0	265	14	1,140	No	No[b]
0570028	NATIONAL GYPSUM COMPANY	348.83	3082.69	-61.0	-4.0	61.1	266	189	1,142	No	No[b]
0570276	METRO REDI-MIX COMPANY	348.40	3085.50	-61.4	-1.2	61.4	269	21	1,148	No	No[b]
0571185	CARGILL, INC.-CORN MILLING DIVISION	348.30	3085.40	-61.5	-1.3	61.5	269	1	1,150	No	No[b]
0571009	MISENER MARINE CONSTRUCTION	348.27	3085.31	-61.5	-1.4	61.5	269	1	1,151	No	No[b]
0570236	WESTSHORE GLASS CORP	349.20	3098.50	-60.6	11.8	61.7	281	4	1,155	No	No[b]
0570065	FLORIDA MINING & MAT COCRETE CORP	349.50	3102.00	-60.3	15.3	62.2	284	28	1,164	No	No[b]
0570237	STANDARD CONCRETE	347.70	3082.70	-62.1	-4.0	62.2	266	23	1,165	No	No[b]
0570297	DAVIS CONCRETE INC.	349.50	3102.10	-60.3	15.4	62.2	284	9	1,165	No	No[b]
0570262	CHROMALLOY CASTINGS TAMPA, CORPORATION	349.00	3100.00	-60.8	13.3	62.2	282	33	1,165	No	No[b]
0570049	FLORIDA MINING & MATERIALS	349.00	3100.80	-60.8	14.1	62.4	283	12	1,168	No	No[b]
0570047	FLORIDA ROCK INDUSTRIES	349.30	3102.30	-60.5	15.6	62.5	284	22	1,170	No	No[b]
0570298	TAMPA BULK SERVICES INC.	347.30	3082.40	-62.5	-4.3	62.6	266	4	1,173	No	No[b]
0970017	SCI FUNERAL SERVICES OF FLORIDA, INC.	459.50	3129.50	49.7	42.8	65.6	49	1	1,232	No	No[b]
0970001	KUA - HANSEL	460.10	3129.30	50.3	42.6	65.9	50	103	1,238	No	No[b]
0970024	FLORIDA ROCK/KISSIMME	460.80	3129.70	51.0	43.0	66.7	50	8	1,254	No	No[b]
1030011	FLORIDA POWER CORPORATION - BARTOW	342.40	3082.60	-67.4	-4.1	67.5	267	2,525	1,270	No	No[b]
0970030	MACASPHALT/KISSIMMEE PLANT	461.00	3132.70	51.2	46.0	68.8	48	4	1,297	No	No[b]
0970004	JOELSON CONCRETE PIPE CO	461.30	3133.50	51.5	46.8	69.6	48	7	1,312	No	No[b]

Table 6-4. Screening Analysis for PM Emitting Facilities in the Vicinity of Cargill - Bartow

Facility ID	Facility Name	Source Location East (km)	Source Location North (km)	Relative Location[a] X (km)	Y (km)	Distance (km)	Direction (deg.)	PM Emissions Rate (TPY)	Q Emissions Threshold [(Dist. - SIA) X 20]	Included in Modeling Analysis? AAQS	PSD Class II
0550017	SINGLETARY CONCRETE PRODUCTS, INC.	458.00	3035.00	48.2	-51.7	70.7	137	32	1,334	No	No[b]
1030284	CELOTEX CORPORATION	338.10	3083.10	-71.7	-3.6	71.8	267	2	1,356	No	No[b]
1030013	FLORIDA POWER CORPORATION - BAYBORO	338.80	3071.30	-71.0	-15.4	72.7	258	195	1,373	No	Yes[c]
0970002	ST CLOUD CITY POWER PLANT	471.80	3124.90	62.0	38.2	72.8	58	5	1,376	No	No[b]
0530017	E.R. JAHNA INDUSTRIES, INC.	386.70	3155.80	-23.1	69.1	72.9	342	17	1,377	No	No[b]
1030116	EWELL INDUSTRIES, INC.	337.72	3074.77	-72.1	-11.9	73.1	261	2	1,381	No	No[b]
1030035	DIRECTORS SERVICES, INC.	337.30	3077.30	-72.5	-9.4	73.1	263	3	1,382	No	No[b]
0690016	E R JAHNA INDUSTRIES	431.90	3156.40	22.1	69.7	73.1	18	45	1,382	No	No[b]
0690001	FLORIDA SELECT CITRUS, INC.	416.20	3159.60	6.4	72.9	73.2	5	99	1,384	No	No[b]
0690036	EXCELETECH INC.	424.10	3158.50	14.3	71.8	73.2	11	1	1,384	No	No[b]
1030095	BAYFRONT MEDICAL CENTER	338.10	3071.80	-71.7	-14.9	73.2	258	3	1,385	No	No[b]
1010070	CHAMPEAU STORAGE & RECYCLING	343.50	3118.30	-66.3	31.6	73.4	295	49	1,389	No	No[b]
0690045	FLORIDA CRUSHED STONE COMPANY	432.20	3156.70	22.4	70.0	73.5	18	11	1,390	No	No[b]
0690062	RINKER MATERIALS CORPORATION	430.70	3157.20	20.9	70.5	73.5	17	14	1,391	No	No[b]
0690011	CLERMONT BUILDERS SUPPLY	424.40	3159.00	14.6	72.3	73.8	11	11	1,395	No	No[b]
0690056	SUNSHINE MATERIALS	424.50	3159.00	14.7	72.3	73.8	11	1	1,396	No	No[b]
1030032	SOUTHDOWN, INC.	337.44	3071.78	-72.4	-14.9	73.9	258	33	1,398	No	No[b]
1030037	EWELL INDUSTRIES, INC.	337.60	3102.70	-72.2	16.0	74.0	282	1	1,399	No	No[b]
1030012	FLORIDA POWER CORPORATION - HIGGINS	336.50	3098.40	-73.3	11.7	74.2	279	1,260	1,405	No	No[b]
0550006	LIN PAC PLASTICS, INC.	464.79	3036.83	55.0	-49.9	74.2	132	49	1,405	No	No[b]
0550021	JAHNA CONCRETE, INC.	462.50	3034.40	52.7	-52.3	74.2	135	45	1,405	No	No[b]
1030114	METAL INDUSTRIES, INC.	336.70	3101.00	-73.1	14.3	74.5	281	20	1,410	No	No[b]
0690058	MASCOTTE, CITY OF	412.00	3161.20	2.2	74.5	74.5	2	1	1,411	No	No[b]
1030117	PINELLAS CO. RESOURCE RECOVERY FACILITY	335.20	3084.10	-74.6	-2.6	74.6	268	329	1,413	No	No[b]
0550018	TAMPA ELECTRIC CO. - PHILLIPS	464.30	3035.40	54.5	-51.3	74.8	133	151	1,417	No	No[b]
0550026	SEBRING SEPTIC TANK & PRECAST CO	463.30	3034.20	53.5	-52.5	75.0	134	1	1,419	No	No[b]
0690039	C A MEYER PAVING & CONST CO	433.60	3158.30	23.8	71.6	75.5	18	6	1,429	No	No[b]
1030147	SONNY GLASBRENNER, INC.	334.30	3085.60	-75.5	-1.1	75.5	269	3	1,430	No	No[b]
1030004	COUCH CONSTRUCTION, L.P.	334.30	3085.60	-75.5	-1.1	75.5	269	11	1,430	No	No[b]
7775048	MR. SONNY GLASBRENNER	334.30	3085.60	-75.5	-1.1	75.5	269	23	1,430	No	No[b]
1030132	COOPER COIL COATING, INC.	333.99	3086.88	-75.8	0.2	75.8	270	4	1,436	No	No[b]
7770262	ANGELO'S RECYCLED MATERIALS	333.90	3084.80	-75.9	-1.9	75.9	269	11	1,438	No	No[b]
1030078	FLORIDA ROCK INDUSTRIES	335.50	3102.60	-74.3	15.9	76.0	282	1	1,440	No	No[b]
1030077	ST. PETERSBURG TIMES PRINTING PLANT	334.60	3074.60	-75.2	-12.1	76.2	261	15	1,443	No	No[b]
1010365	TRINITY MEMORIAL CEMETARY INC	340.72	3119.07	-69.1	32.4	76.3	295	1	1,446	No	No[b]
1030085	FLORIDA ROCK INDUSTRIES, INC.	334.90	3071.40	-74.9	-15.3	76.4	258	36	1,449	No	No[b]
1030123	GENERAL ROOFING & TILE CO	334.80	3071.80	-75.0	-14.9	76.5	259	2	1,449	No	No[b]
1010041	COUCH CONSTRUCTION, L.P.	340.70	3119.50	-69.1	32.8	76.5	295	15	1,450	No	No[b]
0270003	PEACE RIVER CITRUS PRODUCTS	409.80	3010.10	0.0	-76.6	76.6	180	55	1,452	No	No[b]
1030288	BAYCARE SERVICES INC	333.10	3084.40	-76.7	-2.3	76.7	268	1	1,455	No	No[b]
0550032	LESCO, INC	469.50	3038.40	59.7	-48.3	76.8	129	95	1,456	No	No[b]
0270004	SINGLETARY CONCRETE PRODUCTS INC	417.30	3009.80	7.5	-76.9	77.3	174	118	1,465	No	No[b]
1030060	LARGO WASTEWATER TREATMENT PLANT	332.40	3087.90	-77.4	1.2	77.4	271	15	1,468	No	No[b]
1030128	WEST COAST U-CART CONCRETE LIMITED	332.60	3080.10	-77.2	-6.6	77.5	265	57	1,470	No	No[b]
	TROPICANA - BRADENTON	346.80	3040.90	-63.0	-45.8	77.9	234	904	1,478	No	Yes[c]
1010344	J.E. AUSLEY CONSTRUCTION INC	357.73	3145.37	-52.1	58.7	78.4	318	25	1,489	No	No[b]
1010028	OVERSTREET PAVING CO	355.90	3143.70	-53.9	57.0	78.4	317	20	1,489	No	No[b]
1030017	CEMETERY MANAGEMENT, INC.	331.30	3086.30	-78.5	-0.4	78.5	270	1	1,490	No	No[b]
1030210	MEDICO ENVIRONMENTAL SERVICES, INC.	331.30	3086.30	-78.5	-0.4	78.5	270	5	1,490	No	No[b]
1030040	HUMANE SOCIETY OF NORTH PINELLAS	331.70	3096.40	-78.1	9.7	78.7	277	1	1,494	No	No[b]
1030075	ON CALL CREMATORY	331.00	3081.10	-78.8	-5.6	79.0	266	1	1,500	No	No[b]
1030045	EWELL INDUSTRIES, INC.	330.70	3087.40	-79.1	0.7	79.1	271	13	1,502	No	No[b]
1030243	PINELLAS COUNTY HIGHWAY DEPARTMENT	330.80	3095.50	-79.0	8.8	79.5	276	1	1,510	No	No[b]
1030214	TECH PAK, INC.	330.30	3084.80	-79.5	-1.9	79.5	269	1	1,510	No	No[b]
1030129	PINELLAS MEMORIAL PET CEMETERY	329.90	3081.60	-79.9	-5.1	80.1	266	1	1,521	No	No[b]
1010056	PASCO COUNTY (OWNER)	348.81	3138.77	-61.0	52.1	80.2	310	62	1,524	No	No[b]
1030061	ACRE IRON & METAL	329.70	3082.10	-80.1	-4.6	80.2	267	11	1,525	No	No[b]
1030047	NATIONAL CREMATION SOCIETY	329.10	3088.90	-80.7	2.2	80.7	272	4	1,535	No	No[b]
1190017	FLORIDA CRUSHED STONE	385.60	3164.40	-24.2	77.7	81.4	343	4	1,548	No	No[b]
1030034	LIFE SCIENCES	328.50	3076.10	-81.3	-10.6	82.0	263	1	1,560	No	No[b]
1030223	CATALINA YACHTS, MORGAN DIVISION	327.10	3084.00	-82.7	-2.7	82.7	268	6	1,575	No	No[b]
1030217	PARKLAWN MEMORIAL GARDENS	328.20	3101.40	-81.6	14.7	82.9	280	2	1,578	No	No[b]
1190018	FLORIDA CRUSHED STONE COMPANY	401.50	3169.50	-8.3	82.8	83.2	354	67	1,584	No	No[b]
1030020	SPCA OF PINELLAS COUNTY	326.30	3086.20	-83.5	-0.5	83.5	270	3	1,590	No	No[b]
1030026	OVERSTREET PAVING COMPANY	326.20	3086.90	-83.6	0.2	83.6	270	126	1,592	No	No[b]
1030036	FLORIDA MINING & MATERIALS CONCRETE COR.	326.20	3087.10	-83.6	0.4	83.6	270	33	1,592	No	No[b]
1190004	FL DEPT OF CORRECTIONS	382.20	3166.10	-27.6	79.4	84.1	341	4	1,601	No	No[b]
1030008	FLORIDA ROCK INDUSTRIES, INC.	325.70	3086.30	-84.1	-0.4	84.1	270	21	1,602	No	No[b]
0970071	RELIANT ENERGY OSCEOLA, LLC	490.42	3111.30	80.6	24.6	84.3	73	99	1,606	No	No[b]
0530004	CITRUS SERVICE, INC.	364.20	3158.30	-45.6	71.6	84.9	328	15	1,618	No	No[b]
1030189	ACME SPONGE & CHAMOIS CO., INC.	328.90	3115.10	-80.9	28.4	85.7	289	6	1,635	No	No[b]
1030244	A-AMERICAN RENT ALL	324.10	3079.20	-85.7	-7.5	86.0	265	2,190	1,641	No	No[b]
1030070	MORTON PLANT MEASE HEALTH CARE	324.70	3099.70	-85.1	13.0	86.1	279	1	1,642	No	No[b]
0550008	JAHNA CONCRETE, INC.	463.50	3019.20	53.7	-67.5	86.3	141	18	1,645	No	No[b]
1030091	MORTON PLANT MEASE HEALTH CARE	322.60	3093.10	-87.2	6.4	87.4	274	1	1,669	No	No[b]
0530022	SUNSHINE MATERIALS INC.	365.50	3163.20	-44.3	76.5	88.4	330	28	1,688	No	No[b]
1010327	COASTAL LANDFILL DISPOSAL, INC.	341.54	3143.24	-68.3	56.5	88.6	310	25	1,693	No	No[b]
1030044	SUNCOAST PAVING, INC.	326.00	3116.70	-83.8	30.0	89.0	290	24	1,700	No	No[b]
1030063	FLORIDA ROCK INDUSTRIES, INC.	326.10	3117.30	-83.7	30.6	89.1	290	1	1,702	No	No[b]
1030042	STAUFFER MANAGEMENT COMPANY	325.60	3116.70	-84.2	30.0	89.4	290	6	1,708	No	No[b]
1010042	SCI FUNERAL SERVICES OF FLORIDA	335.00	3136.52	-74.8	49.8	89.9	304	2	1,717	No	No[b]

Table 6-4. Screening Analysis for PM Emitting Facilities in the Vicinity of Cargill - Bartow

Facility ID	Facility Name	Source Location East (km)	Source Location North (km)	Relative Location[a] X (km)	Relative Location[a] Y (km)	Relative Location[a] Distance (km)	Relative Location[a] Direction (deg.)	PM Emissions Rate (TPY)	Q Emissions Threshold [(Dist. - SIA) X 20]	Included in Modeling Analysis? AAQS	Included in Modeling Analysis? PSD Class II
1010008	FLORIDA MINING & MATERIALS-HUDSON PLANT	337.30	3141.10	-72.5	54.4	90.6	307	6	1,733	No	No[b]
0530021	FLORIDA CRUSHED STONE CO., INC.	360.00	3162.50	-49.8	75.8	90.7	327	592	1,734	No	No[b]
0530032	CENTRAL POWER & LIME, INC.	360.00	3162.50	-49.8	75.8	90.7	327	854	1,734	No	No[b]
0530005	CHEMICAL LIME INC. (SEE COMMENT)	359.40	3162.30	-50.4	75.6	90.9	326	39	1,737	No	No[b]
0530020	COLUMBIA REG MEDICAL CENTER OAK HILL	352.60	3157.30	-57.2	70.6	90.9	321	2	1,737	No	No[b]
0690014	SILVER SPRINGS CITRUS COOP	423.70	3176.50	13.9	89.8	90.9	9	35	1,737	No	No[b]
1010017	FLORIDA POWER CORP. - ANCLOTE	324.40	3118.70	-85.4	32.0	91.2	291	3,471	1,744	No	No[b]
0530038	PET CREMATION SERV.(FOSTER CREMATORY)	351.90	3157.30	-57.9	70.6	91.3	321	1	1,746	No	No[b]
0530044	FLORIDA CRUSHED STONE, GREGG MINE	359.80	3163.40	-50.0	76.7	91.6	327	72	1,751	No	No[b]
1010025	CEMENT PRODUCTS, INC.	334.20	3138.50	-75.6	51.8	91.6	304	5	1,753	No	No[b]
0090095	MORTON INTERNATIONAL	500.10	3070.60	90.3	-16.1	91.7	100	50	1,754	No	No[b]
1010068	MID-COAST CONCRETE	334.20	3138.70	-75.6	52.0	91.8	305	2	1,755	No	No[b]
0690046	OGDEN MARTIN SYSTEMS OF LAKE, INC.	413.10	3179.30	3.3	92.6	92.7	2	33	1,773	No	Yes[c]
0690032	ASPHALT PRODUCTION LLC	407.10	3180.90	-2.7	94.2	94.2	358	37	1,805	No	No[b]
1190019	BEDROCK RESOURCES (SUMTER MINE)	399.80	3181.00	-10.0	94.3	94.8	354	7	1,817	No	No[b]
1190001	DIXIE LIME & STONE COMPANY	397.50	3181.20	-12.3	94.5	95.3	353	18	1,826	No	No[b]
0550014	BETTER ROADS OF LAKE PLACID	465.60	3008.70	55.8	-78.0	95.9	144	15	1,838	No	No[b]
0550005	GEORGIA PACIFIC CORP	466.98	3009.23	57.2	-77.5	96.3	144	20	1,846	No	No[b]
0530010	SOUTHDOWN, INC.	355.90	3169.10	-53.9	82.4	98.5	327	1,293	1,889	No	No[b]
0690003	SOUTHDOWN/FL MINING & MATERIALS	412.50	3185.70	2.7	99.0	99.0	2	28	1,901	No	No[b]
0690002	CUTRALE CITRUS JUICES USA INC	415.50	3187.30	5.7	100.6	100.8	3	86	1,935	No	No[b]
7770013	ORLANDO PAVING COMPANY, DIV./HUBBARD CON	508.50	3065.80	98.7	-20.9	100.9	102	9	1,938	No	No[b]
7770259	D.A.B. CONSTRUCTORS	411.45	3189.00	1.6	102.3	102.3	1	13	1,966	No	No[b]
0690055	BARHAM INDUSTRIES	412.10	3189.10	2.3	102.4	102.4	1	1	1,969	No	No[b]
0690042	FLORIDA ROCK INDUSTRIES	411.80	3189.30	2.0	102.6	102.6	1	1	1,972	No	No[b]
0694822	PAQUETTE ASPHALT ACQUISITION LLC	411.90	3189.59	2.1	102.9	102.9	1	44	1,978	No	No[b]
0690008	EAGLE-PICHER IND.(WOLVERINE GASKET DIV.)	424.20	3194.10	14.4	107.4	108.4	8	1	2,087	No	No[b]
1190009	PROGRESS RAIL SERVICES CORPORATION	399.40	3195.50	-10.4	108.8	109.3	355	57	2,106	No	No[b]
1190030	CHARLOTTE PIPE AND FOUNDRY CO/PLASTIC DI	399.00	3197.00	-10.8	110.3	110.8	354	10	2,137	No	No[b]
0170002	CITRUS MEMORIAL HOSPITAL	369.70	3190.10	-40.1	103.4	110.9	339	1	2,138	No	No[b]
0690005	GOLDEN GEM GROWERS	434.10	3196.00	24.3	109.3	112.0	13	165	2,159	No	No[b]
0170043	CITRUS RESOURCE MANAGEMENT	368.70	3191.70	-41.1	105.0	112.8	339	44	2,175	No	No[b]
0694801	LAKE COGEN LTD.	434.00	3198.80	24.2	112.1	114.7	12	27	2,214	No	Yes[c]
0170021	CENTRAL MATERIALS COMPANY, INC.	355.50	3188.50	-54.3	101.8	115.4	332	9	2,228	No	No[b]
0830031	ASPHALT PAVERS, INC.	387.70	3209.00	-22.1	122.3	124.3	350	9	2,406	No	No[b]
0830099	PIONEER CONCRETE TILE	394.45	3211.06	-15.4	124.4	125.3	353	4	2,426	No	No[b]
0170009	FLORIDA MINING & MATERIAL	345.80	3195.80	-64.0	109.1	126.5	330	6	2,450	No	No[b]
0170012	EWELL INDUSTRIES/CRYSTAL RIVER FACILITY	345.80	3196.00	-64.0	109.3	126.7	330	1	2,453	No	No[b]
0830050	NOBILITY HOMES, INC.	398.30	3214.20	-11.5	127.5	128.0	355	4	2,480	No	No[b]
0830057	TONLEY FOUNDRY & MACHINE CO., INC.	404.70	3216.30	-5.1	129.6	129.7	358	1	2,514	No	No[b]
0830058	TOWN-I-FLEX HOSE MANUFACTURING COMPANY	404.70	3216.30	-5.1	129.6	129.7	358	2	2,514	No	No[b]
0830060	TOWNLEY FOUNDRY & MACHINE COMPANY, INC	404.70	3216.30	-5.1	129.6	129.7	358	9	2,514	No	No[b]
0830020	EVANS SEPTIC TANK & READY MIX	397.30	3216.10	-12.5	129.4	130.0	354	1	2,520	No	No[b]
0830067	EVANS SEPTIC TANK & READYMIX, INC.	397.30	3216.10	-12.5	129.4	130.0	354	1	2,520	No	No[b]
0830024	LOCKHEED MARTIN ELECTRONICS	403.00	3217.90	-6.8	131.2	131.4	357	1	2,548	No	No[b]
0830015	ASPHALT PAVERS	403.90	3218.00	-5.9	131.3	131.4	357	18	2,549	No	No[b]
0830023	SUNSHINE MATERIALS INC	375.00	3214.10	-34.8	127.4	132.1	345	4	2,561	No	No[b]
0170010	SUNSHINE MATERIALS INC.	341.10	3204.10	-68.7	117.4	136.0	330	2	2,640	No	No[b]
0170007	CRYSTAL RIVER QUARRIES	340.60	3205.30	-69.2	118.6	137.3	330	32	2,666	No	No[b]
0830042	BOUTWELL CONSTRUCTION CO OCALA	397.50	3223.70	-12.3	137.0	137.6	355	16	2,671	No	No[b]
0830019	FLORIDA MINING & MATERIALS CONCRETE CORP	360.55	3216.01	-49.3	129.3	138.4	339	3	2,687	No	No[b]
0170004	FLORIDA POWER CORPORATION - CRYSTAL RIVER	334.30	3204.50	-75.5	117.8	139.9	327	8,220	2,718	No	No[b]
0830007	DAYCO PRODUCTS INC	393.30	3226.20	-16.5	139.5	140.5	353	7	2,729	No	No[b]
0830082	EMERGENCY ONE, INC.	382.10	3225.10	-27.7	138.4	141.1	349	1	2,743	No	No[b]
0830026	FLORIDA MINING/OCALA PLANT	390.50	3227.40	-19.3	140.7	142.0	352	4	2,760	No	No[b]
0830027	RINKER MATERIALS CORP - OCALA	388.70	3227.30	-21.1	140.6	142.2	351	2	2,763	No	No[b]
0830053	CLAIRSON INTERNATIONAL	388.50	3227.30	-21.3	140.6	142.2	351	1	2,764	No	No[b]
0830012	COLUMBIA OCALA REGIONAL MEDICAL CENTER	389.30	3227.60	-20.5	140.9	142.4	352	2	2,768	No	No[b]
0170036	HCR LIMESTONE INC/HOLNAM INC	334.40	3207.50	-75.4	120.8	142.4	328	14	2,768	No	No[b]
0830008	PATRICK INDUSTRIES	387.80	3227.80	-22.0	141.1	142.8	351	2	2,776	No	No[b]
0830004	TERRY ROBERTS/ROBERTS FUNERAL HOME	389.20	3228.20	-20.6	141.5	143.0	352	1	2,780	No	No[b]
0170041	INDEPENDENT AGGREGATES/INGLIS MINE	337.36	3210.44	-72.4	123.7	143.4	330	16	2,788	No	No[b]
0830052	CLAIRSON INTERNATIONAL	386.20	3228.90	-23.6	142.2	144.1	351	58	2,803	No	No[b]
0830043	GOLDEN FLAKE SNACK FOODS	385.90	3228.90	-23.9	142.2	144.2	350	26	2,804	No	No[b]
0830045	STANDARD SAND & SILICA CO	412.70	3231.30	2.9	144.6	144.6	1	7	2,813	No	No[b]
0830039	THE BREWER COMPANY	390.80	3230.80	-19.0	144.1	145.3	352	110	2,827	No	No[b]
0830025	MARK III INDUSTRIES	377.80	3228.70	-32.0	142.0	145.6	347	8	2,831	No	No[b]
0830078	GRIMES AEROSPACE COMPANY	392.06	3231.26	-17.7	144.6	145.6	353	1	2,833	No	No[b]
0830054	CLAIRSON INTERNATIONAL	390.00	3231.10	-19.8	144.4	145.8	352	3	2,835	No	No[b]
0830010	ROYAL OAK ENTERPRISES	387.50	3231.10	-22.3	144.4	146.1	351	97	2,842	No	No[b]
0830001	COUNTS CONSTRUCTION CO	385.90	3231.40	-23.9	144.7	146.7	351	5	2,853	No	No[b]

Footnotes:

[a] The Cargill Bartow facility is located at UTM Coordinates: East 409.80 (km); North 3086.70 (km)

[b] Facility does not have any PSD increment consuming or expanding sources.

[c] Facility included because it has PSD increment consuming or expanding sources.

Notes:

The significant impact area (SIA) determined by modeling equals 4 (km)

Table 6-5. Summary of Stack and Vent Geometry and Particulate Matter Emission Rates for Cargill - Bartow's Baseline (1974) Inventory

Source	Particulate Matter Emissions		Stack/Vent Release Height		Stack/Vent Diameter		Gas Flow Rate		Gas Exit Temperature		Velocity		Location[a]			
							Standard	Actual					X Coordinate		Y Coordinate	
	(lb/hr)	(g/sec)	(ft)	(m)	(ft)	(m)	(dscfm)	(acfm)	(F)	(K)	(ft/sec)	(m/sec)	(ft)	(m)	(ft)	(m)
Phosphate Rock Grinding Mill "D" Vent	1.00	0.126	83	25.30	1.67	0.51	3,200	3,485	115	319	26.64	8.12	1232	375.4	593	180.9
Phosphate Rock Storage Bin Stack R-4	5.10	0.643	55	16.76	3.08	0.94	25,500	26,805	95	308	59.86	18.25	-645	-196.5	-2238	-682.0
Phosphate Rock Storage Bin Stack R-5	2.70	0.340	55	16.76	3.03	0.92	--	32,300	75	297	74.70	22.77	556	169.3	-2959	-901.8
Phosphate Rock Storage Bin Stack R-6	9.00	1.134	55	16.76	3.03	0.92	27,500	28,230	82	301	65.28	19.90	556	169.3	-2959	-901.8
Phosphate Rock Storage Bin Stack R-7	2.10	0.265	50	15.24	1.08	0.33	1,300	1,411	113	318	25.52	7.78	556	169.3	-2959	-901.8
GTSP Fertilizer Plant No. 1, Stack No. 8	20.00	2.520	100	30.48	6.66	2.03	--	100,000	135	330	47.87	14.59	1475	449.7	423	128.8
GTSP Shipping East, Stack No. 13	0.40	0.050	92	28.04	1.80	0.55	--	5,300	75	297	34.73	10.59	936	285.4	500	152.5
GTSP Shipping West, Stack No. 14	0.38	0.048	95	28.96	2.20	0.67	--	3,200	75	297	14.04	4.28	936	285.4	500	152.5
GTSP Storage Building E-1, Stack No. 31	0.71	0.089	108	32.92	6.90	2.10	--	96,000	108	315	42.81	13.05	1304	397.5	182	55.6
GTSP Fertilizer Plant No. 2, Stack No. 7	10.20	1.285	80	24.38	6.58	2.01	--	112,000	112	317	54.92	16.74	1506	458.9	517	157.7
GTSP Fertilizer Plant No. 2, Granulator Stack No. 12	0.10	0.013	46	14.02	2.00	0.61	--	10,000	75	297	53.08	16.18	1403	427.6	490	149.5
Phosphate Rock Grinding Mill "A" Vent	1.13	0.142	74	22.56	1.83	0.56	--	4,090	91	306	25.84	7.87	1283	390.9	678	206.8
Phosphate Rock Grinding Mill "B" Vent	0.90	0.113	74	22.56	1.83	0.56	--	4,550	106	314	28.85	8.79	1265	385.6	649	197.9
Phosphate Rock Grinding Mill "C" Vent	0.93	0.117	74	22.56	1.83	0.56	--	3,865	94	307	24.50	7.47	1250	380.9	623	190.0
Phosphate Rock Transfer Point R-10, R-11, R-12	0.10	0.013	46	14.02	1.00	0.30	1,500	1,520	75	297	32.27	9.84	556	169.3	-2959	-901.8
Phosphate Rock Conveyor R-8	1.40	0.176	53	16.15	0.71	0.22	--	500	75	297	21.16	6.45	556	169.3	-2959	-901.8
Phosphate Rock Conveyor, Stack No. 27	0.80	0.101	40	12.19	1.83	0.56	--	6,000	99	310	37.90	11.55	464	141.3	-904	-275.5
Phosphate Rock Conveyor, Stack No. 28	0.50	0.063	58	17.68	1.83	0.56	--	6,000	91	306	38.04	11.59	670	204.2	-685	-208.8
Phosphate Rock Conveyor, Stack No. 29	0.50	0.063	71	21.64	1.83	0.56	--	6,000	91	306	38.04	11.59	1210	368.8	808	246.3
Phosphate Dryers R-1 and R-2	5.00	0.630	50	15.24	6.71	2.05	--	120,000	140	333	56.59	17.25	556	169.3	-2959	-901.8

Footnotes:

[a] Relative to the No. 4 DAP Stack location.

Table 6-6. Summary of Increases in SO_2 and NO_x Emission Rates due to the Proposed Project Used in the Regional Haze Analysis

Source	SO_2 Emissions[a]		NO_x Emissions[a]	
	(lb/hr)	(g/s)	(lb/hr)	(g/s)
No. 4 Fertilizer Plant	8.89	1.12	5.01	0.63
No. 4 Shipping Plant	0.00	0.00	0.00	0.00
Phosphoric Acid Plant	0.00	0.00	0.00	0.00

[a] Based on potential and actual emission rates presented in Table 3-1.

Table 6-7. Cargill Property Boundary Receptors Used in the Modeling Analysis

Direction (deg)	Distance (m)	Direction (deg)	Distance (m)
10	3760	190	1158
20	3941	200	1212
30	3344	210	1313
40	3780	220	1481
50	4789	230	1761
60	3789	240	2256
70	3065	250	2092
80	2925	260	1996
90	2758	270	1966
100	2629	280	1996
110	2100	290	2092
120	1460	300	2270
130	1265	310	2566
140	1179	320	2706
150	1137	330	2393
160	1131	340	2627
170	1160	350	2507
180	1142	360	3703

Note: Distances are relative to the DAP No. 4 stack location.
deg = degree
m = meter

Table 6-8. Chassahowitzka Wilderness Area Receptors Used in the Modeling Analysis

UTM Coordinates	
East (km)	North (km)
340.3	3,165.7
340.3	3,167.7
340.3	3,169.8
340.7	3,171.9
342.0	3,174.0
343.0	3,176.2
343.7	3,178.3
342.4	3,180.6
341.1	3,183.4
339.0	3,183.4
336.5	3,183.4
334.0	3,183.4
331.5	3,183.4

Table 6-9. Building Dimensions Used in the Modeling Analysis

Structure	Height (ft)	Height (m)	Length (ft)	Length (m)	Width (ft)	Width (m)
E-5 Storage Building	88	26.82	821	250.24	215	65.53
No. 4 Shipping Plant Building	115	35.05	148	12.19	71	9.14
No. 4 Fertilizer Plant Building	140	19.20	190	9.75	97	9.75
E-3&4 Storage Building	40	25.60	453	2.74	228	2.74
E-2 Storage Building	65	19.81	467	142.34	209	63.70
E-1 Storage Building[a]	110	33.53	386	117.65	363	110.64
No. 3 Fertilizer Plant Building	85	25.91	173	52.73	150	45.72
Old GTSP Shipping Building[a]	70	21.34	140	42.67	138	42.06

Footnotes:
[a] Building no longer exists. Considered in the modeling of baseline sources only.

Table 6-10. Maximum Predicted Pollutant Impacts Due to the Proposed Project Only

Averaging Period	Concentration[a] ($\mu g/m^3$)	Receptor Location[b] Direction (degree)	Receptor Location[b] Distance (m)	Time Period (YYMMDDHH)	EPA Significant Impact Level ($\mu g/m^3$)
PM_{10}					
Annual					
	0.79	230	1761	87123124	1
	1.18	210	1313	88123124	
	1.34	180	1142	89123124	
	0.89	250	2092	90123124	
	0.91	230	1761	91123124	
High 24-Hour					
	8.2	120	1460	87121124	5
	9.4	180	1142	88122524	
	11.8	180	1142	89112924	
	7.6	180	1142	90112024	
	8.6	130	1265	91020824	
SO_2					
Annual	0.24	250	2092	87123124	1
	0.35	210	1313	88123124	
	0.40	200	1212	89123124	
	0.28	250	2092	90123124	
	0.27	240	2256	91123124	
High 24-Hour	2.9	140	1179	87011124	5
	3.7	210	1313	88070524	
	4.0[c]	180	1142	89112924	
	2.6	180	1142	90112024	
	2.9	140	1179	91020824	
High 3-Hour	10.2	120	1460	87031924	25
	13.0	200	1212	88103003	
	11.3	170	1160	89042703	
	11.2	180	1142	90112121	
	10.8	140	1179	91062624	

[a] Based on 5-year meteorological record, Tampa/Ruskin, 1987-91.
[b] Relative to DAP No. 4 Stack location.
[c] Refined concentration is 4.12 $\mu g/m^3$.

Note:
YYMMDDHH = Year, Month, Day, Hour Ending.

Table 6-11. Maximum Predicted PM_{10} AAQS Impacts - Screening Analysis

Averaging Period	Concentration[a] (ug/m^3)	Receptor Location[b]		Time Period (YYMMDDHH)
		Direction (degree)	Distance (m)	
Annual	15.9	240	3500	89123124
H6H 24-Hour	83.5	240	3500	89020924

Footnotes:
[a] Based on 5-year meteorological record, Tampa/Ruskin, 1987-91
[b] Relative to the DAP No. 4 Stack location.

Notes:
YYMMDDHH = Year, Month, Day, Hour Ending

Table 6-12. Maximum Predicted PM_{10} Impacts Due to All Future Sources For Comparison to AAQS - Refined Analysis

Averaging Period	Concentration (ug/m^3)			Receptor Location[b]		Time Period (YYMMDDHH)	Florida AAQS (ug/m^3)
	Total	Modeled	Background	Direction (degree)	Distance (m)		
Annual	39.7	17.7	22	244	3300	89123124	50
H6H 24-Hour	126	103.5	22	242	3600	91020224	150

Footnotes:
[a] Based on 5-year meteorological record, Tampa/Ruskin, 1987-91
[b] Relative to the DAP No. 4 Stack location.

Notes:
YYMMDDHH = Year, Month, Day, Hour Ending
H6H = 6th-Highest Concentration in 5 years.

Table 6-13. Maximum Predicted PM_{10} PSD Class II Increment Consumption - Screening Analysis

Averaging Period	Concentration[a] ($\mu g/m^3$)	Receptor Location[b]		Time Period (YYMMDDHH)
		Direction (degree)	Distance (m)	
Annual	0.04	30	4000	87123124
	<0	NA	NA	88123124
	<0	NA	NA	89123124
	0.03	330	4000	90123124
	<0	NA	NA	91123124
High 24-Hour	31.1	160	4000	87032824
	30.7	170	4000	88090624
	35.1	150	4000	89031424
	41.5	170	4000	90010624
	27.2	160	4000	91030824
H2H 24-Hour	20.0	180	4000	87030124
	20.6	180	3000	88090724
	29.1	180	4000	89040524
	37.1	170	4000	90010724
	23.0	160	4000	91030724

[a] Based on 5-year meteorological record, Tampa/Ruskin, 1987-91.
[b] Relative to the DAP No. 4 Stack location.

Note:
YYMMDDHH = Year, Month, Day, Hour Ending.

Table 6-14. Contribution of Project to the 24-Hour PSD Class II Exceedences Predicted in the Vicinity of 170 degrees, 4.0 km - Refined Grid

Total Predicted Concentration (μg/m³)	Project Contribution to Total (μg/m³)	Receptor Location[b] Direction (degree)	Receptor Location[b] Distance (m)	Time Period (YYMMDDHH)
30.50071	0	159	3800	87032824
32.20014	0	160	3800	87032824
31.84911	0	160	3900	87032824
31.09425	0	160	4000	87032824
33.28837	0	161	3800	87032824
33.55768	0	161	3900	87032824
33.29373	0	161	4000	87032824
33.74599	0	162	3800	87032824
34.59942	0	162	3900	87032824
35.05681	0	162	4000	87032824
33.68364	0	163	3800	87032824
34.93075	0	163	3900	87032824
36.02297	0	163	4000	87032824
33.17124	0	164	3800	87032824
34.67492	0	164	3900	87032824
36.16668	0	164	4000	87032824
32.12093	0	165	3800	87032824
33.87688	0	165	3900	87032824
35.63736	0	165	4000	87032824
30.41296	0	166	3800	87032824
32.4068	0	166	3900	87032824
34.43525	0	166	4000	87032824
30.22055	0	167	3900	87032824
32.41832	0	167	4000	87032824
30.22758	0	162	3900	88090624
30.63695	0	162	4000	88090624
30.68334	0	163	3900	88090624
31.42442	0	163	4000	88090624
30.91878	0	164	3900	88090624
31.85024	0	164	4000	88090624
30.98002	0	165	3900	88090624
32.02597	0	165	4000	88090624
30.88345	0	166	3900	88090624
31.99752	0	166	4000	88090624
30.65849	0	167	3900	88090624
31.79049	0	167	4000	88090624
30.36032	0	168	3900	88090624
31.46082	0	168	4000	88090624
30.03011	0	169	3900	88090624
31.08085	0	169	4000	88090624
30.66372	0	170	4000	88090624
30.1134	0	171	4000	88090624

Table 6-14. Contribution of Project to the 24-Hour PSD Class II Exceedences
Predicted in the Vicinity of 170 degrees, 4.0 km - Refined Grid

Total Predicted Concentration (µg/m³)	Project Contribution to Total (µg/m³)	Receptor Location[b] Direction (degree)	Receptor Location[b] Distance (m)	Time Period (YYMMDDHH)
30.18962	0	174	3800	88090724
30.79615	0	174	3900	88090724
31.39965	0	174	4000	88090724
33.46505	0	175	3800	88090724
34.47666	0	175	3900	88090724
35.53563	0	175	4000	88090724
34.418	0	176	3800	88090724
35.54044	0	176	3900	88090724
36.72461	0	176	4000	88090724
32.50371	0	177	3800	88090724
33.33019	0	177	3900	88090724
34.17368	0	177	4000	88090724
31.0503	0	173	3800	89022824
31.04848	0	173	3900	89022824
30.87593	0	173	4000	89022824
31.66562	0	174	3800	89022824
32.54568	0	174	3900	89022824
33.38372	0	174	4000	89022824
30.90059	0.46986	181	3900	89030624
32.06988	0.45675	181	4000	89030624
30.57645	0.42012	182	3800	89030624
31.22311	0.40833	182	3900	89030624
31.69101	0.39706	182	4000	89030624
40.95952	0	150	3800	89031424
39.04444	0	150	3900	89031424
35.08748	0	150	4000	89031424
41.51794	0	151	3800	89031424
41.31319	0	151	3900	89031424
38.24969	0	151	4000	89031424
40.99762	0	152	3800	89031424
42.75819	0	152	3900	89031424
41.21486	0	152	4000	89031424
39.51109	0	153	3800	89031424
42.99819	0	153	3900	89031424
43.53094	0	153	4000	89031424
37.4527	0	154	3800	89031424
41.93327	0	154	3900	89031424
44.64028	0	154	4000	89031424
35.30836	0	155	3800	89031424
39.89342	0	155	3900	89031424
44.17535	0	155	4000	89031424
33.40573	0	156	3800	89031424

Table 6-14. Contribution of Project to the 24-Hour PSD Class II Exceedences
Predicted in the Vicinity of 170 degrees, 4.0 km - Refined Grid

Total Predicted Concentration ($\mu g/m^3$)	Project Contribution to Total ($\mu g/m^3$)	Receptor Location[b] Direction (degree)	Receptor Location[b] Distance (m)	Time Period (YYMMDDHH)
37.49423	0	156	3900	89031424
42.29882	0	156	4000	89031424
31.80948	0	157	3800	89031424
35.26682	0	157	3900	89031424
39.7037	0	157	4000	89031424
30.42765	0	158	3800	89031424
33.39659	0	158	3900	89031424
37.15171	0	158	4000	89031424
31.79567	0	159	3900	89031424
34.99287	0	159	4000	89031424
30.38756	0	160	3900	89031424
33.15793	0	160	4000	89031424
31.54185	0	161	4000	89031424
30.3261	0	162	4000	89031424
30.00041	0	164	4000	89031424
30.2712	0.45532	179	4000	89040524
31.53244	0	181	4000	89060924
30.10406	0	182	3800	89060924
30.92509	0	182	3900	89060924
31.40768	0	182	4000	89060924
31.05822	0.00482	182	4000	89062824
31.83981	0.01134	183	3900	89062824
33.54015	0.01011	183	4000	89062824
31.18594	0.024	184	3800	89062824
32.21115	0.02164	184	3900	89062824
32.45926	0.01958	184	4000	89062824
30.05997	0	154	3800	89071424
30.04427	0	155	3900	89071424
30.38141	0	156	3900	89071424
30.62935	0	157	4000	89071424
30.58186	0	159	3800	90010624
32.81212	0	160	3800	90010624
32.44287	0	160	3900	90010624
31.2984	0	160	4000	90010624
34.26794	0	161	3800	90010624
34.63459	0	161	3900	90010624
34.20192	0	161	4000	90010624
34.95419	0	162	3800	90010624
35.99187	0	162	3900	90010624
36.4324	0	162	4000	90010624
35.09598	0	163	3800	90010624
36.52737	0	163	3900	90010624

Table 6-14. Contribution of Project to the 24-Hour PSD Class II Exceedences Predicted in the Vicinity of 170 degrees, 4.0 km - Refined Grid

Total Predicted Concentration ($\mu g/m^3$)	Project Contribution to Total ($\mu g/m^3$)	Receptor Location[b] Direction (degree)	Receptor Location[b] Distance (m)	Time Period (YYMMDDHH)
37.71523	0	163	4000	90010624
35.0848	0	164	3800	90010624
36.54557	0	164	3900	90010624
38.10695	0	164	4000	90010624
35.31374	0	165	3800	90010624
36.53741	0	165	3900	90010624
38.04515	0	165	4000	90010624
35.97876	0	166	3800	90010624
36.92597	0	166	3900	90010624
38.1387	0	166	4000	90010624
36.97201	0	167	3800	90010624
37.814	0	167	3900	90010624
38.78783	0	167	4000	90010624
37.95136	0	168	3800	90010624
38.9221	0	168	3900	90010624
39.90922	0	168	4000	90010624
38.54566	0	169	3800	90010624
39.78051	0	169	3900	90010624
41.00686	0	169	4000	90010624
38.5466	0	170	3800	90010624
40.02586	0	170	3900	90010624
41.54058	0	170	4000	90010624
37.9472	0	171	3800	90010624
39.55927	0	171	3900	90010624
41.25801	0	171	4000	90010624
36.82376	0	172	3800	90010624
38.45708	0	172	3900	90010624
40.20159	0	172	4000	90010624
35.19586	0	173	3800	90010624
36.77085	0	173	3900	90010624
38.45903	0	173	4000	90010624
33.00534	0	174	3800	90010624
34.44722	0	174	3900	90010624
35.99232	0	174	4000	90010624
30.22135	0	175	3800	90010624
31.43971	0	175	3900	90010624
32.73871	0	175	4000	90010624
30.43574	0	161	3800	90010724
30.96851	0	161	3900	90010724
30.48402	0	161	4000	90010724
30.35203	0	162	3800	90010724
31.70098	0	162	3900	90010724

Table 6-14. Contribution of Project to the 24-Hour PSD Class II Exceedences Predicted in the Vicinity of 170 degrees, 4.0 km - Refined Grid

Total Predicted Concentration (µg/m³)	Project Contribution to Total (µg/m³)	Receptor Location[b] Direction (degree)	Receptor Location[b] Distance (m)	Time Period (YYMMDDHH)
32.41459	0	162	4000	90010724
31.4751	0	163	3900	90010724
33.03679	0	163	4000	90010724
30.73568	0	164	3900	90010724
32.59566	0	164	4000	90010724
30.12477	0	165	3900	90010724
31.72824	0	165	4000	90010724
30.23824	0	166	3900	90010724
31.25623	0	166	4000	90010724
31.07407	0	167	3800	90010724
31.33512	0	167	3900	90010724
31.80586	0	167	4000	90010724
32.86797	0	168	3800	90010724
33.15812	0	168	3900	90010724
33.4369	0	168	4000	90010724
34.3499	0	169	3800	90010724
35.00401	0	169	3900	90010724
35.53326	0	169	4000	90010724
34.9026	0	170	3800	90010724
36.04636	0	170	3900	90010724
37.0894	0	170	4000	90010724
34.21787	0	171	3800	90010724
35.73493	0	171	3900	90010724
37.25061	0	171	4000	90010724
32.38882	0	172	3800	90010724
34.02539	0	172	3900	90010724
35.74862	0	172	4000	90010724
31.30744	0	173	3900	90010724
32.9399	0	173	4000	90010724
30.39808	0	161	3800	91030824
30.41913	0	161	3900	91030824
31.09788	0	162	3900	91030824
31.34428	0	162	4000	91030824
31.70978	0	163	4000	91030824

[a] Based on 5-year meteorological record, Tampa/Ruskin, 1987-91.
[b] Relative to the DAP No. 4 Stack location.

Note:
YYMMDDHH = Year, Month, Day, Hour Ending.

Table 6-15. Maximum Predicted Impacts for the Proposed Project Only at the Chassahowitzka PSD Class I Area Using the CALPUFF Model

Averaging Period	Concentration[a] ($\mu g/m^3$)	Proposed EPA PSD Class I Significant Impact Level ($\mu g/m^3$)
PM_{10}		
Annual	0.0018	0.2
24-Hour	0.0306	0.3
SO_2		
Annual	0.00045	0.1
24-Hour	0.0091	0.2
3-Hour	0.0289	1.0
NO_2		
Annual	0.0001	0.1

[a] Concentrations predicted with the CALPUFF model and 1990 CALMET Tampa Bay wind field meteorological data.

Table 6-16. Maximum Predicted Fluoride Impacts Due to the Future Plant at the Site Vicinity

Averaging Period	Concentration[a] ($\mu g/m^3$)	Receptor Location[b] Direction (degree)	Receptor Location[b] Distance (m)	Time Period (YYMMDDHH)
Annual				
	0.21	250	2092	87123124
	0.29	210	1313	88123124
	0.32	180	1142	89123124
	0.24	250	2092	90123124
	0.24	240	2256	91123124
High 24-Hour				
	2.2	210	1313	87101124
	2.8	210	1313	88070524
	2.8	180	1142	89112924
	1.9	180	1142	90112024
	1.8	140	1179	91020824
High 8-Hour	4.0	190	1158	87100808
	4.5	200	1212	88103008
	4.6	180	1142	89112908
	4.9	210	1313	90020808
	4.2	130	1265	91101124

[a] Based on 5-year meteorological record, Tampa/Ruskin, 1987-91.
[b] Relative to DAP No. 4 Stack Location.

<u>Note:</u>
YYMMDDHH = Year, Month, Day, Hour Ending.

Table 6-17. Maximum Predicted Fluoride Impacts at the Chassahowitzka PSD Class I Area Due to Cargill's Proposed Facility

Averaging Period	Concentration[a] ($\mu g/m^3$)
Annual	0.00092
24-Hour	0.013
8-Hour	0.03
3-Hour	0.041
1-Hour	0.052

[a] Concentrations predicted with the CALPUFF model and 1990 CALMET Tampa Bay wind field.

Table 7-1. Maximum Predicted Concentrations Due To Project Only at Chassahowitzka NWA

Pollutant	Concentrations[a] ($\mu g/m^3$) for Averaging Times				
	Annual	24-Hour	8-Hour	3-Hour	1-Hour
Sulfur Dioxide (SO_2)	0.00045	0.0091	0.021	0.029	0.037
Nitrogen Dioxide (NO_2)	0.0001	0.0037	0.010	0.015	0.019
Fluoride (F)	0.00092	0.013	0.029	0.041	0.052
Particulates (PM_{10})	0.0018	0.0306	0.070	0.11	0.13

[a] Highest predicted with CALPUFF model and FDEP CALMET Tampa Bay Domain, 1990

ND = Not determined

Table 7-2. SO_2 Effects Levels for Various Plant Species

Plant Species	Observed Effect Level ($\mu g/m^3$)	Exposure (Time)	Reference
Sensitive to tolerant	920 (20 percent displayed visible injury)	3 hours	McLaughlin and Lee, 1974
Lichens	200-400	6 hr/wk for 10 weeks	Hart *et al.*, 1988
Cypress, slash pine, live oak, mangrove	1,300	8 hours	Woltz and Howe, 1981
Jack pine seedlings	470-520	24 hours	Malhotra and Kahn, 1978
Black oak	1,310	Continuously for 1 week	Carlson, 1979

Table 7-3. Sensitivity Groupings of Vegetation Based on Visible Injury at Different SO_2 Exposures[a]

Sensitivity Grouping	SO_2 Concentration		Plants
	1-Hour	3-Hour	
Sensitive	1,310 - 2,620 μG/m^3 (0.5 - 1.0 ppm)	790 - 1,570 μG/m^3 (0.3 - 0.6 ppm)	Ragweeds Legumes Blackberry Southern pines Red and black oaks White ash Sumacs
Intermediate	2,620 - 5,240 μG/m^3 (1.0 - 2.0 ppm)	1,570 - 2,100 μG/m^3 (0.6 - 0.8 ppm)	Maples Locust Sweetgum Cherry Elms Tuliptree Many crop and garden species
Resistant	>5,240 μG/m^3 (>2.0 ppm)	>2,100 μG/m^3 (>0.8 ppm)	White oaks Potato Upland cotton Corn Dogwood Peach

[a] Based on observations over a 20-year period of visible injury occurring on over 120 species growing in the vicinities of coal-fired power plants in the southeastern United States.

Source: EPA, 1982a.

Table 7-4. Examples of Reported Effects of Air Pollutants at Concentrations Below National Secondary Ambient Air Quality Standards

Pollutant	Reported Effect	Concentration ($\mu g/m^3$)	Exposure
Sulfur Dioxide[1]	Respiratory stress in guinea pigs	427 to 854	1 hour
	Respiratory stress in rats	267	7 hours/day; 5 day/week for 10 weeks
	Decreased abundance in deer mice	13 to 157	continually for 5 months
Nitrogen Dioxide[2,3]	Respiratory stress in mice	1,917	3 hours
	Respiratory stress in guinea pigs	96 to 958	8 hours/day for 122 days
Particulates[1]	Respiratory stress, reduced respiratory disease defenses	120 PbO_3	continually for 2 months
	Decreased respiratory disease defenses in rats, same with hamsters	100 $NiCl_2$	2 hours

Source: [1]Newman and Schreiber, 1988.

[2]Gardner and Graham, 1976.

[3]Trzeciak et al., 1977.

Table 7-5. Maximum Pollutant Concentrations Predicted for the Cargill Bartow Project at the Chassahowitzka PSD Class I Area

Pollutant	Maximum Predicted Concentrations[a] ($\mu g/m^3$)	
	February 2 (33)	August 16 (228)
SO_4	0.0004	0.0015 [b]
NO_3	0.0011 [b]	0.0002
PM_{10}	0.0306 [b]	0.0172

[a] Predicted with CALPUFF model in the refined mode (Julian Day in parentheses).
[b] Highest concentration predicted for specific pollutant.

Table 7-6. Computed Daily Average RH Factors for Days of Maximum Impacts Predicted for Cargill Bartow at the Chassahowitzka NWA PSD Class I Area

Hour	February 2 (33)[a]		August 16 (228)[a]	
Ending	RH(%)	f(RH)	RH(%)	f(RH)
0	93	7.0	87	3.8
1	97	15.1	90	4.7
2	100	21.4	94	8.4
3	100	21.4	94	8.4
4	97	15.1	94	8.4
5	97	15.1	94	8.4
6	97	15.1	94	8.4
7	100	21.4	88	4.0
8	97	15.1	82	3.0
9	90	4.7	77	2.4
10	79	2.6	68	1.8
11	74	2.1	59	1.4
12	57	1.3	52	1.3
13	59	1.4	52	1.3
14	49	1.2	49	1.2
15	48	1.2	49	1.2
16	46	1.2	47	1.2
17	48	1.2	50	1.2
18	56	1.3	74	2.1
19	64	1.6	82	3.0
20	79	2.6	74	2.1
21	84	3.2	77	2.4
22	84	3.2	85	3.4
23	87	3.8	85	3.4
		7.5		
Average		7.47		3.62

[a] Hourly relative humidity data for 1990 from the National Weather Service station at the Tampa International Airport in Tampa, Florida. Julian day in parenthesis.

Note: RH = relative humidity; f(RH) = relative humidity factor.

Table 7-7. Summary of the Refined Regional Haze Analyses for the Predicted Cargill Bartow Project Impact at the Chassahowitzka NWA PSD Class I Area

Parameter	Units	Days of Maximum Concentrations Predicted for the Project	
		February 2 (33)	August 16 (228)
Maximum Predicted Concentration	$\mu g/m^3$		
SO_4		0.0004	0.0015
NO_3		0.0011	0.0002
PM_{10}		0.0306	0.0172
Computed Concentrations	$\mu g/m^3$		
$(NH_4)_2SO_4$		0.0005	0.0021
NH_4NO_3		0.0014	0.0003
Average Relative Humidity Factor [a]		7.47	3.62
Background Visual Range (Vr) [b]		65	65
Background Extinction Coefficient (bext)	km^{-1}	0.0602	0.0602
Source Extinction Coefficients (bexts)	km^{-1}		
$(NH_4)_2SO_4$		0.000012	0.000022
NH_4NO_3		0.000031	0.000003
PM_{10}		0.000092	0.000051
Total bexts	km^{-1}	0.000134	0.000077
Deciview Change		0.022	0.013
Percent Change (%)		0.22	0.13
Allowable Criteria (%)		5.0	5.0

[a] Computed from relative humidity data measured in 1990 at the National Weather Service station at the Tampa International Airport, Florida.
[b] Provided by U.S. Fish and Wildlife Service.

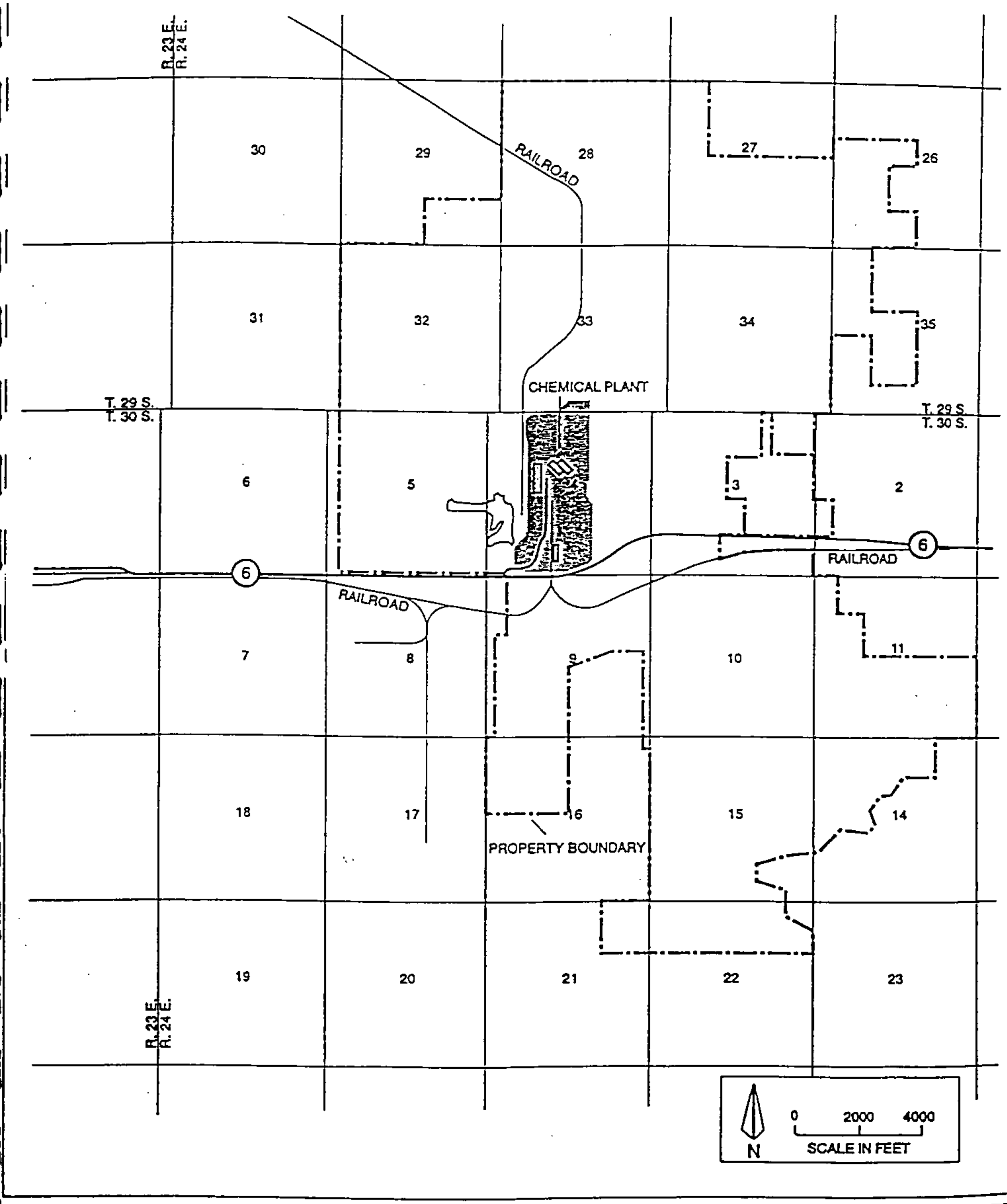


Figure 1-1
Area Map Showing Facility Location

Golder Associates

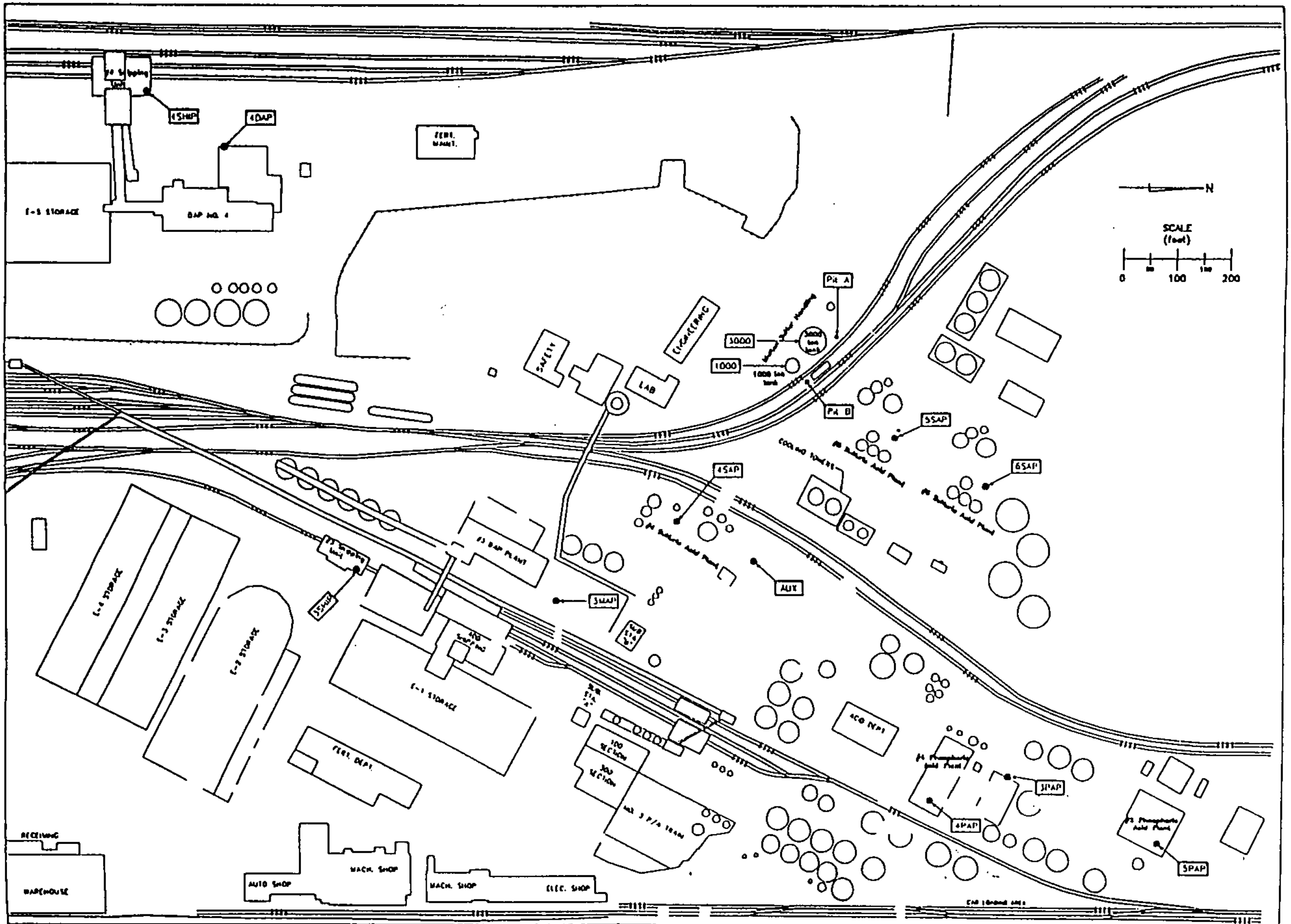


Figure 2-1

Facility Plot Plan

Golder Associates

APPENDIX A

PM_{10} SOURCE INVENTORY

Table A-1. Inventory of PM Point Sources Included in the AAQS Air Modeling Analysis

				Stack Parameters						
Facility ID	Facility	EU ID	Emission Unit Description	Height (ft)	Diameter (ft)	Temperature (F)	Flow (ACFM)	Flow (DSCFM)	Velocity (ft/s)	Emission Rate (lb/hr)
1050097	CUSTOM CHEMICALS CORPORATION	1	SULFONIC ACID - SULFONATION UNIT WITH WET CAUSTIC SCRUBBER	35	0.70	100	40,000		732	0.350
		2	65 HP BOILER ECLIPSE HI TEMP LIQUID PHASE HEATER	20	1.20	350	18,870		278	0.080
		5	CLARK 300 HP BOILER	20	2.00	400	2,310		12	0.040
1050146	PAVEX CORPORATION - BARTOW	1	200 TPH PORTABLE ASPHALT DRUM MIX PLANT	40	4.00		42,500		56.4	12.000
1050048	MULBERRY PHOSPHATES, INC.	5	DAP MFG PLT SCRUBBER	102	8.80	110	97,700		26	13.570
		9	NEBRASKA MODEL NS-E-65 STEAM BOILER	45	3.70	80	5,400		8	16.310
1050050	U S AGRI-CHEMICALS - BARTOW	38	150 TPH DIAMMONIUM PHOSPHATE PLANT (69.6 TPH P2O5 INPUT)	131	7.00	130	184,000	182,000	79	38.590
		39	DAP/MAP STORAGE AND LOADING	74	2.00	80	30,000		159	22.700
1050052	CF INDUSTRIES, INC. - BARTOW	2	NO. 1 MAP/DAP/GTSP SHIPPING UNIT	140	2.50	77	21,000		71	40.400
		5	SULFURIC ACID PLANT NO.5	206	7.00	150	49,300		21	6.621
		6	SULFURIC ACID PLANT NO.6	206	7.00	140	50,700		21	12.000
		21	BOILER NO. 1	36	2.50	600	13,000		44	10.982
		25	NO. 2 MAP/DAP SHIPPING UNIT	135	5.00	77	30,600		25	40.400
		26	WEST PHOSPHATE ROCK UNLOADING SYSTEM	65	4.00	77	38,000		50	14.000
1050056	IMC-AGRICO CO.(PRAIRIE)	1	LIMESTONE BUCKET ELEVATOR, BAGHOUSE	90	1.00	100	2,000		42	0.300
		2	RAYMOND MILL #1, LIMEROCK GRINDING	75	1.10	130	4,520		79	0.240
		3	RAYMOND MILL NO. 3, LIMEROCK GRINDING	75	1.10	130	7,600		133	0.240
		4	LIMEROCK DRYER WITH CYCLONE AND BAGHOUSE	70	4.40	184	46,596	35,669	51	2.800
		5	#4 RAYMOND MILL AT PRAIRIE PLANT	65	2.00	140	6,300		33	0.190
		6	LIMESTONE BIN & TRUCK LOADOUT	50	0.50	78	900		76	0.150
		7	FEED BIN AREA & ASSOC. EQUIP.	75	1.10	130	10,000	9,240	175	2.400
1050053	FARMLAND - GREEN BAY PLANT	3	SULFURIC ACID PLANT #3 DOUBLE CONTACT/ABSORPTION	100	7.50	170	75,663		28	6.750
		7	SOUTH DAP FERTILIZER PLANT	129	7.50	129	107,895		40	46.800
		16	PHOSPHORIC ACID PLANT NO 1 NORTH TRAIN WITH WET SCRUBBER	100	3.50	98	30,000		51	1.430
		20	DAP,MAP, OR TSP STORAGE & SHIPPING BUILDINGS	131	8.00	77	98,116		32	4.100
		28	THERMINOL HEATER TO CONCENTRATE ORTHOPHOSPHORIC ACID	95	5.50	630	16,725		11	0.200
		29	NORTH MAP/DAP FERTILIZER PLANT	129	7.50	108	114,000	88,000	43	31.800
		30	MOLTEN SULFUR STORAGE TANK 1 - 6000 SHORT TONS, 9 VENTS	40	2.00	200	18		1	0.900
		31	MOLTEN SULFUR STORAGE TANK 2 (EAST)-2500 SHORT TONS, 10 VENT	40	2.00	200	18		1	0.900
		32	MOLTEN SULFUR STORAGE TANK 3 (WEST)-2500 SHORT TONS, 10 VENT	40	2.00	200	18		1	0.900
		33	MOLTEN SULFUR TRUCK PIT - 72 SHORT TONS, 1 VENT	40	0.70	200	18		1	0.100
		34	MOLTEN SULFUR RAIL (AND BACK-UP TRUCK) PIT - 91 SHORT TONS	10	0.80	200	1,650		54	0.500
		35	MOLTEN SULFUR NO. 5 SUPPLY PIT - 31 SHORT TONS,	40	2.00	200	18		1	0.100
		36	MOLTEN SULFUR SUPPLY PIT #3 & #4 - 28 SHORT TONS, ONE VENT	10	0.50	200	18		1	0.100
1050045	PASCO PROCESSING, LLC	6	2 CITRUS PEEL DRYERS W/WASTE HEAT EVAPORATOR	89	3.10	167	17,056		37	31.800
		7	CITRUS PELLET MILL COOLER W/2 CYCLONES	23	1.70	90	4,600		33	10.594
1050047	AGRIFOS, L.L.C. - NICHOLS	1	PHOSPHATE ROCK DRYER NO. 1, DRY CYCLONES, VENTURI, CYCLONIC	80	7.50	160	110,000		41	38.100

Table A-1. Inventory of PM Point Sources Included in the AAQS Air Modeling Analysis

Facility ID	Facility	EU ID	Emission Unit Description	Stack Parameters Height (ft)	Diameter (ft)	Temperature (F)	Flow (ACFM)	Flow (DSCFM)	Velocity (ft/s)	Emission Rate (lb/hr)
		2	PHOSPHATE ROCK DRYER NO. 2, DRY CYCLONES, VENTURI, CYCL SEPA	80	7.50	160	110,000		41	38.100
		10	DRY PHOSPHATE ROCK STORAGE BUILDING	85	5.50	80	68,000		47	40.000
		11	1500 TPH DRY PHOS ROCK RAILCAR LOADOUT SYSTEM	85	5.00	75	75,000		63	33.000
1050145	BARTOW ETHANOL, INC.	1	900 HP CLARK BOILER WITH WOOD BURNER	36	3.00	350	28,000		66	64.240
1050059	IMC-AGRICO CO.(NEW WALES)	2	SULFURIC ACID PLANT #1 W/MIST ELIMINATOR	200	8.50	170	171,257	141,355	50	12.500
		3	SULFURIC ACID PLANT #2 W/BRINKS HV MIST ELIMINATOR	200	8.50	170	171,257	141,355	50	4.800
		4	SULFURIC ACID PLANT #3 W/BRINKS MIST ELIMINATOR	200	8.50	170	171,257	141,355	50	4.800
		5	PHOSPHATE ROCK RAILCAR UNLOADING (80 TPH MAXIMUM RATE)	40	3.00	108	25,000		58	6.400
		6	GROUND ROCK SILO W/PNEUMATIC 80 TPH LOAD RATE	110	1.40	110	4,200		45	1.300
		9	DAP PLANT NO. 1 W/3 TELLER VENTURI SCRUBBERS,	133	7.00	105	115,000		49	28.600
		10	GTSP PLANT (65 TPH) W/TELLER PACKED BED SCRUBBER	133	6.00	125	141,000		83.1	33.750
		11	MAP PRILL TOWER W/VENTURI SCRUBBER AND CYCLONIC DEMISTER	120	4.00	155	43,000		57	15.000
		12	GTSP STORAGE (65 TPH) W/ FUME SCRUBBER	133	6.00	108	105,000		61	28.700
		15	ANIMAL FEED SHIPPING/TRUCK LOADOUT (200 TPH), WITH BAGHOUSE.	65	1.00	105	8,000		169	1.080
		21	GROUND PHOSPHATE ROCK BIN AT GTSP PLANT	82	1.00	105	2,500		53	4.800
		23	ANIMAL FEED STORAGE SILOS (3) -"A"SIDE	114	1.00	105	1,600		33	4.750
		24	ANIMAL FEED STORAGE/SHIPPING/RAILCAR LOADOUT	103	1.00	105	6,600		140	3.600
		25	ANIMAL FEED - (2) LIMESTONE SILOS	119	1.00	105	6,000		127	3.600
		26	ANIMAL FEED - SILICA STORAGE BIN	18	1.00	105	1,500		31	1.600
		27	ANIMAL FEED INGREDIENT GRANULATION PLANT	172	8.00	130	200,000		66.3	36.800
		28	ANIMAL FEED STORAGE SILOS (3) - "B SIDE"	114	1.00	105	1,600		33	4.750
		29	#1 FERTILIZER RAIL/TRUCK SHIPPING	133	3.00	90	18,000		42.4	4.700
		31	MULTIFOS SODA ASH CONVEYING SYSTEM W/BAGHOUSE	108	0.80	80			31	3.600
		32	MULTIFOS "A" KILN COOLER W/BAGHOUSE	86	1.50	220	27,412		258	7.700
		33	MULTIFOS "B" KILN COOLER W/BAGHOUSE	86	1.50	274	23,889		225	7.700
		34	MULTIFOS PLANT MILLING & SIZING SYSTEM WEST BAGHOUSE	71	1.70	125	11,933		87	0.933
		35	MULTIFOS MILLING & SIZING SYSTEM EAST BAGHOUSE	71	1.00	100	11,933		253	0.933
		36	MULTIFOS PRODUCTION 1 DRYER 2 KILNS (A/B) FOR MULTIFOS PLANT	172	4.50	105	50,000		52	29.830
		37	MAP/DAP #2 TRUCK LOADOUT	10	1.80	100	10,500		68	3.600
		38	MULTIFOS MILLING & SIZING SYST SURGE BIN BAGHOUSE	65	1.10	100	4,525		79	7.500
		41	GTSP TRUCK LOADOUT FACILITY W/BAGHOUSE	10	1.50	100	19,000		179	5.000
		43	MAP/DAP NO. 2 RAIL LOADOUT	10	1.60	105	8,500		70	3.600
		45	DAP PLANT II - EAST TRAIN	171	6.00	110	100,000		58	6.400
		46	DAP PLANT II - WEST TRAIN	171	6.00	110	100,000		58	6.400
		47	DAP II WEST PRODUCT COOLER	147	4.30	175	60,000		68.9	4.220
		48	URANIUM RECOVERY ACID CLEANUP SCRUBBER	60	3.50	80	18,000		31.2	1.000
		50	URANIUM REFINERY W/BAGHOUSE	100	1.80	102	5,700		37	1.500
		51	URANIUM RECOVERY - CLAY STORAGE BIN	86	0.70	80	1,250		54	1.500
		52	ANIMAL FEED - LIMESTONE FEED BIN	114	1.00	105	1,600		33	4.750
		54	DAP PLANT #1 PRODUCT COOLER	107	3.50	150	45,000		77	7.700
		55	MAP PLANT COOLER	25	4.30	140	30,000		34	5.140
		56	DAP II EAST PRODUCT COOLER	170	5.00	110	76,000	66,000	64.5	6.060
		59	GTSP RAILCAR LOADOUT FACILITY W/ BAGHOUSE	10	1.50	100	7,300		68.9	5.000

Table A-1. Inventory of PM Point Sources Included in the AAQS Air Modeling Analysis

Facility ID	Facility	EU ID	Emission Unit Description	Stack Parameters: Height (ft)	Diameter (ft)	Temperature (F)	Flow (ACFM)	Flow (DSCFM)	Velocity (ft/s)	Emission Rate (lb/hr)
		70	LIMESTONE STORAGE SILO WITH BAGHOUSE.	110	0.75	110	3,000	2,700	113.2	0.700
		74	KILN C SCRUBBER STACK - MULTIFOS PLANT	172	4.50	105	67,000		70.2	14.300
		75	MULTIFOS KILN C COOLER BAGHOUSE	86	3.00	250	45,000	36,700	106.1	1.900
		76	MULTIFOS KILN C MILLING & SIZING BAGHOUSE	90	1.50	130	12,000	11,000	113.2	1.900
1050055	IMC-AGRICO CO.(SO. PIERCE)	1	171 MMBTU ZURN AUX.BOILER FOR SULFURIC ACID PLANTS	35	4.80	430	56,180		51	1.760
		3	PURIFIED MAP/DAP MFG.PLANT W/SCRUBBER	88	3.00	94	12,850		30	0.260
		12	PURIFIED MAP/DAP STORAGE PLANT STORAGE SILO NO. 3	10	1.30	90	300		3	0.130
		13	MAP/DAP BAGGING MACHINE HOPPER BAGHOUSE	10	1.50	77	1,000		9	0.090
		14	MAP/DAP BULK TRUCK SHIPPING BAGHOUSE	10	1.50	77	600		5	0.400
		22	NO 2 BALL MILL PHOS ROCK BAGHOUSE	10	1.80	160	10,366		67	31.800
		23	GTSP PRODUCTION PLANT SCRUBBER SYSTEM	140	9.00	110	140,000		36	35.000
		24	EAST GTSP STORAGE BLDG, NORTH SCRUBBER	80	11.00	90	145,883		25	40.100
		25	EAST GTSP STORAGE BLDG, SOUTH SCRUBBER	80	11.00	90	145,883		25.6	40.100
		26	GTSP ROCK HOPPER BIN BAGHOUSE	10	1.00	90	2,400	2,310	50	22.500
		27	PURIFIED MAP/DAP PLANT STORAGE SILO NO.2	6	1.30	77	300		3	1.300
		28	PURIFIED MAP/DAP PLANT STORAGE SILO NO. 1	10	1.30	77	300		3	0.130
		29	PURIFIED MAP/DAP PLANT BULK RAILCAR LOADER - ONE BAGHOUSE	10	1.30	77	600		7	0.400
1050003	LAKELAND ELECTRIC - LARSEN	3	FOSSIL FUEL FIRED STEAM GENERATOR # 6	165	10.00	340	98,960		21	38.300
		4	STEAM GENERATOR # 7 (PHASE II ACID RAIN UNIT)	165	10.00	340	103,673		22	76.950
		5	PEAKING GAS TURBINE # 3	31	11.80	800	662,400		101	7.940
		6	PEAKING GAS TURBINE # 2	31	11.80	800	662,400		101	7.940
		7	PEAKING GAS TURBINE # 1	31	11.80	800	662,400		101	7.940
		8	COMBINED CYCLE COMBUSTION TURBINE (PHASE II ACID RAIN UNIT)	155	16.00	481	1,034,053		85.7	26.000
1050034	IMC-AGRICO CO. (CFMO)	2	RAYMOND MILLS 1 AND 2 GRINDERS W/SCRUBBERS @ KINGSFORD MINE	60	2.50	110	19,000		64	33.500
		3	RAYMOND MILL NO 3 GRINDER W/SCRUBBER @ KINGSFORD MINE	58	1.90	100	8,500		49	30.000
		4	PHOS RK DRYER W/SCRUBBER @ KINGSFORD MINE	70	7.00	165	110,000		47	44.200
		5	PHOS ROCK TRANSFER AND STORAGE SILOS W/SCRUBBER @ KINGSFORD	106	2.50	95	20,000		67	20.000
		6	UNGROUND PHOSPHATE ROCK RR CAR LOAD OUT @ KINGSFORD MINE	35	2.50	75	10,000		33	20.000
		8	BOILER @ FOUR CORNERS MINE	26	0.95	400	1,000		23.5	0.055
		9	MAGNETITE STORAGE BIN @ FOUR CORNERS MINE (009)	122	0.60	77	500		29.5	0.129
		10	FERROSILICON STORAGE BIN @ FOUR CORNERS MINE	122	0.60	77	380		22.4	1.370
		11	PHOSPHATE ROCK DRYER NO. 1 @ NORALYN MINE (011)	76	6.50	250	113,000		56.8	42.200
		12	PHOSPHATE ROCK DRYER NO. 2 EAST @ NORALYN MINE (012)	55	9.30	155	118,000		29	45.100
		13	PHOSPHATE ROCK STORAGE SILOS 1, 2, 3, & 12 @ NORALYN MINE (0	150	3.50	100	30,000		52	35.000
		14	BALL MILL TRANSFERS (C108) @ NORALYN MINE (014)	24	2.00	110	5,000		26.5	15.000
		15	BALL MILL TRANSFERS (C109) @ NORALYN MINE (015)	24	2.00	110	5,000		26.5	10.000
		16	BALL MILL NO. 3 @ NORALYN MINE (016)	25	1.50	75	4,000		37.7	10.000
		17	BALL MILL NO. 4 @ NORALYN MINE (017)	27	2.00	75	3,000		15.9	10.000
		18	NO. 3 BALL MILL RAILCAR LOADOUTS @ NORALYN MINE (018)	25	1.50	77	4,000		37.7	10.000
		19	NO. 4 BALL MILL RAILCAR LOADOUTS @ NORALYN MINE (019)	29	1.80	77	3,000		19.7	10.000
		20	A TRACK RAILCAR PHOSPHATE ROCK LOADOUT SYSTEM @ NORALYN MINE	27	2.00	85	10,000		53.1	15.000
		21	B TRACK RAILCAR PHOSPHATE ROCK LOADOUT SYSTEM @ NORALYN MINE	27	1.90	81	12,219		71.8	15.000

Table A-1. Inventory of PM Point Sources Included in the AAQS Air Modeling Analysis

Facility ID	Facility	EU ID	Emission Unit Description	Stack Parameters Height (ft)	Diameter (ft)	Temperature (F)	Flow (ACFM)	Flow (DSCFM)	Velocity (ft/s)	Emission Rate (lb/hr)
		22	T7 & T8 (TRANSFER POINTS TO CONVEYORS C31 & C33) @ NORALYN (	40	1.50	100	5,000		47.2	10.000
		23	MATERIAL TRANSFER SOURCES (C20 PIT TRANSFER AREA) @ NORALYN	43	2.00	86	5,000		26.5	15.000
		24	DRY PHOSPHATE ROCK TRANSFER SYSTEM @ NORALYN MINE (024)	135	2.80	60	20,300		55	15.000
		25	SODA ASH MIX TANK & TRANSFER SYSTEM @ LONESOME MINE (025)	35	0.50	77	1,220		103.6	16.000
		28	DRY UNGROUND ROCK TRUCK LOADOUT @ NORALYN MINE	27	2.00					0.300
0570075	CORONET INDUSTRIES, INC.	1	FEED PREP PLANT DRYER WITH WET SCRUBBER.	100	4.50	149	37,500	24,300	39	13.200
		3	PARAGON DEFLUORINATING KILN #2-PACKED BED SCRUBBER	152	5.80	81	49,959		31	13.030
		5	DEFLUORINATING KILNS 6 & 7	150	5.80	104	95,400	75,750	60	15.000
		6	FEED PREPARATION PRODUCT HANDLING DUST COLLECTOR	81	2.70	108	10,200	15,000	29	2.110
		7	7500 CFM FEED BAGHOUSE #12 - FEED PREPARATION, ROCK HANDLIN	107	1.20	77	7,500		110	1.300
		8	FEED PREP SCRUBBER #2	100	3.00	115	7	6	28	6.800
		9	FEED PREP. PLANT-ROCK STORAGE BIN BAGHOUSE	97	1.00	77	2,100		44	0.350
		12	CDP TRUCK LOADING DUST COLLECTOR	62	1.80	77	12,500	12,500	81	2.150
		13	CDP FINES BAGGING W/ BAGHOUSE	67	1.50	77	4,000		37	1.220
		15	NORTH MILL ROOM W/ BAGHOUSE	34	2.70	130	21,600		62	7.120
		16	CDP FINES STORAGE W/ BAGHOUSE	57	1.50	77	10,000		94	1.710
		17	BULK RAILCAR LOADING BAGHOUSE	54	1.80	77	10,000		65	1.710
		18	SOUTH MILL ROOM W/ BAGHOUSE	45	1.80	170	7,100		46	1.710
		20	100 HP KEWANEE BOILER FOR DEFLUORINATING PLANT.	20	1.20	630	4,500		66	1.000
		21	CRANEWAY-TEMPORARY PRODUCT STORAGE CONTROLLED BY BGHS #14	80	4.50	95	248,000		259	34.290
		22	FLUID BED REACTOR #1,DEFLUORINATING A.F.CONTROLLED BY SCRUBB	152	5.80	80	63,158		39	14.020
		23	POTASSIUM FLUOBORATE PRODUCTION WITH WET SCRUBBERS.	32	1.50	73	3,742	3,000	35	5.000
		24	DEFLUORINATING FLUID BED REACTOR #2 CONTROLLED BY SCRUBBER	152	5.80	72	58,036		36	14.020
		27	2500LB/HR KBF4 PLANT W/DUST COLLECTOR	10	0.80	150	1,800	1,470	59	0.460
		28	8 TPH BORAX STORAGE/HANDLING SYSTEM	50	0.50	70	800		67	0.210
		30	500 TON FEED TANK, 100 TON FEED TANK, ELEVATOR, RECLAIM HOPP	55	1.50	68	4,000		37	1.490
		31	80 TON LIMESTONE STORAGE BIN	80	0.60	70	1,000		58	0.275
		32	INORGANIC CHEMICAL PROD. USING SCRUBBER FLUORIDES	45	1.60	250	2,400	1,730	19	1.900
1050004	LAKELAND ELECTRIC - MCINTOSH	1	MCINTOSH UNIT 1- FFFSG (PHASE II ACID RAIN UNIT)	150	9.00	277	310,000		81.2	95.000
		2	DIESEL ENGINE PEAKING UNIT 2	20	2.60	715	24,529		77	1.740
		3	DIESEL ENGINE PEAKING UNIT 3	20	2.60	715	24,529		77	1.740
		4	GAS TURBINE PEAKING UNIT 1	35	13.50	900	682,334		79.5	12.160
		5	MCINTOSH UNIT 2 FFFSG (PHASE II ACID RAIN UNIT)	157	10.50	277	380,100		73.2	111.500
		6	MCINTOSH UNIT 3 FFFSG (PHASE II ACID RAIN UNIT)	250	18.00	167	1,260,536		82.6	273.000
		28	250 MW COMBUSTION TURBINE (SIMPLE CYCLE OPERATION). UNIT 5	85	28.00	1095	3,055,750	894,739	82.7	139.600
0570005	CF INDUSTRIES, INC., PLANT CITY PHOSP	1	GRAHAM SCOTCH MARINE TYPE BOILER	25	3.50	550	33,600		58	0.240
		9	"B" PHOS ACID PLANT WITH SCRUBBER	119	4.00	106	33,732	30,960	44	31.050
		10	"A" DORR OLIVER DAP PLANT W/ VENTURI & PACKED BED SCRUBBER	94	10.00	128	122,570	85,320	26	32.660
		11	"Z" DORN-OLIVER DAP PLANT WITH VENTURI SCRUBBER AND PACKED B	180	9.20	137	174,240	130,937	43	35.560
		12	"X" GTSP/DAP/MAP Plant with Scrubbers	180	9.20	105	107,000		26	32.600
		13	"Y" GTSP/DAP/MAP Plant with Scrubbers	180	9.20	105	10,700		26	15.300
		14	STORAGE BLDG. A SHARES SCRUBBER W/ BLDG. B (PT 18)&B SHIPPIN	115	9.20	80	144,100		36	37.500
		15	"A" SHIPPING. MATERIALS HANDLING OF DAP & GT SP	90	1.70	77	8,500		62	5.000

Table A-1. Inventory of PM Point Sources Included in the AAQS Air Modeling Analysis

Facility ID	Facility	EU ID	Emission Unit Description	Stack Parameters Height (ft)	Diameter (ft)	Temperature (F)	Flow (ACFM)	Flow (DSCFM)	Velocity (ft/s)	Emission Rate (lb/hr)
		18	SIZING/SCREENING OPERATION IN BLDG."B"(EQUIPPED WITH BAGHOUS	33	3.30	78	10,000		19	5.000
		19	TRUCK LOADING STATION AT "B" SHIPPING.	115	9.20	80	20	10	35	0.500
		22	2600 TON MOLTEN SULFUR STORAGE TANK	8	0.90	212	204		5	0.200
		23	TRUCK PIT A, 679 TONS MOLTEN SULFUR STORAGE	12	0.30	212	23		5	0.100
		24	MOLTEN SULFUR STORAGE & HANDLING SYSTEM	12	0.30	212	23		5	0.537
		32	URANIUM RECOVERY MODULE, ACID CLEAN UP SCRUBBER	60	4.00	118	35,000		46.4	3.000
		34	CLAY UNLOADING OPERATION WITH BAGHOUSE.	85	0.50	77	450		38	21.170
0570025	TRADEMARK NITROGEN CORP	1	125 TPD NITRIC ACID PLANT W/ 2 ABSORPTION TOWERS IN SERIES	50	1.70	350	14,823		108	334.000
0570039	TAMPA ELECTRIC COMPANY - BIG BEND	1	UNIT #1 COAL FIRED BOILER W/RESEARCH-COTRELL ESP	499	24.00	269	1,224,000		45	404.000
		2	UNIT #2 RILEY-STOKER COAL FIRED BOILER W/ ESP	499	24.00	269	1,159,400		42	400.000
		3	UNIT #3 RILEY-STOKER COAL-FIRED BOILER W/ ESP	499	24.00	279	1,288,200		47	412.000
		4	UNIT #4 COAL-FIRED BOILER W/ BELCO ESP PSD-FL-040	499	24.00	156	1,622,000		59	130.000
		5	BIG BEND STATION COMBUST. TURBINE #2 - FIRED BY NO. 2 FUEL O	75	14.00	928	568,000		61	33.000
		6	GAS TURBINE #3 - WESTINGHOUSE TURBINE FIRED BY NO. 2 FUEL OI	75	14.00	928	568,000		61	33.000
		7	GAS TURBINE #1 FIRED BY #2 FUEL OIL	35	11.04	1010	527,700		91.9	33.000
		8	BIG BEND STATION UNIT NO. 1 & NO. 2 FLY ASH SILO WITH BAGHOU	102	2.50	250	15,500		52	5.160
		9	FLY-ASH SILO FOR UNIT #3	113	0.90	250	15,500		406	3.000
		12	LIMESTONE SILO A W/ 2 BAGHOUSES, 1 IS 100% BACK-UP P	101	0.50	150	552		46	0.050
		13	LIMESTONE SILO B W/ 2 BAGHOUSES, 1 IS 100% BACK-UP P	101	0.50	150	552		46	0.050
		14	FLYASH SILO FOR UNIT #4 P	139	1.60	140	7,200		59	0.200
		15	UNIT 1 COAL BUNKER W/ROTO-CLONE	179	1.70	78	9,400	9,142	69	0.480
		16	UNIT 2 COAL BUNKER W/ROTO-CLONE	179	1.70	78	9,400	9,142	69	0.480
		17	UNIT 3 COAL BUNKER W/ROTO-CLONE	179	1.70	78	9,400	9,142	69	0.480
0570040	TAMPA ELECTRIC COMPANY - GANNON	1	UNIT #1 STEAM GENERATOR	315	10.00	289	446,800		94	126.000
		2	125MW BABCOCK&WILCOX CORP WET BOTTOM CYCLONIC FIRING TYPE BL	315	10.00	298	476,900		101	126.000
		3	UNIT #3 - B&W WET BOTTOM COAL FIRED BOILER	315	10.60	296	671,200		126	160.000
		4	UNIT#4- B&W WET BOT CYCLONIC FIR`G COAL FIR BOLR, EAST STACK	315	10.00	309	355,100		75	188.000
		5	UNIT #5 COAL FIRED BOILER	315	14.60	303	763,800		76	228.000
		6	UNIT #6 - COAL FIRED BOILER WITH ESP	315	17.60	320	1,184,700		81	380.000
		7	14 MW GAS FIRED TURBINE	35	11.00	1010	527,700		92.6	122.000
		9	ECONOMIZER ASH SILO	72	0.70	350	830	541	35	0.140
		10	FLYASH SILO NO. 1 FOR UNITS 5 & 6	107	1.00	350	4,696		99	1.200
		11	FLY ASH SILO NO. 2 UNITS 1-4	104	2.00	350	11,300		59	2.900
		13	UNIT 1 COAL BUNKER W/ROTO-CLONE	175	1.70	78	9,600	9,337	70	0.190
		14	UNIT 2 COAL BUNKER W/ROTO-CLONE	175	1.70	78	9,600	9,337	70	0.190
		15	UNIT 3 COAL BUNKER W/ROTO-CLONE	177	2.00	78	9,600	9,337	50	0.190
		16	UNIT 4 COAL BUNKER W/ROTO-CLONE	175	1.70	78	9,600	9,337	70	0.190
		17	UNIT 5 COAL BUNKER W/ROTO-CLONE	174	1.20	78	5,400	5,252	79	0.190
		18	UNIT 6 COAL BUNKER W/ROTO-CLONE	175	1.70	78	9,600	9,337	70	0.190
0570038	TAMPA ELECTRIC COMPANY - HOOKER POINT	1	BOILER #1 298 MMBTU/HR (PHASE II ACID RAIN UNIT)	280	11.30	356	493,605		82	37.300
		2	BOILER #2 298 MMBTU/HR (PHASE II ACID RAIN UNIT)	280	11.30	356	493,605		82	37.300

Table A-1. Inventory of PM Point Sources Included in the AAQS Air Modeling Analysis

Facility ID	Facility	EU ID	Emission Unit Description	Stack Parameters Height (ft)	Diameter (ft)	Temperature (F)	Flow (ACFM)	Flow (DSCFM)	Velocity (ft/s)	Emission Rate (lb/hr)
		3	BOILER #3 411 MMBTU/HR (PHASE II ACID RAIN UNIT)	280	12.00	341	425,318		62.7	51.400
		4	BOILER #4 411 MMBTU/HR (PHASE II ACID RAIN UNIT)	280	12.00	341	425,318		62.7	51.400
		5	BOILER #5 610 MMBTU/HR (PHASE II ACID RAIN UNIT)	280	11.30	356	493,605		82	76.300
		6	BOILER #6 778 MMBTU/HR (PHASE II ACID RAIN UNIT)	280	9.40	329	313,188		75.2	97.300
0970014	FLORIDA POWER - INTERCESSION CITY	1	COMBUSTION TURBINE (CT) PEAKING UNIT 1	20	14.63	760	1,764,000		174.9	43.000
		2	COMBUSTION TURBINE (CT) PEAKING UNIT 2	20	14.63	760	1,764,000		174.9	43.000
		3	COMBUSTION TURBINE (CT) PEAKING UNIT 3	20	14.63	760	1,764,000		174.9	43.000
		4	COMBUSTION TURBINE (CT) PEAKING UNIT 4	20	14.63	760	1,764,000		174.9	43.000
		5	COMBUSTION TURBINE (CT) PEAKING UNIT 5	20	14.63	760	1,764,000		174.9	43.000
		6	COMBUSTION TURBINE (CT) PEAKING UNIT 6	20	14.63	760	1,764,000		174.9	43.000
		7	COMBUSTION TURBINE # 7	50	13.75	1043	1,551,317		174.1	15.000
		8	COMBUSTION TURBINE # 8	50	13.75	1043	1,551,317		174.1	15.000
		9	COMBUSTION TURBINE # 9	50	13.75	1043	1,551,317		174.1	15.000
		10	COMBUSTION TURBINE # 10	50	13.75	1043	1,551,317		174.1	15.000
		11	COMBUSTION TURBINE # 11	75	19.00	1034	2,370,627		139.4	17.000

Table A-2. Summary of Source Included in the PSD Increment Air Modeling Analysis

Facility ID	Facility	Emission Unit Description	Stack Parameters Height (ft)	Diameter (ft)	Temperature (°F)	Flow (ACFM)	Velocity (ft/s)	Emission Rate (lb/hr)
0570008	CARGILL FERTILIZER, INC. - RIVERVIEW							
		ANIMAL FEED PLANT NO 1 STACK	136.2	6.0	151	114,143	67.2	7.9
		ANIMAL FEED PLANT AFP LOADOUT SYSTEM	20.0	3.0	89	14	0.03	1.9
		DE HOPPER VENT BAGHOUSE	64.0	1.5	89	613	5.7	0.1
		EXISTING LIMESTONE SILO BAGHOUSE	85.0	1.5	89	806	7.5	0.1
		PROPOSED LIMESTONE SILO BAGHOUSE	85.0	1.5	89	806	7.5	0.1
		PROPOSED SECOND GRANULATION TRAIN	136.2	6.0	151	100,210	59.0	7.9
		NO 3 AND 4 MAP PLANTS AND SOUTH COOLER	132.9	7.0	142	164,450	71.5	2.6
		ROCK PLANT NO 5 MILL DUST COLLECTOR	90.9	2.5	165	18,899	64.5	2.1
		ROCK PLANT NO 7 MILL DUST COLLECTOR	90.9	3.0	165	19,804	47.1	2.6
		ROCK PLANT NO 9 MILL DUST COLLECTOR	90.9	2.5	165	18,899	64.5	0.4
		GROUND ROCK SILO DUST COLLECTOR	66.9	0.8	80	1	0.03	16.8
		NO 5 DAP PLANT	132.9	7.0	109	121,337	52.7	12.8
		GTSP/DAP MANUFACTURING PLANT	126.0	8.0	125	140,598	46.6	21.6
		GTSP TRUCK LOADING STATION	38.1	2.7	77	11	0.03	0.6
		GTSP GROUND ROCK HANDLING	86.9	1.2	77	2	0.03	1.0
		BUILDING NO.6 BAGHOUSE	29.9	1.1	80	2	0.03	0.6
		BELT 7 TO 8 BAGHOUSE	44.9	1.1	80	2	0.03	0.6
		BELT 8 TO 9 BAGHOUSE	75.1	1.6	80	4	0.03	1.2
		SODIUM FLUORIDE PLANT DRYER SCRUBBER	40.0	1.7	120	5,420	41.1	1.0
		MATERIAL HANDLING BAGHOUSE	29.9	1.3	89	4,093	48.0	0.7
		CARGILL RIVERVIEW BASELINE SOURCES						
		PHOSPHATE ROCK GRINDING NO 5&9 MILL DUST COL.	60.0	1.9	140	10,167	57.6	-1.9
		AMMONIA PLANT	60.0	8.3	601	36,828	11.3	-22.2
		SODIUM SILICOFLUORIDE/SODIUM FLUORIDE	28.0	2.5	95	2,326	7.9	-2.4
		NO. 2 AND NO. 3 ROCK SILO BAG FILTER	93.0	1.0	100	2,556	49.2	-0.9
		NOS. 6, 7, AND 8 ROCK MILLS	95.0	2.0	91	6	0.03	-5.2
		NO. 10 KVS MILL	87.0	1.6	118	6,973	57.3	-3.7
		NO. 11 KVS MILL	70.0	1.6	125	6,166	50.6	-3.0
		NO. 12 KVS MILL	71.0	1.6	136	5,562	45.7	-1.3
		NO. 2 AIR SLIDE NORTH BAG FILTER	85.0	0.9	97	1,456	36.6	-0.6
		NO. 2 AIR SLIDE SOUTH BAG FILTER	96.0	0.9	115	2,115	61.7	-0.3
		NO. 3 AIR SLIDE NORTH BAG FILTER	82.0	1.2	113	529	7.2	-0.2
		NO. 3 AIR SLIDE CENTER BAG FILTER	115.0	1.6	116	1,363	11.2	-0.5
		NO. 3 AIR SLIDE SOUTH BAG FILTER	96.0	1.6	116	994	7.8	-0.8
		NO. 3 AIR SLIDE BIN BAG FILTER	108.0	1.2	122	1,375	18.8	-0.9
		NO. 2 PHOSPHORIC ACID SYSTEM	109.0	4.0	140	19,940	26.4	-7.5
		NO. 3 PHOSPHORIC ACID SYSTEM	93.0	4.0	118	11,890	15.7	-5.1

Table A-2. Summary of Source Included in the PSD Increment Air Modeling Analysis

Facility ID	Facility	Emission Unit Description	Stack Parameters					Emission Rate (lb/hr)
			Height (ft)	Diameter (ft)	Temperature (°F)	Flow (ACFM)	Velocity (ft/s)	
		NO. 1 HORIZONTAL FILTER SCRUBBER	59.0	4.8	88	35,131	32.9	-6.2
		NO. 2 HORIZONTAL FILTER SCRUBBER	51.0	4.0	89	31,880	42.2	-6.0
		NO. 3 HORIZONTAL FILTER VACUUM SYSTEM	4.5	1.5	125	1,190	11.1	-0.1
		NO. 7 OIL-FIRED CONCENTRATOR	78.0	6.0	165	15,661	9.2	-7.6
		NO. 8 OIL-FIRED CONCENTRATOR	78.0	6.0	158	16,609	9.8	-14.4
		GTSP BAG FILTER	88.0	1.3	152	3	0.0	-0.3
		GTSP PLANT	126.0	8.0	129	76,194	25.2	-18.3
		NO. 3 TRIPLE REACTOR BELT	65.0	4.0	79	32,128	42.6	-6.2
		NO. 4 TRIPLE REACTOR BELT	65.0	4.0	75	34,481	45.7	-4.7
		NO. 3 CONTINUOUS TRIPLE DRYER	68.0	3.5	118	20,483	35.3	-14.4
		NO. 4 CONTINUOUS TRIPLE DRYER	68.0	3.5	104	28,448	49.0	-9.0
		NOS. 2 & 4 SIZING UNITS	74.0	4.0	77	20,139	26.7	-4.1
		NORMAL SUPERPHOSPHATE	73.0	2.5	106	11,776	40.2	-0.5
		NO. 1 AMMONIUM PHOSPHATE PLANT	90.0	4.0	140	26,034	34.5	-9.4
		NO. 2 AMMONIUM PHOSPHATE PLANT	90.0	3.5	133	27,419	47.2	-11.7
		NO. 3 AMMONIUM PHOSPHATE PLANT	90.0	3.5	143	24,732	42.6	-13.1
		NO. 4 AMMONIUM PHOSPHATE PLANT	90.0	3.5	149	21,474	37.0	-7.0
		NORTH AMMONIUM PHOSPHATE COOLER	54.0	4.3	143	40,220	45.5	-47.0
		SOUTH AMMONIUM PHOSPHATE COOLER	54.0	4.3	125	42,453	48.0	-37.2
	IMC AGRICO PIERCE							
		1AGRI	80.0	8.0	118	210,550	69.7	-40.0
		2AGRI	95.0	5.8	770	76,905	48.4	-31.1
1050055	IMC AGRICO S. PIERCE							
		3AGRI	149.9	5.2	170	166,414	128.2	389.7
	CFI BARTOW PHOSPHATE COMPLEX (FORMERLY BONNIE MINE RD)							
		5CFIN	140.1	2.6	77	23,007	70.9	121.2
		6CFIN	120.0	7.5	140	149,851	56.3	19.4
		7CFIN	136.0	9.3	140	240,584	59.2	39.3
1050057	IMC NICHOLS (FORMERLY CONSERVE)							
		8CONS	150.0	7.5	170	89,980	33.8	-229.4
		9CONS	42.0	4.0	100	26,257	34.8	-39.0
	FARMLAND-HYDRO LTD (GREEN BAY)							
		10FARM	100.1	4.6	95	59,693	60.0	222.9

Table A-2. Summary of Source Included in the PSD Increment Air Modeling Analysis

Facility ID	Facility	Emission Unit Description	Stack Parameters Height (ft)	Diameter (ft)	Temperature (°F)	Flow (ACFM)	Velocity (ft/s)	Emission Rate (lb/hr)
490015	HARDEE POWER PARTNERS							
		HPPCC	89.9	14.5	236	767,966	77.5	20.0
		HPPSC	75.1	17.9	986	1,425,901	94.3	20.0
	IMC FORT LONESOME (PSD EXPANDING)							
		12IMCF	125.0	8.0	151	150,209	49.7	-25.2
		13IMCF	125.0	8.0	151	166,459	55.1	-24.9
		14IMCF	150.0	2.7	110	9,433	27.7	-51.2
	IMC-AGRICO NORALYN MINE							
		15IMCF	38.0	1.9	140	4,014	23.5	222.2
	BARTOW PHOSPHATE CENTER (FORMERLY IMC URANIUM RECOVERY)							
		16IMCF	85.0	0.7	75	772	38.1	-189.7
	CITY OF LAKELAND LARSEN							
		17LAKE	100.0	19.0	950	1,574,460	92.6	15.0
1050004	CITY OF LAKELAND MCINTOSH							
		18LAKE	250.0	16.1	170	1,302,648	107.0	324.0
		19LAKE	149.9	9.0	295	296,994	78.0	111.1
	MOBIL ELECTOPHOSPHATE							
		20MOBI	100.0	4.3	115	35,243	40.5	126.6
570039	TECO BIG BEND							
		22TECO	490.0	24.0	156	1,623,864	59.7	433.4
		23TECO	490.2	24.0	156	1,783,486	65.6	1327.8
	CARGILL BARTOW							
		CGBAR1	50.0	6.6	140	113,834	56.1	108.0
		CGBAR2	200.0	5.0	165	96,511	82.4	37.1
1030013	FPC BAYBORO							
		27FPCB	40.0	22.9	900	530,281	21.5	64.6
105233	TECO POLK CO							

Table A-2. Summary of Source Included in the PSD Increment Air Modeling Analysis

Facility ID	Facility	Emission Unit Description	Stack Parameters: Height (ft)	Diameter (ft)	Temperature (°F)	Flow (ACFM)	Velocity (ft/s)	Emission Rate (lb/hr)
		28TECO	20.0	3.0	500	17,659	43.0	16.0
		29TECO	149.9	19.0	260	939,992	55.1	59.0
		30TECO	199.1	3.5	1400	17,415	30.0	25.0
1030011	FPC BARTOW							
		31FPCB	299.9	9.0	305	388,454	102.0	253.7
		32FPCB	299.9	11.0	275	643,236	113.0	221.4
		33FPCB	29.9	3.0	515	7,139	17.0	0.3
		34FPCB	44.9	17.3	930	1,028,416	73.0	101.6
		35FPCB	24.9	0.9	77	5	0.1	0.1
	FPL MANATEE							
		44FLOR	499.0	26.2	307	2,508,459	77.5	1730.2
	HILLSBOROUGH CO RRF							
		HILRFC3	220.1	11.5	430	343,642	55.0	21.0
570127	CITY OF TAMPA MCCAY BAY REFUGE-TO-ENERGY							
		MCKBAYC5	149.9	4.3	440	59,908	69.9	28.3
	TROPICANA							
		TROPNC3	95.1	3.0	140	29,713	70.7	95.2
		TROPNC8	49.9	1.0	90	484	10.6	111.2
1010071	PASCO CO COGEN							
		PASCOGEN	274.9	4.8	310	54,064	50.0	5.0
0690046	OGDEN MARTIN							
		OGDENMAR	125.0	6.0	300	130,194	76.6	7.6
0694801	LAKE CO COGEN							
		LAKEOGEN	80.1	10.0	3	2,942	0.6	20.0
	POLK POWER PARTNERS							
		POLKPOWP	125.0	15.0	220	678,816	64.1	9.0
1050234	FPC HINES							
		FPCHINES	299.9	9.0	312	453,800	119.2	92.4

Table A-2. Summary of Source Included in the PSD Increment Air Modeling Analysis

Facility ID	Facility	Emission Unit Description	Stack Parameters Height (ft)	Diameter (ft)	Temperature (°F)	Flow (ACFM)	Velocity (ft/s)	Emission Rate (lb/hr)
1050223	FPC TIGER BAY COGEN							
		FPCTIGER	180.1	18.0	220	1,505	0.1	9.0
	NATIONAL GYPSUM							
		NATGYPS1	98.1	3.7	350	38,196	57.9	15.4
		NATGYPS2	54.1	13.4	384	491,464	58.2	2.3

APPENDIX B

CALPUFF MODEL ASSUMPTIONS AND APPROACHES

B.0 CALPUFF MODEL ASSUMPTIONS AND APPROACHES

B.1 INTRODUCTION

As part of the new source review requirements under Prevention of Significant Deterioration (PSD) regulations, new sources are required to address air quality impacts at PSD Class I areas. As part of the PSD analysis report submitted to the Florida Department of Environmental Protection (DEP), the air quality impacts due to the potential emissions of the Cargill Bartow facility are required to be addressed at the PSD Class I area of the Chassahowitzka National Wildlife Area (NWA). The Chassahowitzka NWA is located approximately 118 km north-northwest of Cargill Bartow and is the nearest Class I area to the project. The next closest PSD Class I area, the Everglades National Park is located approximately 237 km from the project.

The evaluation of air quality impacts are not only concerned with determining compliance with PSD Class I increments but also assessing a source's impact on Air Quality Related Values (AQRVs), such as regional haze. Further, compliance with PSD Class I increments can be evaluated by determining if the source's impacts are less than the proposed U.S. Environmental Protection Agency (EPA) Class I significant impact levels. The significant impact levels are threshold levels that are used to determine the type of air impact analyses needed for the project. If the new source's impacts are predicted to be less than significant, then the source's impacts are assumed not to have a significant adverse affect on air quality and additional modeling with other sources is not required. However, if the source's impacts are predicted to be greater than the significant impact levels, additional modeling with other sources is required to demonstrate compliance with Class I increments.

Currently there are several air quality modeling approaches recommended by the Interagency Workgroup on Air Quality Models (IWAQM) to perform these analyses. The IWAQM consists of EPA and Federal Land Managers (FLM) of Class I areas who are responsible for ensuring that AQRVs are not adversely impacted by new and existing sources. These recommendations have been summarized in two documents:

- *Interagency Workgroup on Air Quality Models (IWAQM) Phase 1 Report: Interim Recommendations for Modeling Long Range Transport and Impacts on Regional Visibility*

(EPA, 1993), referred to as the Phase 1 report; and

- *Interagency Workgroup on Air Quality Models (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* (EPA, 1998), referred to as the Phase 2 report.

The recommended modeling approaches from these documents are as follows:

- Phase 1 report: screening analysis (Level 1)
- Phase 2 report: screening analysis
- Phase 2 report: refined analysis

For the proposed phosphoric plant modification expansion, air quality analyses were performed that assess the Project's impacts in the PSD Class I area of the Chassahowitzka NWA using the refined approach from the Phase 2 report for:

- Significant impact analysis; and
- Regional haze analysis.

The refined analysis approach was used instead of the screening analysis approach since the air quality impacts are based on generally more realistic assumptions, include more detailed meteorological data, and are estimated at locations at the Class I area.

B.2 GENERAL AIR MODELING APPROACH

The general modeling approach was based on using the Industrial Source Complex Short-term model (ISCST3, Version 99155) and the long-range transport model, California Puff model (CALPUFF, Version 5.2). The ISCST3 model is applicable for estimating the air quality impacts in areas that are within 50 km from a source. At distances beyond 50 km, the ISCST3 model is considered to overpredict air quality impacts because it is a steady-state model. At those distances, the CALPUFF model is recommended for use. Recently, the FLM have requested that air quality impacts, such as for regional haze, for a source located more than 50 km from a Class I area be predicted using the CALPUFF model. The Florida DEP has also recommended that the CALPUFF model be used to assess if the source has a significant impact at a Class I area located beyond 50 km from the source. As a result, a significant impact and regional haze analyses were performed using the CALPUFF model to assess the Project's impacts at the Chassahowitzka NWA.

The methods and assumptions used in the CALPUFF model were based on the latest recommendations for a screening analysis as presented in the *Interagency Workgroup on Air Quality Models (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* (EPA, 1998).

Based on discussions with DEP, the ISCST3 model can be used to determine the "worst-case" operating load and ambient temperature that produces a source's maximum impact at a Class I area. Based on that analysis, air quality impacts can then be predicted with the CALPUFF model using the "worst-case" operating scenario to compare the source's impacts to Class I significant impact levels and potential contribution to regional haze. For this Project, the ISCST3 model was used to determine the "worst-case" operating scenario that was then considered in the CALPUFF model. The methods and assumptions used in the ISCST3 were based on those presented in Section 6.0 of the PSD report.

A regional haze analysis was performed to determine the affect that the Project's emissions will have on background regional haze levels at the Chassahowitzka NWA. In the regional haze analysis, the change in visual range, as calculated by a deciview change, was estimated for the Project in accordance with the IWAQM recommendations. Based on those recommendations, the CALPUFF model is used to predict the maximum 24-hour average sulfate (SO_4), nitrate (NO_3), and fine particulate (PM_{10}) concentrations as well as ammonium sulfate ($(NH_4)_2SO_4$) and ammonium nitrate (NH_4NO_3) concentrations. The change in visibility due to a source, estimated as a percentage, is then calculated based on the change from background data .

The following sections present the methods and assumptions used to assess the refined significant impact and regional haze analyses performed for the Cargill Bartow Project. The results of these analyses are presented in Sections 6.0 and 7.0 of the PSD report.

B.3 MODEL SELECTION AND SETTINGS

The California Puff (CALPUFF, version 5.0) air modeling system was used to model to assess the project's impacts at the PSD Class I area for comparison to the PSD Class I significant impact levels and to the regional haze visibility criteria. CALPUFF is a non-steady state Lagrangian Gaussian puff long-range transport model that includes algorithms for building downwash effects as well as chemical transformations (important for visibility controlling pollutants), and wet/dry deposition. The CALPUFF meteorological and geophysical data preprocessor (CALMET, Version 5), a preprocessor to CALPUFF, is a diagnostic meteorological model that produces a three-dimensional field of wind and temperature and a two-dimensional field of other meteorological parameters. CALMET was designed to process raw meteorological, terrain and land-use databases to be used in the air modeling analysis. The CALPUFF modeling system uses a number of FORTRAN preprocessor programs that extract data from large databases and converts the data into formats suitable for input to CALMET. The processed data produced from CALMET was input to CALPUFF to assess the pollutant specific impact. Both CALMET and CALPUFF were used in a manner that is recommended by the IWAQM Phase 2 Report (EPA, 1998).

B.3.1 CALPUFF MODEL APPROACHES AND SETTINGS

The IWAQM has recommended approaches for performing a Phase 2 refined modeling analyses that are presented in Table B-1. These approaches involve use of meteorological data, selection of receptors and dispersion conditions, and processing of model output.

The specific settings used in the CALPUFF model are presented in Table B-2.

B.3.2 EMISSION INVENTORY AND BUILDING WAKE EFFECTS

The CALPUFF model included the Project's emission, stack, and operating data as well as building dimensions to account for the effects of building-induced downwash on the emission sources. Dimensions for all significant building structures were processed with the Building Profile Input Program (BPIP), Version 95086, and were included in the CALPUFF model input. The PSD Analysis Report presents a listing of the Project's emissions and structures included in the analysis.

B.4 RECEPTOR LOCATIONS

For the refined analyses, pollutant concentrations were predicted in an array of 13 discrete receptors located at the CNWR area. These receptors are the same as those used in the PSD Class I analysis performed for the PSD Analysis Report.

B.5 METEOROLOGICAL DATA

B.5.1 REFINED ANALYSIS

CALMET was used to develop the gridded parameter fields required for the refined modeling analyses. The follow sections discuss the specific data used and processed in the CALMET model.

B.5.2 CALMET SETTINGS

The CALMET settings contained in Table B-3 were used for the refined modeling analysis. With the exception of hourly precipitation data files, all input data files needed for CALMET were developed by the FDEP staff.

B.5.3 MODELING DOMAIN

A rectangular modeling domain extending 250 km in the east-west (x) direction and 280 km in the north-south (y) direction was used for the refined modeling analysis. The extent of the modeling domain was selected by the Florida DEP staff for predicting impacts at the Chassahowitzka NWA. The southwest corner of the domain is the origin and is located at 27 degrees north latitude and 83.5 degrees west longitude. This location is in the Gulf of Mexico approximately 110 km west of Venice, Florida. For the processing of meteorological and geophysical data, the domain contains 25 grid cells in the x-direction and 28 grid cells in the y-direction. The domain grid resolution is 10-km. The air modeling analysis was performed in the UTM coordinate system.

B.5.4 MESOSCALE MODEL – GENERATION 4 (MM4) DATA

Pennsylvania State University in conjunction with the NCAR Assessment Laboratory developed the MM4 data set, a prognostic wind field or "guess" field, for the United States. The hourly meteorological variables used to create this data set (wind, temperature, dew point depression, and geopotential height for eight standard levels and up to 15 significant levels) are extensive and only allow for one data base set for the year 1990. The analysis used the MM4 data to initialize the CALMET wind field. The MM4 data have a horizontal spacing of 80 km and are used to simulate atmospheric variables within the modeling domain.

The MM4 subset domain was provided by FDEP and consisted of a 6 x 6- cell rectangle, with 80 km grid resolution, extending from the MM4 grid points (49,10) to (54, 15). These data were processed to create a MM4.DAT file, for input to the CALMET model.

The MM4 data set used in the CALMET, although advanced, lacks the fine detail of specific temporal and spatial meteorological variables and geophysical data. These variables were processed into the appropriate format and introduced into the CALMET model through the additional data files obtained from the following sources.

B.5.5 SURFACE DATA STATIONS AND PROCESSING

The surface station data processed for the CALPUFF analyses consisted of data from five NWS stations or Federal Aviation Administration (FAA) Flight Service stations for Gainesville, Tampa, Daytona Beach, Vero Beach, Fort Myers and Orlando. A summary of the surface station information and locations are presented in Table B-4. The surface station parameters include wind speed, wind direction, cloud ceiling height, opaque cloud cover, dry bulb temperature, relative humidity, station pressure, and a precipitation code that is based on current weather conditions. The surface station data were processed by FDEP into a SURF.DAT file format for CALMET input.

Because the modeling domain extends largely over water, C-Man station data from Venice was obtained. These data were processed by Florida DEP into an over-water surface station format (i.e., SEA*.DAT) for input to CALMET. The over-water station data include wind direction, wind speed and air temperature.

B.5.6 UPPER AIR DATA STATIONS AND PROCESSING

The analysis included three upper air NWS stations located in Ruskin, Apalachicola, and West Palm Beach. Data for each station were obtained from the Florida DEP in a format for CALMET input.

The data and locations for the upper air stations are presented in Table B-4.

B.5.7 PRECIPITATION DATA STATIONS AND PROCESSING

Precipitation data were processed from a network of hourly precipitation data files collected from primary and secondary NWS precipitation-recording stations located within the latitude and longitudinal limits of the modeling domain. Data for 14 stations were obtained in NCDC TD-3240 variable format and converted into a fixed-length format. The utility programs PXTRACT and PMERGE were then used to process the data into the format for the PRECIP.DAT file that is used by CALMET. A listing of the precipitation stations used for the modeling analysis is presented in Table B-5.

B.5.8 GEOPHYSICAL DATA PROCESSING

The land-use and terrain information data were developed by the FDEP for the modeling domain and were provided in a GEO.DAT file format for input to CALMET. Terrain elevations for each grid cell of the modeling domain were obtained from Digital Elevation Model (DEM) files obtained from US Geographical Survey (USGS). The DEM data was extracted for the modeling domain grid using the utility extraction program LCELEV. Land-use data were obtained from the USGS GIS.DAT which is based on the ARM3 data. The resolution of the GIS.DAT file is one-eighth of a degree in the east-west direction and one-twelfth of a degree in the north-south direction. Land-use values for the domain grid were obtained with the utility program CAL-LAND. Other parameters processed for the modeling domain by CAL-LAND include surface roughness, surface Albedo, Bowen ratio, soil heat flux, and leaf index field. The land-use parameter values were based on annual averaged values.

Table B-1. IWAQM Phase 2 Refined Modeling Analyses Recommendations [a]

Model Input/Output	Description
Meteorology	Use CALMET (minimum 6 to 10 layers in the vertical; top layer must extend above the maximum mixing depth expected); horizontal domain extends 50 to 80 km beyond outer receptors and sources being modeled; terrain elevation and land-use data is resolved for the situation.
Receptors	Within Class I area(s) of concern; obtain regulatory concurrence on coverage.
Dispersion	1. CALPUFF with default dispersion settings. 2. Use MESOPUFF II chemistry with wet and dry deposition. 3. Define background values for ozone and ammonia for area.
Processing	1. For PSD increments: Use highest, second highest 3-hour and 24-hour average SO_2 concentrations; highest, second highest 24-hour average PM_{10} concentrations; and highest annual average SO_2, PM_{10} and NO_2 concentrations. 2. For haze: process the 24-hour average SO_4, NO_3 and HNO_3 values; compute a 24-hour average relative humidity factor (f(RH)) for the day during which the highest concentration was predicted for each species; calculate extinction coefficients for each species; and compute percent change in extinction using the FLM supplied background extinction.

[a] *IWAQM Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* (EPA, 1998)

Table B-2. CALPUFF Model Settings

Parameter	Setting
Pollutant Species	SO_2, SO_4, NO_x, HNO_3, and NO_3, and PM_{10}
Chemical Transformation	MESOPUFF II scheme
Deposition	Include both dry and wet deposition, plume depletion
Meteorological/Land Use Input	PCRAMMET (enhanced) for the screening analysis; CALMET for the refined analysis
Plume Rise	Transitional, Stack-tip downwash, Partial plume penetration
Dispersion	Puff plume element, PG /MP coefficients, rural mode, ISC building downwash scheme
Terrain Effects	Partial plume path adjustment
Output	Create binary concentration file including output species for SO_4, NO_3 and PM_{10}
Model Processing	Highest predicted 24-hour SO_4, NO_3 and PM_{10} concentrations for year
Background Values [a]	Ozone: 80 ppb; Ammonia: 10 ppb

[a] Recommended values by the Florida DEP.

Table B-3. CALMET Settings

Parameter	Setting
Horizontal Grid Dimensions	250 by 280 km, 10 km grid resolution
Vertical Grid	9 layers
Weather Station Data Inputs	6 surface, 3 upper air, 14 precipitation stations
Wind model options	Diagnostic wind model, no kinematic effects
Prognostic wind field model	MM4 data, 80 km resolution, 6 x 6 grid, used for wind field initialization
Output	Binary hourly gridded meteorological data file for CALPUFF input

Table B-4. Surface and Upper Air Stations Used in the CALPUFF Analysis

Station Name	Station Symbol	WBAN Number	UTM Coordinates Easting (km)	Northin g (km)	Zone	Anemometer Height (m)
Surface Stations						
Tampa	TPA	12842	349.20	3094.25	17	6.7
Daytona Beach	DAB	12834	495.14	3228.05	17	9.1
Orlando	ORL	12815	468.96	3146.88	17	10.1
Gainesville	GNV	12816	377.40	3284.12	17	6.7
Vero Beach	VER	12843	557.52	3058.36	17	6.7
Fort Myers	FMY	12835	413.65	2940.38	17	6.1
Upper Air Stations						
Ruskin	TBW	12842	349.20	3094.28	17	NA
West Palm Beach	PBI	12844	587.87	2951.42	17	NA
Apalachicola	AQQ	12832	110.00[a]	3296.00	16	NA

[a] Equivalent coordinate for Zone 17; Zone 16 coordinate is 690.22 km.

Table B-5. Hourly Precipitation Stations Used in the CALPUFF Analysis

Station Name (Florida)	Station Number	UTM Coordinates Easting (km)	Northing (km)	Zone
Brooksville 7 SSW	81048	358.03	3149.55	17
Daytona Beach WSO AP	82158	495.14	3228.09	17
Deland 1 SSE	82229	470.78	3209.66	17
Inglis 3 E	84273	342.63	3211.65	17
Lakeland	84797	409.87	3099.18	17
Lisbon	85076	423.59	3193.26	17
Lynne	85237	409.26	3230.30	17
Orlando WSO McCoy	86628	468.99	3146.88	17
Parrish	86880	366.99	3054.39	17
Saint Leo	87851	376.48	3135.09	17
St. Petersburg	87886	339.04	3072.21	17
Tampa WSCMO AP	88788	349.17	3094.25	17
Venice	89176	357.59	2998.18	17
Venus	89184	466.756	2996.09	17