PSD APPLICATION FOR
ANIMAL FEED INGREDIENT PLANT
CARGILL FERTILIZER, INC.
RIVERVIEW, FLORIDA

Prepared For:

Cargill Fertilizer, Inc.
8813 Highway 41 South
Riverview, FL 33569

Prepared By:

KBN Engineering and Applied Sciences, Inc.
6241 NW 23rd Street, Suite 500
Gainesville, Florida 32653-1500

July 1996
9651074Y/F1

PART A

APPLICATION FOR AIR PERMIT - LONG FORM

Department of
Environmental Protection

DIVISION OF AIR RESOURCES MANAGEMENT

APPLICATION FOR AIR PERMIT - LONG FORM

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

I. APPLICATION INFORMATION

This section of the Application for Air Permit form identifies the facility and provides general information on the scope and purpose of this application. This section also includes information on the owner or authorized representative of the facility (or the responsible official in the case of a Title V source) and the necessary statements for the applicant and professional engineer, where required, to sign and date for formal submittal of the Application for Air Permit to the Department. If the application form is submitted to the Department using ELSA, this section of the Application for Air Permit must also be submitted in hard-copy.

Identification of Facility Addressed in This Application

Enter the name of the corporation, business, governmental entity, or individual that has ownership or control of the facility; the facility site name, if any; and the facility's physical location. If known, also enter the facility identification number.

1. Facility Owner/Company Name: Cargill Fertilizer, Inc.	
2. Site Name: Tampa Plant	
3. Facility Identification Number: 0570008	[ ] Unknown
4. Facility Location Information: Street Address or Other Locator: 8133 U.S. Highway 41 South City: Riverview County: Hillsborough Zip Code: 33569	
5. Relocatable Facility? [ ] Yes [x] No	6. Existing Permitted Facility? [x] Yes [ ] No

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	July 17, 1996
2. Permit Number:	0570008-013-AC
3. PSD Number (if applicable):	PSD-FL-234
4. Siting Number (if applicable):	

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official:

   Melody Russo, Environmental Superintendent

2. Owner/Authorized Representative or Responsible Official Mailing Address:

Organization/Firm: **Cargill Fertilizer, Inc.**
Street Address: **8813 Highway 41 South**
City: **Riverview** State: **FL** Zip Code: **33569**

3. Owner/Authorized Representative or Responsible Official Telephone Numbers:

Telephone: **(813) 677-9111** Fax: **(813) 671-6149**

4. Owner/Authorized Representative or Responsible Official Statement:

I, the undersigned, am the owner or authorized representative of the non-Title V source addressed in this Application for Air Permit or the responsible official, as defined in Rule 62-210.200, F.A.C., 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.*

Melody Russo 7/11/96

Signature Date

* Attach letter of authorization if not currently on file.

Scope of Application

This Application for Air Permit addresses the following emissions unit(s) at the facility. An Emissions Unit Information Section (a Section III of the form) must be included for each emissions unit listed.

Emissions Unit ID		Description of Emissions Unit	Permit Type
Unit #	Unit ID		
1R	*	Animal Feed Plant	AC1A

See individual Emissions Unit (EU) sections for more detailed descriptions.
Multiple EU IDs indicated with an asterisk (*). Regulated EU indicated with an "R".

Purpose of Application and Category

Check one (except as otherwise indicated):

Category I: All Air Operation Permit Applications Subject to Processing Under Chapter 62-213, F.A.C.

This Application for Air Permit is submitted to obtain:

[ ] Initial air operation permit under Chapter 62-213, F.A.C., for an existing facility which is classified as a Title V source.

[ ] Initial air operation permit under Chapter 62-213, F.A.C., 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: ______________________________

[ ] Air operation permit renewal under Chapter 62-213, F.A.C., for a Title V source.

Operation permit to be renewed: ______________________________

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

Current construction permit number: ______________________________

Operation permit to be renewed: ______________________________

[ ] Air operation permit revision or administrative correction for a Title V source to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application. Also check Category III.

Operation permit to be revised/corrected: ______________________________

____

[ ] Air operation permit revision for a Title V source 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 to be revised: ______________________________

Reason for revision: ______________________________

____

Category II: All Air Construction Permit Applications Subject to Processing Under Rule 62-210.300(2)(b),F.A.C.

This Application for Air Permit is submitted to obtain:

[ ] Initial air operation permit under Rule 62-210.300(2)(b), F.A.C., for an existing facility seeking classification as a synthetic non-Title V source.

Current operation/construction permit number(s): ______________________

[ ] Renewal air operation permit under Rule 62-210.300(2)(b), F.A.C., for a synthetic non-Title V source.

Operation permit to be renewed: ______________________

[ ] Air operation permit revision for a synthetic non-Title V source. Give reason for revision; e.g.; to address one or more newly constructed or modified emissions units.

Operation permit to be revised: ______________________

Reason for revision: ______________________

Category III: All Air Construction Permit Applications for All Facilities and Emissions Units.

This Application for Air Permit is submitted to obtain:

[x] Air construction permit to construct or modify one or more emissions units within a facility (including any facility classified as a Title V source).

Current operation permit number(s), if any: ______________________

0570008-002-AC

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

Current operation permit number(s): ______________________

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

Application Processing Fee

Check one:

[x] Attached - Amount: $ $ 7,500.00 [ ] Not Applicable.

Construction/Modification Information

1. Description of Proposed Project or Alterations:
2. Projected or Actual Date of Commencement of Construction : 1 Sep 1996
3. Projected Date of Completion of Construction : 30 Sep 2000

Professional Engineer Certification

1. Professional Engineer Name: David A. Buff Registration Number: 19011
2. Professional Engineer Mailing Address: Organization/Firm: KBN Eng and Applied Sciences, 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's 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.

David A. Buff — July 16,1996

Signature (seal) — Date

* Attach any exception to certification statement.

Application Contact

1. Name and Title of Application Contact: Kathy Edgemon, Environmental Engineer
2. Application Contact Mailing Address: Organization/Firm: Cargill Fertilizer, Inc. Street Address: 8813 Highway 41 South City: Riverview State: FL Zip Code: 33569
3. Application Contact Telephone Numbers: Telephone: (813) 671-6369 Fax: (813) 671-6149

Application Comment

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates: Zone: 17 East (km): 362.9 North (km): 3082.5			
2. Facility Latitude/Longitude: Latitude (DD/MM/SS): 27 / 51 / 28 Longitude: (DD/MM/SS): 82 / 23 / 15			
3. Governmental Facility Code: 0	4. Facility Status Code: A	5. Facility Major Group SIC Code: 28	6. Facility SIC(s): 2874
7. Facility Comment (limit to 500 characters):			

Facility Contact

1. Name and Title of Facility Contact: Melody Russo, Environmental Superintendent
2 Facility Contact Mailing Address: Organization/Firm. Cargill Fertilizer, Inc. Street Address 8813 U.S. Highway 41 South City Riverview State: FL Zip Code: 33569
3 Facility Contact Telephone Numbers: Telephone (813) 677-6297 Fax: (813) 671-6149

Facility Regulatory Classifications

1. Small Business Stationary Source? [ ] Yes	[x] No	[ ] Unknown
2. Title V Source? [x] Yes	[ ] No	
3. Synthetic Non-Title V Source? [ ] Yes,	[x] No	
4. Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)? [x] Yes	[ ] No	
5. Synthetic Minor Source of Pollutants Other than HAPs? [ ] Yes	[x] No	
6. Major Source of Hazardous Air Pollutants (HAPs)? [x] Yes	[ ] No	
7. Synthetic Minor Source of HAPs? [ ] Yes	[x] No	
8. One or More Emissions Units Subject to NSPS? [x] Yes	[ ] No	
9. One or More Emissions Units Subject to NESHAP? [x] Yes	[ ] No	
10. Title V Source by EPA Designation? [ ] Yes	[x] No	
11. Facility Regulatory Classifications Comment (limit to 200 characters):		

B. FACILITY REGULATIONS

Rule Applicability Analysis (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

Not Applicable

List of Applicable Regulations (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

62-212.400 - PSD Preconstruction Review

C. FACILITY POLLUTANTS

Facility Pollutant Information

1. Pollutant Emitted		2. Pollutant Classification
PM	Particulate Matter - Total	A
PM10	Particulate Matter - PM10	A
FL	Fluorides - Total	A
SO2	Sulfur Dioxide	A
NOx	Nitrogen Oxides	A
H107	Hydrogen fluoride	A

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Detail Information:

1. Pollutant Emitted:		
2. Requested Emissions Cap:	(lb/hr)	(tons/yr)
3. Basis for Emissions Cap Code:		
4. Facility Pollutant Comment (limit to 400 characters):		

Facility Pollutant Detail Information:

1. Pollutant Emitted:		
2. Requested Emissions Cap:	(lb/hr)	(tons/yr)
3. Basis for Emissions Cap Code:		
4. Facility Pollutant Comment (limit to 400 characters):		

E. FACILITY SUPPLEMENTAL INFORMATION

Supplemental Requirements for All Applications

1. Area Map Showing Facility Location:
   [x] Attached, Document ID: **See Part B**
   [ ] Not Applicable [ ] Waiver Requested

2. Facility Plot Plan:
   [x] Attached, Document ID: **See Part B**
   [ ] Not Applicable [ ] Waiver Requested

3. Process Flow Diagram(s):
   [x] Attached, Document ID(s): **See Part B**
   [ ] Not Applicable [ ] Waiver Requested

4. Precautions to Prevent Emissions of Unconfined Particulate Matter:
   [x] Attached, Document ID: **See Part B**
   [ ] Not Applicable [ ] Waiver Requested

5. Fugitive Emissions Identification:
   [ ] Attached, Document ID: ____________
   [x] Not Applicable [ ] Waiver Requested

6. Supplemental Information for Construction Permit Application:
   [x] Attached, Document ID: **See Part B**
   [ ] Not Applicable

Additional Supplemental Requirements for Category I Applications Only

7. List of Proposed Exempt Activities:
   [ ] Attached, Document ID: ____________
   [x] Not Applicable

8. List of Equipment/Activities Regulated under Title VI:
   [ ] Attached, Document ID: ____________
   [ ] Equipment/Activities On site but Not Required to be Individually Listed
   [x] Not Applicable

9. Alternative Methods of Operation:
   [ ] Attached, Document ID: ____________
   [x] Not Applicable

10. Alternative Modes of Operation (Emissions Trading):
    [ ] Attached, Document ID: ____________
    [x] Not Applicable

11. Identification of Additional Applicable Requirements: [ ] Attached, Document ID: ____________ [x] Not Applicable
12. Compliance Assurance Monitoring Plan: [ ] Attached, Document ID: ____________ [x] Not Applicable
13. Risk Management Plan Verification: [ ] Plan Submitted to Implementing Agency - Verification Attached Document ID: ____________ [ ] Plan to be Submitted to Implementing Agency by Required Date [x] Not Applicable
14. Compliance Report and Plan [ ] Attached, Document ID: ____________ [x] Not Applicable
15. Compliance Statement (Hard-copy Required) [ ] Attached, Document ID: ____________ [x] Not Applicable

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through L 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. Some of the subsections comprising the Emissions Unit Information Section of the form are intended for regulated emissions units only. Others are intended for both regulated and unregulated emissions units. Each subsection is appropriately marked.

A. TYPE OF EMISSIONS UNIT
(Regulated and Unregulated Emissions Units)

Type of Emissions Unit Addressed in This Section

1. 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.

2. Single Process, Group of Processes, or Fugitive Only? 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.

B. GENERAL EMISSIONS UNIT INFORMATION
(Regulated and Unregulated Emissions Units)

Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section (limit to 60 characters): **Animal Feed Plant**		
2. Emissions Unit Identification Number: [ ] No Corresponding ID [ ] Unknown *		
3. Emissions Unit Status Code: **A**	4. Acid Rain Unit? [ ] Yes [x] No	5. Emissions Unit Major Group SIC Code: **28**
6. Emissions Unit Comment (limit to 500 characters): *** 78, 79, 80, 81, 82, 83.**		

Emissions Unit Control Equipment Information

A.

1. Description (limit to 200 characters): **Baghouses (5)**
2. Control Device or Method Code: **18**

B.

1. Description (limit to 200 characters): **Cyclones (4) (cyclones reclaim product and are not for pollution control purposes)**
2. Control Device or Method Code: **75**

C.

1. Description (limit to 200 characters): **Defluorination Scrubbers (2)**
2. Control Device or Method Code: **53**

C. EMISSIONS UNIT DETAIL INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Details

1. Initial Startup Date:	
2. Long-term Reserve Shutdown Date:	
3. Package Unit: Manufacturer:	Model Number:
4. Generator Nameplate Rating:	MW
5. Incinerator Information: Dwell Temperature: Dwell Time: Incinerator Afterburner Temperature:	 °F seconds °F

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate:	93	mmBtu/hr
2. Maximum Incineration Rate:	lbs/hr	tons/day
3. Maximum Process or Throughput Rate:	500,000	lb PFS/hr
4. Maximum Production Rate:	96,700	lb/hr
5. Operating Capacity Comment (limit to 200 characters): Represents total rates for AFI Plant #1 and AFI Plant #2. PFS = Phosphatic Fertilizer Solution. Other inputs include: Diatomaceous earth and limestone.		

Emissions Unit Operating Schedule

1. Requested Maximum Operating Schedule:

24 hours/day	7 days/week
52 weeks/yr	8,760 hours/yr

D. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

Rule Applicability Analysis (Required for Category II Applications and Category III applications involving non Title-V sources. See Instructions.)

List of Applicable Regulations (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

62-212.400 PSD Preconstruction Review
62-296.403(1)(i) Phosphate Processing-BACT for Fluorides
62-296.403(3) Test Methods
62-296.700(3) Phosphate Processing-RACT for PM
62-296.700(4) Phosphate Processing-RACT for PM
62-296.700(5) Phosphate Processing-RACT for PM
62-296.700(6) Phosphate Processing-RACT for PM
62-296.705(2)(a) Phosphate Processing-RACT for PM
62-296.705(3) Test Methods
62-296.711 Materials handling-RACT for PM
62-297.310 General Compliance Test Requirements

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

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: 11	
2. Emission Point Type Code: [ ] 1 [ ] 2 [x] 3 [ ] 4	
3. Descriptions of Emissions 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: [ ] D [ ] F [ ] H [ ] P [ ] R [x] V [ ] W	
6. Stack Height:	136 feet
7. Exit Diameter:	6 feet
8 Exit Temperature:	150 °F

9. Actual Volumetric Flow Rate:	**95,000** acfm
10. Percent 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): **Parameters are for the common stack for each AFI plant. See Part B for parameters for other sources.**	

F. SEGMENT (PROCESS/FUEL) INFORMATION
(Regulated and Unregulated Emissions Units)

Segment Description and Rate: Segment 1 of 3

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **In-Process Fuel Use, Natural Gas: General**	
2. Source Classification Code (SCC): **3-90-005-98**	
3. SCC Units: **Million Cubic Feet Burned**	
4. Maximum Hourly Rate: **0.093**	5. Maximum Annual Rate: **812**
6. Estimated Annual Activity Factor:	
7. Maximum Percent Sulfur:	8. Maximum Percent Ash:
9. Million Btu per SCC Unit: **1,000**	
10. Segment Comment (limit to 200 characters): **Segment represents two dryers each rated at 46.35 MMBtu/hr.**	

Segment Description and Rate: Segment 2 of 3

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **In-Process Fuel Use, Distillate Oil: General**	
2. Source Classification Code (SCC): **3-90-005-98**	
3. SCC Units: **Thousand Gallons Burned**	
4. Maximum Hourly Rate: **0.66**	5. Maximum Annual Rate: **265**
6. Estimated Annual Activity Factor:	
7. Maximum Percent Sulfur: **0.5**	8. Maximum Percent Ash:
9. Million Btu per SCC Unit: **140**	
10. Segment Comment (limit to 200 characters): **Segment represents two dryers each rated at 46.35 MMBtu/hr. Limited to 264,857 gal/yr of fuel oil burning.**	

F. SEGMENT (PROCESS/FUEL) INFORMATION
(Regulated and Unregulated Emissions Units)

Segment Description and Rate: Segment 3 of 3

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Mineral Products, Phosphate Rock**	
2. Source Classification Code (SCC): **3-05-019-99**	
3. SCC Units: **Tons Processed**	
4. Maximum Hourly Rate: **40**	5. Maximum Annual Rate: **300,000**
6. Estimated Annual Activity Factor:	
7. Maximum Percent Sulfur:	8. Maximum Percent Ash:
9. Million Btu per SCC Unit:	
10. Segment Comment (limit to 200 characters): **Represents granular animal feed phosphate product for both AFI Plant #1 and AFI Plant #2.**	

Segment Description and Rate: Segment _____ of _____

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (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 Percent Sulfur:	8. Maximum Percent Ash:
9. Million Btu per SCC Unit:	
10. Segment Comment (limit to 200 characters):	

G. EMISSIONS UNIT POLLUTANTS
(Regulated and Unregulated Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
SO2			EL
PM	018	075	EL
PM10	018	075	EL
FL	053		EL
NOx			NS
CO			NS

Emissions Unit Information Section 1 of 1

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: SO2

2. Total Percent Efficiency of Control: %

3. Potential Emissions: 47 lb/hour 9.4 tons/year

4. Synthetically Limited? [x] Yes [ ] No

5. Range of Estimated Fugitive/Other Emissions:

   [ ] 1 [ ] 2 [ ] 3 ________ to ________ tons/yr

6. Emission Factor: 71.5 lb/1,000 gal

   Reference: AP-42

7. Emissions Method Code:

   [x] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

8. Calculation of Emissions (limit to 600 characters):

   See Part B. Fuel oil burning limited to 264,857 gal/yr.

9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):

Emissions Unit Information Section 1 of 1

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: OTHER	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: 0.5 % S fuel oil	
4. Equivalent Allowable Emissions: 47 lb/hour	9.4 tons/year
5. Method of Compliance (limit to 60 characters): Fuel analysis and fuel usage records	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): Based on permit 0570008-002-AC	

B.

1. Basis for Allowable Emissions Code:	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units:	
4. Equivalent Allowable Emissions: lb/hour	tons/year
5. Method of Compliance (limit to 60 characters):	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: **PM**

2. Total Percent Efficiency of Control: %

3. Potential Emissions: **14.4** lb/hour **57.4** tons/year

4. Synthetically Limited? [ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions:

   [ ] 1 [ ] 2 [ ] 3 ________ to ________ tons/yr

6. Emission Factor:

   Reference: **See Part B**

7. Emissions Method Code:

   [X] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

8. Calculation of Emissions (limit to 600 characters):

   See Part B

9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units:	
4. Equivalent Allowable Emissions: **12** lb/hour	**52.6** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 5**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Limit for total of both common plant stacks (6.0 lb/hr each). Proposed BACT limit.**	

B.

1. Basis for Allowable Emissions Code:	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units:	
4. Equivalent Allowable Emissions: lb/hour	tons/year
5. Method of Compliance (limit to 60 characters):	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: **PM10**
2. Total Percent Efficiency of Control: %
3. Potential Emissions: **14.4** lb/hour **57.4** tons/year
4. Synthetically Limited? [ ] Yes [**X**] No
5. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3 ________ to ________ tons/yr
6. Emission Factor: Reference: **See Part B**
7. Emissions Method Code: [x] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5
8. Calculation of Emissions (limit to 600 characters): **See Part B**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):

Emissions Unit Information Section 1 of 1

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units:	
4. Equivalent Allowable Emissions: **12** lb/hour	**52.6** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 5**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Limit for total of both common plant stacks (6.0 lb/hr each). Proposed BACT limit.**	

B.

1. Basis for Allowable Emissions Code:	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units:	
4. Equivalent Allowable Emissions: lb/hour	tons/year
5. Method of Compliance (limit to 60 characters):	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: FL
2. Total Percent Efficiency of Control: %
3. Potential Emissions: 1.05 lb/hour 3.26 tons/year
4. Synthetically Limited? [x] Yes [ ] No
5. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3 ________ to ________ tons/yr
6. Emission Factor: 0.04 lb/ton P2O5 Reference: BACT
7. Emissions Method Code: [x] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5
8. Calculation of Emissions (limit to 600 characters): **223.6 tons P2O5/batch x 2 batches/day x 0.04 lb/ton ÷ 17 hr/batch = 1.05 lb/hr; 1.05 lb/hr x 17 hr/day x 365 days/yr x 1 ton/2,000 lb = 3.26 TPY**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: OTHER		
2. Future Effective Date of Allowable Emissions:		
3. Requested Allowable Emissions and Units: 0.04 lb/ton P2O5		
4. Equivalent Allowable Emissions:	1.05 lb/hour	3.26 tons/year
5. Method of Compliance (limit to 60 characters): EPA Method 13A or 13B		
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): BACT determination. Limit represents total for both common plant stacks (0.53 lb/hr each).		

B.

1. Basis for Allowable Emissions Code:		
2. Future Effective Date of Allowable Emissions:		
3. Requested Allowable Emissions and Units:		
4. Equivalent Allowable Emissions:	lb/hour	tons/year
5 Method of Compliance (limit to 60 characters):		
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):		

I. VISIBLE EMISSIONS INFORMATION
(Regulated Emissions Units Only)

Visible Emissions Limitations: Visible Emissions Limitation 1 of 2

1.	Visible Emissions Subtype: **VE20**
2.	Basis for Allowable Opacity: [x] Rule [ ] Other
3.	Requested Allowable Opacity Normal Conditions: **20** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour
4.	Method of Compliance: **EPA Method 9.**
5.	Visible Emissions Comment (limit to 200 characters): **Rule 62-296.705(2)(a), for common stack.**

Visible Emissions Limitations: Visible Emissions Limitation 2 of 2

1.	Visible Emissions Subtype: **VE5**
2.	Basis for Allowable Opacity: [ ] Rule [X] Other
3.	Requested Allowable Opacity Normal Conditions: **5** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour
4.	Method of Compliance: **EPA Method 9**
5.	Visible Emissions Comment (limit to 200 characters): **Permit condition, for all PM sources except common stack. Limit accepted in lieu of PM stack test per Rule 62-297.620.**

J. CONTINUOUS MONITOR INFORMATION
(Regulated Emissions Units Only)

Continuous Monitoring System Continuous Monitor _____ of _____

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

Continuous Monitoring System Continuous Monitor _____ of _____

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

K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION
(Regulated and Unregulated Emissions Units)

PSD Increment Consumption Determination

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

   If the emissions unit addressed in this section emits particulate matter or sulfur dioxide, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for particulate matter or sulfur dioxide. Check the first statement, if any, that applies and skip remaining statements.

   [x] The emissions unit is undergoing PSD review as part of this application, or has undergone PSD review previously, for particulate matter or sulfur dioxide. If so, emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after January 6, 1975. If so, baseline emissions are zero, and the emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source and the emissions unit began initial operation after January 6, 1975, but before December 27, 1977. If so, baseline emissions are zero, and the emissions unit consumes increment.

   [ ] For any facility, the emissions unit began (or will begin) initial operation after December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

2. Increment Consuming for Nitrogen Dioxide?

If the emissions unit addressed in this section emits nitrogen oxides, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for nitrogen dioxide. Check first statement, if any, that applies and skip remaining statements.

[x] The emissions unit addressed in this section is undergoing PSD review as part of this application, or has undergone PSD review previously, for nitrogen dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after February 8, 1988. If so, baseline emissions are zero, and the source consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source and the emissions unit began initial operation after February 8, 1988, but before March 28, 1988. If so, baseline emissions are zero, and the source consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after March 28, 1988. If so, baseline emissions are zero, and the emissions unit consumes increment.

[ ] None of the above apply. If so, baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

3.	Increment Consuming/Expanding Code:			
	PM	[x] C	[ ] E	[ ] Unknown
	SO_2	[x] C	[ ] E	[ ] Unknown
	NO_2	[x] C	[ ] E	[ ] Unknown
4	Baseline Emissions:			
	PM	lb/hour	0	tons/year
	SO_2	lb/hour	0	tons/year
	NO_2		0	tons/year
5	PSD Comment (limit to 200 characters):			

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

Supplemental Requirements for All Applications

1.	Process Flow Diagram [x] Attached, Document ID: See Part B [ ] Not Applicable		[ ] Waiver Requested
2.	Fuel Analysis or Specification [x] Attached, Document ID: See Part B [ ] 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
7.	Operation and Maintenance Plan [ ] Attached, Document ID: ______		[x] Not Applicable
8.	Supplemental Information for Construction Permit Application [x] Attached, Document ID: See Part B		[ ] Not Applicable
9	Other Information Required by Rule or Statute [x] Attached, Document ID: See Part B		[ ] Not Applicable

Additional Supplemental Requirements for Category I Applications Only

10. Alternative Methods of Operation

    [ ] Attached, Document ID: ____________ [x] Not Applicable

11. Alternative Modes of Operation (Emissions Trading)

    [ ] Attached, Document ID: ____________ [x] Not Applicable

12. Identification of Additional Applicable Requirements

    [ ] Attached, Document ID: ____________ [x] Not Applicable

13. Compliance Assurance Monitoring Plan

    [ ] Attached, Document ID: ____________ [x] Not Applicable

14. Acid Rain Permit 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: ____________

    [x] Not Applicable

PART B

PSD REPORT

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1.0 INTRODUCTION

Cargill Fertilizer, Inc., is constructing an animal feed ingredient (AFI) plant at its existing fertilizer manufacturing facility in Riverview, Florida (see Figure 1-1). The plant was originally permitted under air construction permit AC29-242897, issued June 16, 1994. This permit was amended on January 12, 1996, with the issuance of air construction permit 05700008-002-AC. The purpose of this amendment was to update the design data for the plant.

The AFI plant is located in an area to the northeast of the existing granular triple superphosphate (GTSP) production plant (see Figure 1-2). The AFI plant is currently permitted to produce a total of 150,000 tons per year (TPY) of granular animal feed ingredient. The AFI plant began initial operations in January 1996, and is currently in the startup and debugging mode. Compliance tests have not yet been conducted on the animal feed plant sources.

Cargill is now proposing to expand the AFI plant. The expansion will allow the production rate of the plant to increase from 150,000 TPY to 300,000 TPY. This expansion will be accomplished through the addition of a second animal feed plant essentially identical to the existing plant. These additional facilities will allow the daily production rate of animal feed product to increase from 411 tons per day (TPD) to 822 TPD.

In addition to the proposed increase in production rate, Cargill is proposing to increase the allowable particulate matter (PM) emissions from the common stack serving the process equipment. The original vendor guarantees for PM emissions from the control equipment serving the common stack are not considered to be routinely achievable. Cargill is proposing a revised PM emission rate that is representative of best available control technology (BACT) for similar type sources.

The purpose of this construction permit application is to increase the production rate of the AFI plant and revise the current PM emission limit. The original AFI project constituted a minor modification to an existing major source. Due to the proposed project, maximum emissions of fluorides (F), particulate matter (PM), and particulate matter less than or equal to 10 micrometers (PM10) will increase. Therefore, certain permit restrictions in the current construction permit must be changed. Since an alteration in federally enforceable permit restrictions is being requested, air permitting source applicability is determined as though construction had not yet commenced on the AFI plant (Rule 62-212.500(2)(d)5.). Based on the total maximum emissions from the AFI plant after expansion, prevention of significant deterioration (PSD) new source review will be required for F, PM, PM10 and NO_x emissions. PM10 is defined as PM with an aerodynamic particle size diameter of 10 microns or less.

Although much of the information presented in the original application has not changed, complete information is presented again in this application. A project description, design information, air emissions, and control equipment information is presented. Required analysis under PSD new source review is also presented, including control technology review, air quality impact analysis, and additional impact analysis.

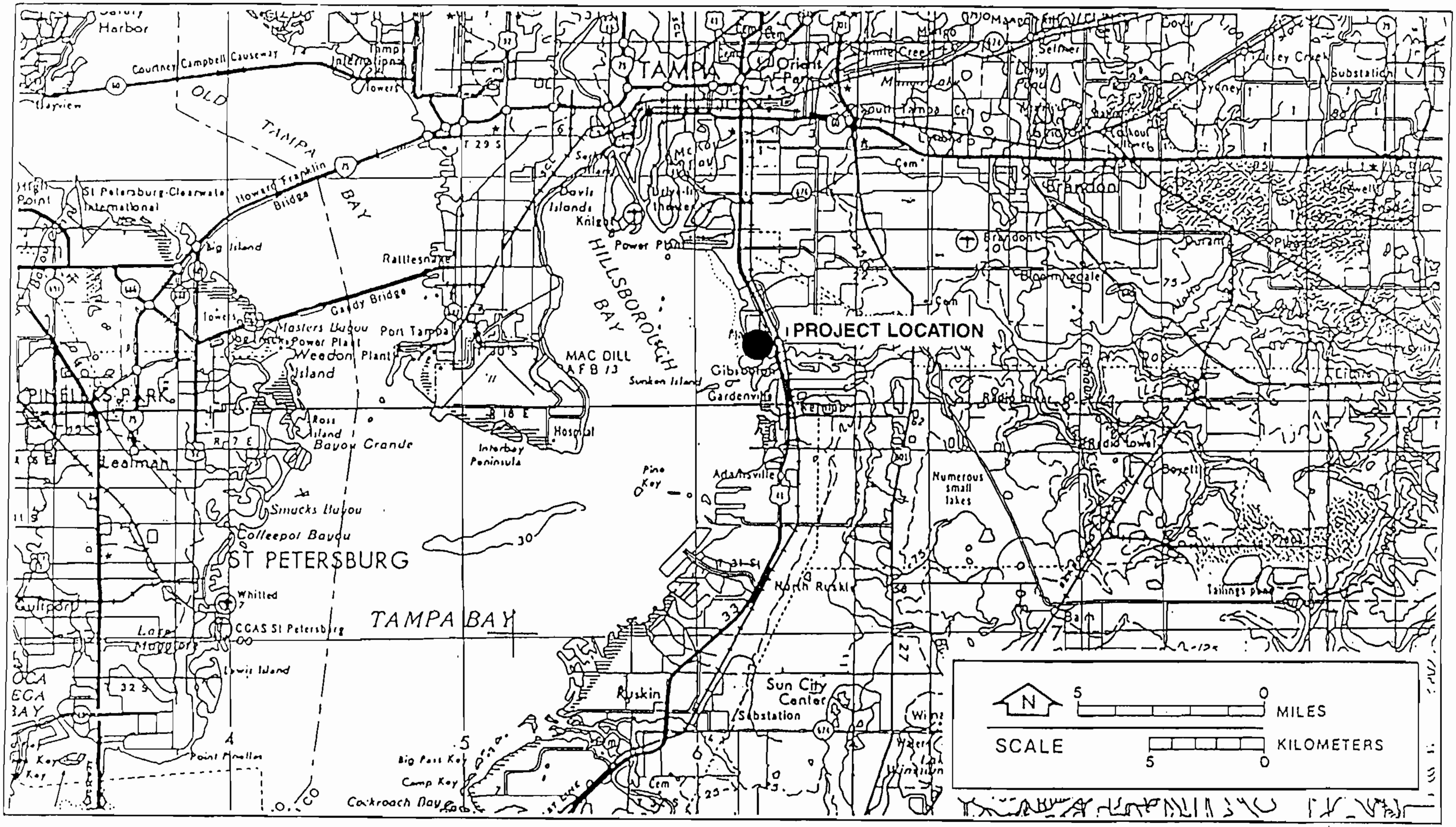

Figure 1-1
General Location Map of Cargill Fertilizer, Inc.'s
Animal Feed Phosphate Plant

Source: USGS, 1981.

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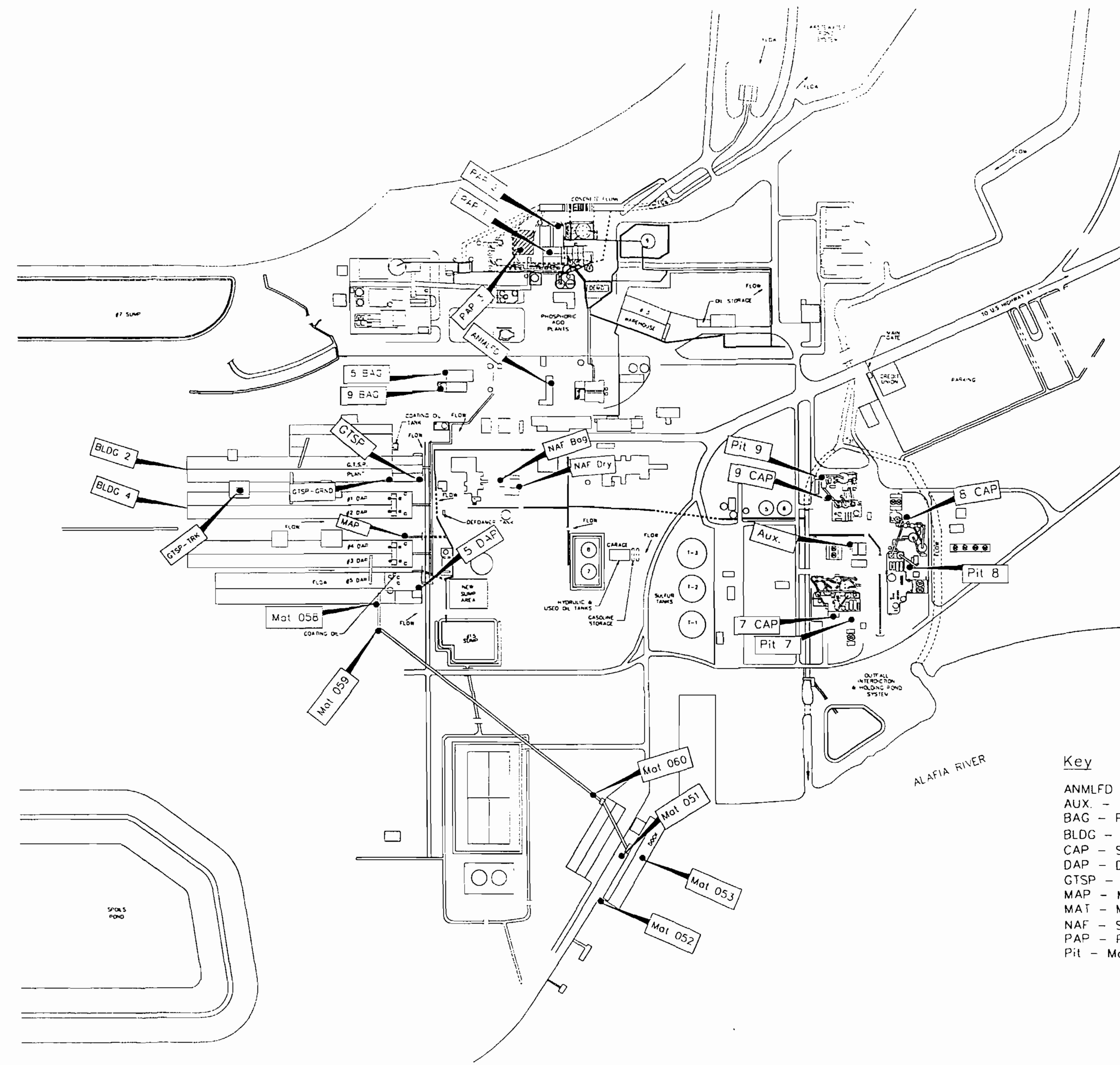

Key

ANMLFD – Animal Feed Plant
AUX. – Auxiliary Steam Boiler
BAG – Phosphate Rock Grinders/Dryers
BLDG – GTSP Storage Building
CAP – Sulfuric Acid Plant
DAP – Diammonium Phosphate Plant
GTSP – Granular Triple Super Phosphate Plant
MAP – Monoammonium Phosphate Plant
MAT – Material Handling System
NAF – Sodium Silicofluoride/Sodium Fluoride Plant
PAP – Phosphoric Acid Production Facility
Pit – Molten Sulfur Storage and Handling System

Figure 1–2
Facility Plot Plan of Cargill Riverview Facility

Source: Cargill Fertilizer, 1996.

Facility:	Cargill Fertilizer Plant
Location:	Riverview, FL
Filename:	tpa-plt4.dwg
Date:	July 9, 1996

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2.0 PROJECT DESCRIPTION

2.1 GENERAL

Two types of animal feed phosphate are produced by the AFI plant: dicalcium phosphate (DCP) and monocalcium phosphate (MCP). In the process, phosphatic fertilizer solution (PFS) from the existing phosphate fertilizer plant is defluorinated and fed to the granulation area where it is reacted with limestone to produce animal feed phosphates. The defluorination process is a batch operation which uses diatomaceous earth and PFS. After reaction with limestone, the products are discharged to a rotary dryer where they are granulated. The solids are discharged from the dryer to the solids handling section of the granulation plant where the product is classified, cooled and de-dusted. Product material is then transferred to bulk storage where it is subsequently loaded into trucks or railcars.

Cargill is constructing an AFI plant with the capability of producing 150,000 TPY of AFI. This plant is designated as AFI Plant #1. The proposed project will consist of a duplication of the existing process equipment (defluorinated acid batch tanks, pug mill, dryer and cooler/classifier, etc.) in order to double the production capacity to 300,000 TPY. The new process equipment (designated as AFI Plant #2) will be essentially identical to the existing facilities, and will be located adjacent to the existing plant.

The new plant will share certain common equipment with the existing plant. The shared facilities will include the diatomaceous earth and limestone unloading systems, and the AFI loadout system.

2.2 PROCESS DESCRIPTION

The process operations of the existing and proposed plants are described in the following sections. A general flow diagram of the process is presented in Figure 2-1.

2.2.1 Diatomaceous Earth Unloading

Diatomaceous earth (DE) is pneumatically unloaded from trucks or railcars and conveyed to a storage silo. The silo is fitted with an efficient baghouse to control PM emissions from the transfer operation. The maximum DE unloading rate is currently 12 TPH. The DE is then transferred to a weigh bin before it is pneumatically transferred to the acid defluorination tanks.

With the proposed plant expansion, the DE unloading operation will remain the same (12 TPH, maximum), but maximum operating hours will increase to 8,760 hr/yr. DE will be pneumatically conveyed to the acid batch tanks in both AFI Plant #1 and AFI Plant #2.

2.2.2 Acid Defluorination

DE is metered from the weigh bin to the acid batch tanks where it is slurried with PFS. The acid defluorination area produces PFS which is low in fluorine content. PFS is defluorinated in a batch stripping process by adding a silica source (DE) and vaporizing SiF_4 by spraying heated PFS in a stream of air. Currently, the AFI Plant #1 has two batch tanks. The proposed AFI Plant #2 will add two additional batch tanks, for a total of four batch tanks. At the conclusion of the batch operation, defluorinated PFS is pumped through acid heaters to the storage (dilution) tank, or directly to the storage tank.

223.6x 365 / 150,000

The current permitted production rate of the AFI Plant #1 is 150,000 TPY of AFI. This rate is based on 223.6 tons of P_2O_5 per batch, one 17-hour batch per day, and 365 days per year. Thus, approximately 0.544 tons of P_2O_5 is required to produce 1 ton of AFI. The AFI Plant #1 granulation operation is currently limited to 8,300 operating hours per year. The existing granulation equipment will not be affected by the plant expansion. However, maximum operating hours will increase to 8,760 hr/yr.

The AFI Plant #2 will utilize granulation equipment identical to the AFI Plant #1. The future maximum production rate will be 300,000 TPY of AFI, total for both AFI Plant #1 and AFI Plant #2 plants, based on 223.6 tons of P_2O_5 per batch and two batches per day, 365 days per year.

Fluoride emissions from the acid batch tanks are controlled by wet scrubbers. The two existing AFI Plant #1 batch tanks are controlled by a single wet scrubber. The two new AFI Plant #2 batch tanks will be controlled by a separate wet scrubber, equivalent in design to the existing AFI Plant #1 wet scrubber.

2.2.3 Granulation Process

In AFI Plant #1 granulation plant, the defluorinated PFS is reacted with limestone to produce calcium phosphate. Ground limestone is pneumatically unloaded from trucks into a bulk storage silo adjacent to the granulation plant area. The maximum limestone unloading rate is 25 TPH. A baghouse controls PM emissions from the transfer operation.

Limestone is periodically transferred from the storage silo by pneumatic conveyor to the limestone day bin in the granulation plant building. PM emissions from the day bin are controlled by a baghouse. The baghouse is vented back inside the building.

The limestone is metered from the limestone day bin into a hopper and then into a high speed mixer where it reacts with heated defluorinated PFS to form a mixture of monocalcium phosphate or dicalcium phosphate. The proportions of limestone and hot acid are adjusted to determine the grade of AFI produced. The acid and limestone slurry is combined in the mixer. A stream of dust and crushed oversize material from the recycle system are added to the acid/limestone slurry in the pug mill, which produces a granular material. The material then discharges into the rotary dryer.

The damp calcium phosphate solids discharge from the pug mill directly into the rotary dryer. Heated air is supplied from a separate combustion chamber which is normally fueled by natural gas. Provisions are made to use No. 2 fuel oil as a stand-by fuel in case of natural gas interruption. No. 2 fuel oil will be used for less than 400 hours per year. Dry solids discharge from the end of the dryer, through a grizzly, into the dryer elevator.

The maximum current production rate of the AFI Plant #1 dryer is 150,000 TPY of AFI product, which equates to 24.17 TPH based on a 17-hour day, 365 days per year. The dryer exhaust gases pass through cyclones to capture product, and then through a venturi scrubber for PM control.

AFI Plant #2 will utilize the existing limestone unloading system and storage silo. This system will be common to both AFI plants. The limestone from the storage silo will be pneumatically conveyed to a separate limestone day bin in the AFI Plant #2 granulation area. The AFI Plant #2 granulation area will be identical to the AFI Plant #1 granulation area, consisting of a limestone metering system, high speed mixer, pug mill, and dryer. As in the AFI Plant #1, the dryer in the AFI Plant #2 will be controlled by a cyclone followed by a wet venturi scrubber. The wet scrubber will be equivalent to the AFI Plant #1 scrubber, but may be supplied by a different manufacturer. The exhaust gases will vent through the AFI Plant #2 common stack.

The maximum production rate of the AFI Plant #2 dryer will be the same as the AFI Plant #1 dryer: 150,000 TPY of AFI product, which equates to 24.17 TPH based on a 17-hour day, 365 days per year. The proposed future production rate of both AFI Plant #1 and AFI Plant #2 combined will be 300,000 TPY, or 48.35 TPH based on a 17-hour day.

2.2.4 Solids Handling

The solids handling section of the AFI Plant #1 granulation plant takes the solids discharged from the dryer and classifies, cools and de-dusts the materials. The dryer elevator discharges material onto a double-deck screen which separates the material into oversize, product and fines streams. Provisions are made to bypass excess recycle material around the screen directly to the roller mill, which also receives the oversize material from the screen.

Product size material from the screen discharges to a fluid bed classifier/cooler. This unit has a dual function; positive removal of dust and fines from the product stream by entrainment into the fluidizing air; and cooling of the product material to minimize storage and shipping problems. Cooled, onsize material is discharged from the fluid bed unit into the product storage silos. Particulate emissions from the mills and classifier/cooler are vented to the equipment vents cyclones and then to the dryer venturi scrubber.

The AFI Plant #2 will utilize an identical system for solids handling, consisting of a fluid bed cooler/classifier and roller mills. AFI product will be sent to the existing product silos which also serve AFI Plant #1. Particulate emissions from the AFI Plant #2 mills and classifier/cooler will be vented to the equipment vents cyclones and then to the dryer venturi scrubber within AFI Plant #2. The exhaust from the scrubber exits through the AFI Plant #2 common stack.

2.2.5 Product Loadout

The existing product loadout system will serve both AFI Plant #1 and AFI Plant #2. Withdrawal of product from the product silos is metered to the loadout elevator and then to the loadout surge bin, loadout weigh bin, and finally to trucks or railcars. The maximum loading rate through the loadout system is 100 TPH. The silos and load-out systems are equipped with ventilation systems and a baghouse to control PM emissions. An 80-ton tank is used to store off-specification material for recycle. PM emissions from the tank are vented to the equipment vents cyclones.

2.3 POLLUTION CONTROL EQUIPMENT AND AIR EMISSIONS

Potential emissions from the existing process equipment and product storage and handling operations are controlled by scrubbers and baghouses. A wet scrubber is used to control fluoride emissions from the defluorination process. A wet scrubber is also used to control PM emissions from the pug mill, dryer, and equipment vents. Baghouses are used to control potential PM emissions from product storage and handling operations. These systems will remain in place in the future. It is noted that several cyclones are used in the process to capture product, and although they aid in controlling PM emissions, are not considered as pollution control equipment.

The new pollution control equipment in the AFI Plant #2 will be equivalent in design to the equipment in the AFI Plant #1. The equipment will include a defluorination acid scrubber and a dryer/vents wet scrubber.

Air emissions from the various sources are presented in Table 2-1.

2.3.1 Diatomaceous Earth Unloading

Diatomaceous earth powder is pneumatically conveyed from the common carrier tank to the DE hopper. The DE baghouse filters the air prior to discharge. A MAC Environmental Model 39-AVRC-21 is installed on the DE hopper to remove particulate from the vented air. The DE baghouse is designed to discharge PM at less than 0.02 grains per dry standard cubic foot (gr/dscf). Design air flow rate is 600 actual cubic feet per minute (acfm), or 518 dry standard cubic feet per minute (dscfm). Maximum calculated PM emissions are 0.089 lb/hr and 0.39 TPY (see Table 2-1).

2.3.2 Defluorination Area

Currently, air from the two defluorination batch tanks and the dilution tank vent is drawn into a packed cross-flow scrubber which removes fluoride and PM from the gas stream. The scrubber contains a void section, three Kimre mesh packed sections and a dry Kimre mesh demister section. The cross sectional area of the packed sections is 20 square feet. Pond water is pumped to the scrubber at a rate of approximately 170 gallons per minute (gpm). The pond water is returned to the existing cooling pond. The scrubber is designed to control fluorides to less than 0.04 lb/ton of P_2O_5 input to the process, or 0.53 lb/hr and 1.63 TPY (see Table 2-1).

Approximately 9,000 acfm of air from the batch tanks and dilution tank is drawn into the scrubber. The exhaust gases are discharged to the atmosphere through the common plant stack.

To accommodate the two new batch tanks in AFI Plant #2, a scrubber of equivalent design will be constructed. Gases from the new scrubber will discharge to the AFI Plant #2 common stack. This scrubber also will be designed to control fluorides to less than 0.04 lb/ton of P_2O_5 input to the process, or 0.53 lb/hr and 1.63 TPY (see Table 2-1).

2.3.3 Granulation Plant

All the equipment in the AFI Plant #1 granulation plant, including the pug mill, is vented to cyclone dust collectors and then to a venturi scrubber designed to remove PM from the gas streams before venting to the atmosphere. During manufacture of the AFI materials, the only raw materials used are limestone and defluorinated acid, thus fluoride emissions from the process equipment are very low. The cyclones are not considered to be control equipment since they recover product.

Dryer

The dryer exhaust gases are directed through the dryer cyclones and then through a venturi scrubber for particulate removal. Emissions due to fuel combustion for the dryer are presented in Table 2-2. Emissions are presented for nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), and volatile organic compounds (VOC). Estimated emissions from fuel combustion were developed using factors specified in the Environmental Protection Agency's (EPA) Compilation of Air Pollution Emission Factors (AP-42) (see Attachment A). Emissions are presented for natural gas and No. 2 fuel oil use. Fuel oil use will be limited to 400 hr/yr.

Dryer and Equipment Vents Scrubber

Approximately 50,000 acfm of exhaust gases from the rotary dryer and 35,000 acfm from the equipment vents are vented through high-efficiency cyclones and then to a crossflow venturi scrubber for particulate matter removal. The crossflow scrubber provided for the dryer operation is a variable venturi scrubber. Scrubber liquid design flow is 850 gpm. The dryer scrubber has a sump which is supplied with freshwater makeup at 10 to 40 gpm and the spent scrubber liquor is consumed in the reaction section to provide necessary dilution of the feed acid.

The scrubber manufacturer originally guaranteed a PM removal efficiency of 99.99 percent for the venturi scrubber with an outlet dust loading of 0.004 gr/scf. This guarantee was based on a particle size distribution provided by Cargill. However, review of this information indicates that this particle size distribution data was in error, and in reality, there is a higher proportion of smaller particles reaching the scrubber. As a result, Cargill has concerns that the guarantee will not be met. Based on these concerns, Cargill is proposing to increase the maximum PM/PM10 emissions from the dryer/vents scrubber (and the common stack) to 6.0 lb/hr and 26.28 TPY. This PM/PM10 emission rate is also equivalent to approximately 0.01 gr/dscf, based on a maximum outlet air flow rate of 95,000 acfm (69,900 dscfm).

AFI Plant #2

The AFI Plant #2 will utilize a pollution control system equivalent in design to AFI Plant #1. Maximum emissions from the common stack will be 6.0 lb/hr and 26.28 TPY.

2.3.4 Limestone Handling

Limestone powder is pneumatically conveyed from trucks to the limestone silo. The limestone silo baghouse is designed to remove limestone powder from the air which is vented from the silo. The limestone silo is constructed with a MAC Environmental Model 39-AVRC-21 baghouse, which uses polyester filter media. The baghouse has been sized for a 25 TPH limestone transfer rate and it will operate for a maximum of 8,760 hours per year. The PM emissions from the baghouse will be less than 0.02 gr/dscf. Design air flow rate is 800 acfm, or 691 dscfm. Maximum calculated PM emissions are 0.12 lb/hr and 0.52 TPY.

In AFI Plant #1, limestone powder will be pneumatically conveyed from the limestone silo to the limestone day bin. The limestone day bin baghouse is designed to remove limestone powder from the air that is vented from the day bin. The limestone day bin is constructed with a MAC Environmental Model 39-AVSC-36 baghouse. The baghouse is sized to filter the airflow from a 25 ton per hour limestone transfer. The baghouse will operate for a maximum of 3,500 hours per year. The limestone hopper baghouse reduces PM emissions below 0.02 gr/scf. The air is vented inside the building so emissions are negligible.

An identical limestone day bin, pneumatic conveying system and baghouse will be constructed to serve AFI Plant #2. The emission from this baghouse will also be vented inside the AFI plant building.

2.3.5 AFP Loadout System

Both AFI Plant #1 and AFI Plant #2 will utilize a common loadout system. Granular animal feed phosphate is transferred by belt conveyor from the granulation areas to either of four AFP product storage silos. A MAC Environmental Model 144-MCF-255 baghouse ventilates the silos and the transfer points. The silos are connected by a duct so that all silos can be vented by the single AFP silo baghouse. The air discharge from the AFP silo baghouse will contain less than 0.02 gr/scf of PM. This source is expected to operate only during product loadout, a maximum of 3,500 hours per year. The PM emissions from the baghouse will be less than 0.02 gr/dscf. Design air flow rate is 15,000 acfm, or 13,000 dscfm. Maximum calculated PM emissions are 2.22 lb/hr and 3.89 TPY (see Table 2-1).

2.3.6 Emissions Summary

A summary of the pollution control equipment and emissions of fluorides and PM from the AFI plants are presented in Table 2-1.

2.4 STACK DATA

Stack geometry and operating data are presented in Table 2-3 for each emission source located at the animal feed plants. These sources include the common stack for each plant, the DE and limestone handling baghouses, and the AFI product loadout baghouse.

Table 2-1. Summary of Pollution Control Equipment and PM/PM10 and Fluoride Emissions, Animal Feed Plant, Cargill Fertilizer

Source	Control Type	Manufacturer/Model	Design Capacity Value	Design Capacity Units	Control Efficiency (percent)	Operating Hours	PM/PM10 Emissions (gr/dscf)	PM/PM10 Emissions (lb/hr)	PM/PM10 Emissions (TPY)	Fluoride Emissions (lb/ton P_2O_5)	Fluoride Emissions (lb/hr)	Fluoride Emissions (TPY)
EXISTING SOURCES												
DE HOPPER	Baghouse	MAC 39-AVRC-21	518	dscfm	99.9	8,760	0.02	0.089	0.39	NA	NA	NA
AFI PLANT #1 COMMON STACK:												
Defluor. Batch Tanks A & B	Wet Scrubber	BCI/Bithell CF4x4-3	9,000	acfm	99.95 (Fl)	8,760	NA	6.00	26.28	0.04	0.53 (b)	1.63
Reactor/Granulator/ Materials Handling	Dryer Scrubber	Fisher-Klosterman/MS 1200	85,000	acfm	99.9 (PM)	8,760						
LIMESTONE SILO	Baghouse	MAC 39-AVRC-21	691	dscfm	99.9	8,760	0.02	0.12	0.52	NA	NA	NA
AFP LOADOUT SYSTEM	Baghouse	MAC 144-MCF-255	12,960	dscfm	99.9	3,500	0.02	2.22	3.89	NA	NA	NA
NEW SOURCES												
AFI PLANT #2 COMMON STACK:												
Defluor. Batch Tanks C & D	Wet Scrubber	BCI/Bithell CF4x4-3 (a)	9,000	acfm	99.95 (Fl)	8,760	NA	6.00	26.28	0.04	0.53 (b)	1.63
Reactor/Granulator/ Materials Handling	Dryer Scrubber	Fisher-Klosterman/MS 1200 (a)	85,000	acfm	99.9 (PM)	8,760						
TOTAL AFI PLANT							Total =	14.43	57.36	Total =	1.05	3.26

Note: acfm = actual cubic feet per minute
AFP = animal feed phosphate
DE = diatomaceous earth
dscfm = dry standard cubic foot per minute.
gr/scf = grains per standard cubic foot
lb/hr = pounds per hour
TPY = tons per year

(a) Scrubber will be of type shown, or equivalent.
(b) Based on 223.6 tons P_2O_5 per batch run; 1 batch per day and 17 hours per batch, operating 365 days per year.

Table 2-2. Summary of Total Emissions from Fuel Combustion in Both AFI Plant Dryers

Parameter	No. 2 Fuel Oil	Natural Gas
OPERATING DATA		
Operating Time (hr/yr)	400	8,760
Heat Input Rate (MMBtu/hr)	92.70	92.70
Fuel Oil Use (gal/hr) [a]	662.1	NA
Fuel Oil Use (gal/yr)	264,857	NA
Maximum Sulfur Content (Wt %)	0.5	NA
Natural Gas Use (scf/hr)	NA	92,700
Natural Gas Use (MMscf/yr)	NA	812.05

Pollutant	Emission Factor [b]	No. 2 Fuel Oil lb/hr	No. 2 Fuel Oil TPY	Natural Gas lb/hr	Natural Gas TPY
EMISSIONS DATA					
SO2: Fuel Oil	142*S lb/Mgal [c]	47.01	9.40	0.056	0.24
Natural Gas	0.6 lb/MMft³				
NOx: Fuel Oil	20 lb/Mgal	13.24	2.65	12.98	56.84
Natural Gas	140 lb/MMft³				
CO: Fuel Oil	5 lb/Mgal	3.31	0.66	3.24	14.21
Natural Gas	35 lb/MMft³				
NMVOC: Fuel Oil	0.2 lb/Mgal	0.132	0.026	0.26	1.14
Natural Gas	2.8 lb/MMft³ [d]				

Note: NA = not applicable.
These emissions are discharged through the common plant stacks.
Particulate matter will be controlled. Total PM/PM10 emissions from the common plant stacks are presented in Table 2-1.

[a] Based on 140,000 Btu/gal for 0.5% S oil; 1000 Btu/scf for natural gas.
[b] Emission factors based on AP-42.
[c] "S" denotes the weight % sulfur in fuel oil; max sulfur content = 0.5%
[d] Based on methane comprises 52% of total VOC

Table 2-3. Stack and Vent Geometry and Operating Data

Source	Stack/Vent Release Height (ft)	Stack/Vent Diameter (ft)	Gas Flow Rate (ACFM)	Gas Flow Rate (SCFM)	Gas Flow Rate (DSCFM)	Gas Exit Temperature (°F)	Water Vapor Content (Percent)	Velocity (ft/sec)
EXISTING SOURCES								
DE Hopper Dust Collector Vent	64	1.5	600	576	518	90	10	5.7
AFI Plant #1 Common Stack	136	6.0	95,000	82,230	69,895	150	15	56.0
Limestone Silo Dust Collector	85	1.5	800	768	691	90	10	7.5
AFP Loadout System Dust Collector	15	1.0 x 3.5	15,000	14,400	12,960	90	10	55.6
PROPOSED NEW SOURCES								
AFI Plant # 2 Common Stack	136	6.0	95,000	82,230	69,895	150	15	56.0

Note: ACFM = actual cubic feet per minute
AFP = animal feed phosphate
DE = diatomaceous earth
DSCFM = dry standard cubic feet per minute
SCFM = standard cubic feet per minute

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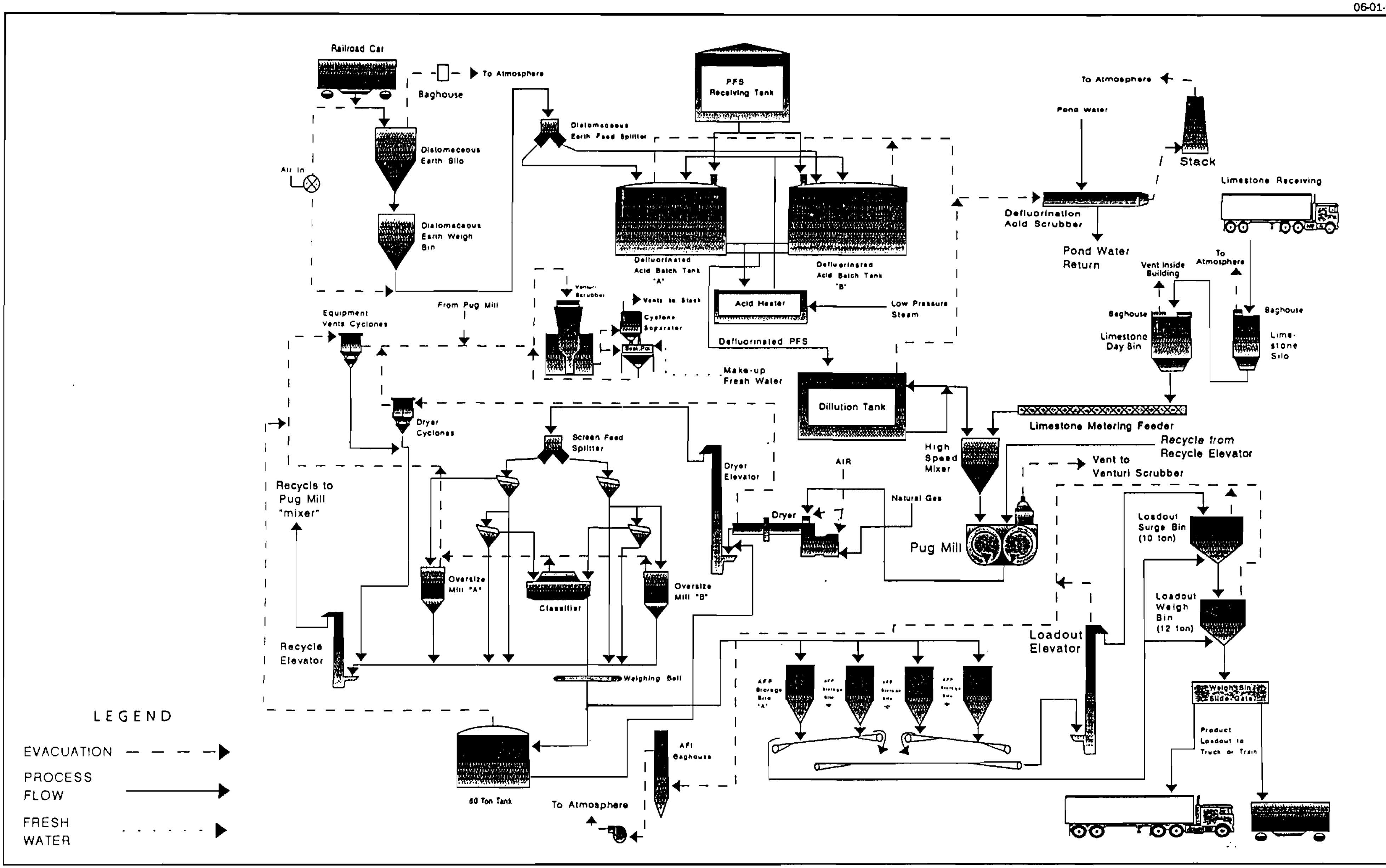

Figure 2-1
Animal Feed Plant Process Flow Diagram

Source: Cargill Fertilizer, Inc., 1995.

3.0 REGULATORY APPLICABILITY

3.1 PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

The purpose of the proposed project is to increase the production rate of the AFI plant by adding a second AFI plant. In addition, the current PM/PM10 emission limit for the existing AFI Plant #1 is proposed to be increased. The original AFI project constituted a minor modification to an existing major source. Due to the proposed project, maximum emissions of fluorides and PM/PM10 will increase. Therefore, certain permit restrictions in the current construction permit must be changed. Since an alteration in federally enforceable permit restrictions is being requested, the applicability of new source review is determined as if construction had not yet commenced on the AFI plant (Rule 62-212.500(2)(d)5., F.A.C.).

The total maximum emissions from the AFI plants after expansion are presented in Table 3-1. Also shown are the prevention of significant deterioration (PSD) significant emission rates. Based on the total emissions after modification, PSD new source review will be required for F, PM, PM10 and NO_x emissions. PM10 is defined as particulate matter with an aerodynamic particle size diameter of 10 micrometers (μm) 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. Best Available Control Technology (BACT) evaluation,
2. Air quality impact analysis,
3. Ambient monitoring analysis, and
4. Additional impact analysis.

These requirements are addressed in the following sections.

3.2 NEW SOURCE PERFORMANCE STANDARDS

Federal New Source Performance Standards (NSPS) currently exist for facilities producing phosphoric acid and phosphate fertilizer products (40 CFR 60, Subparts T through X). Specifically, these standards apply to wet-process phosphoric acid plants, superphosphoric acid plants, granular diammonium phosphate (DAP) plants, monoammonium phosphate (MAP) plants, triple superphosphate (TSP) plants, and granular triple superphosphate (GTSP) storage facilities.

Because the animal feed plant will not produce or store any of these products, the AFI Plant is not subject to the NSPS requirements.

3.3 STATE OF FLORIDA EMISSION STANDARDS FOR FLUORIDES

Because the proposed plant utilizes PFS as a raw material, potential fluoride emissions from the defluorination and granulation processes are subject to the emission limitations of Rule 62-296.403(1), Florida Administrative Code (F.A.C.) pertaining to fluoride emissions from phosphate processing plants. Because the operational nature of the proposed plant does not apply to the source categories listed in 62-296.403(1), paragraphs (a) through (h), the provisions of paragraph (i) would apply. This provision states that a best available control technology (BACT) determination would apply to the source, as determined pursuant to Rule 62-296.330, F.A.C. Therefore, a BACT determination must be made regarding fluoride emissions from the common stack. Such a BACT determination was made in the original construction permit issued for the animal feed plant. In this permitting process, a fluoride emission limit of 0.04 lb/ton P_2O_5 for the common stack was determined to be BACT. Since the control equipment for AFI Plant #2 will be equivalent to that for AFI Plant #1, the new plant will also meet the previously determined BACT requirements.

3.4 REASONABLY AVAILABLE CONTROL TECHNOLOGY (RACT)

The animal feed plant is located in area of Hillsborough County which has been designated as an air quality maintenance area for PM. Therefore, the facility is subject to the RACT provisions for PM as codified in 62-296.700 F.A.C. The new animal feed plant will also be subject to these provisions.

Phosphate processing operations at phosphate fertilizer plants are subject to the provisions of 62-296.705 F.A.C.. For animal feed ingredient plants, the applicable PM emission limitation is 0.3 lb per ton of product and 20 percent opacity. These limitations apply to the existing dryer and cooler/classifier system, and will also apply to the new system within AFI Plant #2.

Materials handling sources within the existing and new facilities will be subject to the emission limitations as specified in 62-296.711, F.A.C., which state a PM emission limit of 0.03 grains per dry standard cubic foot (gr/dscf).

The emissions limitations for sources within the animal feed plants will meet the RACT requirements. Maximum PM emissions from the baghouses for the materials handling systems will be 0.02 gr/dscf, which is below the RACT limitation. PM emissions from each common plant stack, based on the RACT limit of 0.3 pounds per ton of product, are follows:

24.17 tons/hr product x 0.3 lb/ton = 7.25 lb/hr PM emissions

As presented in Table 2-1, total PM emissions from the common stack will meet the RACT emission limitation. Therefore, PM emissions from each source within the animal feed plants will comply with all applicable RACT emissions limitations.

Table 3-1. PSD Source Applicability Analysis, AFI Plant

Pollutant	AFI Plant Total Emissions (TPY)	PSD Significant Emission Rate (TPY)	PSD Review Triggered?
Particulate Matter (TSP)	57.36	25	Yes
Particulate Matter (PM10)	57.36	15	Yes
Fluorides	3.26	3	Yes
Sulfur Dioxide	9.4	40	No
Nitrogen Oxides	56.8	40	Yes
Carbon Monoxide	14.2	100	No
Volatile Organic Compounds	1.1	40	No

4.0 AMBIENT MONITORING ANALYSIS

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 (see Table 3-1).

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/PM10 is 10 $\mu g/m^3$, 24-hour average, and for NO_x is 14 $\mu g/m^3$, annual average. The predicted increase in PM/PM10 and NO_x concentrations due to the proposed modification only are presented in Section 6.0. The predicted PM/PM10 increase is 14.4 $\mu g/m^3$, 24-hour average, and the predicted increase in annual NO_x concentrations is 1.4 $\mu g/m^3$. Since the predicted increases in PM/PM10 impacts due to the proposed modification are greater than the *de minimis* monitoring concentration levels, a preconstruction air monitoring analysis must be conducted for PM/PM10. To provide information for the establishment of a background NO_2 concentration, an ambient monitoring analysis is also provided for NO_x. This analysis is presented in the following sections.

4.1 PM/PM10 AMBIENT MONITORING ANALYSIS

The PSD ambient monitoring guidelines allow the use of existing data to satisfy preconstruction review requirements. Presented in Table 4-1 is a summary of existing ambient PM/PM10 data for monitors located in the vicinity of Cargill's Riverview facility. Data are presented for the last two years of record, 1994-1995. As shown, several PM and PM10 monitors were operational in the vicinity of Cargill's Riverview facility during this period. One of these stations, the Gardinier Park station, is located immediately adjacent to the Riverview facility.

The monitors show that ambient PM10 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 PM10 background concentration for use in the modeling analysis, the annual average PM10 concentration of 20 $\mu g/m^3$ recorded at the Gardinier Park monitor during 1995 was selected. This concentration was utilized for both the 24-hour and annual average background PM10 concentrations in the air quality impact analysis since this monitor is impacted by several existing point sources, such as Cargill and Tampa Electric's Big Bend station, which are included explicitly in the modeling analysis.

4.2 NO_x AMBIENT MONITORING ANALYSIS

The PSD ambient monitoring guidelines allow the use of existing data to satisfy preconstruction review requirements. Presented in Table 4-2 is a summary of existing ambient NO_x data for monitors located in the vicinity of Cargill's Riverview facility. Data are presented for the last two years of record, 1994-1995. As shown, only one NO_x continuous monitor was operational in Hillsborough County during this period. This monitor shows that ambient NO_x concentrations were well below the ambient air quality standard of 100 $\mu g/m^3$, annual average.

For purposes of an ambient NO_x background concentration for use in the modeling analysis, the highest annual average concentration recorded at the monitor during either year, 21 $\mu g/m^3$, was selected. This concentration should be conservative since this monitor would be impacted by several existing point sources which are included explicitly in the modeling analysis, such as Cargill and TECO Big Bend and Gannon power plants.

Table 4-1. Summary of PM/PM10 Monitoring Data Collected Near Cargill's Riverview Facility

County	Station ID	Monitor Location	Distance to Cargill (km)	Year	Number of Observations	Maximum Concentrations Reported ($\mu g/m^3$) Highest 24-Hour	Second-Highest 24-Hour	Annual[a]
		Particulate Matter - Total						
Hillsborough	1800-083-G02	Gardinier Park, US 41	0.81	1995	16	67	62	45
				1994	60	152	78	41
Hillsborough	1800-085-G02	Eisenhower Jr HS; Big Bend Road	8.03	1995	14	58	50	36
				1994	59	115	61	32
Hillsborough	1800-106-J02	North Ruskin; Big Bend Road	8.04	1995	59	65	56	36
Hillsborough	1800-107-J02	North Ruskin; Bullfrog Creek County Park	8.47	1995	56	71	70	33
		PM10						
Hillsborough	1800-066-G02	Gibsonton; ICWU Building; HWY 41 North	3.69	1995	61	85	77	28
				1994	61	99	69	27
Hillsborough	1800-083-G02	Gardinier Park, US 41	0.81	1995	43	47	39	20
Hillsborough	1800-085-G02	Eisenhower Jr HS; Big Bend Road	8.03	1995	41	45	40	18

[a] Geometric mean concentration.

Table 4-2. Summary of NO_x Monitoring Data Collected Near Cargill's Riverview Facility

County	Station ID	Monitor Location	Distance to Cargill (km)	Year	Number of Observations	Maximum Concentrations Reported ($\mu g/m^3$)	
						1-Hour	Annual
Hillsborough	4360-065-G01	Tampa; 5121 Gandy Boulevard (USMC Reserve)	14.77	1995	8,579	150	21
				1994	8,580	96	18

5.0 BEST AVAILABLE CONTROL TECHNOLOGY 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 applicable pollutants. 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. As mentioned previously, this approach has been challenged in court and a settlement agreement reached which requires EPA to initiate formal rulemaking concerning the top down 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 modification at Cargill, the pollutants PM/PM10, fluorides and NO_x require BACT analysis. The following sections present the BACT analysis.

5.2 BACT ANALYSIS FOR PM/PM10

5.2.1 Material Handling Sources

The animal feed plant uses a combination of baghouses, cyclones and wet scrubbers to control PM/PM10 emissions. Baghouses are used to control all raw material (diatomaceous earth and limestone) handling operations, as well as product loadout operations. Baghouse technology represents the state of the art in control of PM/PM10 emissions for material handling sources. Baghouses are highly efficient and allow collected PM to be recovered as product. Although wet PM controls (i.e., scrubbers) could be employed, an additional liquid waste stream would be generated. The proposed emission level of 0.02 gr/dscf for these baghouses represents the standard vendor guarantee for the baghouses.

Baghouse technology is proposed as BACT for the material handling sources within the Animal Feed plants. The proposed BACT emission level is 0.02 gr/dscf for each baghouse. No other technology is capable of achieving lower PM/PM10 levels than the proposed baghouse technology.

A review of currently operating animal feed plants in Florida was conducted. This review identified two such plants: PCS Phosphates located in White Springs, and IMC Fertilizer, located in Polk County. Emission sources, control technology, and emission rates associated with these animal feed plant sources were identified as follows:

IMC Fertilizer

* AFI Silica Unloading and Storage

    1 baghouse
    Process rate = 10 TPH
    Flow rate - 1,500 acfm
    PM emission limit - 1.6 lb/hr; equivalent to 0.12 gr/dscf

* AFI Limestone Storage Silos

    2 baghouses
    Process rate = 80 TPH
    Flow rate - 6,000 acfm
    PM emission limit - 3.6 lb/hr; equivalent to 0.07 gr/dscf

* AFI Product Storage Silos

    2 baghouses
    Process rate = 100 TPH
    Flow rate - 1,600 acfm
    PM emission limit (each) - 4.75 lb/hr; equivalent to 0.35 gr/dscf

PCS Phosphates

* Phos. Rock, Limestone and DICAL Storage; DICAL Shipping
    4 baghouses
    Process rates vary
    No PM emission limit, but design data in application - 0.01 gr/Acf for each

* DICAL De-Dust; Fines reclaim
    2 baghouses
    Process rates vary
    No PM emission limit, but design data in application - 0.02 gr/Acf for each

Cargill's proposed PM/PM10 emission rate of 0.02 gr/dscf for these material handling sources is lower than nearly all of these other animal feed plant permitted emission rates.

5.2.2 Process Equipment

PM emissions from the animal feed dryers and cooler/classifier systems are controlled by cyclones followed by a wet scrubber. This combination provides for a high overall PM collection efficiency. The cyclones allow for recovery of product in a dry form, with subsequent recycling back to the process. The wet venturi scrubber control is an efficient control device and is the most appropriate technology for gas streams that contain a significant amount of moisture or particulates that are "sticky." The exhaust gas stream from the animal feed dryers has these characteristics. This gas stream is combined with the gas stream from the cooler/classifier system prior to being scrubbed.

A review of previous BACT determinations for PM emissions from phosphate rock dryers, asphaltic dryers, and similar materials dryers was conducted. The results of this review is presented in Table 5-1. The table lists all determinations contained in the BACT/LAER Clearinghouse since 1991.

As shown, previous BACT determinations for asphalt plants resulted in PM emissions in the range of 0.03 to 0.04 gr/dscf. A number of other determinations were found in the BACT Clearinghouse for lime kilns and various material dryers. Three of these determinations were expressed in terms of a grain loading, and emission limits were set at 0.02 gr/dscf. Nearly all were expressed in terms of lb/ton of material throughput, and the emission limits ranged from 0.12 to 0.60 lb/ton.

In addition to these previous BACT determinations, a review of currently operating animal feed plants in Florida was conducted. This review identified two such plants: PCS Phosphates located in White Springs, and IMC Fertilizer, located in Polk County. Through this review, it was revealed that IMC Fertilizer was issued a PSD permit for a new air classifier/bag collector at their existing animal feed ingredients plant in 1993 (AC53-222859; PSD-FL-199). The resulting BACT determination for PM was 0.015 gr/dscf, and the control device was a baghouse. However, IMC does not vent the dryer exhaust gases to this baghouse; the dryer is controlled by a separate venturi scrubber. Other emission sources, control technology, and emission rates associated with the IMC animal feed plant were identified as follows:

* Animal feed plant common stack (reactor, pug mill, granulator, dryer, screening system and cooler)

  3 venturi/crossflow scrubbers, 1 venturi scrubber and 3 cyclones
  Production rate = 120 TPH
  Flow rate - 179,000 acfm; 141,000 dscfm
  PM emission limit - 36.8 lb/hr; equivalent to 0.030 gr/dscf
  Actual PM test data - 10 to 26 lb/hr; up to 0.018 gr/dscf

For the PCS Phosphates plant, the following information concerning their animal feed plant was obtained:

* Reactor/dryer/product handling system common stack

  cyclonic/venturi scrubbers
  Production rate = 40 TPH
  Flow rate - 92,000 acfm; 76,000 dscfm
  PM emission limit - 46.11 lb/hr based on process eight table; equivalent to 0.071 gr/dscf
  Actual PM test data - 7 to 10 lb/hr; up to 0.016 gr/dscf

Cargill's proposed PM/PM10 emission rate is equivalent to approximately 0.01 gr/dscf, which is much lower than these previously determined BACT levels, as well as below permitted or actual PM emissions for other animal feed plants in Florida.

5.3 BACT ANALYSIS FOR FLUORIDES

AFI Plant #1, when originally permitted in 1994, was subject to Rule 62-296.403(1)(I), which requires BACT for fluorides to be implemented. As a result, AFI Plant #1 underwent a BACT determination. The resulting BACT was determined to be a wet scrubber utilizing pond water as the scrubbing medium. The BACT emission limit was 0.04 lb/ton P2O5 input, and 0.53 lb/hr.

The proposed AFI Plant #2 is proposing to utilize an identical or equivalent venturi scrubber, and to meet a fluoride emission limit identical to AFI Plant #1. As this system was considered to be BACT for AFI Plant #1, it is also considered to be BACT for AFI Plant #2.

5.4 BACT ANALYSIS FOR NO_x

In the animal feed plant, NO_x is created during the combustion of natural gas, the primary fuel, or No. 2 fuel oil, the backup fuel. The fuel combustion takes place in the rotary dryer, which dries the wet, granulated animal feed product. The use of natural gas, which contains no fuel bound nitrogen, and No. 2 fuel oil, which contains low fuel bound nitrogen levels, result in low NO_x emissions relative to burning of other types of fossil fuel, such as No. 6 fuel oil or coal. Good combustion practices are implemented to achieve the highest combustion efficiency. While this reduces fuel consumption and lowers CO and VOC emissions, higher NO_x emissions can result. However, the level of NO_x emissions (56.8 TPY) are relatively low, and do not warrant further reduction.

Phosphate fertilizer plants typically have several rotary dryers located throughout the plant, such as those associated with DAP, MAP and GTSP production. Although several add-on NO_x control technologies are potentially available for application to rotary dryers, these are not known to have been applied in the phosphate industry. These technologies include flue gas recirculation, selective non-catalytic reduction (SNCR by ammonia or urea injection), and selective catalytic reduction (SCR).

Based on the low NO_x emissions from the expanded animal feed plant, the use of low nitrogen containing fuels (natural gas and No. 2 fuel oil) and good combustion practices are proposed as BACT for NO_x emissions.

Table 5-1. Summary of BACT Determinations for PM Emissions From Dryers of Aggregates/Non-Metallic Minerals

Plant Type/Company	State	Permit #	Permit Issue Date	New Source? (a)	Throughput	Emission Limit	Equivalent Limit (lb/ton)	Equivalent Limit (gr/dscf)	Control Equipment
Asphalt Plants									
Matric Construction Co.	CA	7079-101	15-Mar-95	Yes	75 ton/hr	0.04 gr/dscf	--	0.04	Baghouse
Calif. Commercial Asphalt	CA	A/N910794	12-Feb-92	Yes	275 ton/hr	0.03 gr/dscf	0.041	0.03	Baghouse
Horowitz Quarry	CA	230555	25-Feb-91	Yes	8,000 ton/day	150 lb/day	0.019	--	Dust Collector
All American Asphalt	CA	240010	15-Jan-91	Yes	600 ton/hr	150 lb/day	0.021	--	Baghouse
Lime Plants									
CLM Corp.	WI	93-DBY-074	01-Jun-94	Yes	36 ton/hr	0.12 lb/ton	0.12	--	ESP
New River Lime, Inc.	KY	C-93-053	26-Aug-93	No	46 ton/hr	0.02 gr/acf	--	0.02	Baghouse
Dravo Lime Co.	KY	C-93-032	12-Aug-93	Yes	46 ton/hr	0.02 gr/acf	0.41 *	0.02	Baghouse
W.S. Frey Company, Inc.	VA	20504	14-May-93	Yes	182,500 ton/yr	7.2 lb/hr	0.35	--	Baghouse
Dravo Lime Co.	KY	C-93-024	09-Mar-93	Yes	46 ton/hr	0.02 gr/acf	0.60 *	0.02	Baghouse
Western Lime and Cement	WI	90-MWH-060	1990	Yes	350 ton/day	0.6 lb/ton	0.60	--	Baghouse
Stone Crushing Plant									
Luck Stone Corp.	VA	50429	15-Aug-85	Yes	11,025 ton/yr	4.33 ton/yr (each)	0.785	--	Baghouse
					11,025 ton/yr	3.3 ton/yr (each)	0.599	--	Baghouse
Miscellaneous Plants									
A&M Products *	CA	S1233-2-0	13-Apr-95	Yes	210 ton/day	27 lb/day	0.12 *	0.01	Baghouse
Omya, Inc.	VT	VT-009	27-Jul-90	No	20 ton/hr (each)	1.32 lb/hr	0.066	--	Multiple Cyclones

(a) Indicates if emission unit subject to BACT was new construction (yes) or a modification (no).
* Rates verified by permit.
Source: BACT/RACT/LAER Clearinghouse Database, June 1995.

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 to 200 kilometers of a PSD Class I area, then a significant impact analysis is also performed for the PSD Class I area. Currently, the National Park Service (NPS) has recommended 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 full 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.

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 96113) dispersion model (EPA, 1995) was used to evaluate the pollutant impacts due to the proposed modification to Cargill's animal feed plant. This model is maintained on the EPA's Technical Transfer Network (TTN) bulletin board service. A listing of ISCST3 model features in presented in Table 6-1. The ISCST3 model is applicable to sources located in either flat or rolling terrain where terrain heights do not exceed stack heights. The ISCST3 model is designed to calculate hourly concentrations based on hourly meteorological parameters (i.e., wind direction, wind speed, atmospheric stability, ambient temperature, and mixing heights).

In this analysis, the EPA regulatory default options were used to predict all maximum impacts. Based on the land-use within a 3-km radius of the Cargill facility, the rural dispersion coefficients were used in the modeling analysis. The ISCST3 model was used to provide maximum concentrations for the annual and 24-hour averaging times.

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 Tampa International Airport and Ruskin, respectively. The 5-year period of meteorological data was from 1987 through 1991. The NWS station at Tampa International Airport, located approximately 18 km to the northwest of the Cargill plant site, was selected for use in the study because it is the closest primary weather station to the study area that is representative of the plant site.

6.2.3 Emission Inventory

The proposed animal feed plant expansion will result in emission rate increases above the EPA significant emission rates for PM, PM10, NO_x, and fluorides. These increases are due solely to animal feed plant sources. The animal feed plant PM and PM10 emission rates provided in Table 2-1 are identical.

Significant Impact Analysis

The PM/PM10 and NO_x emission rate increases and the physical and operational stack parameters for the animal feed plant sources are summarized in Table 6-2. This table is based on emission and stack parameter data presented in Tables 2-1, 2-2, and 2-3. Because the emission rate increases for the DE hopper dust collector vent and the limestone silo dust collector are very small (0.12 lb/hr or less), these sources were not included in the significant impact modeling analysis. For the PM/PM10 analysis, the modeled sources included the two common stacks and the AFP loadout system. The NO_x modeling analysis included only the two common stacks as these are the only sources of NO_x associated with the AFI plant. All sources were modeled at locations relative to the No. 9 Sulfuric Acid Plant stack, which is the modeling origin.

AAQS Analysis

For PM10, an inventory of future Cargill sources and their locations relative to the origin is provided in Table 6-3. Other PM facilities that were considered in the modeling analysis are provided in Table 6-4. Facilities were evaluated against the North Carolina screening technique. Based on this technique, facilities whose maximum annual emissions in tons/year do not exceed the quantity 20 x (D-D1), where D1 is the proposed project's significant impact distance for PM/PM10, were eliminated from the modeling analysis.

Non-Cargill PM10 sources that were to be included in the AAQS analysis were obtained from three primary sources. Most of the source data were obtained from a recent modeling analysis performed for a PSD application for US AgriChem, a source in Polk County. Additional PM10 source data were obtained from the recent modeling analysis performed for the FPL Manatee Plant site certification application (SCA). Lastly, FDEP provided the source inventory for several of the facilities.

A summary of the PM10 source data that was used for the AAQS analysis is presented in Appendix B, Tables B-1 and B-2. For PM10 emission sources only, sources were combined based on EPA's method for merging sources (EPA, 1992). In general, individual PM10 emission sources of 100 TPY or more within a facility were modeled separately (i.e., no merging was performed). Those PM10 emission sources of less than 100 TPY within a facility were all merged into one source based on the following approach. For each stack, the parameter M was computed:

$$M = \frac{h_s \, V \, T_s}{Q}$$

where: M = merged stack parameter which accounts for the relative influence of stack height, plume rise, and emission rate on concentrations

h_s = stack height (m)

V = $(\pi/4)\, d_s^2 v_s$ = stack gas volumetric flow rate (m^3/s)

d_s = inside stack diameter (m)

v_s = stack gas exit velocity (m/s)

T_s = stack gas exit temperature (K)

Q = pollutant emission rate (g/s)

The stack with the lowest value of M was used as the representative stack. Then, the sum of the emissions from all applicable sources was assumed to be emitted from the representative stack.

For NO_x, an inventory of future (and 1987 PSD baseline) Cargill sources and their locations relative to the origin is provided in Table 6-5. Background NO_x facilities that were considered in the modeling analysis are provided in Table 6-6. Facilities were evaluated against the North Carolina screening technique. Facilities whose maximum annual emissions in tons/year do not exceed the quantity 20 x (D-D1), where D1 is the proposed project's significant impact distance for NO_x, were eliminated from the modeling analysis. Non-Cargill NO_x sources that were to be included in the AAQS analysis were obtained from the FPL Manatee SCA modeling analysis. A summary of the NO_x source data that were used for the AAQS analysis is presented in Appendix C1, Tables C-1 and C-2. NO_x emissions from Cargill Riverview sources, other than the animal feed plant, are presented in Appendix C2.

PSD Class II Analysis

A summary of Cargill's PM10 sources for the PSD baseline year (1974) are provided in Table 6-7. These sources were used with Cargill's future sources from Table 6-3 to determine the PSD increment consumption with the proposed project. Non-Cargill PSD sources were obtained from the US AgriChem PSD analysis. Additional PSD increment consuming sources in the vicinity of Cargill, obtained from FDEP, were included as well. These sources include the

Hillsborough Co. Resource Recovery facility, the McKay Bay Refuse-to-Energy facility, and the Tropicana plant in Bradenton. The PSD source emission inventory is presented in Appendix B.

A summary of Cargill's NO_x sources for the PSD baseline year (1987) are provided in Table 6-5. These sources were used with Cargill's future sources from Table 6-5 to determine the PSD increment consumption with the proposed project. Non-Cargill NO_x PSD sources were obtained from the FPL Manatee SCA modeling analysis and are presented in Appendix C1.

<u>PSD Class I Analysis</u>

Because the proposed animal feed plant expansion maximum impacts do not exceed the recommended NPS significant impact levels for PM10 and NO_x at the Chassahowitzka NWA PSD Class I area, a PSD Class I increment consumption modeling assessment is not required. However, impacts of each pollutant were evaluated for the Class I area in order to support the air quality related values (AQRV) analysis. The AQRV analysis is presented in Section 7.0.

6.2.4 Receptor Locations

For predicting maximum PM10 concentrations in the vicinity of the Cargill Riverview plant, a polar receptor grid comprised of 119 discrete and 108 regular grid receptors was used for the screening analysis. These receptors included 36 receptors located on the plant property boundary at 10-degree intervals, plus 83 additional off-property receptors at distances of 0.5, 0.8, 1.1, and 1.5 km from the No. 9 Sulfuric Acid Plant stack, which is the origin of the air modeling coordinate system. The 36 property boundary receptors used for the screening analysis are presented in Table 6-8. The additional regular grid receptors are located at radial distances of 2.0, 2.5, and 3.0 km. For predicting maximum NO_x concentrations in the vicinity of the plant, only the 119 discrete polar grid receptors were utilized in the modeling analysis. The significant impact distances for the proposed project are 3.0 km for PM10 and 1.5 km for NO_x.

Modeling refinements were performed by employing a polar receptor grid with a maximum spacing of 100 m along each radial and an angular spacing between radials of 2 degrees.

For predicting impacts at the Chassahowitzka National Wilderness Class I area, 13 discrete receptors located along the border of the PSD Class I area were used. A listing of the Class I receptors is presented in Table 6-9. Modeling refinements at the Chassahowitzka NWA were not performed due to the distance from the Cargill plant site to the Class I area.

6.2.5 Building Downwash Effects

All significant building structures within Cargill's existing plant area were determined by a site plot plan (see Figure 1-2). Eighteen 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 6-10.

6.3 MODELING RESULTS FOR SIGNIFICANT IMPACT ANALYSIS

6.3.1 PM10

The modeling analysis results for the proposed project only in the vicinity of the plant are summarized in Table 6-11. Based on the screening modeling results, the maximum predicted PM10 impacts due to the proposed project only are 2.2 and 14.4 $\mu g/m^3$ for the annual and 24-hour average, respectively. Because the maximum predicted values are above the EPA significant impact levels of PM10 of 5 and 1 $\mu g/m^3$, respectively, additional AAQS and PSD Class II modeling analyses are required for this pollutant. The distance to which the PM10 impact is significant was determined to be 3.0 km.

The maximum PM10 concentrations predicted at the Chassahowitzka NWA are presented in Table 6-11. The maximum predicted PM10 impacts are 0.004 and 0.09 $\mu g/m^3$, for the annual and 24-hour average, respectively. These maximum predicted values are below the NPS recommended annual and 24-hour significant impact levels for PM10 of 0.1 and 0.33 $\mu g/m^3$, respectively. Therefore, a PSD Class I modeling analysis is not required for PM10 at the Chassahowitzka NWA.

6.3.2 NO_x

The maximum predicted NO_x impacts due to the proposed project only in the vicinity of the Cargill plant are presented in Table 6-12. The maximum impact of 1.35 $\mu g/m^3$ exceeds the significant impact level of 1 $\mu g/m^3$. Therefore, additional AAQS and PSD Class II modeling analyses are required for this pollutant. The distance to which the NO_x impact is significant was determined to be 1.5 km. The maximum predicted NO_x impacts due to the proposed project only at the Chassahowitzka NWA are presented in Table 6-12. The maximum impact of 0.003 $\mu g/m^3$ is below the NPS significant impact level of 0.025 $\mu g/m^3$. Therefore, a PSD Class I modeling analyses is not required for NO_x.

6.4 AAQS ANALYSIS

6.4.1 PM10

A summary of the maximum PM10 concentrations predicted for all sources for the screening analysis is presented in Table 6-13. Based on the screening analysis results, modeling refinements were performed. The results of the refined modeling analysis are presented in Table 6-14. The maximum predicted annual and 24-hour PM10 concentrations are 43 and 113 $\mu g/m^3$, respectively, which includes an ambient non-modeled background concentration of 20 $\mu g/m^3$. The maximum PM10 concentrations are less than the AAQS of 50 and 150 $\mu g/m^3$, respectively.

6.4.2 NO_x

A summary of the maximum NO_x concentrations predicted for all sources for the screening analysis is presented in Table 6-15. Based on the screening analysis results, modeling refinements were performed. The results of the refined modeling analysis are compared with the AAQS in Table 6-16. The maximum predicted annual NO_x concentration is 34.5 $\mu g/m^3$, which is well below the AAQS of 100 $\mu g/m^3$.

6.5 PSD CLASS II ANALYSIS

6.5.1 PM10

A summary of the maximum PM10 PSD increment consumption predicted for all sources for the screening analysis is presented in Table 6-17. Based on the screening analysis results, modeling refinements were performed. The results of the refined modeling analysis are presented in Table 6-18. The maximum predicted PM10 annual and 24-hour PSD increment consumption of 1.0 and 11.6 $\mu g/m^3$, respectively, are less than the allowable PSD Class II increments of 17 and 30 $\mu g/m^3$, respectively.

6.5.2 NO_x

A summary of the maximum NO_x PSD increment consumption predicted for all sources for the screening analysis is presented in Table 6-19. Based on the screening analysis results, modeling refinements were performed. The results of the refined modeling analysis are compared with the allowable PSD increment in Table 6-20. The maximum predicted NO_x PSD increment consumption of 5.4 $\mu g/m^3$ is well below the allowable PSD Class II increment of 25 $\mu g/m^3$.

6.6 CLASS I IMPACTS FOR ADDITIONAL IMPACT AND AQRV ANALYSIS

6.6.1 PM10

The maximum total PM10 air quality impacts predicted for all modeled sources at the Chassahowitzka NWA are summarized in Table 6-21. Impacts are presented for various averaging times to support the AQRV analysis. Background PM10 concentrations are based on the latest available PM ambient monitoring data for the monitoring station located closest to Chassahowitzka (see Table 6-22). Total cumulative impacts based on modeled sources' impacts and background are shown in Table 6-23.

6.6.2 NO_x

The maximum NO_x total air quality impacts at the Chassahowitzka NWA are summarized in Table 6-24. Impacts are presented for various averaging times to support the AQRV analysis. There is no representative nearby NO_x monitoring data available for Chassahowitzka in order to determine a background concentration.

6.7 FLUORIDE IMPACTS

The maximum predicted fluoride impacts due to the Cargill animal feed plant in the vicinity of the Cargill plant site is summarized in Table 6-25. The maximum predicted 24- and 8-hour impacts of 0.83 and 1.62 $\mu g/m^3$, respectively, are below the FDEP Ambient Reference Concentration (FARC) limits of 6 and 24 $\mu g/m^3$, respectively.

The maximum predicted fluoride impacts in the Chassahowitzka Class I area due to the Cargill Animal Feed Plant are also presented in Table 6-25.

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 Emissions for the Animal Feed Plant

Source	Stack/Vent Release Height (ft)	Stack/Vent Release Height (m)	Stack/Vent Diameter (ft)	Stack/Vent Diameter (m)	Gas Flow Rate (acfm)	Gas Exit Temperature (°F)	Gas Exit Temperature (°K)	Velocity (ft/sec)	Velocity (m/s)	Emisison Rate PM10 (lb/hr)	Emisison Rate PM10 (g/s)	Emisison Rate NOx (lb/hr)	Emisison Rate NOx (g/s)	Emisison Rate Fluorides (lb/hr)	Emisison Rate Fluorides (g/s)
EXISTING SOURCES															
DE Hopper Dust Collector Vent	64	19.5	1.5	0.46	600	90	305	5.7	1.74	0.089	0.01 (b)	NA	NA	NA	NA
AFI Plant #1 Common Stack	136	41.5	6.0	1.83	95,000	150	339	56.0	17.07	6.00	0.756	6.62	0.83	0.53	0.067
Limestone Silo Dust Collector	85	25.9	1.5	1.46	800	90	305	7.5	2.29	0.12	0.015 (b)	NA	NA	NA	NA
AFP Loadout System Dust Collector	15	4.6	1.0 x 3.5	0.64	15,000	90	305	55.6 (a)	16.95 (a)	2.22	0.28	NA	NA	NA	NA
PROPOSED NEW SOURCES															
AFI Plant # 2 Common Stack	136	41.5	6.0	1.83	95,000	150	339	56.0	17.07	6.00	0.756	6.62	0.83	0.53	0.067

Note: acfm = actual cubic feet per minute.
AFP = animal feed phosphate.
DE = diatomaceous earth.
NA = Not applicable.

(a) Discharge direction is horizontal; a velocity of 0.01 m/s was used for modeling purposes.
(b) Insignificant PM10 sources not included in modeling analysis.

Table 6-3. Stack and Vent Geometry and Future Maximum PM and PM10 Emissions for Cargill Fertilizer, Riverview

Title V Emission Unit No.	AIRS Number	Source	PM Emissions (lb/hr)	PM Emissions (g/sec)	PM10 Emissions (lb/hr)	PM10 Emissions (g/sec)	Stack/Vent Release Height (ft)	Stack/Vent Release Height (m)	Stack/Vent Diameter (ft)	Stack/Vent Diameter (m)	Gas Flow Rate (acfm)	Gas Exit Temperature (F)	Gas Exit Temperature (K)	Velocity (a) (ft/sec)	Velocity (a) (m/sec)	Discharge Direction (Vert./Horiz.)	Location (b) X Coordinate (ft)	Location (b) X Coordinate (m)	Location (b) Y Coordinate (ft)	Location (b) Y Coordinate (m)
1	22,23,24	No. 3 and No.4 MAP Plants and South Cooler	22.00	2.77	22.00	2.77	133	40.54	7.0	2.13	116,500	133	329	50.45	15.38	V	-1795	-547	-157	-48
2	55	No. 5 DAP Plant	12.80	1.61	12.80	1.61	133	40.54	7.0	2.13	121,732	110	316	52.72	16.07	V	-1711	-521	-133	-40
3	7	GTSP/DAP Manufacturing Plant	21.60	2.72	21.60	2.72	126	38.40	8.0	2.44	140,400	125	325	46.55	14.19	V	-1647	-502	27	8
4	70,71	Two GTSP Storage Buildings	NA	NA	NA	NA	NA	NA	NA	NA	NA	77	298	NA	NA	--	NA	NA	NA	NA
5	72	GTSP Truck Loading Station	0.53	0.07	0.53	0.07	38	11.58	2.7	0.81	2,200	77	298	6.55	2.00	H	-2355	-718	27	8
6	8	GTSP Ground Rock Handling	0.95	0.12	0.95	0.12	87	26.52	1.2	0.37	4,400	138	332	64.84	19.76	H	-1775	-541	67	21
7		Material Handling Conveyor																		
	51	West Baghouse	1.16	0.15	1.16	0.15	30	9.14	3.5	1.07	33,000	80	300	57.17	17.42	V	-879	-268	-1373	-418
	52	South Baghouse	1.16	0.15	1.16	0.15	40	12.19	1.5	0.46	4,500	80	300	42.44	12.94	H	-964	-294	-1601	-488
	53	Tower East Baghouse	3.10	0.39	3.10	0.39	50	15.24	2.5	0.76	12,000	80	300	40.74	12.42	H	-803	-245	-1425	-434
	58	Building No.6 Baghouse	0.62	0.08	0.62	0.08	30	9.14	1.2	0.35	3,630	80	300	57.24	17.45	H	-1820	-555	-419	-128
	59	Belt 7 to 8 Baghouse	0.62	0.08	0.62	0.08	45	13.72	1.2	0.35	3,630	80	300	57.24	17.45	H	-1820	-555	-522	-159
	60	Belt 8 to 9 Baghouse	1.19	0.15	1.19	0.15	75	22.86	1.6	0.48	6,930	80	300	59.54	18.15	H	-1188	-362	-1178	-359
8		Phosphate Rock Grinding/Drying System																		
	101,102	No. 5 & 9 Mill Dust Collectors	6.20	0.78	6.20	0.78	70	21.34	2.5	0.76	22,000	170	350	74.70	22.77	V	-1543	-470	482	147
9	73	Phosphoric Acid Production Facility	NA	NA	NA	NA	110	33.53	4.8	1.47	57,000	100	311	51.85	15.80	--	NA	NA	NA	NA
10	43	Auxiliary Steam Boiler	13.00	1.64	6.50	0.82	20	6.10	4.5	1.37	39,300	420	489	41.18	12.55	V	35	11	-191	-58
11	6	No. 9 Sulfuric Acid Plant	NA	NA	NA	NA	150	45.72	9.0	2.74	158,000	170	350	41.39	12.62	V	0	0	0	0
	5	No. 8 Sulfuric Acid Plant	NA	NA	NA	NA	150	45.72	8.0	2.44	153,700	150	339	50.96	15.53	V	255	78	-89	-27
	4	No. 7 Sulfuric Acid Plant	NA	NA	NA	NA	150	45.72	7.5	2.29	109,924	152	340	41.47	12.64	V	-60	-18	-422	-129
12		Sodium Silicofluoride/Sodium Fluoride Plant																		
	41	Dryer Scrubber	1.00	0.13	1.00	0.13	40	12.19	1.7	0.51	5,400	120	322	41.09	12.52	V	-1272	-388	35	11
	54	Material Handling Baghouse	0.69	0.09	0.69	0.09	30	9.14	1.3	0.41	4,000	90	305	47.99	14.63	V	-1350	-412	60	18
13	*	Molten Sulfur Handling																		
		Pits/Truck Loading (c)	0.44	0.06	0.44	0.06	8	2.44	0.3	0.10	135.00	240	389	26.31	8.02	V	78	24	-238	-73
		Tanks (d)	2.43	0.31	2.43	0.31	24	7.32	0.8	0.25	445	240	389	13.71	4.18	V	-586	-179	-362	-110
14		Animal Feed Plant																		
	79	DE Hopper Vent	0.09	0.01	0.09	0.01	64	19.51	1.5	0.46	600	90	305	5.66	1.72	--	-1689	-515	728	222
	78	AFI Plant No. 1 Stack	6.00	0.76	6.00	0.76	136	41.45	6.0	1.83	95,000	150	339	56.00	17.07	V	-1173	-358	413	126
	80	Limestone Silo	0.12	0.02	0.12	0.02	85	25.91	1.5	0.46	800	90	305	7.55	2.30	--	-1030	-314	522	159
	81	AFP Loadout System	2.22	0.28	2.22	0.28	15	4.57	2.1	0.64	15,000	90	305	71.43	21.77	V	-801	-244	528	161
	--	AFI Plant No. 2 Stack	6.00	0.76	6.00	0.76	136	41.45	6.0	1.83	95,000	150	339	56.00	17.07	V	-1293	-394	413	126
Total Emissions			103.92	13.09	97.4	12.27														

* AIRS Nos. 063, 064, 065, 066, 067, 068, 069, 074.
NA = No PM/PM10 or NOx emissions from this source.
(a) For modeling purposes, horizontal discharges were modeled with a velocity of 0.01 m/s.
(b) Relative to H2SO4 Plant No. 9 stack location.
(c) Assumes one pit being loaded for 24 hours/day.
(d) Assumes one tank being loaded for 24 hours/day.

Table 6-4. Facility Screening Analysis for PM Emitting Facilities (>20 TPY) in the Vicinity of Proposed Cargill Project

Facility Name/Location	Facility Location UTMs E (km)	N (km)	Relative to Cargill X(m)	Y(m)	Distance (km)	20 X (D-3)	PM Emissions (TPY)	Include in Modeling?
APAC-Florida, Inc.	347.1	3027.3	-15800	-55200	57.4	1088.3	163	NO
Adams Packing Association	421.7	3104.2	58800	21700	62.7	1193.5	144	NO
Agrico Chemical	400.0	3061.0	37100	-21500	42.9	797.6	84	NO
Agrico Chemical Co	362.1	3076.1	-800	-6400	6.4	69.0	195	YES
Agrico Chemical Co Pierce	403.7	3079.0	40800	-3500	40.9	759.0	840	YES
Agrico Chemical Co South Pierce	407.5	3071.5	44600	-11000	45.9	858.7	1096	YES
Alcoa	416.8	3116.0	53900	33500	63.5	1209.2	446	NO
Alcoma Packing - Lake Wales	451.6	3085.5	88700	3000	88.8	1715.0	263	NO
Allsun Products	413.5	3093.8	50600	11300	51.8	976.9	318	NO
Alumax Extrusions	385.6	3097.0	22700	14500	26.9	478.7	172	NO
Amcon Concrete	364.0	3075.0	1100	-7500	7.6	91.6	39	NO
Amcon Concrete	358.4	3090.2	-4500	7700	8.9	118.4	3	NO
Amcon Products	364.6	3092.8	1700	10300	10.4	148.8	32	NO
American Orange Corp	429.8	3047.3	66900	-35200	75.6	1451.9	181	NO
Amoco Oil	357.8	3092.0	-5100	9500	10.8	155.6	9	NO
Aristrech Chemical Corp	411.7	3085.9	48800	3400	48.9	918.4	7	NO
Asgrow Florida Company	388.6	3104.6	25700	22100	33.9	617.9	5	NO
Auburndale Cogeneration	420.8	3103.3	57900	20800	61.5	1170.5	161	NO
Bay Concrete	365.0	3084.0	2100	1500	2.6	-8.4	3	YES
Bay Concrete	365.1	3093.8	2200	11300	11.5	170.2	37	NO
Bio-Medical Service Corp of GA	413.9	3081.3	51000	-1200	51.0	960.3	46	NO
Bordo Citrus Product Inc	427.8	3097.5	64900	15000	66.6	1272.2	13	NO
Brannen Prestress Co.	353.7	3016.5	-9200	-66000	66.6	1272.8	100	NO
Brannen Prestress Co.	353.7	3016.5	-9200	-66000	66.6	1272.8	100	NO
C & M Products Co	405.5	3079.1	42600	-3400	42.7	794.7	162	NO
C F Industries Bonnie Mine Rd	408.4	3082.4	45500	-100	45.5	850.0	1319	YES
C&M Products	405.5	3079.1	42600	-3400	42.7	794.7	37	NO
C-Cure of Florida	386.0	3098.7	23100	16200	28.2	504.3	21	NO
CF Industries	388.0	3116.0	25100	33500	41.9	777.2	84	NO
CF Industries - Bartow	408.4	3082.4	45500	-100	45.5	850.0	790	NO
CSX Transportation Inc.	361.0	3089.0	-1900	6500	6.8	75.4	404	YES
Cargill Terminal	358.1	3091.7	-4800	9200	10.4	147.5	22	NO
Cargill/Nutrena Feed Division	360.8	3095.8	-2100	13300	13.5	209.3	21	NO
Cast Metals Corp	368.8	3094.6	5900	12100	13.5	209.2	8	NO
Cast-Crete Corp of Florida	371.9	3099.2	9000	16700	19.0	319.4	11	NO
Central Florida Hot-Mix	412.5	3097.7	49600	15200	51.9	977.5	19	NO
Central Phosphates Inc.	359.1	3089.8	-3800	7300	8.2	104.6	26	NO
Chapman Contracting	356.8	3068.4	-6100	-14100	15.4	247.3	4	NO
Chevron Asphalt Inc.	358.2	3092.0	-4700	9500	10.6	152.0	4	NO
Citrus Hill Mfg	447.9	3068.3	85000	-14200	86.2	1663.6	66	NO
Citrus World	441.0	3087.3	78100	4800	78.2	1504.9	601	NO
City of Tampa Dept.	364.0	3089.5	1100	7000	7.1	81.7	48	NO
Coca Cola	421.6	3103.7	58700	21200	62.4	1188.2	387	NO
Comco of America	361.4	3086.9	-1500	4400	4.6	33.0	9	NO
Commercial Metals Inc	358.5	3088.3	-4400	5800	7.3	85.6	108	YES
Conserv Inc.	398.7	3084.2	35800	1700	35.8	656.8	1598	YES
Consolidated Minerals Inc. Plant City	393.8	3096.3	30900	13800	33.8	616.8	756	YES
Couch Construction Co	364.3	3098.1	1400	15600	15.7	253.3	45	NO
Couch Construction Company	362.1	3096.7	-800	14200	14.2	224.5	26	NO
Crown Door Company	362.1	3092.5	-800	10000	10.0	140.6	13	NO
David J. Joseph Co.	364.0	3092.9	1100	10400	10.5	149.2	123	NO
Delta Asphalt	372.1	3105.4	9200	22900	24.7	433.6	72	NO
Dravo Lime Co.	362.9	3084.7	-0	2200	2.2	-16.0	48	YES
Driggers Concrete	360.0	3065.9	-2900	-16600	16.9	277.0	21	NO
ER Carpenter	397.0	3131.5	34100	49000	59.7	1134.0	55	NO
Earl Massey	440.4	3103.4	77500	20900	80.3	1545.4	39	NO
Eastern Association Terminal	360.2	3088.9	-2700	6400	6.9	78.9	534	YES
Eastern Electric Apparatus Repair Co.	366.6	3092.0	3700	9500	10.2	143.9	21	NO
Eger Concrete Eastside Dr N	410.5	3102.5	47600	20000	51.6	972.6	11	NO
Eger Concrete Lake Ida & 5th St	428.1	3102.0	65200	19500	68.1	1301.1	49	NO
Ennis Drum Service Inc	422.5	3102.5	59600	20000	62.9	1197.3	4	NO
Erly Juice Inc	399.0	3101.8	36100	19300	40.9	758.7	117	NO

Table 6-4. Facility Screening Analysis for PM Emitting Facilities (>20 TPY) in the Vicinity of Proposed Cargill Project

Facility Name/Location	Facility Location UTMs E (km)	N (km)	Relative to Cargill X(m)	Y(m)	Distance (km)	20 X (D-3)	PM Emissions (TPY)	Include in Modeling?
Ero Industries	427.5	3095.6	64600	13100	65.9	1258.3	33	NO
Estech	411.5	3074.2	48600	-8300	49.3	926.1	311	NO
Estech-Duette Phosphate Mine	388.9	3047.2	26000	-35300	43.8	816.8	750	NO
Ewell Ind Bonnie Mine Rd	407.7	3080.9	44800	-1600	44.8	836.6	96	NO
Ewell Ind S Florida Ave	406.3	3092.9	43400	10400	44.6	832.6	348	NO
Ewell Industries	367.1	3092.7	4200	10200	11.0	160.6	19	NO
Ewell Industries	367.0	3092.8	4100	10300	11.1	161.7	13	NO
FMC Corp/Citrus Machinery Division	409.6	3102.6	46700	20100	50.8	956.8	9	NO
FPC Bayboro	338.8	3071.3	-24100	-11200	26.6	471.5	2526	YES
FPC Intercession City 7EA Turbine (#180)	446.3	3126.0	83400	43500	94.1	1821.3	108	NO
FPC-Bartow	342.4	3082.6	-20500	100	20.5	350.0	9244	YES
Farmland Industries Green Bay Plant	409.5	3080.1	46600	-2400	46.7	873.2	1486	YES
Florida Brick & Clay Co	384.9	3097.1	22000	14600	26.4	468.1	26	NO
Florida Crushed Stone	358.9	3088.4	-4000	5900	7.1	82.6	20	NO
Florida Distillers Company	421.4	3102.9	58500	20400	62.0	1179.1	2	NO
Florida Fence Post	409.2	3039.9	46300	-42600	62.9	1198.3	6	NO
Florida Institute of Phosphate Research	415.0	3085.8	52100	3300	52.2	984.1	4	NO
Florida M & M	362.2	3066.2	-700	-16300	16.3	266.3	21	NO
Florida Mega-Mix	364.5	3093.4	1600	10900	11.0	160.3	22	NO
Florida Mining & Materials Alabama Lane	420.8	3103.4	57900	20900	61.6	1171.1	40	NO
Florida Petroleum	360.9	3094.0	-2000	11500	11.7	173.5	16	NO
Florida Power & Light	367.2	3054.1	4300	-28400	28.7	514.5	40179	YES
Florida Precast Concrete	360.4	3094.2	-2500	11700	12.0	179.3	132	NO
Florida Privitization Inc	418.3	3048.0	55400	-34500	65.3	1245.3	281	NO
Florida Rock Industries	416.6	3085.8	53700	3300	53.8	1016.0	57	NO
Florida Rock Industries	363.9	3093.5	1000	11000	11.0	160.9	8	NO
Florida Rock Industries	428.0	3105.2	65100	22700	68.9	1318.9	55	NO
Florida Rock Industry	365.8	3085.0	2900	2500	3.8	16.6	21	YES
Florida Rock Industry	362.3	3097.5	-600	15000	15.0	240.2	20	NO
Florida Steel Corp	364.6	3092.8	1700	10300	10.4	148.8	144	NO
Florida Tile	405.4	3102.4	42500	19900	46.9	878.6	309	NO
GAF Building Materials Corp	362.2	3087.2	-700	4700	4.8	35.0	57	YES
GNB Inc. (PAC CHL)	361.8	3088.3	-1100	5800	5.9	58.1	25	NO
Garder Asphalt Corp	360.8	3093.3	-2100	10800	11.0	160.0	5	NO
Gardinier	415.3	3063.3	52400	-19200	55.8	1056.1	175	NO
Garrison Stevedoring	357.8	3091.7	-5100	9200	10.5	150.4	182	YES
Gaylord Container Corp	366.3	3092.3	3400	9800	10.4	147.5	108	NO
General Chemical Corp	359.9	3092.3	-3000	9800	10.2	145.0	30	NO
Glen-Mar Concrete Products	363.2	3093.3	300	10800	10.8	156.1	22	NO
Gold Bond Building Products	347.3	3082.7	-15600	200	15.6	252.0	117	NO
Gold Bond Building Products	347.3	3082.7	-15600	200	15.6	252.0	117	NO
Golden Triangle Asphalt	333.8	3086.1	-29100	3600	29.3	526.4	1274	YES
Graves Enterprises Riverview	363.1	3085.3	200	2800	2.8	-3.9	350	YES
Griffin Industries	364.1	3096.4	1200	13900	14.0	219.0	4	NO
Gulf Coast Lead Company	364.0	3093.5	1100	11000	11.1	161.1	17	NO
Gulf Coast Metals	364.7	3093.6	1800	11100	11.2	164.9	13	NO
H & S Properties	360.3	3093.2	-2600	10700	11.0	160.2	9	NO
Hardee Memorial Hospital	419.2	3046.7	56300	-35800	66.7	1274.4	1	NO
Hardee Power Station Ft. Green Springs	404.8	3057.4	41900	-25100	48.8	916.9	1251	YES
Haynes Funeral Home Plant City	388.1	3100.3	25200	17800	30.9	557.1	6	NO
High Performance Finishers	428.0	3096.0	65100	13500	66.5	1269.7	12	NO
Hillsborough Animal Control Center	368.5	3092.7	5600	10200	11.6	172.7	11	NO
Hillsborough Co Resource Recovery	368.2	3092.7	5300	10200	11.5	169.9	172	YES
Hillsborough Co. Animal Control Center	364.9	3093.5	2000	11000	11.2	163.6	16	NO
Holly Hill	441.0	3115.4	78100	32900	84.7	1634.9	145	NO
Holman Inc.	359.3	3087.1	-3600	4600	5.8	56.8	54	NO
Hull Materials, Inc.	399.4	3070.6	36500	-11900	38.4	707.8	13	NO
Humana Hospital	429.9	3076.7	67000	-5800	67.3	1285.0	1	NO
Humana Hospital	373.3	3093.4	10400	10900	15.1	241.3	4	NO
Hydro Conduit Corp	363.8	3093.5	900	11000	11.0	160.7	2	NO
IMC Ft. Lonesome	389.6	3067.9	26700	-14600	30.4	548.6	678	YES
IMC Kingsford	398.2	3075.7	35300	-6800	35.9	659.0	422	NO

Table 6-4. Facility Screening Analysis for PM Emitting Facilities (>20 TPY) in the Vicinity of Proposed Cargill Project

	Facility Location UTMs		Relative to Cargill		Distance	20 X	PM Emissions	Include in
Facility Name/Location	E (km)	N (km)	X(m)	Y(m)	(km)	(D-3)	(TPY)	Modeling?
IMC Noralyn Mine	414.7	3080.3	51800	-2200	51.8	NA	NA	NO
IMC Port Sutton Terminal	360.1	3087.5	-2800	5000	5.7	54.6	442	YES
IMC Fertilizer New Wales	396.7	3079.4	33800	-3100	33.9	618.8	1430	YES
IMC Fertilizer Prairie	402.9	3087.0	40000	4500	40.3	745.0	288	NO
IMC Fertilizer Rainbow Division	402.3	3085.8	39400	3300	39.5	730.8	88	NO
IMC/Uranium Recovery C F Industries	408.4	3082.8	45500	300	45.5	850.0	1071	YES
Imperial Phosphate Ltd.	404.8	3069.5	41900	-13000	43.9	817.4	162	NO
International Paper Company	421.7	3104.3	58800	21800	62.7	1194.2	8	NO
International Salt Company	358.2	3090.2	-4700	7700	9.0	120.4	21	NO
John Carlos Florida	426.2	3104.1	63300	21600	66.9	1277.7	29	NO
Johnson Controls Battery Group, Inc.	359.9	3102.5	-3000	20000	20.2	344.5	156	NO
Kaiser Aluminum	408.3	3085.5	45400	3000	45.5	850.0	106	NO
Kaplan Industries	418.3	3079.3	55400	-3200	55.5	1049.8	53	NO
Kearney Development Company	368.7	3094.8	5800	12300	13.6	212.0	21	NO
Kimmins Recycling Corporation	360.4	3093.1	-2500	10600	10.9	157.8	66	NO
LaFarge Corp	357.7	3090.8	-5200	8300	9.8	135.9	1221	YES
LaFarge Corp.	356.3	3092.8	-6600	10300	12.2	184.7	51	NO
Laidlaw Environmental Services Inc	424.7	3091.9	61800	9400	62.5	1190.2	9	NO
Lakeland City Electric & Utilities	404.0	3105.3	41100	22800	47.0	880.0	8	NO
Lakeland City Power Larsen Power Station	409.3	3102.8	46400	20300	50.6	952.9	107	NO
Lakeland City Power McIntosh Power Station	409.2	3106.1	46300	23600	52.0	NA	NA	NO
Lehigh Portland Cement Co	361.3	3086.9	-1600	4400	4.7	33.6	7	NO
Lehigh Portland Cement Co Port Sutton	360.7	3086.8	-2200	4300	4.8	36.6	18	NO
Leisey Shell Corp	352.7	3064.8	-10200	-17700	20.4	348.6	20	NO
Lykes Pasco Packing	412.4	3096.5	49500	14000	51.4	968.8	48	NO
MacDill AFB	355.0	3080.6	-7900	-1900	8.1	102.5	2	NO
Macasphalt	423.1	3101.5	60200	19000	63.1	1202.5	70	NO
Manatee Scrap Processing	366.9	3053.8	4000	-28700	29.0	519.5	108	NO
Manna Pro Corporation	364.7	3092.6	1800	10100	10.3	145.2	16	NO
Marathon Petroleum Company	362.2	3087.2	-700	4700	4.8	35.0	13	NO
Metals & Materials Recycling	386.5	3097.4	23600	14900	27.9	498.2	1	NO
Mobil Mining & Minerals Big Four Mine	394.7	3069.6	31800	-12900	34.3	626.3	68	NO
Mobil Mining & Minerals SR 676	398.5	3085.1	35600	2600	35.7	653.9	990	YES
Mobil-Electrophos Division	405.6	3079.4	42700	-3100	42.8	796.2	544	NO
Monier Roof Tile	414.0	3102.5	51100	20000	54.9	1037.5	44	NO
National Portland Cement Co. of FL	346.4	3056.4	-16500	-26100	30.9	557.6	186	NO
Nitram	362.5	3089.0	-400	6500	6.5	70.2	218	YES
North American Salt Co	362.4	3065.7	-500	-16800	16.8	276.1	5	NO
Orange Co of Florida	418.7	3083.6	55800	1100	55.8	1056.2	119	NO
Orlando Utilities Station #1	463.5	3116.0	100600	33500	106.0	2060.6	84	NO
Orlando Utilities Station #2	483.5	3150.6	120600	68100	138.5	2710.0	375	NO
Ott-Laughlin	427.8	3099.7	64900	17200	67.1	1282.8	1	NO
Owens-Brockway Glass Container	423.4	3102.3	60500	19800	63.7	1213.2	189	NO
Packaging Corp of America	423.4	3102.8	60500	20300	63.8	1216.3	38	NO
Pakhoed Dry Bulk Terminals	360.8	3087.3	-2100	4800	5.2	44.8	483	YES
Paktank Florida	360.8	3087.3	-2100	4800	5.2	44.8	178	YES
Palm Harbor Homes	391.8	3101.5	28900	19000	34.6	631.7	22	NO
Pavers Incorporated	414.0	3098.2	51100	15700	53.5	1009.1	479	NO
Pavex Corp	413.0	3086.2	50100	3700	50.2	944.7	44	NO
Pembroke Materials Inc	420.4	3075.2	57500	-7300	58.0	1099.2	12	NO
Pinellas Co. Resource Recovery Facility	335.2	3084.1	-27700	1600	27.7	494.9	329	NO
Purina Mills	402.0	3087.0	39100	4500	39.4	727.2	88	NO
Quikrete of Florida	412.8	3099.0	49900	16500	52.6	991.1	253	NO
R & L Metals	363.6	3093.0	700	10500	10.5	150.5	5	NO
R C Martin Concrete Products	388.6	3092.1	25700	9600	27.4	488.7	28	NO
R V Shulnburg	362.5	3097.3	-400	14800	14.8	236.1	6	NO
Reed Minerals Division	362.2	3085.5	-700	3000	3.1	1.6	70	YES
Resource Recovery of America Inc	401.8	3085.8	38900	3300	39.0	720.8	10	NO
Reynolds Aluminum Recycling	362.7	3097.5	-200	15000	15.0	240.0	14	NO
Ridge Cogeneration	416.7	3100.4	53800	17900	56.7	1074.0	414	NO
Ridge Pallets Inc	419.1	3078.1	56200	-4400	56.4	1067.4	96	NO
Ridge Pallets Inc.	418.6	3084.1	55700	1600	55.7	1054.5	165	NO

Table 6-4. Facility Screening Analysis for PM Emitting Facilities (>20 TPY) in the Vicinity of Proposed Cargill Project

Facility Name/Location	Facility Location UTMs E (km)	N (km)	Relative to Cargill X(m)	Y(m)	Distance (km)	20 X (D-3)	PM Emissions (TPY)	Include in Modeling?
Rinker Cencon Corp	412.4	3099.0	49500	16500	52.2	983.6	159	NO
Rinker Materials Corp	364.9	3084.4	2000	1900	2.8	-4.8	8	YES
Rinker Materials Corp.	392.2	3100.0	29300	17500	34.1	622.6	14	NO
Rinker Materials Corporation	363.2	3098.1	300	15600	15.6	252.1	22	NO
Royster Co	362.6	3098.4	-300	15900	15.9	258.1	18	NO
Royster Company	406.8	3085.1	43900	2600	44.0	819.5	1393	YES
Sani-Med Inc.	359.8	3079.9	-3100	-2600	4.0	20.9	16	NO
Schering Berlin Polymers	410.7	3098.9	47800	16400	50.5	950.7	30	NO
Scrapall Inc.	359.4	3093.1	-3500	10600	11.2	163.3	31	NO
Cargill Fertilizer - Bartow (Seminole Fertilizer)	409.8	3086.7	46900	4200	47.1	881.8	2760	YES
South Bay Hospital	365.3	3065.1	2400	-17400	17.6	291.3	18	NO
Southeastern Galvanizing Division	368.5	3094.5	5600	12000	13.2	204.8	21	NO
Southeastern Wire	368.3	3094.5	5400	12000	13.2	203.2	21	NO
Southern Culvert	391.5	3095.0	28600	12500	31.2	564.2	17	NO
Southern Mill Creek Products Inc.	362.8	3097.7	-100	15200	15.2	244.0	6	NO
Southern Prestressed	363.2	3098.4	300	15900	15.9	258.1	2	NO
Southport Stevedore	358.5	3091.8	-4400	9300	10.3	145.8	30	NO
Speedling, Inc.	354.1	3062.2	-8800	-20300	22.1	382.5	19	NO
Standard Sand & Silica	441.5	3118.2	78600	35700	86.3	1666.6	286	NO
Stauffer Chemical Company	365.3	3093.6	2400	11100	11.4	167.1	9	NO
Stilwell Foods of Florida	389.8	3098.9	26900	16400	31.5	570.1	2	NO
Sulfur Terminals Co	358.0	3090.0	-4900	7500	9.0	119.2	9	NO
Sulfuric Acid Trading Company	349.0	3081.5	-13900	-1000	13.9	218.7	1204	YES
Sun Pac Foods	422.7	3092.6	59800	10100	60.6	1152.9	62	NO
Surfacing Products of America	347.5	3037.6	-15400	-44900	47.5	889.4	153	NO
TECO Big Bend	361.9	3075.0	-1000	-7500	7.6	91.3	7897	YES
TECO Gannon	360.0	3087.5	-2900	5000	5.8	55.6	5857	YES
TECO Hooker's Point	358.0	3091.0	-4900	8500	9.8	136.2	1231	YES
TECO Polk	402.5	3067.4	39600	-15100	42.4	787.6	438	NO
Tampa Armature Works	365.6	3091.7	2700	9200	9.6	131.8	13	NO
Tampa Bay Crematory	372.9	3090.7	10000	8200	12.9	198.6	10	NO
Tampa Bay Stevedores Inc	358.3	3088.6	-4600	6100	7.6	92.8	24	NO
Tampa City McKay Bay Refuse-to-Energy	360.0	3091.9	-2900	9400	9.8	136.7	344	YES
Tampa Sand & Material	360.1	3092.2	-2800	9700	10.1	141.9	17	NO
Tarmac Florida	362.8	3098.4	-100	15900	15.9	258.0	23	NO
Tarmac Florida Hialeah	362.8	3097.0	-100	14500	14.5	230.0	36	NO
The Florida Brewery	422.8	3104.7	59900	22200	63.9	1217.6	121	NO
The Gibson-Homans	365.5	3094.8	2600	12300	12.6	191.4	21	NO
The Mancini Packing Company	421.4	3040.8	58500	-41700	71.8	1376.8	1	NO
Treasure Isle Inc.	378.0	3096.9	15100	14400	20.9	357.3	11	NO
Triangle Pacific Corp	413.3	3098.8	50400	16300	53.0	999.4	6	NO
Tropicana Products, Inc.	346.8	3040.9	-16100	-41600	44.6	832.1	969	YES
US Agri-Chemicals Hwy 60	413.2	3086.3	50300	3800	50.4	948.9	443	NO
US Agri-Chemicals Hwy 630	416.0	3069.0	53100	-13500	54.8	NA	NA	NO
Union Camp Corp	402.0	3102.0	39100	19500	43.7	813.9	47	NO
Union Oil Company of California	358.0	3089.1	-4900	6600	8.2	104.4	14	NO
Universal Waste & Transit	384.9	3093.7	22000	11200	24.7	433.7	7	NO
Unocal Chemical Division	358.4	3088.4	-4500	5900	7.4	88.4	15	NO
Verlite Co	363.0	3098.1	100	15600	15.6	252.0	64	NO
Vigoro Industries Inc.	427.9	3097.4	65000	14900	66.7	1273.7	136	NO
W R Bonasal Co	363.6	3098.1	700	15600	15.6	252.3	19	NO
W R Grace & Co	380.2	3093.0	17300	10500	20.2	344.7	11	NO
Wachula City Power	418.4	3047.0	55500	-35500	65.9	1257.6	21	NO
Westcon	375.3	3092.8	12400	10300	16.1	262.4	21	NO
Weyerhaeuser Co	362.8	3098.3	-100	15800	15.8	256.0	25	NO
Zipperer S. Agape Mortuary Services	363.0	3064.7	100	-17800	17.8	296.0	21	NO

Note: The Cargill Riverview facility is located at UTM Coordinates 362.9 km E, 3082.5 km N

Table 6-5. Stack and Vent Geometry and NOx Emissions for Cargill Fertilizer, Riverview

AIRS Number		NOx Emissions (TPY)	NOx Emissions (g/sec)	Stack/Vent Release Height (ft)	Stack/Vent Release Height (m)	Stack/Vent Diameter (ft)	Stack/Vent Diameter (m)	Gas Flow Rate (acfm)	Gas Exit Temperature (F)	Gas Exit Temperature (K)	Velocity (ft/sec)	Velocity (m/sec)	Location (a) X Coordinate (ft)	Location (a) X Coordinate (m)	Location (a) Y Coordinate (ft)	Location (a) Y Coordinate (m)
								1987 PSD Baseline								
22,23	No. 3 and No.4 MAP Plants and South Cooler	0.40	0.012	90	27.43	3.33	1.01	35,000	140	333.15	66.98	20.42	-1795	-547	-157	-48
55	No. 5 DAP Plant	2.40	0.069	133	40.54	7.00	2.13	116,500	108	315.37	50.45	15.38	-1711	-521	-133	-40
43	Auxiliary Steam Boiler	0.77	0.022	20	6.10	4.50	1.37	39,300	420	488.71	41.18	12.55	35	11	-191	-58
41	Sodium Silicofluoride/Sodium Fluoride Plant	0.74	0.021	40	12.19	1.67	0.51	5,400	120	322.04	41.09	12.52	-1272	-388	35	11
101,102	Phosphate Rock Grinding/Drying System	0.05	0.001	60	18.29	1.92	0.59	10,000	140	333.15	57.56	17.55	-1543	-470	482	147
7	GTSP/DAP Manufacturing Plant	6.10	0.175	126	38.40	8.00	2.44	140,000	125	324.82	46.42	14.15	-1647	-502	27	8
6	No. 9 Sulfuric Acid Plant (b)	41.40	1.191	150	45.72	9.00	2.74	149,000	152	340.00	39.04	11.90	0	0	0	0
5	No. 8 Sulfuric Acid Plant (b)	28.10	0.808	150	45.72	8.00	2.44	105,000	150	338.71	34.82	10.61	255	78	-89	-27
4	No. 7 Sulfuric Acid Plant (b)	30.90	0.889	150	45.72	7.50	2.29	122,000	170	350.00	46.03	14.03	-60	-18	-422	-129
	Total NOx Emissions	110.86	3.190													
								Current Sources with Proposed Modification								
22,23,24	No. 3 and No.4 MAP Plants and South Cooler	2.07	0.060	133	40.54	7.00	2.13	116,500	133	329	50.45	15.38	-1795	-547	-157	-48
55	No. 5 DAP Plant	24.55	0.706	133	40.54	7.00	2.13	121,732	110	316	52.72	16.07	-1711	-521	-133	-40
7	GTSP/DAP Manufacturing Plant	36.83	1.059	126	38.40	8.00	2.44	140,400	125	325	46.55	14.19	-1647	-502	27	8
	Phosphate Rock Grinding/Drying System															
101,102	No. 5 & 9 Mill Dust Collectors	15.98	0.460	70	21.34	2.50	0.76	22,000	170	350	74.70	22.77	-1543	-470	482	147
43	Auxiliary Steam Boiler	313.17	9.009	20	6.10	4.50	1.37	39,300	420	489	41.18	12.55	35	11	-191	-58
6	No. 9 Sulfuric Acid Plant	65.7	1.890	150	45.72	9.00	2.74	158,000	170	350	41.39	12.62	0	0	0	0
5	No. 8 Sulfuric Acid Plant	59.1	1.700	150	45.72	8.00	2.44	153,700	150	339	50.96	15.53	255	78	-89	-27
4	No. 7 Sulfuric Acid Plant	48.2	1.387	150	45.72	7.50	2.29	109,924	152	340	41.47	12.64	-60	-18	-422	-129
	Sodium Silicofluoride/Sodium Fluoride Plant															
41	Dryer Scrubber	1.69	0.049	40	12.19	1.67	0.51	5,400	120	322	41.09	12.52	-1272	-388	35	11
	Animal Feed Plant															
78	AFI Plant No. 1 Stack	28.45	0.818	136	41.45	6.00	1.83	95,000	150	339	56.00	17.07	-1173	-358	413	126
--	AFI Plant No. 2 Stack	28.45	0.818	136	41.45	6.00	1.83	95,000	150	339	56.00	17.07	-1293	-394	413	126
		624.2	18.0													

a) Relative to H2SO4 Plant No. 9 stack location.
b) Based on emission factor of 0.12 lb/ton of 100% H2SO4: No. 7 H2SO4 - 514,991 tons H2SO4.
No. 8 H2SO4 - 468,283 tons H2SO4.
No. 9 H2SO4 - 689,423 tons H2SO4.

Notes:
Baseline Stack parameters for the No. 3 and No. 4 MAP Plants based on 1991 application.
Baseline Stack parameters for the No. 5 DAP Plant based on 1987 application.

Table 6-6. Facility Screening Analysis for NOx Emitting Facilities (>20 TPY) within 52 km of Proposed Cargill Riverview

APIS ID	Facility Name/Location	Facility Location UTMs E (km)	N (km)	Relative to Cargill X(m)	Y(m)	Distance (km)	20 X (D-1.5)	NOx Emissions (TPY)	Include in Modeling?
40HIL290008	Cargill Riverview	362.9	3082.5	0	0	0.0	-30.0	452.90	YES
40HIL290039	TECO Big Bend	361.9	3075.0	-1000	-7500	7.6	121.3	82,622	YES
40MAN410007	Tropicana Products, Inc Bradenton	346.8	3040.9	-16100	-41600	44.6	862.1	1,420	YES
40PNL520013	FPC -Bayboro	338.8	3071.3	-24100	-11200	26.6	501.5	1,936	YES
40HIL290040	TECO Gannon	360.0	3087.5	-2900	5000	5.8	85.6	79,085	YES
40HIL290029	Nitram	362.5	3089.0	-400	6500	6.5	100.2	964	YES
40TPA53????	TECO Polk Power Station	404.9	3057.1	39600	-15100	42.4	817.6	2,342	YES
--	Seminole Electric Hardee Unit 3	404.8	3057.4	41900	-25100	48.8	946.9	1,206	YES
40PNL520011	FPC - Bartow	342.4	3082.6	-20500	100	20.5	380.0	7,783	YES
40TPA250015	TPS Hardee Power Station	404.9	3107.9	42000	-25400	49.1	951.7	2,102	YES
40HIL290038	TECO-Hookers Pt. Sta	358.0	3091.0	-4900	8500	9.8	166.2	4,560	YES
40HIL290127	McKay Bay Refuse-To-Energy	360.0	3091.9	-2900	9400	9.8	166.7	1,317	YES
40HIL290261	Hillsborough County RRF	368.2	3092.7	5300	10200	11.5	199.9	1,542	YES
40TPA530059	IMC Agrico- New Wales	396.7	3079.4	33800	-3100	33.9	648.8	613	NO
40PNL520117	Pinellas RRF	335.2	3084.1	-27700	1600	27.7	524.9	947	YES
--	FPC Polk County Site	414.3	3073.9	51400	-8600	52.1	1,012.3	814	NO
40PNL520012	FPC - Higgins	336.5	3098.4	-26400	15900	30.8	586.4	9,020	YES
40MAN41007	FPL Manatee	367.2	3054.1	4300.0	-2800	28.3	536.6	22,732	YES
40TPA530046	Cargill-Bartow Plant	409.8	3086.6	46900	4100	47.1	912	666.3	NO

Note: Cargill Riverview is located at UTM Coordinates 362.9 km E, 3082.5 km N
Significant impact distance for NOx is 1.5 km.

Table 6-7. Stack and Vent Geometry and Baseline (1974) Particulate Matter Emissions for Cargill Fertillizer, Riverview

Source	Particulate Matter Emissions		Stack/Vent Release Height		Stack/Vent Diameter		Gas Flow Rate		Moisture	Gas Exit Temperature			Velocity		Location (a)			
							Standard	Actual							X Coordinate		Y Coordinate	
	(lb/hr)	(g/sec)	(ft)	(m)	(ft)	(m)	(dscfm)	(acfm)	(% H20)	(C)	(F)	(K)	(ft/sec)	(m/sec)	(ft)	(m)	(ft)	(m)
Ammonia Plant	22.25	2.803	60	18.29	8.33	2.54	36,796	74,716	1	316	601	589	11.25	3.43	-2233	-681	-1028	-313
Auxiliary Steam Boiler	0.79	0.100	20	6.10	4.50	1.37	23,283	38,207	1	203	397	476	24.41	7.44	35	11	-191	-58
Sodium Silicofluoride/Sodium Fluoride Plant	2.43	0.307	28	8.53	2.50	0.76	2,337	2,594	5.3	35	95	308	7.95	2.42	-1272	-388	35	11
No. 2 and No. 3 Rock Silo Bag Filter	0.90	0.114	93	28.35	1.04	0.32	2,510	2,781	4.2	38	100	311	49.22	15.00	-1272	-388	35	11
Nos. 6, 7, and 8 Rock Mills	5.21	0.656	95	28.96	1.99	0.61	9,560	10,466	4.6	33	91	306	51.40	15.67	-1272	-388	35	11
No. 10 KVS Mill	3.67	0.462	87	26.52	1.60	0.49	6,870	8,154	7.7	48	118	321	57.25	17.45	-790	-241	664	202
No. 11 KVS Mill	3.00	0.378	70	21.34	1.60	0.49	6,075	7,364	8.5	52	126	325	50.63	15.43	-790	-241	664	202
No. 12 KVS Mill	1.33	0.168	71	21.64	1.60	0.49	5,480	6,833	9.4	58	136	331	45.67	13.92	-790	-241	664	202
No. 2 Air Slide North Bag Filter	0.58	0.072	85	25.91	0.92	0.28	1,450	1,606	4.8	36	97	309	36.62	11.16	-996	-303	1138	347
No. 2 Air Slide South Bag Filter	0.28	0.035	96	29.26	0.86	0.26	2,147	2,489	6.1	46	115	319	61.70	18.80	-996	-303	1247	380
No. 3 Air Slide North Bag Filter	0.15	0.019	82	24.99	1.24	0.38	520	623	9.4	45	113	318	7.22	2.20	-996	-303	1138	347
No. 3 Air Slide Center Bag Filter	0.50	0.063	115	35.05	1.60	0.49	1,343	1,569	6.5	47	117	320	11.19	3.41	-996	-303	1138	347
No. 3 Air Slide South Bag Filter	0.80	0.101	96	29.26	1.64	0.50	990	1,117	3.2	47	117	320	7.86	2.39	-790	-241	664	202
No. 3 Air Slide Bin Bag Filter	0.91	0.114	108	32.92	1.24	0.38	1,350	1,558	4.5	50	122	323	18.75	5.72	-996	-303	1247	380
No. 2 Phosphoric Acid System	7.46	0.940	109	33.22	4.01	1.22	19,973	28,517	20.4	60	140	333	26.42	8.05	-996	-303	1138	347
No. 3 Phosphoric Acid System	5.08	0.640	93	28.35	4.01	1.22	11,915	14,733	11.4	48	118	321	15.76	4.80	-996	-303	1247	380
No. 1 Horizontal Filter Scrubber	6.21	0.782	59	17.98	4.75	1.45	34,970	37,913	4.3	31	88	304	32.93	10.04	-1250	-381	1092	333
No. 2 Horizontal Filter Scrubber	6.00	0.756	51	15.54	4.01	1.22	31,915	34,897	4.8	32	90	305	42.22	12.87	-1250	-381	1092	333
No. 2 Horizontal Filter Vacuum System	0.02	0.003	4.5	1.37	1.13	0.34	625	833	16.8	52	126	325	10.42	3.18	-1250	-381	1092	333
No. 3 Horizontal Filter Vacuum System	0.13	0.016	4.5	1.37	1.51	0.46	1,197	1,562	15.0	52	126	325	11.08	3.38	-1250	-381	1092	333
No. 7 Oil-Fired Concentrator	7.58	0.955	78	23.77	6.00	1.83	15,680	29,152	36.3	74	165	347	9.23	2.81	-1250	-381	1092	333
No. 8 Oil-Fired Concentrator	14.42	1.816	78	23.77	6.00	1.83	16,580	28,376	31.6	70	158	343	9.76	2.98	-1250	-381	1092	333
GTSP Bag Filter	0.35	0.044	88	26.82	1.29	0.39	1,475	1,782	3.95	67	153	340	18.91	5.76	-1775	-541	67	21
GTSP Plant	18.29	2.305	126	38.40	7.99	2.44	76,000	99,905	15.1	54	129	327	25.23	7.69	-1647	-502	27	8
No. 5 and No. 9 Mills Bag Filter	10.21	1.286	66	20.12	1.99	0.61	9,445	10,802	4.8	46	115	319	50.78	15.48	-1543	-470	482	147
No. 3 Triple Reactor Belt	6.21	0.782	65	19.81	4.01	1.22	32,170	33,949	3.3	26	79	299	42.55	12.97	-1250	-381	683	208
No. 4 Triple Reactor Belt	4.75	0.598	65	19.81	4.01	1.22	34,525	36,493	4.1	24	75	297	45.67	13.92	-1250	-381	683	208
No. 3 Continuous Triple Dryer	14.42	1.816	68	20.73	3.50	1.07	20,320	24,985	10.9	48	118	321	35.28	10.75	-1250	-381	683	208
No. 4 Continuous Triple Dryer	9.00	1.134	68	20.73	3.50	1.07	28,220	32,555	7.4	40	104	313	48.99	14.93	-1250	-381	683	208
Nos. 2 & 4 Sizing Units	4.09	0.516	74	22.56	4.01	1.22	20,165	21,187	3.2	25	77	298	26.67	8.13	-1250	-381	683	208
Normal Superphosphate	0.45	0.057	73	22.25	2.50	0.76	11,820	13,694	7.5	41	106	314	40.20	12.25	-1250	-381	683	208
No. 1 Ammonium Phosphate Plant	9.38	1.181	90	27.43	4.01	1.22	26,060	37,349	20.7	60	140	333	34.47	10.51	-1696	-517	264	80
No. 2 Ammonium Phosphate Plant	11.67	1.470	90	27.43	3.50	1.07	27,190	36,608	16.6	56	133	329	47.20	14.39	-1696	-517	264	80
No. 3 Ammonium Phosphate Plant	13.08	1.648	90	27.43	3.50	1.07	24,530	35,865	21.8	62	144	335	42.59	12.98	-1660	-506	346	105
No. 4 Ammonium Phosphate Plant	6.96	0.877	90	27.43	3.50	1.07	21,290	32,834	25.2	65	149	338	36.96	11.27	-1660	-506	346	105
North Ammonium Phosphate Cooler	47.00	5.922	54	16.46	4.34	1.32	40,400	48,418	4.6	62	144	335	45.50	13.87	-1696	-517	264	80
South Ammonium Phosphate Cooler	37.17	4.683	54	16.46	4.34	1.32	42,660	49,137	3.7	52	126	325	48.04	14.64	-1660	-506	346	105
Material Handling- West Baghouse	1.16	0.150	30	9.14	3.50	1.07	--	33,000	--	--	80	300	57.17	17.42	-879	-268	-1373	-418
Material Handling- South Baghouse	1.16	0.150	40	12.19	1.50	0.46	--	4,500	--	--	80	300	42.44	12.94	-964	-294	-1601	-488
Material Handling- Tower Baghouse	3.10	0.390	50	15.24	2.50	0.76	--	12,000	--	--	80	300	40.74	12.42	-803	-245	-1425	-434
Molten Sulfur Handling- Pits	0.44	0.060	8	2.44	0.30	0.10	--	135	--	--	240	389	26.31	8.02	78	24	-238	-73
Molten Sulfur Handling- Tanks	2.43	0.310	24	7.32	0.80	0.25	--	445	--	--	240	389	13.71	4.18	-586	-179	-362	-110
Total Particulate	291.01	36.682																

(a) Relative to H2SO4 No. 9 stack location.

Source: 1974 Annual Air Operating Report to Hillsborough County.

Table 6-8. Cargill Property Boundary Receptors Used in the Modeling Analysis

Direction (deg)	Distance (m)	Direction (deg)	Distance (m)
10	965	190	362
20	805	200	390
30	675	210	796
40	597	220	971
50	550	230	1,296
60	525	240	1,512
70	517	250	1,494
80	524	260	1,019
90	550	270	1,064
100	596	280	1,151
110	414	290	1,296
120	338	300	1,421
130	294	310	1,623
140	285	320	1,962
150	293	330	2,000
160	311	340	1,843
170	343	350	1,759
180	347	360	1,245

Note: Distances are relative to the H_2SO_4 No. 9 plant stack location.
deg = degree.
m = meter.

Table 6-9. Chassahowitzka Wilderness Area Receptors Used in the Modeling Analysis

UTM Coordinates		Relative to Cargill[a]	
East (km)	North (km)	X (m)	Y (m)
340.3	3165.7	-22600	83200
340.3	3167.7	-22600	85200
340.3	3169.8	-22600	87300
340.7	3171.9	-22200	89400
342.0	3174.0	-20900	91500
343.0	3176.2	-19900	93700
343.7	3178.3	-19200	95800
342.4	3180.6	-20500	98100
341.1	3183.4	-21800	100900
339.0	3183.4	-23900	100900
336.5	3183.4	-26400	100900
334.0	3183.4	-28900	100900
331.5	3183.4	-31400	100900

[a] Used for AQRV Analysis.

Table 6-10. Building Dimensions for Cargill Riverview Plant Structures Used in the Modeling Analysis

Structure	Height (ft)	Height (m)	Length (ft)	Length (m)	Width (ft)	Width (m)
Phosphoric Acid Plant						
South Building	100	30.48	73	22.25	33	10.06
North Building	100	30.48	76	23.16	46	14.02
Dry Rock Processing Plant						
No 5/9 Mills Building	35	10.67	75	22.86	47	14.33
Animal Feed Proc. Plant						
AFI Building	120	36.58	120	36.58	30	9.14
AFI Loadout Silos	100	30.48	298	90.83	37	11.28
Material Storage Area						
Building No. 6	74	22.56	812	247.50	122	37.19
Building No. 5	54.7	16.67	879	267.92	174	53.04
Building No. 4	54.7	16.67	799	243.54	105	32.00
Building No. 2 (Bottom)	62	18.90	919	280.11	102	31.09
Building No. 2 (Top)	70.1	21.37	402	122.53	126	38.40
GTSP Building	127	38.71	127	38.71	64	19.51
DAP 5 Building Tier A	86.5	26.37	100	30.48	46	14.02
DAP 5 Building Tier B	126.5	38.56	37	11.28	27	8.23
Map 3/4 Building	90	27.43	109	33.22	54	16.46
Docks						
West Building	30	9.14	126	38.40	100	30.48
East Building Tier A	30	9.14	130	39.62	80	24.38
East Building Tier B	50	15.24	60	18.29	50	15.24
Sulfuric Acid Plant						
Auxiliary Boiler Building	18	5.49	46	14.02	45	13.72

Table 6-11. Maximum Predicted PM10 Impacts Due to the Proposed Project Only - Screening Analysis

Averaging Time	Concentration ($\mu g/m^3$)	Receptor Location[a]		Period Ending (YYMMDDHH)
Site Vicinity		Direction (degrees)	Distance (m)	
Annual	1.9	260.	1019.	87123124
	1.2	260.	1019.	88123124
	1.0	200.	390.	89123124
	2.2	260.	1019.	90123124
	2.1	260.	1019.	91123124
24-Hour	14.3	140.	285.	87121124
	11.2	140.	285.	88050624
	9.0	200.	390.	89070424
	12.2	260.	1019.	90110424
	14.4	260.	1019.	91102224
Chassahowitzka NWA		UTM-E (m)	UTM-N (m)	
Annual	0.00122	342000.	3174000.	87123124
	0.00215	340300.	3165700.	88123124
	0.00376	342000.	3174000.	89123124
	0.00221	340700.	3171900.	90123124
	0.00147	343000.	3176200.	91123124
24-Hour	0.043	343000.	3176200.	87121224
	0.073	331500.	3183400.	88090524
	0.093	343700.	3178300.	89030624
	0.078	343700.	3178300.	90021924
	0.053	340300.	3167700.	91012024

Note: Impacts reported are highest predicted.
YY=Year, MM=Month, DD=Day, HH=Hour.

[a] Relative to H_2SO_4 Plant No. 9 stack location. Impacts reported are highest predicted.

Table 6-12. Maximum Predicted NO_x Impacts Due to the Proposed Project Only - Screening Analysis

Averaging Time	Concentration ($\mu g/m^3$)	Receptor Location[a]		Period Ending (YYMMDDHH)
Site Vicinity		Direction (degrees)	Distance (m)	
Annual	1.20	260.	1019.	87123124
	0.78	260.	1019.	88123124
	0.50	260.	1019.	89123124
	1.35	260.	1019.	90123124
	1.30	260.	1019.	91123124
Chassahowitzka NWA		UTM-E (m)	UTM-N (m)	
Annual	0.001	342000.	3174000.	87123124
	0.002	340300.	3165700.	88123124
	0.003	342000.	3174000.	89123124
	0.002	340300.	3167700.	90123124
	0.001	343000.	3176200.	91123124

Note: Impacts reported are highest predicted.
YY=Year, MM=Month, DD=Day, HH=Hour.

[a] Relative to H_2SO_4 Plant No. 9 stack location. Impacts reported are highest predicted.

Table 6-13. Maximum Predicted PM10 Concentrations for All Sources - AAQS Screening Analysis

Averaging Time	Modeled Sources' Concentration ($\mu g/m^3$)	Receptor Location[a] Direction (degrees)	Receptor Location[a] Distance (m)	Period Ending (YYMMDDHH)
Annual				
	18.5	260.	1019.	87123124
	18.5	220.	971.	88123124
	22.4	210.	796.	89123124
	19.3	260.	1019.	90123124
	17.4	260.	1019.	91123124
HIGH 24-Hour				
	76	350.	3000.	87050824
	76	350.	3000.	88042824
	89	200.	800.	89030724
	69	20.	3000.	90061124
	77	20.	3000.	91062624
HSH 24-Hour				
	65	10.	3000.	87121124
	75	350.	3000.	88040824
	84	200.	800.	89050724
	62	360.	3000.	90061124
	71	30.	3000.	91021124

Note: YY=Year, MM=Month, DD=Day, HH=Hour.

[a] Relative to H_2SO_4 Plant No. 9 stack location.

Table 6-14. Maximum Predicted PM10 Concentrations for All Sources Compared With AAQS--Refined Analysis

Averaging Time	Concentration ($\mu g/m^3$)			Receptor Location[a]		Period Ending (YYMMDDHH)	Florida AAQS ($\mu g/m^3$)
	Total	Modeled Sources	Background	Direction (degrees)	Distance (m)		
Annual	43	23	20	216	890	89123124	50
HSH 24-Hour	113	93	20	198	700	89030724	150

Note: YY = year.
MM = month.
DD = day.
HH = hour.
HSH = highest, second-highest.

[a] Relative to H_2SO_4 Plant No. 9 stack location.

Source: KBN, 1994.

Table 6-15. Maximum Predicted NO_2 Concentrations for All Sources - AAQS Screening Analysis

Averaging Time	Modeled Sources' Concentration ($\mu g/m^3$)	Receptor Location[a] Direction (degrees)	Receptor Location[a] Distance (m)	Period Ending (YYMMDDHH)
Annual				
	9.63	100.	596.	87123187
	10.87	220.	971.	88123188
	13.39	200.	800.	89123189
	10.05	260.	1019.	90123190
	9.65	260.	1019.	91123191

Note: YY=Year, MM=Month, DD=Day, HH=Hour.

[a] Relative to H_2SO_4 Plant No. 9 stack location.

Table 6-16. Maximum Predicted NO_2 Concentrations for All Sources Compared With AAQS--Refined Analysis

Averaging Time	Year	Concentration ($\mu g/m^3$)			Receptor Location[a]		Period Ending (YYMMDDHH)	Florida AAQS ($\mu g/m^3$)
		Total	Modeled Sources	Background	Direction (degrees)	Distance (m)		
Annual	1989	34.5	13.5	21	200	900	89123124	100

Note: YY = year.
MM = month.
DD = day.
HH = hour.
HSH = highest, second-highest.

[a] Relative to H_2SO_4 Plant No. 9 stack location.

Table 6-17. Maximum Predicted PM10 Increment Consumption - PSD Class II Screening Analysis

Averaging Time	Concentration ($\mu g/m^3$)	Receptor Location[a] Direction (degrees)	Receptor Location[a] Distance (m)	Period Ending (YYMMDDHH)
Annual				
	0.66	60.	3000.	87123124
	0.68	80.	3000.	88123124
	0.88	120.	3000.	89123124
	0.96	170.	3000.	90123124
	0.71	170.	3000.	91123124
HIGH 24-Hour				
	12.24	240.	3000.	87041324
	10.91	260.	1019.	88020424
	12.68	200.	3000.	89091624
	11.69	260.	1019.	90083124
	11.39	260.	1019.	91052124
HSH 24-Hour				
	11.22	220.	3000.	87100624
	8.45	180.	3000.	88020424
	10.98	200.	2500.	89092624
	10.47	140.	2500.	90083124
	10.35	200.	3000.	91051624

Note: YY=Year, MM=Month, DD=Day, HH=Hour.

[a] Relative to H_2SO_4 Plant No. 9 stack location.

Table 6-18. Maximum Predicted PM10 PSD Increment Consumption Compared with PSD Class II Increments -- Refined Analysis

Averaging Time	Concentration ($\mu g/m^3$)	Receptor Location[a] Direction (degrees)	Receptor Location[a] Distance (m)	Period Ending (YYMMDDHH)	Allowable PSD Increment ($\mu g/m^3$)
Annual					
	1.0	166	3,000	90123124	17
HSH 24-Hour					
	11.2	220	3,000	87100624	30
	11.6	196	2,900	89092624	

Note: YY=Year, MM=Month, DD=Day, HH=Hour.

[a] Relative to H_2SO_4 Plant No. 9 stack location.

Table 6-19. Maximum Predicted NO_2 PSD Increment Consumption for All Sources -- AAQS Screening Analysis

Averaging Time	Concentration ($\mu g/m^3$)	Receptor Location[a] Direction (degrees)	Distance (m)	Period Ending (YYMMDDHH)
Annual				
	4.8	260.	1019.	87123124
	4.7	220.	971.	88123124
	4.2	200.	800.	89123124
	5.3	260.	1019.	90123124
	5.2	260.	1019.	91123124

Note: YY=Year, MM=Month, DD=Day, HH=Hour.

[a] Relative to H_2SO_4 Plant No. 9 stack location.

Table 6-20. Maximum Predicted NO_2 PSD Increment Consumption for All Sources Compared with PSD Class II Increments -- Refined Analysis

Averaging Time	Concentration ($\mu g/m^3$)	Receptor Location[a] Direction (degrees)	Receptor Location[a] Distance (m)	Period Ending (YYMMDDHH)	Allowable PSD Increment ($\mu g/m^3$)
Annual					
	5.42	256	1,100	90123124	25
	5.37	256	1,100	91123124	

Note: YY=Year, MM=Month, DD=Day, HH=Hour.

[a] Relative to H_2SO_4 Plant No. 9 stack location.

Table 6-21. Predicted Total PM10 Concentrations for All Sources at the Chassahowitzka NWA

Averaging Time	Concentration ($\mu g/m^3$)	Receptor Location[a] X (m)	Receptor Location[a] Y (m)	Period Ending (YYMMDDHH)
Annual				
	0.01	-20900.	91500.	87123124
	0.02	-22600.	83200.	88123124
	0.03	-20900.	91500.	89123124
	0.02	-22600.	85200.	90123124
	0.01	-19900.	93700.	91123124
High 24-Hour				
	0.31	-19900.	93700.	87121224
	0.45	-22600.	83200.	88072524
	0.42	-31400.	100900.	89072924
	0.60	-19200.	95800.	90021924
	0.41	-22600.	83200.	91012024
High 8-Hour				
	0.86	-22200.	89400.	87072708
	1.11	-22600.	83200.	88072508
	1.39	-31400.	100900.	89072908
	1.78	-19200.	95800.	90021908
	1.23	-22600.	83200.	91012008
High 3-Hour				
	1.87	-19900.	93700.	87121224
	2.21	-22600.	83200.	88072503
	2.78	-31400.	100900.	89072903
	2.86	-19900.	93700.	90021906
	2.19	-22600.	83200.	91012009
High 1-Hour				
	5.62	-19900.	93700.	87121223
	5.91	-22600.	87300.	88122824
	6.66	-22600.	83200.	89091523
	6.65	-22600.	83200.	90081802
	6.57	-22600.	83200.	91012007

Note: YY=Year, MM=Month, DD=Day, HH=Hour.

[a] Relative to H_2SO_4 Plant No. 9 stack location.

Table 6-22. *Summary of PM Monitoring Data Collected Near the Chassahowitzka NWA*

					Maximum Concentrations Reported ($\mu g/m^3$)	
Year	County	Station ID	Monitor Location	Number of Observations	24-Hour	Annual
1993	Citrus	0580-003-J02	Crystal River; Twin Rivers Marina	26[b]	102	38
1993	Citrus	0580-003-J09	Crystal River; Twin Rivers Marina[a]	26[b]	88	33
1993	Citrus	0580-005-J02	Crystal River; East of FPC Plant	28[b]	36	21
1992	Citrus	0580-003-J02	Crystal River; Twin Rivers Marina	58	86	33
1992	Citrus	0580-003-J09	Crystal River; Twin Rivers Marina[a]	59	77	1
1992	Citrus	0580-005-J02	Crystal River; East of FPC Plant	59	69	24

[a] Colocated monitor.
[b] Monitoring discontinued in June 1993.

Table 6-23. Incremental and Cumulative PM10 Impacts at the Class I Area Due to the Animal Feed Plant

Averaging Time	Background PM Concentration ($\mu g/m^3$)	Increase Due to Animal Feed Plant ($\mu g/m^3$)	Cumulative PM10 Concentration with Proposed Project ($\mu g/m^3$)	Primary/Secondary Ambient Air Quality Standard ($\mu g/m^3$)
Annual	38	0.03	38	50
24-hour	102	0.60	103	150
8-hour	179[a]	1.8	181	—
3-hour	230[a]	2.9	233	—
1-hour	255[a]	6.7	262	—

[a] Based on the following factors:
1-hour/24-hour = 1/0.4
3-hour/24-hour = 0.9/0.4
8-hour/24-hour = 0.7/0.4

Table 6-24. Predicted Total NO_2 Concentrations for All Sources at the Chassahowitzka NWA

Averaging Time	Concentration ($\mu g/m^3$)	Receptor Location[a] X (m)	Receptor Location[a] Y (m)	Period Ending (YYMMDDHH)
Annual				
	0.84	-22600.	83200.	87123124
	1.18	-22600.	83200.	88123124
	1.91	-22600.	83200.	89123124
	1.12	-22600.	83200.	90123124
	0.83	-22600.	83200.	91123124
High 24-Hour				
	12.98	-20900.	91500.	87030124
	12.94	-31400.	100900.	88090724
	15.97	-19200.	95800.	89030624
	14.28	-31400.	100900.	90021424
	11.88	-22600.	83200.	91012024
High 8-Hour				
	33.68	-20900.	91500.	87030108
	28.60	-22600.	85200.	88090624
	37.79	-19900.	93700.	89011508
	33.36	-19900.	93700.	90021908
	35.64	-22600.	83200.	91012008
High 3-Hour				
	54.24	-20900.	91500.	87030103
	55.13	-22200.	89400.	88030324
	64.28	-22600.	87300.	89122603
	52.97	-22600.	83200.	90061906
	73.64	-20900.	91500.	91040824
High 1-Hour				
	122.54	-20900.	91500.	87122102
	125.76	-22600.	87300.	88090624
	153.25	-22600.	87300.	89052206
	158.87	-22600.	83200.	90061906
	123.77	-22600.	87300.	91012005

Note: YY=Year, MM=Month, DD=Day, HH=Hour.

[a] Relative to H_2SO_4 Plant No. 9 stack location.

Table 6-25. Maximum Predicted Fl Concentrations Due to the Proposed Project as Compared with FDEP Ambient Reference Concentrations (ARCs)

Averaging Time	Concentration ($\mu g/m^3$)	Receptor Location[a]		Period Ending (YYMMDDHH)	FDEP ARC ($\mu g/m^3$)
Site Vicinity					
		Direction (degrees)	Distance (m)		
Annual					
	0.10	260.	1019.	87123124	NA
	0.06	260.	1019.	88123124	
	0.04	260.	1019.	89123124	
	0.11	260.	1019.	90123124	
	0.10	260.	1019.	91123124	
High 24-Hour					
	0.83	140.	285.	87121124	6
	0.57	150.	293.	88050624	
	0.51	260.	1019.	89051824	
	0.61	270.	1064.	90121424	
	0.83	260.	1019.	91102224	
High 8-Hour					
	1.50	140.	285.	87121108	24
	0.98	130.	294.	88050708	
	1.08	300.	1421.	89072108	
	1.62	150.	293.	90070708	
	1.08	150.	293.	91030424	
Chassahowitzka NWR					
		X (m)	Y (m)		
Annual					
	0.0001	-20900.	91500.	87123124	
	0.0001	-22600.	83200.	88123124	
	0.0002	-20900.	91500.	89123124	
	0.0001	-22600.	85200.	90123124	
	0.0001	-19900.	93700.	91123124	
High 24-Hour					
	0.0023	-19900.	93700.	87121224	
	0.0034	-22600.	83200.	88072524	
	0.0030	-22200.	89400.	89030624	
	0.0044	-19200.	95800.	90021924	
	0.0031	-22600.	83200.	91012024	
High 8-Hour					
	0.0067	-22200.	89400.	87072708	
	0.0079	-22600.	83200.	88072508	
	0.0099	-31400.	100900.	89072908	
	0.0132	-19200.	95800.	90021908	
	0.0093	-22600.	83200.	91012008	

Note: YY=Year, MM=Month, DD=Day, HH=Hour.

[a] Relative to H_2SO_4 Plant No. 9 stack location.

7.0 ADDITIONAL IMPACT ANALYSIS

7.1 INTRODUCTION

Cargill is proposing to modify its existing facility in Riverview, Florida. The facility is subject to the PSD new source review requirements for PM(TSP)/PM10, NO_x, and fluorides. The additional impact analysis and the Class I area analysis address 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 86 kilometers (km) north-northwest of the Cargill Riverview plant. In addition, potential impacts upon visibility resulting from the proposal 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 consist primarily of tidal lands and poorly drained sands with organic pans. These tidal lands occur along the coast between the tidal swamps and the flatwoods. The tidal lands consist of mucky fine sand to dark-gray fine sand overlying gray fine sand, mixed with broken and whole shells. Many of the soils in the region and a large portion of the site have been disturbed and altered by industrial activities.

These soils will not be affected by the additional PM/PM10, NO_x, or fluoride concentrations resulting from the proposed modification, because both the underlying substrate and the sea spray from the nearby Hillsborough bay are neutral to alkaline and would neutralize any acidifying effects of NO_x deposition. The PM/PM10 emissions are composed primarily of limestone, which is a naturally occurring substance in the area.

The poorly drained sands 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 NO_x deposition resulting from the increased NO_x emissions from the proposed expansion.

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.

Vegetation in the Vicinity of Cargill

Cut-over pine flatwoods and mixed forest comprise the natural vegetation in the vicinity of the Cargill site. Mangrove trees and salt-tolerant plants are found near the coast. Winter vegetables and pasture grasses are cultivated inland from the facility.

Nitrogen Dioxide

A review of the literature indicates great variability in NO_2 dose-response relationship in vegetation (see Table 7-1). Acute NO_2 injury symptoms are manifested as water-soaked lesions, which first appear on the upper surface, followed by rapid tissue collapse. Low-concentration, long-term exposures as frequently encountered in polluted atmospheres often do not induce the lesions associated with acute exposures but may still result in some growth suppression. *Citrus* trees exposed to 470 μg/m³ of NO_2 for 290 days showed injury (Thompson *et al.*, 1970). Sphagnum exposed for 18 months at an average concentration of 11.7 μg/m³ showed reduced growth (Press *et al.*, 1986)

The maximum ground-level NO_2 concentrations (1-hour and annual average) predicted to occur in the vicinity of the Cargill plant due to operation of all sources, including the animal feed plant, are 560 μg/m³ and 34.5 μg/m³, respectively (see Table 6-16). These maximum predicted concentrations are well below reported effects levels. The proposed project will increase predicted NO_x impacts by only 41 μg/m³ for 1-hour average and 1.35 μg/m³ for annual average.

Particulate Matter

The maximum predicted concentrations of PM (in the form of TSP and PM10) due to operation of all sources, including the proposed modification, are 113 μg/m³ for 24-hour average and 43 μg/m³ for annual average (see Table 6-14). By comparing predicted concentrations with the few injury threshold values reported in the literature (Darley and Middleton, 1966; Krause and Kaiser, 1977), no potential effects on vegetation are predicted, because these concentrations are below the values reported to adversely affect plants.

Fluorides

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 through the roots (Applied Sciences Associates, Inc., 1978).

The sensitivity of plants to fluorides varies widely. Gladiolus are considered the most sensitive. Visible symptoms are reported to occur when gladiolus have been exposed to concentrations >0.5 μg/m³ for 5 to 10 days. More tolerant fruit tree species and conifers first showed symptoms at around 1 μg/m³ at 10-day exposures (Treshow and Anderson, 1989). Plant sensitivities can range from 16 μg/m³ of fluoride in sensitive plants to 500 μg/m³ 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 increase in 8-hour, 24-hour, and annual fluoride concentrations in the vicinity of the Cargill plant due to the proposed AFI plant expansion are 1.6, 0.8, and 0.1 $\mu g/m^3$, respectively (see Table 6-25). Based on these predicted concentrations, no significant effects are predicted.

7.3.3 Impacts Upon Visibility

One new emission source will be created by the proposed AFI plant expansion. This source will be controlled by a wet venturi scrubber and, therefore, a visible emission plume from this source may occur at times. However, Cargill has a number of similar type sources already in operation. 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 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 increase from the Cargill Riverview 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 were not specifically defined. 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 cumulative 8-hour PM10 concentration, including the Cargill animal feed plant, is 181 $\mu g/m^3$ (see Table 6-23). This concentration is close to the lower threshold value that reportedly affects plant foliage. However, since the animal feed plant contributes only 2 $\mu g/m^3$, 8-hour average impact, to the total predicted impacts, no effects to vegetative AQRVs are expected from the animal feed plant.

Nitrogen Dioxide Exposure

Acute NO_2 injury symptoms are manifest as water-soaked lesions, which first appear on the upper surface, followed by rapid tissue collapse. Low-concentration, long-term exposures do not induce the lesions associated with acute exposures but may still result in some growth suppression. A review of the literature (EPA, 1982a) indicates greater variability in the NO_2 dose-response relationship in vegetation, and no threshold effect levels are supported. The NO_2 doses known to adversely affect some plants are shown in Table 7-1.

The maximum annual average NO_2 concentration due to the animal feed plant is shown in Table 6-24. No representative nearby NO_2 monitoring data are available to provide background conditions at Chassahowitzka. The predicted doses of NO_2 in the Chassahowitzka NWA due to the project are significantly lower than the doses reported to injure vegetation and animals; therefore, the project's NO_2 emissions are not expected to have an adverse effect on vegetation AQRVs at Chassahowitzka NWA.

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 to fluorides varies widely. Gladiolus are considered the most sensitive. Visible symptoms are reported to occur when gladiolus have been exposed to concentrations >0.5 microgram per cubic meter ($\mu g/m^3$) for 5 to 10 days. More tolerant fruit tree species and conifers first showed symptoms at around 1 $\mu g/m^3$ 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 fluoride concentrations in the Chassahowitzka NWA due to the modified AFI plant (see Table 6-25) are below reported effect levels. 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

Particulate Matter Exposure

A wide range of physiological and ecological effects to fauna has been reported for particulate pollutants (Newman, 1980; Newman and Schreiber, 1988). The most severe of these effects have been observed at concentrations above the PM10 secondary ambient air quality standards (150 $\mu g/m^3$, 24-hour average, and 50 $\mu g/m^3$, annual average). Physiological and behavioral effects have also been observed in experimental animals at or below these standards. However, no observable effects to fauna are expected at concentrations below the values reported in Table 7-2. As shown in Table 6-23, the cumulative concentrations of PM10 in the Class I area with the proposed project are below those that would cause respiratory stress in wildlife. The proposed project's contribution to cumulative impacts is negligible.

Nitrogen Dioxide Exposure

The predicted NO_2 concentrations in the Class I area (Table 6-24) are well below the lowest observed effects levels in animals (Table 7-3). Given these conditions, the project's emissions pose no risk to wildlife AQRVs at Chassahowitzka NWA. Because predicted levels are below those known to cause effects to vegetation, there is also no risk to any wildlife habitat.

Fluoride Exposure

The predicted fluoride concentrations in the Class I area (Table 6-25) are well below the lowest observed effects levels for plants and, therefore, animals. Given these conditions, the proposed source's emissions poses no risk to wildlife AQRVs at Chassahowitzka NWA.

7.4.4 Soils

Particulate Matter Exposure

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.

Nitrogen Dioxide Exposure

The greatest threat to soils from increased NO_x deposition is a decrease in pH or an increase in nitrate to levels considered unnatural or potentially toxic. The results from the Florida Acid Deposition Study (FADS) network for two sampling stations (Site 8 and Site 5) located to the north of the Class I area indicate that the average sulfate deposition ranges from 14.5 to 17.7 kg/ha/yr (Pollman, 1994). The predicted amount of NO_x deposition due to the proposed project is insignificant in light of the sulfate deposition measured in the area and the inherent sulfur content of the soils. In addition, the regular flooding of these soils by the Gulf of Mexico regulates the pH, and any rise in acidity would be buffered by this activity.

7.4.5 Impacts Upon Visibility

Because the Chassahowitzka NWA is located approximately 86 km to the north-northwest of the Cargill site, a visibility impact assessment of the Class I area is required. A Level I visibility screening analysis was conducted following the procedures outlined in "Workbook for Estimating Visibility Impairment" (EPA, 1980). The Level I screening analysis is designed to provide a conservative estimate of plume visual impacts (i.e., impacts higher than expected). The EPA model, VISCREEN, was used for this analysis. PM10 and NO_x emissions used for the calculations were based upon the total maximum emissions from the AFI Plants No. 1 and No. 2.

Model input and output results are presented in Figure 7-1. As indicated, the maximum visual impacts caused by the AFI plant expansion do not exceed the screening criteria inside or outside the Class I area after the proposed modification.

7.4.6 Regional Haze Analysis

General

A regional haze analysis was conducted to determine if the proposed Cargill modification would cause a perceptible degradation in visibility at the Chassahowitzka NWR. The CNWR is located approximately 86 kilometers (km) north-northwest of the Cargill plant. Visibility is an Air Quality Related Value at the CNWR. The visibility of an area is generally characterized by either its visual range, V_r (i.e., the greatest distance that a dark object can be seen) or its extinction coefficient, b_{ext} (i.e., the attenuation of light over a distance due to particle scattering and/or gaseous absorption). The visual range and extinction coefficient are related to one another by the following equation[a]:

$$b_{ext} = 3.912 \; / \; V_r \quad (km^{-1}) \tag{1}$$

The National Park Service (NPS) in coordination with the Fish and Wildlife Service (FWS) uses the Deciview index (NPS, 1992), d_v, to describe an area's change in extinction coefficient. The deciview is defined as:

$$d_v = 10 \ln (b_{ext}/0.01) \tag{2}$$

where ln represents the natural logarithm of the quantity in parentheses. A change in an area's deciview (NPS, 1995), Δd_v, of 1 corresponds to an approximate 10 percent changed in extinction, which is considered as a noticeable change in regional haze. The deciview change is defined by:

$$\Delta d_v = 10 \ln (1 + b_{exts}/b_{extb}) \tag{3}$$

where b_{exts} and b_{extb} represent the extinction coefficients due to the source (i.e., the proposed expansion) and for the CNWR background visual range, respectively. Based on recent communications with the NPS, the background visual range for the CNWR is 65 km based on air monitoring data (USFWS, 1995).

Calculation of Source Extinction

The source extinction due to the proposed plant expansion is calculated according to interim recommendations that are provided in the Interagency Workgroup on Air Quality Modeling (IWAQM) Phase I Report, Appendix B. The report states that the primary sources of regional visibility degradation are mostly fine particles with diameters ≤ 2.5 μm, ammonium bi-sulfate [$(NH_4)_2SO_4$] and ammonium nitrate (NH_4NO_3). The procedures for determining the ambient concentration levels of these compounds due to the proposed project are:

1. Obtain the maximum hourly sulfur dioxide (SO_2), nitrogen oxides (NO_x), and sulfuric acid (H_2SO_4) mist impacts due to the proposed expansion from air quality dispersion models such as the Industrial Source Complex Short Term (ISCST3) or the MESOPUFF II model. For the present analysis, the maximum impacts were provided from the ISCST3 model, a steady state model that was used for the modeling analysis for the Prevention of Significant Deterioration (PSD) application. Based on verbal communications with Bud Rolofson of the NPS, the NPS had changed it's policy of using the hourly maximum impacts to using the highest 24-hour impacts for these pollutants. The maximum 24-hour impacts are based on the highest predicted concentrations from the ISCST3 model for the 5-year period, 1987 to 1991. The maximum 24-hour impacts at the CNWR due to the proposed project only are 0.186, 0.052, and 0.047 $\mu g/m^3$ for SO_2, NO_x, and H_2SO_4 mist (as PM), respectively.
2. Assume a 100 percent conversion of SO_2 to SO_4^{2-} and NO_x to NO_3. Multiplicative factors for this conversion are presented in IWAQM Inset 1, as 1.5 and 1.35, respectively, which are based on the ratios of the molecular weights of the compounds. Based on further discussions with the NPS, a 3 percent per hour conversion rate for SO_2 to SO_4^{2-} was used instead of assuming a 100 percent conversion for SO_2 to SO_4^{2-}. Table 7-4 shows the hourly conversion of SO_2 to SO_4^{2-} for a maximum 24-hour SO_2 concentration of 0.186 $\mu g/m^3$. For the worst-case 24-hour period, a 24-hour cumulative SO_4^{2-} concentration was calculated to be 0.0965 $\mu g/m^3$. Concentrations of H_2SO_4 mist were assumed to exist as primary fine particulates.
3. Calculate maximum concentrations of ammonium sulfate and ammonium nitrate from multiplicative factors 1.375 and 1.29, respectively, from IWAQM, Appendix B.
4. Obtain hourly values of relative humidity (RH). The maximum predicted 24-hour impacts from the ISCST3 model occurred on 2/19/90. The Tampa National Weather

Service hourly surface observations for this day indicate an average RH of approximately 82.5 percent.

5. Calculate the extinction coefficients of ammonium sulfate, ammonium nitrate, and primary fine particulate. The extinction coefficients for each compound are defined by:

$$b_{exts} = 0.003 \text{ (comp) } f(RH)$$

where (comp) represents the ambient concentration of the compound in question, and f(RH) is the relative humidity factor. From Figure B-1 in Appendix B, a RH of 82.5 percent corresponds to a RH factor of 4.0. For H_2SO_4 mist (as fine particulate matter), an RH factor of unity was used per IWAQM recommendations. The total source extinction coefficient value is equal to the sum of the calculated extinction coefficients for each compound.

A summary of the calculations is provided in Table 7-5. The total source extinction coefficient due to the proposed project was determined to be 0.0028. From equation (3), above, the total deciview change due to the proposed project is 0.46.

Based on this analysis, the proposed project will result in less that a 10 percent decrease in visibility to the clearest days observed at the CNWR. Therefore, no adverse impacts upon regional haze is expected to occur due to the proposed Cargill project.

Table 7-1. NO_2 Doses Reported to Affect Plant Species Similar to Vegetation in the Region

Species	Dose and Effect	Reference
Ryegrass	39.5 $\mu g/m^3$ for 6 minutes had no effect on shoot weight	Lane and Bell, 1984
Citrus	470 $\mu g/m^3$ for 290 days injured trees	Thompson *et al.*, 1970
Sphagnum	11.7 $\mu g/m^3$ averaged over 18 months compared with control of 4.8 $\mu g/m^3$ (exceeded 15 $\mu g/m^3$ 4 times) reduced growth	Press *et al.*, 1986

Source: KBN, 1996.

Table 7-2. Examples of Reported Effects of Particulates at Concentrations Below National Ambient Air Quality Standards

Pollutant	Reported Effect	Concentration ($\mu g/m^3$)	Exposure
Particulates[a]	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

[a] Newman and Schreiber, 1988. Env. Tox. Chem. 7:381-390.

Table 7-3. Examples of Lowest Observed Effect Levels of Nitrogen Dioxide

Pollutant	Reported Effect Exposure	Concentration ($\mu g/m^3$)	
Nitrogen Dioxide	Respiratory stress in mice	1,917	3 hours
	Respiratory stress in guinea pigs	95 to 950	8 hr/day for[a] 122 days

[a] Used to compare as a range between 3-hour and 24-hour averaging times.
[b] Used to compare with annual averaging times.

Source: Adapted from Newman (1981) and Newman and Schreiber (1988).

Table 7-4. Hourly Conversion Rate of SO2 to SO4 for Proposed Cargill Expansion at the Chassahowitzka NWR

Hour	SO2	SO4
1	0.1860	0.0056
2	0.1804	0.0054
3	0.1750	0.0053
4	0.1698	0.0051
5	0.1647	0.0049
6	0.1597	0.0048
7	0.1549	0.0046
8	0.1503	0.0045
9	0.1458	0.0044
10	0.1414	0.0042
11	0.1372	0.0041
12	0.1330	0.0040
13	0.1291	0.0039
14	0.1252	0.0038
15	0.1214	0.0036
16	0.1178	0.0035
17	0.1143	0.0034
18	0.1108	0.0033
19	0.1075	0.0032
20	0.1043	0.0031
21	0.1011	0.0030
22	0.0981	0.0029
23	0.0952	0.0029
24	0.0923	0.0028
Total		0.0965

Note: Assumes hourly conversion rate of 3 percent

Table 7-5. Calculation of Change in Deciview Due to the Proposed Cargill Project

Pollutant	Value	Reference
Maximum Emission Rates (lb/hr)		
SO2	14.01	
NOx	13.24	
H2SO4 (as PM)	12.00	
Highest 24-Hour Chassahowitzka NWR Impacts ($\mu g/m^3$)		
SO2	0.18577	(a)
NOx	0.0523	(b)
H2SO4 (as PM)	0.0474	(b)
SO4	0.0965	(c)
NO3	0.0706	(d)
(NH4)2SO4	0.1327	(e)
NH4NO3	0.0911	(f)
Average RH (percent)	82.5	(g)
RH factor, f(RH)	4.0	(h)
Extinction Coefficients (km^{-1})		
Background: (bextb)	0.0602	(i)
(NH4)2SO4	0.0016	(j)
NH4NO3	0.0011	(j)
H2SO4 (as PM)	0.0001	(k)
Total (bexts)	0.0028	
Deciview Change		
total delta dv =	0.4592	(l)

References:

a. Highest predicted concentration from ISCST3 model using a 5-year meteorological data record from 1987-91
b. Concentration calculated from ratio of emissions to SO2 emissions times the maximum SO2 concentration
c. SO4 concentrations based on 3 percent per hour conversion rate from SO2
d. NO3 = NOx * 1.35 from IWAQM Inset No. 1
e. = SO4 times 1.375 from IWAQM Appendix B
f. = NO3 times 1.29 from IWAQM Appendix B
g. Based on average RH for highest impact day.
h. From IWAQM Figure B-1.
i. = 3.912 / 65 where 65 is background visual range.
j. = .003 * compound * f(RH) from IWAQM Appendix B
k. = .003 * compound. f(RH) set = 1 for fine PM
l. Delta DV = 10 * ln (1 + bexts/bextb)

Visual Effects Screening Analysis for
Source: CARGILL RIV. ANIMAL FEED
Class I Area: CHASSAHOWITZKA NWA

*** Level-1 Screening ***

Input Emissions for

Particulates	14.43	LB /HR
NOx (as NO2)	13.24	LB /HR
Primary NO2	.00	LB /HR
Soot	.00	LB /HR
Primary SO4	47.01	LB /HR

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	.04 ppm
Background Visual Range:	65.00 km
Source-Observer Distance:	86.00 km
Min. Source-Class I Distance:	86.00 km
Max. Source-Class I Distance:	104.00 km
Plume-Source-Observer Angle:	11.25 degrees
Stability:	6
Wind Speed:	1.00 m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	84.	86.0	84.	2.00	.620	.05	.008
SKY	140.	84.	86.0	84.	2.00	.265	.05	-.012

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	55.	77.0	114.	2.00	.670	.05	.009
SKY	140.	55.	77.0	114.	2.00	.298	.05	-.014

9651074Y/F1/WP/ANI-FEED.VIS (07/09/96)

Figure 7-1
Level-1 Visibility Screening Analysis for
Cargill Animal Feed Plant Expansion

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APPENDIX A

AP-42 EMISSIONS FACTORS

Table 1.3-2 (English Units). CRITERIA POLLUTANT EMISSION FACTORS FOR UNCONTROLLED FUEL OIL COMBUSTION

Firing Configuration (SCC)[a]	SO_2[b]		SO_3[c]		NO_x[d]		CO[e,f]		Filterable PM[g]	
	lb/10³ gal	EMISSION FACTOR RATING	lb/10³ gal	EMISSION FACTOR RATING	lb/10³ gal	EMISSION FACTOR RATING	lb/10³ gal	EMISSION FACTOR RATING	lb/10³ gal	EMISSION FACTOR RATING
Utility boilers										
No. 6 oil fired, normal firing (1-01-004-01)	157S	A	5.7S	C	67	A	5	A	—[h]	A
No. 6 oil fired, tangential firing (1-01-004-04)	157S	A	5.7S	C	42	A	5	A	—[h]	A
No. 5 oil fired, normal firing (1-01-004-05)	157S	A	5.7S	C	67	A	5	A	—[h]	B
No. 5 oil fired, tangential firing (1-01-004-06)	157S	A	5.7S	C	42	A	5	A	—[h]	B
No. 4 oil fired, normal firing (1-01-005-04)	150S	A	5.7S	C	67	A	5	A	—[h]	B
No. 4 oil fired, tangential firing (1-01-005-05)	150S	A	5.7S	C	42	A	5	A	—[h]	B
Industrial boilers										
No. 6 oil fired (1-02-004-01/02/03)	157S	A	2S	A	55	A	5	A	—[h]	A
No. 5 oil fired (1-02-004-04)	157S	A	2S	A	55	A	5	A	—[h]	B
Distillate oil fired (1-02-005-01/02/03)	142S	A	2S	A	20	A	5	A	—[h]	A
No. 4 oil fired (1-02-005-04)	150S	A	2S	A	20	A	5	A	—[h]	B
Commercial/institutional/residential combustors										
No. 6 oil fired (1-03-004-01/02/03)	157S	A	2S	A	55	A	5	A	—[h]	A
No. 5 oil fired (1-03-004-04)	157S	A	2S	A	55	A	5	A	—[h]	B
Distillate oil fired (1-03-005-01/02/03)	142S	A	2S	A	20	A	5	A	—[h]	A
No. 4 oil fired (1-03-005-04)	150S	A	2S	A	20	A	5	A	—[h]	B
Residential furnace (No SCC)	142S	A	2S	A	18	A	5	A	3	A

Table 1.3-2 (cont.).

[a] SCC = Source Classification Code.
[b] References 1-6,23,42-46. S indicates that the weight % of sulfur in the oil should be multiplied by the value given.
[c] References 1-5,45-46,22.
[d] References 3-4,10,15,24,42-46,48-49. Expressed as NO_2. Test results indicate that at least 95% by weight of NO_x is NO for all boiler types except residential furnaces, where about 75% is NO. For utility vertical fired boilers use 105 lb/10^3 gal at full load and normal (> 15%) excess air. Nitrogen oxides emissions from residual oil combustion in industrial and commercial boilers are related to fuel nitrogen content, estimated by the following empirical relationship: lb NO_2 /10^3 gal = 20.54 + 104.39(N), where N is the weight percent of nitrogen in the oil.
[e] References 3-5,8-10,23,42-46,48. CO emissions may increase by factors of 10 to 100 if the unit is improperly operated or not well maintained.
[f] Emission factors for CO_2 from oil combustion should be calculated using lb CO_2/10^3 gal oil = 259 C (distillate) or 288 C (residual).
[g] References 3-5,7,21,23-24,42-46,47,49. Filterable PM is that particulate collected on or prior to the filter of an EPA Method 5 (or equivalent) sampling train. PM-10 values include the sum of that particulate collected on the PM-10 filter of an EPA Method 201 or 201A sampling train and condensable emissions as measured by EPA Method 202.
[h] Particulate emission factors for residual oil combustion are, on average, a function of fuel oil grade and sulfur content:
No. 6 oil: 9.19(S) + 3.22 lb/10^3 gal, where S is the weight % of sulfur in oil.
No. 5 oil: 10 lb/10^3 gal
No. 4 oil: 7 lb/10^3 gal
No. 2 oil: 2 lb/10^3 gal

Table 1.3-4 (English Units). EMISSION FACTORS FOR TOTAL ORGANIC COMPOUNDS (TOC), METHANE, AND NONMETHANE TOC (NMTOC) FROM UNCONTROLLED FUEL OIL COMBUSTION

Firing Configuration (SCC)[a]	TOC[b]		Methane[b]		NMTOC[b]	
	lb/10^3 gal	EMISSION FACTOR RATING	lb/10^3 gal	EMISSION FACTOR RATING	lb/10^3 gal	EMISSION FACTOR RATING
Utility boilers						
No. 6 oil fired, normal firing (1-01-004-01)	1.04	A	0.28	A	0.76	A
No. 6 oil fired, tangential firing (1-01-004-04)	1.04	A	0.28	A	0.76	A
No. 5 oil fired, normal firing (1-01-004-05)	1.04	A	0.28	A	0.76	A
No. 5 oil fired, tangential firing (1-01-004-06)	1.04	A	0.28	A	0.76	A
No. 4 oil fired, normal firing (1-01-005-04)	1.04	A	0.28	A	0.76	A
No. 4 oil fired, tangential firing (1-01-005-05)	1.04	A	0.28	A	0.76	A
Industrial boilers						
No. 6 oil fired (1-02-004-01/02/03)	1.28	A	1	A	0.28	A
No. 5 oil fired (1-02-004-04)	1.28	A	1	A	0.28	A
Distillate oil fired (1-02-005-01/02/03)	0.252	A	0.052	A	0.2	A
No. 4 oil fired (1-02-005-04)	0.252	A	0.052	A	0.2	A
Commercial/institutional/ residential combustors						
No. 6 oil fired (1-03-004-01/02/03)	1.605	A	0.475	A	1.13	A
No. 5 oil fired (1-03-004-04)	1.605	A	0.475	A	1.13	A
Distillate oil fired (1-03-005-01/02/03)	0.556	A	0.216	A	0.34	A
No. 4 oil fired (1-03-005-04)	0.556	A	0.216	A	0.34	A
Residential furnace (No SCC)	2.493	A	1.78	A	0.713	A

a SCC = Source Classification Code.
b References 16-19. Volatile organic compound emissions can increase by several orders of magnitude if the boiler is improperly operated or is not well maintained.

Table 1.3-7 (Metric And English Units). CUMULATIVE PARTICLE SIZE DISTRIBUTION AND SIZE-SPECIFIC EMISSION FACTORS FOR UNCONTROLLED INDUSTRIAL BOILERS FIRING DISTILLATE OIL[a]

EMISSION FACTOR RATING: E

Particle Size[b] (μm)	Cumulative Mass % ≤ Stated Size	Cumulative Emission Factor [kg/10^3 L (lb/10^3 gal)]
	Uncontrolled	Uncontrolled
15	68	0.16 (1.33)
10	50	0.12 (1.00)
6	30	0.07 (0.58)
2.5	12	0.03 (0.25)
1.25	9	0.02 (0.17)
1.00	8	0.02 (0.17)
0.625	2	0.005 (0.04)
TOTAL	100	0.24 (2.00)

[a] Reference 29. Source Classification Codes 1-02-005-01/02/03.
[b] Expressed as aerodynamic equivalent diameter.

Table 1.4-2 (Metric And English Units). EMISSION FACTORS FOR SULFUR DIOXIDE (SO_2), NITROGEN OXIDES (NO_x), AND CARBON MONOXIDE (CO) FROM NATURAL GAS COMBUSTION[a]

Combustor Type (Size, 10^6 Btu/hr Heat Input) (SCC)[b]	SO_2[c]			NO_x[d]			CO[e]		
	kg/10^6 m^3	lb/10^6 ft^3	RATING	kg/10^6 m^3	lb/10^6 ft^3	RATING	kg/10^6 m^3	lb/10^6 ft^3	RATING
Utility/large Industrial Boilers (> 100) (1-01-006-01, 1-01-006-04)									
Uncontrolled	9.6	0.6	A	8800	550[f]	A	640	40	A
Controlled - Low NO_x burners	9.6	0.6	A	1300	81[f]	D	ND	ND	NA
Controlled - Flue gas recirculation	9.6	0.6	A	850	53[f]	D	ND	ND	NA
Small Industrial Boilers (10 - 100) (1-02-006-02)									
Uncontrolled	9.6	0.6	A	2240	140	A	560	35	A
Controlled - Low NO_x burners	9.6	0.6	A	1300	81[f]	D	980	61	D
Controlled - Flue gas recirculation	9.6	0.6	A	480	30	C	590	37	C
Commercial Boilers (0.3 - < 10) (1-03-006-03)									
Uncontrolled	9.6	0.6	A	1600	100	B	330	21	C
Controlled - Low NO_x burners	9.6	0.6	A	270	17	C	425	27	C
Controlled - Flue gas recirculation	9.6	0.6	A	580	36	D	ND	ND	NA
Residential Furnaces (< 0.3) (No SCC)									
Uncontrolled	9.6	0.6	A	1500	94	B	640	40	B

[a] Units are kg of pollutant/10^6 cubic meters natural gas fired and lb of pollutant/10^6 cubic feet natural gas fired. Based on an average natural gas fired higher heating value of 8270 kcal/m^3 (1000 Btu/scf). The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. ND = no data. NA = not applicable.

[b] SCC = Source Classification Code.

[c] Reference 7. Based on average sulfur content of natural gas, 4600 g/10^6 Nm^3 (2000 gr/10^6 scf).

Table 1.4-2 (cont.).

[d] References 10,15-19. Expressed as NO_2. For tangentially fired units, use 4400 kg/10^6 m^3 (275 lb/10^6 ft^3). At reduced loads, multiply factor by load reduction coefficient in Figure 1.4-1. Note that NO_x emissions from controlled boilers will be reduced at low load conditions.

[e] References 9-10,16-18,20-21.

[f] Emission factors apply to packaged boilers only.

Table 1.4-3 (Metric And English Units). EMISSION FACTORS FOR CARBON DIOXIDE (CO_2) AND TOTAL ORGANIC COMPOUNDS (TOC) FROM NATURAL GAS COMBUSTION[a]

Combustor Type (Size, 10^6 Btu/hr Heat Input) (SCC)[b]	CO_2[c]			TOC[d]		
	$kg/10^6\ m^3$	$lb/10^6\ ft^3$	RATING	$kg/10^6\ m^3$	$lb/10^6\ ft^3$	RATING
Utility/large industrial boilers (>100) (1-01-006-01, 1-01-006-04)	ND[e]	ND	NA	28[f]	1.7[f]	C
Small industrial boilers (10 - 100) (1-02-006-02)	1.9 E+06	1.2 E+05	D	92[g]	5.8[g]	C
Commercial boilers (0.3 - <10) (1-03-006-03)	1.9 E+06	1.2 E+05	C	128[h]	8.0[h]	C
Residential furnaces (No SCC)	2.0 E+06	1.3 E+05	D	180[h]	11[h]	D

[a] All factors represent uncontrolled emissions. Units are kg of pollutant/10^6 cubic meters and lb of pollutant/10^6 cubic feet. Based on an average natural gas higher heating value of 8270 kcal/m^3 (1000 Btu/scf). The emission factors in this table may be converted to other natural gas heating values by multiplying the given factor by the ratio of the specified heating value to this average heating value. NA = not applicable.
[b] SCC = Source Classification Code.
[c] References 10,22-23.
[d] References 9-10,18.
[e] ND = no data.
[f] Reference 8: methane comprises 17% of organic compounds.
[g] Reference 8: methane comprises 52% of organic compounds.
[h] Reference 8: methane comprises 34% of organic compounds.

APPENDIX B

LIST OF PM/PM10 SOURCES USED FOR THE AAQS AND PSD MODELING ANALYSIS

Table B-1. PM Source Screening Analysis Using the EPA 'M' Factor

ISCST ID	Relative Coord (m) X	Relative Coord (m) Y	QS (g/s)	HS (m)	TS (K)	VS (m/s)	DS (m)	Flowrate (m^3/s)	Merged Stack Parameter "M"
Sources From US Agri-Chem PSD Application									
Agri1	40800	-3500	4.46	24.4	316.3	5.76	3.05	42.1	72763
Agri2	40800	-3500	5.04	24.4	320.8	21.25	2.44	99.4	154193
Agri3	40800	-3500	3.92	29.0	683.0	14.75	1.77	36.3	183131
Agri4	40800	-3500	1.9	10.4	298.0	5.92	0.70	2.3	3702
Agri5	40800	-3500	1.9	27.4	298.0	3.60	0.98	2.7	11682
Agri6	40800	-3500	1.9	27.4	298.0	4.79	0.70	1.8	7931
Agri7	40800	-3500	1.9	24.7	298.0	4.15	2.13	14.8	57264
Agri8	40800	-3500	3.17	24.7	298.0	3.69	2.13	13.1	30518
AGRIA	40800	-3500	24.19	10.4	298.0	5.92	0.70		
Agri9	44600	-11000	3.02	38.1	327.4	14.55	3.05	106.3	439086
Agri10	44600	-11000	4.12	30.5	306.3	6.87	1.22	8.0	18198
Agri11	44600	-11000	0.55	26.8	307.4	9.24	0.91	6.0	90083
Agri12	44600	-11000	0.43	38.1	319.1	15.84	1.07	14.2	402713
Agri13	44600	-11000	0.03	29.3	298.0	1.15	0.40	0.1	42003
Agri14	44600	-11000	0.03	20.7	298.0	2.87	0.46	0.5	98216
Agri15	44600	-11000	0.03	16.2	298.0	1.72	0.46	0.3	45857
Agri16	44600	-11000	0.26	19.8	310.2	5.48	0.49	1.0	24424
Agri17	44600	-11000	0.23	19.8	300.2	88.45	0.49	16.7	431268
Agri18	44600	-11000	4	3.1	344.1	20.69	0.55	4.9	1290
Agri19	44600	-11000	4.4	42.7	304.7	10.66	2.74	62.9	185734
Agri20	44600	-11000	5.07	24.4	296.9	7.80	3.35	68.8	98154
Agri21	44600	-11000	5.07	24.4	295.2	7.23	3.35	63.7	90461
Agri22	44600	-11000	4.32	18.3	323.0	9.70	0.30	0.7	938
AGRIB	44600	-11000	31.56	18.3	323.0	9.70	0.30		
CFIn23	45500	-100	15.27	42.7	298.0	21.60	0.80	10.9	9048
CFIn24	45500	-100	5.1	42.7	298.0	21.73	0.76	9.9	24578
CFIn25	45500	-100	0.83	62.8	338.6	6.51	2.13	23.2	594196
CFIn26	45500	-100	1.5	62.8	333.0	6.69	2.13	23.8	332291
CFIn27	45500	-100	5.1	36.9	338.6	18.76	1.83	49.3	120818
CFIn28	45500	-100	5.44	35.7	338.6	11.31	2.44	52.9	117382
CFIn29	45500	-100	2.45	36.6	333.0	17.17	2.29	70.7	351603
CFIn30	45500	-100	1.27	16.8	298.0	9.01	1.37	13.3	52233
CFIn31	45500	-100	4.95	41.5	333.0	18.05	2.83	113.5	316595
CFIn32	45500	-100	1.38	11.0	588.6	13.45	0.76	6.1	28549
CFIn33	45500	-100	5.12	41.2	298.0	7.92	1.52	14.4	34421
CFIn34	45500	-100	1.76	19.8	298.0	15.36	1.22	18.0	60227
CFIn35	45500	-100	0.12	30.5	299.7	5.95	0.76	2.7	205473
CFINDA	45500	-100	50.29	42.7	298.0	21.60	0.80		
Cons36	35800	1700	4.43	24.7	327.4	3.77	2.29	15.5	28333
Cons37	35800	1700	0.29	8.2	533.0	13.74	0.61	4.0	60739
Cons38	35800	1700	0.43	11.9	533.0	8.91	0.98	6.7	99051
Cons39	35800	1700	28.91	45.7	349.7	10.31	2.29	42.5	23484
Cons40	35800	1700	4.92	12.8	310.8	10.60	1.22	12.4	10019
Cons41	35800	1700	1.18	15.9	321.9	20.18	0.76	9.2	39583
Cons42	35800	1700	1.18	24.4	327.4	23.81	1.07	21.4	144826
Cons43	35800	1700	1.18	22.0	360.8	31.08	0.98	23.4	157341
Cons44	35800	1700	0.63	63.1	330.2	21.12	0.43	3.1	101419
Cons45	35800	1700	0.63	63.1	330.2	21.12	0.43	3.1	101419

Table B-1. PM Source Screening Analysis Using the EPA 'M' Factor

ISCST ID	Relative Coord (m) X	Relative Coord (m) Y	QS (g/s)	HS (m)	TS (K)	VS (m/s)	DS (m)	Flowrate (m^3/s)	Merged Stack Parameter "M"
Cons46	35800	1700	0.63	54.6	338.6	14.37	0.18	0.4	10723
Cons47	35800	1700	0.2	55.5	310.8	2.97	0.43	0.4	37179
Cons48	35800	1700	1.38	63.1	333.0	51.22	0.27	2.9	44646
CONSA	35800	1700	45.99	54.6	338.6	14.37	0.18		
Cons49	30900	13800	0.12	16.5	298.0	19.14	0.43	2.8	113614
Cons50	30900	13800	0.06	3.1	338.6	18.19	0.24	0.8	14164
Cons51	30900	13800	0.03	15.2	294.1	20.70	0.15	0.4	54651
Cons52	30900	13800	1.76	46.3	299.7	12.14	1.77	29.9	235663
Cons53	30900	13800	0.03	21.3	298.0	12.58	0.18	0.3	67859
Cons54	30900	13800	2.1	46.3	298.0	13.17	1.77	32.4	213050
Cons55	30900	13800	1.67	30.5	338.0	11.98	1.37	17.7	108944
Cons56	30900	13800	1.76	24.4	319.1	6.20	1.68	13.7	60750
Cons57	30900	13800	1.64	46.3	300.2	9.61	1.77	23.6	200534
Cons58	30900	13800	1.9	45.7	313.0	18.34	1.77	45.1	339886
Cons59	30900	13800	0.26	24.7	315.2	9.05	0.82	4.8	143054
Cons60	30900	13800	0.17	32.6	298.0	33.69	0.37	3.6	207068
Cons61	30900	13800	0.86	30.5	319.1	0.01	0.91	0.0	74
Cons62	30900	13800	0.06	29.6	298.0	13.58	0.30	1.0	140977
Cons63	30900	13800	0.12	15.9	298.0	19.14	0.43	2.8	109404
Cons64	30900	13800	0.09	14.0	298.0	17.97	0.18	0.5	21228
Cons65	30900	13800	0.26	18.9	298.0	24.95	0.55	5.9	128408
Cons66	30900	13800	0.14	20.4	298.0	11.50	0.46	1.9	83071
Cons67	30900	13800	0.09	21.3	298.0	31.89	0.37	3.4	242279
Cons68	30900	13800	0.89	10.4	327.4	19.16	0.82	10.1	38562
Cons69	30900	13800	0.2	17.4	298.0	28.75	0.46	4.8	123660
Cons70	30900	13800	0.2	16.5	298.0	19.96	0.55	4.7	116303
Cons71	30900	13800	0.2	13.7	349.7	14.17	0.55	3.4	80762
Cons72	30900	13800	0.12	6.1	605.2	20.21	0.37	2.2	66851
Cons73	30900	13800	4.4	24.4	308.0	79.21	1.37	116.8	199270
Cons74	30900	13800	0.66	9.8	295.8	10.76	0.46	1.8	7814
Cons75	30900	13800	1.76	46.3	295.2	11.16	1.77	27.5	213386
CONSB	30900	13800	21.55	30.5	319.1	0.01	0.91		
Farm84	46600	-2400	0.09	12.2	366.3	0.03	0.61	0.0	435
Farm85	46600	-2400	0.09	12.2	366.3	2.67	0.61	0.8	38713
Farm86	46600	-2400	0.66	30.5	349.7	8.70	2.29	35.8	578691
Farm87	46600	-2400	0.66	30.5	351.9	9.74	2.29	40.1	651944
Farm88	46600	-2400	2.94	39.3	326.9	12.41	2.29	51.1	223467
Farm89	46600	-2400	4.46	27.4	305.2	5.48	0.91	3.6	6690
Farm90	46600	-2400	3.31	50.3	298.0	8.86	0.70	3.4	15438
Farm91	46600	-2400	3.43	26.8	349.7	19.09	0.73	8.0	21848
Farm92	46600	-2400	3.22	39.6	311.9	5.66	1.22	6.6	25392
Farm93	46600	-2400	3.8	39.3	319.1	10.66	2.13	38.0	125419
Farm94	46600	-2400	3.8	39.9	298.0	9.92	2.44	46.4	145249
Farm95	46600	-2400	3.22	39.3	327.4	7.47	2.29	30.8	123004
Farm96	46600	-2400	2.94	56.4	338.0	5.17	1.52	9.4	60819
Farm97	46600	-2400	6.62	35.1	349.7	22.72	0.67	8.0	14831
Farm98	46600	-2400	3.4	39.3	327.4	6.84	2.29	28.2	106667
Farm99	46600	-2400	0.06	12.2	366.3	0.03	0.61	0.0	652
Farm100	46600	-2400	0.09	12.2	366.3	0.03	0.61	0.0	435
FARM	46600	-2400	42.79	12.2	366.3	0.03	0.61		

Table B-1. PM Source Screening Analysis Using the EPA 'M' Factor

ISCST ID	Relative Coord (m) X	Relative Coord (m) Y	QS (g/s)	HS (m)	TS (K)	VS (m/s)	DS (m)	Flowrate (m^3/s)	Merged Stack Parameter "M"
Flor101	4300	-28400	108.93	152.1	425.8	23.61	7.99	1183.8	703828
Flor102	4300	-28400	108.93	152.1	425.8	23.98	7.92	1181.4	702388
Hard106	41900	-25000	1.89	22.9	389.0	23.90	4.88	447.0	2103253
IMCF107	26700	-14600	3.17	38.1	339.1	15.16	2.44	70.9	288910
IMCF108	26700	-14600	3.14	38.1	339.1	16.80	2.44	78.6	323223
IMCF109	26700	-14600	6.45	45.7	316.3	8.43	0.82	4.5	9981
IMCF110	26700	-14600	6.77	22.9	314.7	17.33	0.85	9.8	10450
IMCFA	26700	-14600	19.53	45.7	316.3	8.43	0.82		
IMCF116	33600	-3500	3.6	40.5	313.6	15.18	2.13	54.1	191020
IMCF117	33600	-3200	2.53	40.5	313.6	1.01	0.91	0.7	3301
IMCF118	33800	-3100	0.43	18.3	313.6	9.70	0.30	0.7	9146
IMCF119	33800	-3100	0.43	13.7	313.6	9.70	0.30	0.7	6861
IMCF120	33800	-3100	0.43	26.5	438.6	86.24	0.46	14.3	387693
IMCF121	33800	-3100	1.78	52.1	316.3	17.97	1.83	47.3	437748
IMCF122	33800	-3100	0.43	26.5	438.6	86.24	0.46	14.3	387693
IMCF123	33800	-3100	0.43	5.2	380.2	38.27	0.40	4.8	22026
IMCF124	33800	-3100	0.43	17.4	352.4	22.96	0.40	2.9	41072
IMCF125	33800	-3100	3.34	52.4	313.6	15.97	1.37	23.5	115890
IMCF126	33800	-3100	0.43	32.6	313.6	20.96	0.55	5.0	118431
IMCF127	33800	-3100	0.43	19.8	352.4	14.37	0.46	2.4	38772
IMCF128	33800	-3100	2.13	21.6	299.7	10.35	0.30	0.7	2228
IMCF129	33800	-3100	0.12	30.5	299.7	54.62	0.46	9.1	690999
IMCF130	33800	-3100	0.43	31.7	313.6	21.48	0.49	4.1	93645
IMCF131	33800	-3100	0.6	12.2	315.2	20.12	0.91	13.1	83799
IMCF132	33800	-3100	1.78	52.1	316.3	17.97	1.83	47.3	437748
IMCF133	33800	-3100	0.17	33.5	316.3	13.86	0.43	2.0	125567
IMCF134	33800	-3100	0.58	28.7	352.4	10.78	1.83	28.4	493564
IMCF135	33600	-3400	4.26	40.5	316.3	20.66	1.83	54.3	163567
IMCF136	33800	-3100	0.06	30.5	311.9	12.58	0.55	3.0	473560
IMCF137	33600	-3500	1.93	40.5	333.0	21.43	1.22	25.1	175228
IMCF138	33800	-3100	0.2	26.2	299.7	16.50	0.21	0.6	22446
IMCF139	33600	-3300	3.63	40.5	315.2	18.87	1.83	49.6	174714
IMCF140	33800	-3100	0.43	36.0	313.6	10.35	0.30	0.7	19192
IMCF141	33800	-3100	0.46	19.8	313.6	51.75	0.30	3.7	49402
IMCF142	33800	-3100	0.35	32.6	338.6	15.84	1.07	14.2	449347
IMCF143	33800	-3100	0.43	18.3	313.6	16.17	0.30	1.1	15246
IMCF144	33800	-3100	0.66	7.6	333.0	10.49	1.31	14.1	54358
IMCF145	33800	-3100	0.43	34.1	313.6	10.35	0.30	0.7	18216
IMCF146	33800	-3100	0.78	51.8	316.3	1.97	1.52	3.6	75118
IMCF147	33800	-3100	0.43	32.0	313.6	42.69	0.30	3.0	70423
IMCF148	33800	-3100	0.81	12.2	299.7	9.39	0.27	0.5	2425
IMCF149	33800	-3100	0.43	35.7	313.6	38.81	0.30	2.7	71345
IMCF150	33800	-3100	0.2	5.5	313.6	9.70	0.30	0.7	5902
IMCF151	33900	-3100	4.64	52.4	321.9	13.14	2.44	61.4	223485
IMCF152	33800	-3100	0.43	34.1	313.6	10.35	0.30	0.7	18216
IMCFB	33800	-3100	41.06	21.6	299.7	10.35	0.30		
IMCU168	45500	300	2.42	27.4	299.7	16.50	0.21	0.6	1941
IMCU169	45500	300	5.82	18.3	302.4	9.50	1.07	8.5	8118
IMCU170	45500	300	1.47	30.5	321.9	12.98	0.55	3.1	20583
IMCU171	45500	300	0.12	30.5	299.7	5.95	0.76	2.7	205473

Table B-1. PM Source Screening Analysis Using the EPA 'M' Factor

ISCST ID	Relative Coord (m)		QS	HS	TS	VS	DS	Flowrate	Merged Stack Parameter
	X	Y	(g/s)	(m)	(K)	(m/s)	(m)	(m^3/s)	"M"
IMCU172	45500	300	23.9	25.9	296.9	11.64	0.15	0.2	66
IMCU173	45500	300	0.63	25.9	296.9	11.64	0.15	0.2	2512
IMCU174	45500	300	0.4	27.4	299.7	16.50	0.21	0.6	11745
IMCU175	45500	300	0.12	15.2	313.6	8.09	0.61	2.4	94162
IMCU	45500	300	34.88	25.9	296.9	11.64	0.15		
Mobi182	35600	2600	4.55	24.4	344.1	12.65	2.29	52.1	96063
Mobi183	35600	2600	5.5	24.4	344.1	12.65	2.29	52.1	79471
Mobi184	35500	2700	1.12	30.5	338.6	19.02	1.10	18.1	166560
Mobi185	35300	2500	3.11	25.9	338.6	16.10	2.29	66.3	187060
Mobi186	35500	2700	1.41	24.4	326.9	11.68	0.49	2.2	12450
Mobi187	35500	2700	1.55	24.4	326.9	11.68	0.49	2.2	11325
Mobi188	35500	2600	0.14	4.6	312.4	16.50	0.43	2.4	24435
Mobi189	35500	2800	0.72	4.0	521.9	2.12	0.76	1.0	2761
Mobi190	35500	2800	1.96	25.9	299.7	14.54	1.68	32.2	127694
Mobi191	35400	2600	7	25.9	296.9	19.40	1.52	35.2	38686
Mobi192	35500	2800	1.38	12.2	344.1	11.83	1.07	10.6	32333
Mobi193	35500	2800	0.06	24.1	349.7	14.64	0.24	0.7	92951
MOBIL	35500	2800	28.5	4.0	521.9	2.12	0.76		
Roys202	43900	2600	1.93	22.6	308.0	3.80	1.07	3.4	12302
Semi203	46900	4200	1.38	24.4	299.7	17.90	0.52	3.8	20128
Semi204	46900	4200	0.12	10.7	305.2	9.98	0.55	2.4	64345
Semi205	46900	4200	1.27	15.2	294.1	8.02	0.34	0.7	2570
Semi206	46900	3500	3.77	15.2	333.0	17.29	2.04	56.5	76073
Semi207	46900	4200	0.58	20.7	294.1	2.46	0.52	0.5	5492
Semi208	46900	4200	0.43	30.5	300.2	9.70	0.61	2.8	60322
Semi209	47000	4500	1.73	45.7	304.1	9.32	2.04	30.5	244818
Semi210	46900	4200	0.46	30.5	324.7	9.70	0.61	2.8	60990
Semi211	46900	4200	1.93	16.8	294.1	17.42	1.07	15.7	40005
Semi213	47000	4500	1.35	61.0	341.3	24.58	1.52	44.6	687395
Semi214	46900	4200	0.06	6.1	366.3	17.46	0.30	1.2	45961
Semi215	46900	4200	33.6	30.5	324.7	13.40	2.04	43.8	12901
Semi216	46900	4200	0.06	10.4	366.3	0.12	0.30	0.0	536
Semi217	46900	4200	0.43	16.2	301.9	4.19	0.67	1.5	16750
Semi218	46900	4200	0.06	9.5	366.3	0.03	0.61	0.0	506
Semi219	46900	4200	0.26	12.8	307.4	9.41	1.16	9.9	150500
Semi220	46900	4200	0.06	7.9	366.3	0.12	0.30	0.0	410
Semi221	46900	4200	0.63	30.5	294.1	13.20	2.13	47.0	669256
Semi222	46900	4200	0.06	7.9	366.3	0.12	0.30	0.008	410
Semi223	46900	4200	0.63	27.4	296.9	11.37	0.98	8.6	110866
Semi224	46900	4200	0.52	14.0	296.9	8.09	0.61	2.4	18926
Semi225	47000	4500	2.82	40.2	316.3	26.40	2.13	94.1	424476
Semi226	46900	4200	0.75	21.3	299.7	21.27	1.28	27.4	233398
Semi227	46900	4200	1.38	22.6	305.2	9.98	0.55	2.4	11830
Semi228	46900	4200	1.93	16.8	298.0	17.42	1.07	15.7	40536
Semi229	46900	4200	1.93	16.8	294.1	17.42	1.07	15.7	40005
Semi230	46900	4200	0.58	14.0	298.0	15.16	0.24	0.7	4940
Semi231	46900	4200	0.58	16.2	294.1	20.21	0.12	0.2	1872
Semi232	46900	4200	0.81	16.2	299.7	7.68	0.67	2.7	16180
Semi233	46900	4200	3.17	24.4	313.6	16.63	2.01	52.8	127270
Semi234	46900	3500	3.77	15.2	333.0	17.29	2.04	56.5	76073

Table B-1. PM Source Screening Analysis Using the EPA 'M' Factor

ISCST ID	Relative Coord (m) X	Relative Coord (m) Y	QS (g/s)	HS (m)	TS (K)	VS (m/s)	DS (m)	Flowrate (m^3/s)	Merged Stack Parameter "M"
Semi235	46900	4200	3.77	30.2	330.2	16.21	2.29	66.8	176481
Semi236	47000	4500	1.3	61.0	346.9	28.46	1.52	51.6	840075
Semi237	46900	4200	0.09	30.5	260.8	15.52	1.52	28.2	2487418
Semi238	47000	4500	3.34	61.0	346.9	28.46	1.52	51.6	326975
Semi239	46900	4200	0.09	18.0	317.4	9.70	0.61	2.8	179753
Semi240	46900	4200	0.12	10.7	305.2	9.98	0.55	2.4	64345
Semi241	46900	4200	3.22	24.4	294.1	8.38	0.76	3.8	8465
Semi242	46900	4200	0.12	10.7	305.2	9.98	0.55	2.4	64345
SEMINOL	46900	4200	79.16	7.9	366.3	0.12	0.30		
TECO243	-1000	-7500	50.96	149.4	404.7	13.74	7.32	578.2	685816
TECO244	-1000	-7500	50.44	149.4	404.7	13.02	7.32	547.9	656578
TECO245	-900	-7500	51.97	149.4	410.2	14.47	7.32	608.9	717842
TECO246	-1200	-7000	4.17	22.9	770.8	18.74	4.27	268.4	1133958
TECO247	-1200	-7300	4.17	22.9	770.8	18.74	4.27	268.4	1133958
TECO248	-1000	-7500	4.17	10.7	816.3	15.17	4.57	248.8	519740
TECO249	-1000	-7500	54.61	149.4	341.9	18.21	7.32	766.3	716563
TECO250	-1000	-7500	0.66	31.1	394.1	16.04	0.76	7.3	135084
TECO251	-1000	-7500	2.1	34.4	394.1	123.77	0.27	7.1	45802
TECO252	-1000	-7500	0.03	42.4	333.0	18.19	0.49	3.4	1613230
TECO253	-1000	-7500	0.06	54.6	298.6	21.04	0.52	4.5	1213264
TECO254	-1000	-7500	0.06	54.6	298.6	21.04	0.52	4.5	1213264
TECO255	-1000	-7500	0.06	54.6	298.6	21.04	0.52	4.5	1213264
TECOBBA	-1000	-7500	0.21	54.6	298.6	21.04	0.52		
TECO256	-2900	5000	15.89	93.3	415.8	28.90	3.05	211.1	515335
TECO257	-2900	5000	15.89	93.3	420.8	30.85	3.05	225.4	556722
TECO258	-2900	5000	20.18	93.3	419.7	38.64	3.23	316.6	614175
TECO259	-2900	5000	23.69	93.3	426.9	22.97	3.05	167.8	282068
TECO260	-2900	5000	28.76	93.3	423.6	23.18	4.45	360.5	495259
TECO261	-2900	5000	47.91	93.3	433.0	24.74	5.36	558.2	470569
TECO262	-2900	5000	15.4	10.7	816.3	136.61	1.52	247.9	140202
TECO263	-2900	5000	0.03	22.0	449.7	10.96	0.21	0.4	124904
TECO264	-2900	5000	0.14	32.6	449.7	30.37	0.30	2.1	224866
TECO265	-2900	5000	0.37	31.7	449.7	18.27	0.61	5.3	205716
TECO267	-2900	5000	0.06	53.3	298.6	21.49	0.52	4.6	1211503
TECO268	-2900	5000	0.03	54.0	298.6	15.52	0.61	4.5	2435574
TECO269	-2900	5000	0.03	53.3	298.6	21.49	0.52	4.6	2423006
TECO270	-2900	5000	0.03	53.0	298.6	24.26	0.37	2.6	1377071
TECO271	-2900	5000	0.03	53.3	298.6	21.49	0.52	4.6	2423006
TECOGANA	-2900	5000	0.72	22.0	449.7	10.96	0.21		
FPCB292	-24100	-11200	8.14	12.2	755.4	6.54	6.98	250.3	283329
FPC-296	-20500	100	31.96	91.4	424.8	31.09	2.74	183.3	222708
FPC-297	-20500	100	27.9	91.4	408.2	34.44	3.35	303.6	405936
FPC-298	-20500	100	0.04	9.1	541.5	5.18	0.91	3.4	415033

Table B-1. PM Source Screening Analysis Using the EPA 'M' Factor

ISCST ID	Relative Coord (m) X	Relative Coord (m) Y	QS (g/s)	HS (m)	TS (K)	VS (m/s)	DS (m)	Flowrate (m^3/s)	Merged Stack Parameter "M"
FPC-299	-20500	100	12.8	13.7	772.0	22.25	5.27	485.3	401023
FPC-300	-20500	100	0.01	7.6	298.1	0.04	0.27	0.0	519
FPCBART	-20500	100	72.71	7.6	298.1	0.04	0.27		
Sources Obtained from FDEP									
GAF1	-700	4700	0.43	10.7	298.0	0.06	14.30	9.6	71457
GAF2	-700	4700	0.18	6.1	298.0	15.16	0.49	2.9	28871
GAF3	-700	4700	0.03	6.1	298.0	2.87	0.46	0.5	28901
GAF4	-700	4700	0.29	10.1	700.0	8.53	0.70	3.3	80031
GAF4	-700	4700	0.24	11.6	464.0	18.59	0.49	3.5	78619
GAF4	-700	4700	0.02	13.7	298.0	1.22	0.61	0.4	72781
GAF4	-700	4700	0.03	13.7	298.0	1.22	0.61	0.4	48520
GAF4	-700	4700	0.03	13.7	298.0	1.22	0.61	0.4	48520
GAF	-700	4700	1.25	6.1	298.0	15.16	0.49		
BayConc1	2200	11300	0.62	3.0	299.0	0.61	0.61	0.2	258
BayConc2	2200	11300	0.45	18.3	298.0	4.57	0.61	1.3	16185
Pakhoed1	-2100	4800	0.2	9.1	299.0	39.32	0.30	2.8	37812
Pakhoed2	-2100	4800	0.08	4.9	299.0	13.72	0.34	1.2	22813
Pakhoed3	-2100	4800	0.13	14.3	299.0	8.84	0.52	1.9	61747
IMC_Ag1	-800	-6400	0.4	11.0	298.0	12.80	0.46	2.1	17433
IMC_Ag2	-800	-6400	0.19	7.6	298.0	10.36	0.40	1.3	15518
IMC_Ag3	-800	-6400	0.19	7.6	298.0	10.36	0.40	1.3	15518
IMC_Ag4	-800	-6400	1.42	9.1	298.0	26.52	0.67	9.4	17856
IMC_Ag5	-800	-6400	1.16	13.7	314.0	12.19	0.85	6.9	25652
IMC_Ag6	-800	-6400	1.93	22.9	314.0	12.80	1.52	23.2	86536
IMCAGCH	-800	-6400	5.29	7.6	298.0	10.36	0.40		
DravLim1 (Pt 4)	0	2200	0.04	5.5	298.0	7.01	0.15	0.1	5076
DravLim2 (Pt 2,3,5)	0	2200	0.12	5.5	298.0	11.28	0.12	0.1	1742
DravLim3 (Pt 1)	0	2200	0.08	5.5	298.0	1.83	0.61	0.5	10957
DravLim4 (Pt 6)	0	2200	0.05	5.5	299.0	11.28	0.12	0.1	4196
DRAVLIME			0.13	5.5	299.0	1.83	0.61		
GarrStv1	-5100	9200	0.5	18.3	298.0	0.30	1.37	0.4	4823
GarrStv2	-5100	9200	4.71	6.1	298.0	0.30	3.05	2.2	846
ReedMin1	-700	3000	0.43	9.1	329.0	9.75	1.19	10.8	75502
ReedMin2	-700	3000	1.45	9.1	306.0	9.75	1.68	21.6	41506
ReedMin3	-700	3000	0.06	11.0	300.0	0.30	3.35	2.6	145433
ReedMin4	-700	3000	0.06	10.4	300.0	0.30	3.35	2.6	137500
REEDMIN	-700	3000	2.00	9.1	306.0	9.75	1.68		
RinkerM	2000	1900	0.25	6.7	298.0	18.90	0.40	2.4	18968
FlRock	2900	2500	0.63	6.7	298.0	8.53	0.70	3.3	10404
CommMet1	-4400	5800	1.3	15.2	298.0	16.15	1.22	18.9	65781
CommMet1	-4400	5800	1.78	15.2	298.0	22.25	1.22	26.0	66188

Table B-1. PM Source Screening Analysis Using the EPA 'M' Factor

ISCST ID	Relative Coord (m) X	Y	QS (g/s)	HS (m)	TS (K)	VS (m/s)	DS (m)	Flowrate (m^3/s)	Merged Stack Parameter "M"
Combined PM Sources from FPL Manatee SCA									
CSX Corporation									
CSXTR01	-1900	6500	3.88	13.7	298.1	13.2	2.38		
CSXTR11	-1900	6500	3.53	18.3	298.7	3.05	2.74		
CSXTRC9	-1900	6500	3.76	0.9	298.1	194.04	0.15		
Eastern Association Terminal									
EASTAT03	-2700	6400	3.5	4.3	298.7	194.04	0.61		
EASTATBA	-2700	6400	2.1	3.4	298.1	24.05	0.34		
EASTATBB	-2700	6400	9.2	4.6	298.1	81.76	0.76		
Golden Triangle Asphalt									
GLDTRI01	-29100	3600	123.48	12.2	410.9	20.74	1.22		
Graves Enterprises									
GRAVES01	200	2800	10.08	4.3	1144	3.05	3.66		
Hillsborough Co Resource Recovery									
HILRFC3	5300	10200	2.65	67.1	494.3	16.76	3.51		
TECO Hookers Point									
TECHKC6	-4900	8500	35.44	85.3	448.2	10.48	3.44		
IMC Port Sutton Terminal									
IACPTS01	-2800	5000	5.52	19.8	338.7	12.63	2.44		
IACPTSBA	-2800	5000	3.58	2.1	322	32.07	0.34		
Lafarge Corp.									
LAFRG29	-5200	8100	11.98	44.5	494.8	40.24	2.44		
LAFRG30	-5200	8100	5.67	30.8	401.9	6.09	3.81		
LAFRGMM	-5200	8100	17.06	1.5	310.8	17.92	0.58		
Nitram									
NITRM06	-400	6500	3.55	52.7	310.9	5.84	4.57		
NITRMBA	-400	6500	2.32	11.9	298.1	4.48	0.58		
Sulfuric Acid Trading Co.									
SULFTC3	-13900	-1000	0.4	7.6	480.4	4.56	0.52		
Tampa City McKay Bay Refuse-to-Energy									
MCKBAYC5	-2900	9400	3.57	45.7	500	21.3	1.3		
Tropicana									
TROPNC3	-16100	-41600	11.99	29	333.1	21.56	0.91		
TROPNC8	-16100	-41600	14.01	15.2	305.4	3.23	0.3		

Table B-2 . PM Emission Inventory of AAQS Sources Taken from FPL Manatee SCA

APIS Number	Facility/Source	Facility Relative Location Coordinate (in meters) X	Y	ISCST ID	APIS Src #	Stack Height (ft)	(m)	Stack Diameter (ft)	(m)	Exit Velocity (ft/s)	(m/s)	Temperature (°F)	(K)	Maximum PM Emissions (lb/hr)	(TPY)	(g/s)	Merged Stack Parameter M Test (a)
40HIL290018	LaFarge Corp.	-5200	8100	LAFRG29	29	146.0	44.5	8.0	2.44	132.0	40.24	431	494.8	95.1	416	11.98	
				LAFRG30	30	101.0	30.8	12.5	3.81	20.0	6.09	264	401.9	45.0	197	5.67	
					01	98.0	29.9	1.6	0.49	39.8	12.13	77	298.0	1.1	5	0.14	145434
					02	98.0	29.9	1.6	0.49	39.8	12.13	77	298.0	1.1	5	0.14	145434
					03	102.0	31.1	1.9	0.58	64.7	19.71	77	298.0	2.8	12	0.35	137848
					05	100.0	30.5	2.5	0.76	40.7	12.42	77	298.0	3.2	14	0.40	127941
					06	147.0	44.8	1.7	0.52	44.1	13.43	77	298.0	1.6	7	0.20	190429
					07	147.0	44.8	1.7	0.52	44.1	13.43	77	298.0	1.6	7	0.20	190429
					08	147.0	44.8	1.7	0.52	44.1	13.43	77	298.0	1.6	7	0.20	190429
					09	171.0	52.1	1.1	0.34	84.2	25.66	77	298.0	1.1	5	0.14	258462
					11	47.0	14.3	1.3	0.40	62.8	19.14	77	298.0	1.3	6	0.17	60418
					12	83.0	25.3	2.3	0.70	80.2	24.45	77	298.0	5.0	22	0.63	112606
					13	83.0	25.3	3.4	1.04	62.4	19.02	77	298.0	8.7	38	1.09	111758
					14	57.0	17.4	2.2	0.67	57.0	17.37	157	342.4	1.6	7	0.20	182114
					15	30.0	9.1	2.4	0.73	55.2	16.84	77	298.0	3.9	17	0.49	39178
					16	83.0	25.3	3.4	1.04	62.4	19.02	77	298.0	8.7	38	1.09	111758
					17	90.0	27.4	1.1	0.34	87.7	26.73	77	298.0	3.2	14	0.40	49594
					18	16.0	4.9	2.4	0.73	55.2	16.84	77	298.0	3.9	17	0.49	20918
					19	83.0	25.3	3.4	1.04	62.4	19.02	77	298.0	8.7	38	1.09	111758
					20	57.0	17.4	2.2	0.67	57.0	17.37	77	298.0	3.2	14	0.40	79249
					21	30.0	9.1	2.4	0.73	55.2	16.84	77	298.0	3.9	17	0.49	39178
					23	49.0	14.9	2.2	0.67	35.1	10.69	77	298.0	2.1	9	0.26	64537
					24	49.0	14.9	2.2	0.67	35.1	10.69	77	298.0	2.1	9	0.26	64537
					25	72.0	22.0	0.8	0.24	265.3	80.85	77	298.0	2.1	9	0.26	92017
					27	20.0	6.1	2.2	0.67	78.9	24.06	100	310.8	4.6	20	0.58	27728
					31	49.0	14.9	2.0	0.61	63.6	19.40	77	298.0	2.9	13	0.37	68221
					42	174.0	53.0	1.5	0.46	75.5	23.00	77	298.0	20.1	88	2.53	23880
					43	174.0	53.0	1.5	0.46	94.3	28.75	77	298.0	2.3	10	0.29	260415
					44	60.0	18.3	1.0	0.30	112.0	34.15	77	298.0	1.3	6	0.17	77393
					45	60.0	18.3	1.0	0.30	112.0	34.15	77	298.0	1.3	6	0.17	77393
					50	123.0	37.5	1.0	0.30	84.9	25.87	77	298.0	1.1	5	0.14	145926
					--	33.0	10.1	2.4	0.73	55.2	16.84	196	364.1	2.9	13	0.37	69774
					--	5.0	1.5	1.9	0.58	58.8	17.92	100	310.8	2.5	11	0.32	6990 Lowest M
					--	95.0	29.0	1.5	0.46	37.7	11.50	77	298.0	1.1	5	0.14	117812
					--	57.0	17.4	2.2	0.67	57.0	17.37	77	298.0	3.2	14	0.40	79249
					--	73.0	22.3	1.9	0.58	76.4	23.29	77	298.0	2.9	13	0.37	110271
					--	115.0	35.1	1.9	0.58	70.5	21.50	100	310.8	2.9	13	0.37	167244
					--	33.0	10.1	2.4	0.73	55.2	16.84	196	364.1	1.6	7	0.20	129082
					--	90.0	27.4	1.0	0.30	106.1	32.34	77	298.0	1.3	6	0.17	109917
					--	34.0	10.4	1.1	0.34	107.0	32.61	77	298.0	1.6	7	0.20	45703
					--	83.0	25.3	3.4	1.04	62.4	19.02	180	355.2	2.1	9	0.26	558454
					--	57.0	17.4	2.2	0.67	57.0	17.37	157	342.4	2.1	9	0.26	140088
					--	83.0	25.3	3.4	1.04	62.4	19.02	180	355.2	1.6	7	0.20	725990
					--	83.0	25.3	1.3	0.40	80.3	24.49	77	298.0	1.6	7	0.20	116013
					--	33.0	10.1	2.4	0.73	55.2	16.84	196	364.1	2.1	9	0.26	99294
				LAFRGMM		5.0	1.5	1.9	0.58	58.8	17.92	100	310.8	2.5	11.1	17.06	
40HIL290014	Eastern Association Terminal	-2700	6400	EASTAT03	3	14	4.3	2.0	0.61	636.6	194.04	78	298.7	27.8	122	3.50	20810
					1	55	16.8	4.2	1.28	62.6	19.07	77	298.1	12.0	53	1.52	80852
					2	70	21.3	0.5	0.15	25.5	7.76	77	298.1	0.1	0	0.01	87071
					4	11	3.4	1.6	0.49	93.3	28.42	78	298.7	2.5	11	0.31	17557
					6	11	3.4	1.1	0.34	78.9	24.05	77	298.1	1.0	5	0.13	17024 Lowest M
					9	11	3.4	1.1	0.34	78.9	24.05	78	298.7	1.0	5	0.13	17058

Table B-2 . PM Emission Inventory of AAQS Sources Taken from FPL Manatee SCA

APIS Number	Facility/Source	Facility Relative Location Coordinate (in meters) X	Y	ISCST ID	APIS Src #	Stack Height (ft)	(m)	Stack Diameter (ft)	(m)	Exit Velocity (ft/s)	(m/s)	Temperature (°F)	(K)	Maximum PM Emissions (lb/hr)	(TPY)	(g/s)	Merged Stack Parameter M Test (a)
				EASTATBA	1,2,4,6,9	11	3.4	1.1	0.34	78.9	24.05	77	298.1	16.6	73	2.10	
					11	15	4.6	2.5	0.76	268.2	81.76	77	298.1	18.3	80	2.30	22113
					12	15	4.6	2.5	0.76	268.2	81.76	77	298.1	18.3	80	2.30	22113
					13	15	4.6	2.5	0.76	268.2	81.76	77	298.1	18.3	80	2.30	22113
					14	15	4.6	2.5	0.76	268.2	81.76	77	298.1	18.3	80	2.30	22113
				EASTATBB	11,12,13,14	15	4.6	2.5	0.76	268.2	81.76	77	298.1	73.1	320	9.20	
40HIL290024	IMC-Agrico Co. (Port Sutton)	-2800	5000	IACPTS01	1	65	19.8	8.0	2.44	41.4	12.63	150	338.7	43.8	192	5.52	
					2	68	20.7	6.0	1.83	55.1	16.80	79	299.3	11.1	49	1.40	195547
					3	45	13.7	1.5	0.46	113.2	34.50	90	305.4	3.09	14	0.39	61511
					4	7	2.1	1.1	0.34	105.2	32.07	120	322.0	1.54	7	0.19	10363 Lowest M
					5	32	9.8	1.7	0.52	51.4	15.67	120	322.0	1.8	8	0.23	45658
					6	18	5.5	1.1	0.34	105.2	32.07	120	322.0	1.54	7	0.19	27140
					7	39	11.9	1.1	0.34	105.2	32.07	120	322.0	1.54	7	0.19	58721
					8	97	29.6	1.1	0.34	61.4	18.71	77	298.1	0.9	4	0.11	136264
					9	101	30.8	1.3	0.4	43.9	13.40	120	322.0	1.05	5	0.13	128463
					12	10	3	2.0	0.61	132.6	40.43	100	310.9	5.94	26	0.75	14694
				IACPTSBA	ALL	7	2.1	1.1	0.34	105.2	32.07	120	322.0	28.5	125	3.58	
40HIL290029	Nitram	-400	6500	NITRM06	6	173	52.7	15.0	4.57	19.1	5.84	100	310.9	28.2	124	3.55	
					3	90	27.4	4.5	1.37	35.3	10.76	260	399.8	4.1	18	0.52	334144
					4	30	9.1	4.5	1.37	35.3	10.76	450	505.4	2.04	9	0.26	280573
					8	36	11	1.9	0.58	47	14.33	77	298.1	0.6	3	0.08	155187
					9	39	11.9	1.9	0.58	14.7	4.48	77	298.1	2.1	9	0.26	16150 Lowest M
					10	63	19.2	0.3	0.09	106.1	32.34	77	298.1	0.12	1	0.02	58877
					11	35	10.7	0.3	0.09	129.7	39.53	77	298.1	0.14	1	0.02	40107
					12	35	10.7	5.0	1.52	35.4	10.79	101	311.5	9.24	40	1.16	56258
				NITRMBA	3-12	39	11.9	1.9	0.58	14.7	4.48	77	298.1	18.3	80	2.32	
40HIL290033	CSX Transportation Inc.	-1900	6500	CSXTR01	1	45	13.7	7.8	2.38	43.3	13.20	77	298.1	30.8	135	3.88	
				CSXTR11	11	60	18.3	9.0	2.74	10	3.05	78	298.7	28	123	3.53	
					2	3	0.9	0.5	0.15	636.6	194.04	77	298.1	1.9	8	0.24	3833 Lowest M
					3	40	12.2	6.7	2.04	47.5	14.49	77	298.1	17.9	78	2.26	76214
					4	40	12.2	2.2	0.67	63.6	19.38	77	298.1	1.9	8	0.24	103539
					5	40	12.2	1.8	0.55	59.6	18.17	77	298.1	1.2	5	0.15	104665
					6	4	1.2	0.5	0.15	360.8	109.96	77	298.1	1.1	5	0.14	4965
					7	3	0.9	0.5	0.15	275.9	84.08	77	298.1	0.8	4	0.10	3986
					8	3	0.9	0.5	0.15	275.9	84.08	77	298.1	0.8	4	0.10	3986
					9	36	11	3.3	1.01	37.2	11.34	77	298.1	3.93	17	0.50	59584
					10	54	16.5	6.0	1.83	12.4	3.77	77	298.1	0.27	1	0.03	1625766
				CSXTRC9	2-10	3	0.9	0.5	0.15	636.6	194.04	77	298.1	29.8	131	3.76	
40HIL290099	Sulfuric Acid Trading Co.	-13900	-1000		1	25	7.6	1.7	0.52	15	4.56	405	480.4	1.38	6	0.17	
					2	25	7.6	1.7	0.52	15	4.56	405	480.4	1.38	6	0.17	
					3	0	0	0.0	0	0	0.00	0	255.4	0.51	2	0.06	
				SULFTC3	1,2,3	25	7.6	1.7	0.52	15	4.56	405	480.4	3.27	14	0.40	

Table B-2 . PM Emission Inventory of AAQS Sources Taken from FPL Manatee SCA

APIS Number	Facility/Source	Facility Relative Location Coordinate (in meters) X	Y	ISCST ID	APIS Src #	Stack Height (ft)	(m)	Stack Diameter (ft)	(m)	Exit Velocity (ft/s)	(m/s)	Temperature (°F)	(K)	Maximum PM Emissions (lb/hr)	(TPY)	(g/s)	Merged Stack Parameter M Test (a)
40HIL290127	Tampa City McKay Bay RTE	-2900	9400		1	160	45.7	4.3	1.30	70.0	21.30	440	500.0	7.0	31	0.88	
					2	160	45.7	4.3	1.30	70.0	21.30	440	500.0	7.0	31	0.88	
					3	160	45.7	4.3	1.30	70.0	21.30	440	500.0	7.0	31	0.88	
					4	160	45.7	4.3	1.30	70.0	21.30	440	500.0	7.0	31	0.88	
					5	57	17.4	2.0	0.61	11.2	3.41	200	366.5	0.4	2	0.05	
				MCKBAYC5	1-5	160	45.7	4.3	1.30	70.0	21.30	440	500.0	28.36	124	3.57	
40MAN410007	Tropicana Products, Inc.	-16100	-41600		1	95	29	3.0	0.91	70.7	21.56	140	333.1	31.8	139	4.01	33779 Lowest M
					2	95	29	3.0	0.91	70.7	21.56	140	333.1	31.8	139	4.01	33779 Lowest M
					3	95	29	3.2	0.98	62.2	18.95	140	333.1	31.5	138	3.97	34780
				TROPNC3	01-03	95	29	3.0	0.91	70.7	21.56	140	333.1	95.2	417	11.99	
					10	30	9.1	2.5	0.76	1.4	0.41	600	588.7	2.2	10	0.28	3559
					11	71	21.6	6.3	1.92	25.2	7.69	441	500.4	17.39	76	2.19	109887
					12	71	21.6	6.3	1.92	39.2	11.95	536	553.2	18.2	80	2.29	180535
					14	103	31.4	6.3	1.92	22.4	6.83	489	527.0	21.5	94	2.71	120749
					15	80	24.4	7.0	2.13	24.8	7.55	540	555.4	7.87	34	0.99	368262
					16	80	24.4	12.0	3.66	54.3	16.55	268	404.3	1.75	8	0.22	7807661
					18	50	15.2	1.0	0.3	10.6	3.23	90	305.4	26.4	116	3.33	318
					20	65	19.8	6.7	2.04	18.9	5.76	90	305.4	15.9	70	2.00	56922
				TROPNC8	10-20	50	15.2	1.0	0.3	10.6	3.23	90	305.4	111.2	487	14.01	
40PNL520004	Golden Triangle Asphalt	-29100	3600	GLDTRI01	1	40	12.2	4.0	1.22	68	20.74	280	410.9	980	4292	123.48	
40HIL290261	Hillsborough County RRF	5300	10200	HILRFC3	--	220	67.1	11.5	3.51	55.0	16.76	430	494.3	21.0	92	2.65	
40HIL290317	Graves Enterprises	200	2800	GRAVES01	1	14	4.3	12.0	3.66	10	3.05	1600	1144.3	80.0	350	10.08	
40HIL290038	TECO Hooker's Point	-4900	8500		1	280.0	85.3	11.3	3.44	20.0	6.10	295	419.3	29.9	11	3.77	538137
					2	280.0	85.3	11.3	3.44	18.0	5.49	315	430.2	29.9	11	3.77	496914
					3	280.0	85.3	12.0	3.66	26.0	7.93	322	434.3	41.1	16	5.18	596978
					4	280.0	85.3	12.0	3.66	24.7	7.52	300	422.0	41.1	16	5.18	550080
					5	280.0	85.3	11.3	3.44	34.4	10.48	347	448.2	61.0	23	7.69	484492 Lowest M
					6	280.0	85.3	9.4	2.87	73.0	22.26	320	433.3	78.2	30	9.85	540635
				TECHKC6	01-06	280.0	85.3	11.3	3.44	34.4	10.48	347	448.2	281.3	106.9	35.44	

Notes:

Some point sources provided by TECO PPS data were identifed with an APIS source number.

(a) M parameter used for merging multiple stacks at a single facility. Where M= (Stack ht (m) x Airflow (m^3/s) x Exit Temperature (K)) / Maximum emissions (g/s), based on Screening Procedures for Estimating Air Quality Impacts From Stationary Sources (EPA, 1992)

UTM Coordinates of the Cargill Riverview Facility are: 362.9 3082.5

TABLE 6
PM-10 CLASS II AREA
PSD INCREMENT INVENTORY

Facility	UTM East	UTM North	PM* (g/s)	Height+ (m)	Temperature (K)	Velocity** (m/s)	Diameter (m)
Agrico Chemical Pierce	403.7	3,079.0	5.04	24.38	320.8	21.25	2.44
Agrico Chemical Pierce	403.7	3,079.0	3.92	28.96	683.0	14.75	1.77
Agrico South Pierce	407.5	3,071.3	49.10	45.70	350.0	39.06	1.60
CF Industries Bonnie Mine Road	408.4	3,082.4	15.27	42.70	298.0	21.60	0.80
CF Industries Bonnie Mine Road	408.4	3,082.4	2.45	36.58	333.0	17.17	2.29
CF Industries Bonnie Mine Road	408.4	3,082.4	4.95	41.45	333.0	18.05	2.83
Conserv Inc.	398.7	3,084.2	28.91	45.72	349.7	10.31	2.29
Conserv Inc.	398.7	3,084.2	4.92	12.80	310.8	10.60	1.22
FPC Bayboro C4	338.8	3071.3	8.14	12.2	755.4	6.54	6.98
FPC-Bartow TC2	342.4	3082.6	31.96	91.4	424.8	31.09	2.74
FPC-Bartow TD4	342.4	3082.6	12.8	13.7	772	22.25	5.27
FPC-Bartow TO3	342.4	3082.6	27.9	91.4	408.2	34.44	3.35
FPC-Bartow TO4	342.4	3082.6	0.04	9.1	541.5	5.18	0.91
FPC-Bartow TO9	342.4	3082.6	0.01	7.6	298.1	0.04	0.27
Farmland Industries Green Bay Plant	409.5	3,080.1	28.09	30.50	308.0	18.30	1.40
Florida Power & Light	367.2	3054.1	218	152.1	425.8	23.61	7.99
Hardee Power Station	404.8	3,057.4	1.89	22.90	389.0	23.90	4.88
IMC Ft. Lonesome	389.6	3,067.9	3.17	38.10	339.1	15.16	2.44
IMC Ft. Lonesome	389.6	3,067.9	3.14	38.10	339.1	16.80	2.44
IMC Ft. Lonesome	359.6	3,067.9	6.45	45.72	316.3	8.43	0.82
IMC Fertilizer Noralyn Mine	414.7	3,080.3	28.00	11.58	333.0	7.17	0.58
IMC/Uranium Recovery CF Industries	408.4	3,082.8	23.90	25.90	297.0	11.60	0.20
Lakeland City Power CT (Larsen)	409.2	3,102.8	1.89	30.48	783.0	28.22	5.79
Lakeland McIntosh	409.5	3,105.8	40.82	76.20	350.0	32.60	4.90
Lakeland McIntosh	409.5	3,105.8	14.00	45.70	419.0	23.77	2.74
Mobil-Electrophos Division	405.6	3,079.4	15.95	30.48	319.1	12.34	1.31
TECO Big Bend	361.9	3,079.4	167.30	149.40	342.0	20.00	7.32
TECO Big Bend	361.9	3,057.0	54.61	149.35	341.9	18.21	7.32
TECO Polk KBA	402.5	3067.4	2.02	6.1	533	13.1	0.9
TECO Polk KBB	402.5	3067.4	7.43	45.7	400	16.79	5.8
TECO Polk KBC	402.5	3067.4	3.15	60.7	1033	9.14	1.07
WR Grace/Seminole	409.8	3,087.0	13.61	15.24	333.0	17.10	2.00
WR Grace/Seminole	409.8	3,087.0	4.68	60.96	347.0	25.10	1.52

Table 6a. Additional PM/PM10 PSD Class II Increment-Consuming Sources

	UTM Coordinates East	UTM Coordinates North	PM (g/s)	Height (m)	Temperature (K)	Velocity (m/s)	Diameter (m)
Hillsborough Co. Resource Recovery Facility	368.2	3092.7	2.65	67.1	494.3	16.76	3.51
Tampa City McKay Bay Refrigerator-Energy	360.0	3091.9	3.57	45.7	500.0	21.3	1.3
Tropicana	346.8	3040.9	11.99	29.0	333.1	21.56	0.91
Tropicana	346.8	3040.9	14.01	15.2	305.4	3.23	0.3

APPENDIX C1

LIST OF NO_X SOURCES USED FOR AAQS AND PSD MODELING ANALYSIS

Table C-1. Summary of Individual Source Emission and Operating Parameters for the NOx AAQS and PSD Modeling Analysis

APIS Number	Facility Name	Facility Location UTM E,N (km) / Relative X,Y (m) (a)		APIS Src #	Stack Height (ft)	Stack Height (m)	Stack Diam. (ft)	Stack Diam. (m)	Exit Velocity (ft/s)	Exit Velocity (m/s)	Temperature (°F)	Temperature (K)	Maximum NOx Emissions (lb/hr)	Maximum NOx Emissions (TPY)	Maximum NOx Emissions (g/s)
40PNL520011	FPC - Bartow	342.4	3082.6	01	300.0	91.4	9.0	2.74	119.0	36.27	312	428.7	542.7	2,377	68.38
		-20500	100	02	300.0	91.4	9.0	2.74	102.0	31.09	305	424.8	368.7	1,615	46.46
				03	300.0	91.4	11.0	3.35	113.0	34.44	275	408.2	619.2	2,712	78.02
				04	30.0	9.1	3.0	0.91	17.0	5.18	515	541.5	0.3	1	0.04
				05	45.0	13.7	17.3	5.27	73.0	22.25	930	772.0	63.5	278	8.00
				06	45.0	13.7	17.3	5.27	73.0	22.25	930	772.0	63.5	278	8.00
				07	45.0	13.7	17.3	5.27	73.0	22.25	930	772.0	55.6	243	7.00
				08	45.0	13.7	17.3	5.27	73.0	22.25	930	772.0	63.5	278	8.00
												TOTAL	1776.9	7,783	223.89
40PNL520013	FPC -Bayboro	338.8	3071.3	01	40.0	12.2	22.894	6.98	21.5	6.55	900	755.4	225.1	484	28.36
		-24100	-11200	02	40.0	12.2	22.894	6.98	21.5	6.55	900	755.4	231.5	484	29.16
				03	40.0	12.2	22.894	6.98	21.5	6.55	900	755.4	213.6	484	26.91
				04	40.0	12.2	22.894	6.98	21.5	6.55	900	755.4	206.1	484	25.97
												TOTAL	876.2	1,936	110.40
40PNL520012	FPC - Higgins	336.5	3098.4	01	173.7	52.9	12.5	3.81	30.0	9.14	325	435.9	383.7	1,681	48.35
		-26400	15900	02	173.7	52.9	12.5	3.81	30.0	9.14	314	429.8	366.0	1,603	46.12
				03	173.7	52.9	12.5	3.81	22.0	6.71	302	423.2	153.5	672	19.34
				04	55.0	16.8	15.1	4.60	372.0	113.39	850	727.6	273.4	1,197	34.44
				05	55.0	16.8	15.1	4.60	372.0	113.39	850	727.6	273.4	1,197	34.44
				06	55.0	16.8	15.1	4.60	372.0	113.39	850	727.6	304.7	1,335	38.39
				07	53.0	16.2	15.1	4.60	372.0	113.39	850	727.6	304.7	1,335	38.39
												TOTAL	2059.3	9,020	259.47
40HIL290261	Hillsborough County RRF	368.2	3092.7	01-03	220	67.056	11.5	3.505	55	16.764	430	494.3	351.99	1,542	44.351
		5300	10200												
40HIL290127	McKay Bay RTE	360.0	3091.9	01	150.0	45.7	4.3	1.30	69.9	21.30	440	500.0	75.2	329	9.47
		-2900	9400	02	150.0	45.7	4.3	1.30	69.9	21.30	440	500.0	75.2	329	9.47
				03	150.0	45.7	4.3	1.30	69.9	21.30	440	500.0	75.2	329	9.47
				04	150.0	45.7	4.3	1.30	69.9	21.30	440	500.0	75.2	329	9.47
												TOTAL	300.6	1,317	37.88
40HIL290029	Nitram	362.5	3089.0	03	90	27.432	4.5	1.37	35.3	10.759	260	399.8	66.0	289	8.32
		-400	6500	04	30	9.144	4.5	1.37	35.3	10.759	450	505.4	66.0	289	8.32
				07	55	16.764	2.5	0.76	121.9	37.155	250	394.3	87.5	383	11.03
				08	36	10.973	1.9	0.58	47.0	14.326	77	298.1	0.6	3	0.08
												TOTAL	220.1	964	27.73
40PNL520117	Pinellas RRF	335.2	3084.1	03	161.0	49.1	9.0	2.74	88.0	26.82	450	505.5	216.2	947	27.24
		-27700	1600												
--	Seminole Electric Hardee Unit 3	404.8	3057.4	-- (b)	75.0	22.86	23	7.01	107.2	32.675	1073	851.5	275.34	1206	34.693
		41900	-25100												
40HIL290039	TECO - Big Bend	361.9	3075.0	01,02	490.0	149.4	24.0	7.32	94.0	28.65	300	422.0	12362.0	54,146	1557.6

Table C-1 Summary of Individual Source Emission and Operating Parameters for the NOx AAQS and PSD Modeling Analysis

APIS Number	Facility Name	Facility Location UTM E,N (km) / Relative X,Y (m) (a)		APIS Src #		Stack Height (ft)	Stack Height (m)	Stack Diam. (ft)	Stack Diam. (m)	Exit Velocity (ft/s)	Exit Velocity (m/s)	Temperature (°F)	Temperature (K)	Maximum NOx Emissions (lb/hr)	Maximum NOx Emissions (TPY)	Maximum NOx Emissions (g/s)
		-1000	-7500	03		490.0	149.4	24.0	7.32	47.0	14.33	292	417.6	2881.0	12,619	363.01
				04		490.0	149.4	24.0	7.32	65.0	19.81	156	342.2	2598.0	11,379	327.35
				05		75.0	22.9	14.0	4.27	26.8	8.17	928	770.9	447.0	1,958	56.32
				06		75.0	22.9	14.0	4.27	26.8	8.17	928	770.9	447.5	1,960	56.39
				07		35.0	10.7	10.4	3.17	18.2	5.55	1010	816.5	128.0	561	16.13
													TOTAL	18863.5	82,622	2376.8
40HIL290040	TECO - Gannon	360.0	3087.5	01		306.0	93.3	10.4	3.17	79.0	24.08	309	427.0	1839.0	8,055	231.71
		-2900	5000	02		306.0	93.3	10.4	3.17	79.0	24.08	309	427.0	1898.0	8,313	239.15
				03		306.0	93.3	11.0	3.35	99.0	30.18	300	422.0	2401.0	10,516	302.53
				04		306.0	93.3	10.0	3.05	72.0	21.95	329	438.2	2638.0	11,554	332.39
				05		306.0	93.3	10.8	3.29	123.7	37.70	288	415.4	3454.0	15,129	435.20
				06		306.0	93.3	17.5	5.33	77.0	23.47	292	417.6	5698.0	24,957	717.95
				07		35.0	10.7	11.0	3.35	16.4	5.00	1010	816.5	128.0	561	16.13
													TOTAL	18056.0	79,085	2275.1
40HIL290038	TECO - Hookers Point	358.0	3091.0	01		280.0	85.3	11.3	3.44	20.3	6.19	295	419.3	121.0	530	15.25
		-4900	8500	02		280.0	85.3	11.3	3.44	18.0	5.49	329	438.2	121.0	530	15.25
				03		280.0	85.3	12.0	3.66	26.0	7.93	322	434.3	167.0	731	21.04
				04		280.0	85.3	12.0	3.66	24.0	7.32	300	422.0	167.0	731	21.04
				05		280.0	85.3	11.3	3.44	36.0	10.98	347	448.2	243.0	1,064	30.62
				06		280.0	85.3	9.4	2.87	73.0	22.26	322	434.3	222.0	972	27.97
													TOTAL	1041.0	4,560	131.17
--	TECO - Polk Power Station	402.5	3067.4	--	(b)	20.0	6.1	3.0	0.90	43.0	13.10	500	533.0	7.9	35	1.00
		39600	-15100	--	(b)	150.0	45.7	19.0	5.80	55.1	16.79	260	400.0	523.0	2,291	65.90
				--	(b)	199.0	60.7	3.5	1.07	30.0	9.14	1400	1033.0	3.7	16	0.47
													TOTAL	534.7	2,342	67.37
40TPA250015	TPS - Hardee Power Station (295 MW)	404.9	3057.1	01	(b)	90.0	27.4	14.5	4.42	80.0	24.38	253	396.0	639.8	701	80.61
		42000	-25400	02	(b)	90.0	27.4	14.5	4.42	80.0	24.38	253	396.0	639.8	701	80.61
				03	(b)	75.1	22.9	16.0	4.88	103.0	31.39	953	785.0	639.8	701	80.61
													TOTAL	1919.3	2,102	241.83
40MAN41007	Tropicana Products	346.8	3040.9	11		71.0	21.6	6.3	1.92	25.2	7.69	441	500.4	32.0	140	4.03
		-16100	-41600	12		71.0	21.6	6.3	1.92	39.2	11.95	536	553.2	96.7	424	12.18
				14		103.0	31.4	6.3	1.92	22.4	6.83	489	527	91.0	399	11.47
				15	(b)	80.0	24.4	7.0	2.13	24.8	7.55	540	555.4	31.4	138	3.96
				16	(b)	80.0	24.4	12.0	3.66	54.3	16.55	268	404.3	73.0	320	9.20
													TOTAL	324.1	1,420	40.84
	FPL Manatee	367.2	3054.1	01		475.0	144.8	26.2	8.0	80.4	24.5	300	422.04	2595.0	11,366	326.97
		4300	-28000	02		475.0	144.8	26.2	8.0	80.4	24.5	300	422.04	2595.0	11,366	326.97

Table C-1 Summary of Individual Source Emission and Operating Parameters for the NOx AAQS and PSD Modeling Analysis

APIS Number	Facility Name	Facility Location UTM E,N (km)		APIS Src #	Stack Height		Stack Diam.		Exit Velocity		Temperature		Maximum NOx Emissions		
		Relative X,Y (m) (a)			(ft)	(m)	(ft)	(m)	(ft/s)	(m/s)	(°F)	(K)	(lb/hr)	(TPY)	(g/s)

Notes.
(a) Location relative to the Proposed Cargill Project (East, North UTM location (km) are 362.9, 3082.5)
(b) NOx PSD increment consuming source

Table C-2. Summary of Modeling Parameters for the NOx AAQS and PSD Class II Modeling Analysis

APIS Number	Facility Name	Facility Location Relative X,Y (m) (a)		ISCST ID	APIS Src #	Stack Height (ft)	Stack Height (m)	Stack Diam. (ft)	Stack Diam. (m)	Exit Velocity (ft/s)	Exit Velocity (m/s)	Temperature (°F)	Temperature (K)	Maximum NOx Emissions (g/s)
40PNL520011	FPC - Bartow	-20500	100		01	300.0	91.4	9.0	2.74	119.0	36.27	312	428.7	68.38
					02	300.0	91.4	9.0	2.74	102.0	31.09	305	424.8	46.46
				FPCBTC2A	01,02	300.0	91.4	9.0	2.74	102.0	31.09	305	424.8	114.84
				FPCBT03	03	300.0	91.4	11.0	3.35	113.0	34.44	275	408.2	78.02
				FPCBT04	04	30.0	9.1	3.0	0.91	17.0	5.18	515	541.5	0.04
					05	45.0	13.7	17.3	5.27	73.0	22.25	930	772.0	8.00
					06	45.0	13.7	17.3	5.27	73.0	22.25	930	772.0	8.00
					07	45.0	13.7	17.3	5.27	73.0	22.25	930	772.0	7.00
					08	45.0	13.7	17.3	5.27	73.0	22.25	930	772.0	8.00
				FPCBRC4B	05-08	45.0	13.7	17.3	5.27	73.0	22.25	930	772.0	31.00
40PNL520013	FPC -Bayboro	-24100	-11200		01	40.0	12.2	22.894	6.98	21.5	6.55	900	755.4	28.36
					02	40.0	12.2	22.894	6.98	21.5	6.55	900	755.4	29.16
					03	40.0	12.2	22.894	6.98	21.5	6.55	900	755.4	26.91
					04	40.0	12.2	22.894	6.98	21.5	6.55	900	755.4	25.97
				FPCBYC4A	01-04	40.0	12.2	22.894	6.98	21.5	6.55	900	755.4	110.40
40PNL520012	FPC - Higgins	-26400	15900		01	173.7	52.9	12.5	3.81	30.0	9.14	325	435.9	48.35
					02	173.7	52.9	12.5	3.81	30.0	9.14	314	429.8	46.12
				FPCHGC2	01-02	173.7	52.9	12.5	3.81	30.0	9.14	314	429.8	94.46
				FPCHG03	03	173.7	52.9	12.5	3.81	22.0	6.71	302	423.2	19.34
					04	55.0	16.8	15.1	4.60	372.0	113.39	850	727.6	34.44
					05	55.0	16.8	15.1	4.60	372.0	113.39	850	727.6	34.44
					06	55.0	16.8	15.1	4.60	372.0	113.39	850	727.6	38.39
				FPCHGC3	04,-06	55.0	16.8	15.1	4.60	372.0	113.39	850	727.6	107.28
				FPCHG07	07	53.0	16.2	15.1	4.60	372.0	113.39	850	727.6	38.39
													TOTAL	461.22
40HIL290261	Hillsborough County RRF	5300	10200	HCRRFC3	01-03	220	67.056	11.5	3.5052	55	16.764	430	494.3	44.351
40HIL290127	McKay Bay RTE	-2900	9400		01	150.0	45.7	4.3	1.30	69.9	21.30	440	500.0	9.47
					02	150.0	45.7	4.3	1.30	69.9	21.30	440	500.0	9.47
					03	150.0	45.7	4.3	1.30	69.9	21.30	440	500.0	9.47
					04	150.0	45.7	4.3	1.30	69.9	21.30	440	500.0	9.47
				MCKAYC4	01-04	150.0	45.7	4.3	1.30	69.9	21.30	440	500.0	37.88
40HIL290029	Nitram	-400	6500											
				NTRAM03	03	90	27.432	4.5	1.37	35.3	10.759	260	399.8	8.32
				NTRAM04	04	30	9.144	4.5	1.37	35.3	10.759	450	505.4	8.32
				NTRAM07	07	55	16.764	2.5	0.76	121.9	37.155	250	394.3	11.03

Table C-2 Summary of Modeling Parameters for the NOx AAQS and PSD Class II Modeling Analysis

APIS Number	Facility Name	Facility Location Relative X,Y (m) (a)		ISCST ID	APIS Src #	Stack Height (ft)	Stack Height (m)	Stack Diam. (ft)	Stack Diam. (m)	Exit Velocity (ft/s)	Exit Velocity (m/s)	Temperature (°F)	Temperature (K)	Maximum NOx Emissions (g/s)
				NTRAM08	08	36	10.973	1.9	0.58	47.0	14.326	77	298.1	0.08
40PNL520117	Pinellas RRF	-27700	1600	PNLRF03	03	161.0	49.1	9.0	2.74	88.0	26.82	450	505.5	27.24
--	Seminole Electric Hardee Unit 3	41900	-25100	SEMHD3	--	75.0	22.86	23	7.01	107.2	32.675	1073	851.5	88.099
40HIL290039	TECO - Big Bend	-1000	-7500	TECBBC2A	01,02	490.0	149.4	24.0	7.32	94.0	28.65	300	422.0	804.13
				TECBB03	03	490.0	149.4	24.0	7.32	47.0	14.33	292	417.6	251.11
				TECBB04	04	490.0	149.4	24.0	7.32	65.0	19.81	156	342.2	327.60
					05	75.0	22.9	14.0	4.27	26.8	8.17	928	770.9	3.71
					06	75.0	22.9	14.0	4.27	26.8	8.17	928	770.9	56.43
				TECBBC2B	05,06	75.0	22.9	14.0	4.27	26.8	8.17	928	770.9	60.14
				TECBB07	07	35.0	10.7	10.4	3.17	18.2	5.55	1010	816.5	0.32
40HIL290040	TECO - Gannon	-2900	5000		01	306.0	93.3	10.4	3.17	79.0	24.08	309	427.0	15.89
					02	306.0	93.3	10.4	3.17	79.0	24.08	309	427.0	134.22
				TECGNC2A	01,02	306.0	93.3	10.4	3.17	79.0	24.08	309	427.0	150.11
				TECGN03	03	306.0	93.3	11.0	3.35	99.0	30.18	300	422.0	168.54
				TECGN04	04	306.0	93.3	10.0	3.05	72.0	21.95	329	438.2	23.69
				TECGN05	05	306.0	93.3	10.8	3.29	123.7	37.70	288	415.4	289.74
				TECGN06	06	306.0	93.3	17.5	5.33	77.0	23.47	292	417.6	177.32
				TECGN07	07	35.0	10.7	11.0	3.35	16.4	5.00	1010	816.5	0.35
40HIL290038	TECO - Hookers Point	-4900	8500		01	280.0	85.3	11.3	3.44	20.3	6.19	295	419.3	1.52
					02	280.0	85.3	11.3	3.44	18.0	5.49	329	438.2	1.52
				TECHKC2A	01,02	280.0	85.3	11.3	3.44	18.0	5.49	295	419.3	3.0492
					03	280.0	85.3	12.0	3.66	26.0	7.93	322	434.3	12.93
					04	280.0	85.3	12.0	3.66	24.0	7.32	300	422.0	18.97
				TECHKC2B	03,04	280.0	85.3	12.0	3.66	24.0	7.32	300	422.0	31.9
				TECHK05	05	280.0	85.3	11.3	3.44	36.0	10.98	347	448.2	1.73
				TECHK06	06	280.0	85.3	9.4	2.87	73.0	22.26	322	434.3	1.01
--	TECO - Polk Power Station	39600	-15100	TECPKAA	-- (b)	20.0	6.1	3.0	0.90	43.0	13.10	500	533.0	
				TECPKAB	-- (b)	150.0	45.7	19.0	5.80	55.1	16.79	260	400.0	

Table C-2. Summary of Modeling Parameters for the NOx AAQS and PSD Class II Modeling Analysis

APIS Number	Facility Name	Facility Location Relative X,Y (m) (a)		ISCST ID	APIS Src #		Stack Height (ft)	Stack Height (m)	Stack Diam. (ft)	Stack Diam. (m)	Exit Velocity (ft/s)	Exit Velocity (m/s)	Temperature (°F)	Temperature (K)	Maximum NOx Emissions (g/s)
				TECPKAC	--	(b)	199.0	60.7	3.5	1.07	30.0	9.14	1400	1033.0	
40TPA250015	TPS - Hardee Power Station (295 MW)	42000	-25400	TPSHD01	01	(b)	90.0	27.4	14.5	4.42	80.0	24.38	253	396.0	80.61
				TPSHD02	02	(b)	90.0	27.4	14.5	4.42	80.0	24.38	253	396.0	80.61
				TPSHD03	03	(b)	75.1	22.9	16.0	4.88	103.0	31.39	953	785.0	80.61
40MAN41007	Tropicana Products	-16100	-41600	TROPC11	11		71.0	21.6	6.3	1.92	25.2	7.69	441	500.4	4.03
				TROPC12	12		71.0	21.6	6.3	1.92	39.2	11.95	536	553.2	12.18
				TROPC14	14		103.0	31.4	6.3	1.92	22.4	6.83	489	527	11.47
				TROPC15	15	(b)	80.0	24.4	7.0	2.13	24.8	7.55	540	555.4	3.96
				TROPC16	16	(b)	80.0	24.4	12.0	3.66	54.3	16.55	268	404.3	9.20
	FPL Manatee	4300	-28000	FPLMANTE	01		475.0	144.8	26.2	8.0	80.4	24.5	300	422.04	326.97
					02		475.0	144.8	26.2	8.0	80.4	24.5	300	422.04	326.97

Notes:
(a) Location relative to the Proposed Cargill Project (East, North UTM location (km) are 362.9, 3082.5)
(b) NOx PSD increment consuming source

APPENDIX C2

CALCULATION OF NO_X EMISSIONS FOR CARGILL RIVERVIEW SOURCES

NOx Emissions for Dryers at Fertilizer Plants No. 3 and No. 4.

Parameter	Annual Emissions Natural Gas
OPERATING DATA	
Operating Time-Natural Gas (hr/yr)	8,500
Heat Input Rate (MMBtu/hr)	4.88
Natural Gas Use (scf/hr) (a)	4,880
Natural Gas Use (MMscf/yr)	41.48

Pollutant	Emission Factor (b)		Natural Gas lb/hr	Natural Gas (TPY)
EMISSIONS DATA				
NOx:	100	lb/MMft³	0.49	2.07

Note: NA = not applicable.

(a) Based on 1,000 Btu/scf for natural gas.
(b) Emission factors based on AP-42 or state mandated factor.

NOx Emissions for Dryer at Fertilizer Plant No. 5

Parameter	Hourly Emissions: No. 2 Fuel Oil	Hourly Emissions: Natural Gas	Annual Emissions: Case 1 All Natural Gas	Annual Emissions: Case 2 Maximum All Fuel Oil
OPERATING DATA				
Operating Time-Natural Gas (hr/yr)	NA	NA	8,760	8,360
Operating Time-Fuel Oil (hr/yr)	NA	NA	0	400
Heat Input Rate (MMBtu/hr)	40.0	40.0	25.0	25.0
Fuel Oil Use (gal/hr) (a)	285.7	NA	NA	285.7
Fuel Oil Use (gal/yr)	NA	NA	NA	114,286
Maximum Sulfur Content (Wt %)	0.5	NA	NA	0.5
Natural Gas Use (scf/hr)	NA	40,000	25,000	NA
Natural Gas Use (MMscf/yr)	NA	NA	219.00	NA

Pollutant	Emission Factor (b)		No. 2 Fuel Oil lb/hr	Natural Gas lb/hr	Case 1 All Natural Gas (TPY)	Case 2 Maximum Fuel Oil (TPY)
EMISSIONS DATA						
NOx: Fuel Oil	20	lb/Mgal	5.71	5.60	24.53	24.55
Natural Gas	140	lb/MMft^3				

Note: NA = not applicable.

(a) Based on 140,000 Btu/gal for 0.5% S oil; 1,000 Btu/scf for natural gas.
(b) Emission factors based on AP-42 or state mandated factor.

NOx Emissions for Dryer at GTSP Plant

Parameter	Hourly Emissions: No. 2 Fuel Oil	Hourly Emissions: Natural Gas	Annual Emissions: Case 1 All Natural Gas	Annual Emissions: Case 2 Maximum Fuel Oil
OPERATING DATA				
Operating Time-Natural Gas (hr/yr)	NA	NA	8,760	8,360
Operating Time-Fuel Oil (hr/yr)	NA	NA	0	400
Heat Input Rate (MMBtu/hr)	60.0	60.0	60.0	60.0
Fuel Oil Use (gal/hr) (a)	428.6	NA	NA	428.6
Fuel Oil Use (gal/yr)	NA	NA	NA	171,429
Maximum Sulfur Content (Wt %)	0.5	NA	NA	0.5
Natural Gas Use (scf/hr)	NA	60,000	60,000	NA
Natural Gas Use (MMscf/yr)	NA	NA	525.60	NA

Pollutant	Emission Factor (b)		No. 2 Fuel Oil lb/hr	Natural Gas lb/hr	Case 1 All Natural Gas (TPY)	Case 2 Maximum Fuel Oil (TPY)
EMISSIONS DATA						
NOx: Fuel Oil	20	lb/Mgal	8.57	8.40	36.79	36.83
Natural Gas	140	lb/MMft³				

Note: NA = not applicable.

(a) Based on 140,000 Btu/gal for 0.5% S oil; 1,000 Btu/scf for natural gas.

(b) Emission factors based on AP-42 or state mandated factor.

NOx Emissions for Dryers at Cargill Riverview Nos. 5 and 9 Mills

Parameter			Hourly Emissions No. 2 Fuel Oil	Hourly Emissions Natural Gas	Annual Emissions Case 1 All Natural Gas	Annual Emissions Case 2 Maximum Fuel Oil
OPERATING DATA						
Operating Time-Natural Gas (hr/yr)			NA	NA	8,760	8,360
Operating Time-Fuel Oil (hr/yr)			NA	NA	0	400
Heat Input Rate (MMBtu/hr)			26.0	26.0	26.0	26.0
Fuel Oil Use (gal/hr) (a)			185.7	NA	NA	185.7
Fuel Oil Use (gal/yr)			NA	NA	NA	74,286
Maximum Sulfur Content (Wt %)			0.50	NA	NA	0.50
Natural Gas Use (scf/hr)			NA	26,000	26,000	NA
Natural Gas Use (MMscf/yr)			NA	NA	227.76	NA
Pollutant	**Emission Factor (b)**		**No. 2 Fuel Oil lb/hr**	**Natural Gas lb/hr**	**Case 1 All Natural Gas (TPY)**	**Case 2 Fuel Oil (TPY)**
EMISSIONS DATA						
NOx: Fuel Oil	20	lb/Mgal	3.80	3.64	15.94	15.98
Natural Gas	140	lb/MMft^3				

Note: NA = not applicable.

(a) Based on 140,000 Btu/gal for 0.5% S oil; 1,000 Btu/scf for natural gas.
(b) Emission factors based on AP-42.

NOx Emissions for Auxillary Boiler

Parameter	Hourly Emissions: No. 2 Fuel Oil	Hourly Emissions: Natural Gas	Annual Emissions Case 1: All Natural Gas	Annual Emissions Case 2: All Fuel Oil
OPERATING DATA				
Operating Time-Natural Gas (hr/yr)	NA	NA	8,760	0
Operating Time-Fuel Oil (hr/yr)	NA	NA	0	8,760
Heat Input Rate (MMBtu/hr)	130.0	130.0	130.0	130.0
Fuel Oil Use (gal/hr) (a)	928.6	NA	NA	928.6
Fuel Oil Use (gal/yr)	NA	NA	NA	8,134,286
Maximum Sulfur Content (Wt %)	0.35	NA	NA	0.35
Natural Gas Use (scf/hr)	NA	130,000	130,000	NA
Natural Gas Use (MMscf/yr)	NA	NA	1,138.80	NA

Pollutant	Emission Factor (b)		No. 2 Fuel Oil lb/hr	Natural Gas lb/hr	Case 1 All Natural Gas (TPY)	Case 2 All Fuel Oil (TPY)
EMISSIONS DATA						
NOx: Fuel Oil	20	lb/Mgal	18.57	71.50	313.17	81.34
Natural Gas	550	lb/MMft³				

Note: NA = not applicable.

(a) Based on 140,000 Btu/gal for 0.35% S oil; 1,000 Btu/scf for natural gas.
(b) Emission factors based on AP-42.

NOx Emissions for Sulfuric Acid Plants # 7,8,9

Parameter			
OPERATING DATA			
Operating Time (hr/yr)		NA	8,760
		(ton/day)	TPY
Sulfur Production (100% H2SO4)	CAP No. 7	2,200	803,000
	CAP No. 8	2,700	985,500
	CAP No. 9	3,000	1,095,000
	Total =	7,900	2,883,500

Pollutant	Emission Factor (b)	(lb/hr) (a)	(TPY)
EMISSIONS DATA			
NOx: CAP No. 7	0.12 lb/ton sulfur produced	11.00	48.18
CAP No. 8	0.12 lb/ton sulfur produced	13.50	59.13
CAP No. 9	0.12 lb/ton sulfur produced	15.00	65.70
	Total =	39.50	173.01

Note: NA = not applicable.

(a) Hourly emissions are calculated taking daily rates and dividing by 24.
(a) Emission factor based on CAP 8 & 9 plant construction permit application submitted 1993.

NOx Emissions for Dryer at Sodium Manufacturing Plant

Parameter	Hourly Emissions: No. 2 Fuel Oil	Hourly Emissions: Natural Gas	Annual Emissions Case 1: All Natural Gas	Annual Emissions Case 2: All Fuel Oil
OPERATING DATA				
Operating Time-Natural Gas (hr/yr)	NA	NA	7,280	0
Operating Time-Fuel Oil (hr/yr)	NA	NA	0	7,280
Heat Input Rate (MMBtu/hr)	3.25	3.25	3.25	3.25
Fuel Oil Use (gal/hr) (a)	23.2	NA	NA	23.2
Fuel Oil Use (gal/yr)	NA	NA	NA	169,000
Maximum Sulfur Content (Wt %)	0.5	NA	NA	0.5
Natural Gas Use (scf/hr)	NA	3,250	3,250	NA
Natural Gas Use (MMscf/yr)	NA	NA	23.66	NA

Pollutant	Emission Factor (b)		No. 2 Fuel Oil lb/hr	Natural Gas lb/hr	Case 1 All Natural Gas (TPY)	Case 2 Maximum Fuel Oil (TPY)
EMISSIONS DATA						
NOx: Fuel Oil	20	lb/Mgal	0.46	0.33	1.18	1.69
Natural Gas	100	lb/MMft³				

Note: NA = not applicable.

(a) Based on 140,000 Btu/gal for 0.5% S oil; 1,000 Btu/scf for natural gas.
(b) Emission factors based on AP-42 or state mandated factor.

NOx Emissions for Dryers at Animal Feed Plant

Parameter	Hourly Emissions: No. 2 Fuel Oil	Hourly Emissions: Natural Gas	Annual Emissions: Case 1 All Natural Gas	Annual Emissions: Case 2 Maximum Fuel Oil
OPERATING DATA				
Operating Time-Natural Gas (hr/yr)	NA	NA	8,760	8,360
Operating Time-Fuel Oil (hr/yr)	NA	NA	0	400
Heat Input Rate (MMBtu/hr)	46.35	46.35	46.35	46.35
Fuel Oil Use (gal/hr) (a)	331.1	NA	NA	331.1
Fuel Oil Use (gal/yr)	NA	NA	NA	132,429
Maximum Sulfur Content (Wt %)	0.50	NA	NA	0.50
Natural Gas Use (scf/hr)	NA	46,350	46,350	46,350
Natural Gas Use (MMscf/yr)	NA	NA	406.03	387.49

Pollutant	Emission Factor (b)		No. 2 Fuel Oil lb/hr	Natural Gas lb/hr	Case 1 All Natural Gas (TPY)	Case 2 Fuel Oil (TPY)
EMISSIONS DATA						
NOx: Fuel Oil	20	lb/Mgal	6.62	6.49	28.42	28.45
Natural Gas	140	lb/MMft^3				

Note: NA = not applicable.

(a) Based on 140,000 Btu/gal for 0.5% S oil; 1,000 Btu/scf for natural gas.
(b) Emission factors based on AP-42.