United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

MAY 20 2002

RECEIVED
MAY 28 2002
BUREAU OF AIR REGULATION

In Reply Refer To:
FWS/R4/RF/RS IV

Mr. C. H. Fancy
Chief, Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road, MS 48
Tallahassee, Florida 32399-2400

Dear Mr. Fancy:

Our Air Quality Branch has reviewed the Prevention of Significant Deterioration Application for IMC Phosphates Company to increase the allowable sulfuric acid production for their phosphate fertilizer manufacturing facility. The facility is 103 km southeast of Chassahowitzka National Wildlife Refuge, a Class I air quality area administered by the Fish and Wildlife Service. The technical review comments from our Air Quality Branch are enclosed.

We are pleased to see that IMC will meet a limit of 0.10 pounds sulfuric acid mist per ton of 100% sulfuric acid.

IMC's analyses predict insignificant impacts to Class I increments and visibility at Chassahowitzka NWR. We advised IMC that a deposition analysis was not needed because of the project's relatively low nitrogen oxides emissions increases. However, in the future, we would like applicants to include estimates of both nitrogen and sulfur deposition, as these estimates are easily obtained from the CALPUFF model and will help us understand the impacts of new sources on deposition in the Class I area.

Thank you for giving us the opportunity to comment on this permit application. We appreciate your cooperation in notifying us of proposed projects with the potential to impact the air quality and related resources of our Class I air quality areas.

If we may be of further assistance, please feel free to contact me at (404) 679-4000, or Ellen Porter of our Air Quality Branch in Denver at (303) 969-2617.

Sincerely yours,

Sam D. Hamilton
Regional Director

May 13, 2002

Memorandum

To: Regional Director, Region 4

From: Chief, Air Quality Branch

Subject: Permit Review – IMC Phosphates Company New Wales Plant, Polk County, Florida

We have reviewed the Prevention of Significant Deterioration (PSD) permit application that the Florida Department of Environmental Protection (FDEP) forwarded to us for IMC Phosphates Company's (IMC) proposal to increase allowable sulfuric acid production for their phosphate fertilizer manufacturing facility. The facility is 103 km southeast of Chassahowitzka Wilderness. This project will result in PSD significant increases in emissions of sulfur dioxide (SO_2), sulfuric acid mist (SAM), and nitrogen oxides (NO_X). IMC emissions (in tons per year – TPY) are summarized below.

POLLUTANT	EMISSIONS INCREASE (TPY)
SO_2	1376
SAM	141
NO_X	113

We agree that IMC will use best available control technology to control emissions from the project. In addition, we have reviewed IMC's analyses and agree that the project would have a low potential for impacts on air quality and related resources at Chassahowitzka.

Please sign the attached letter and forward it and the technical review document to the FDEP by May 22, 2002. If you have questions, please contact me at (303) 969-2814 or Ellen Porter at (303) 969-2617.

Sandra V. Silva

Attachment

Technical Review of Prevention of Significant Deterioration Permit Application
for
IMC Phosphates Company New Wales Facility
Polk County, Florida

by

Air Quality Branch, Fish and Wildlife Service – Denver
May 10, 2002

IMC Phosphates Company (IMC) has submitted a Prevention of Significant Deterioration (PSD) permit application to increase the allowable sulfuric acid production for their phosphate fertilizer manufacturing facility from 14,500 to 17,000 tons per day 100% sulfuric acid. The facility is 103 km southeast of Chassahowitzka Wilderness, a Class I air quality area administered by the U.S. Fish and Wildlife Service (FWS). This project will result in PSD significant increases in emissions of sulfur dioxide (SO_2), sulfuric acid mist (SAM), and nitrogen oxides (NO_X). IMC emissions (in tons per year – TPY) are summarized below.

POLLUTANT	EMISSIONS INCREASE (TPY)
SO_2	1376
SAM	141
NO_X	113

Best Available Control Technology (BACT)

IMC will control SO_2 emissions to 3.5 pounds per ton of 100% sulfuric acid with the use of the double absorption system, and SAM emissions to 0.10 pounds per ton of 100% sulfuric acid with the use of mist eliminators. We agree that these limits represent BACT.

Class I Area Modeling Analyses

IMC used CALPUFF to evaluate impacts to Class I increments at Chassahowitzka. The analysis predicted that the project's emissions would not contribute significantly to the Class I increments.

IMC used CALPUFF to evaluate impacts to visibility at Chassahowitzka. However, in their original November 2001 application, IMC used incorrect background values for the analysis. In a December 21, 2001, note, we advised the Florida Department of Environmental Protection (FDEP) that the analysis should be revised in accordance with guidance from the Federal Land Managers Air Quality Related Values Workgroup (FLAG). IMC revised the analysis and submitted a new analysis on May 1, 2002. Their analysis predicted a maximum change in light extinction of 1%, well below the threshold value of 5% recommended by the FLAG guidance. Therefore, impacts to visibility at Chassahowitzka are expected to be insignificant.

Although nitrogen deposition is a concern at Chassahowitzka, we advised the applicant that a deposition analysis would not be required because of the relatively low NO_X emissions from the project. However, in the future, we would like applicants to include estimates of both nitrogen and sulfur deposition, as these estimates are easily obtained from the CALPUFF model.

Contact: Ellen Porter, Air Quality Branch (303) 969-2617.

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
352/377-5822 • FAX/377-7158

Project No. 124-01-03

Fax

To: Syed Arif / Cleve Holladay FDEP	
Fax No.:	
From: Pradeep Raval	Fax No.: 352-377-7158
Date: 5/14/02	Time: 12:30p
Sent By: PR	

This message consists of 5 page(s) PLUS this cover sheet.
If you experience difficulties with this transmission, please call 352-377-5822.

Remarks: Original being sent by overnight mail.
PR

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
352/377-5822 • FAX/377-7158

KA 124-01-03

May 14, 2002

Mr. Syed Arif, P.E.
Florida Department of
Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: IMC Phosphates MP, Inc. (New Wales)
Additional Information - Sulfuric Acid Production Increase
DEP File No. 1050059-036-AC, PSD-FL-325

Dear Mr. Arif:

The following additional information is in reference to your discussion with Pradeep Raval yesterday regarding a modeling update for the above referenced project.

The modeling was updated, in accordance with discussions with Mr. Cleve Holladay, to determine the maximum predicted ambient air impacts as a result of sulfur dioxide emissions for the 3-hour period only, reflecting an emission rate of 4 pounds per ton of 100% acid for each of the three plants modeled.

The results of the modeling, tabulated in Attachment 1, indicate that the proposed emission rates will not cause or contribute to an exceedance of the ambient air quality standard or allowable PSD increment.

If you have any questions, please call me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler, Ph.D., P.E.

JBK:par
Encl.

c: C. D. Turley, IMC
M. Daigle, IMC

ATTACHMENT 1

REVISED AMBIENT AIR IMPACT ANALYSES

IMC is requesting an emission limitation of 4 pounds per ton of 100% acid, 3-hr average, and accepting an emission limitation of 3.5 pounds per ton of 100% acid, 24-hour average.

As required by FDEP, the air dispersion modeling was revised to reflect the higher 3-hr average. The all modeling inputs previously submitted to FDEP were left unchanged, except for the higher 3-hr emission rate of 71.4 g/s for each of the three plants.

The results of the modeling to determine the area of significant impact, presented in Table 1, indicate that the maximum predicted impacts are significant in the Class II area and less than significant in the Class I area.

The Class II refined modeling was conducted up to a distance of 7 kilometers from the source. This distance is one kilometer beyond the distance at which the highest-high impacts indicted significant impact.

The emission inventories for the ambient air quality standard and PSD increment analyses were updated based on information from Cleve Holladay. The resulting maximum predicted impacts are well within the allowable impacts, as shown in Table 1. The emissions inventories are presented in Tables 2 and 3.

For the ambient standards analysis, a background concentration was added to the maximum predicted impact in order to account for miscellaneous sources that may not have been included in the emissions inventory. The 2001 ambient air monitoring data from the nearest monitoring station (Anderson Road) indicated a maximum 3-hr concentration of 0.059 ppm, or about 180 ug/m3.

The resulting maximum predicted 3-hr impacts, including the background levels are well within the allowable concentration, as shown in Table 1.

TABLE I

SUMMARY OF SULFUR DIOXIDE REVISED AMBIENT AIR ANALYSES

MET. YR.	CLASS I AREA IMPACTS (1)	CLASS II AREA IMPACTS (1)
	SIGNIFICANT IMPACT ANALYSIS	
	3-HR(CALPUFF Model) ug/m3	3-HR (ISC3 Model) ug/m3
1987		38.1
1988		33.0
1989		37.4
1990	0.62	44.2
1991		34.9
Sig. Impact Level	1	25

MET. YR.	REFINED MODELING CLASS II AREA IMPACTS (1)	
	3-HR PSD INCREMENT, ug/m3	3-HR NAAQS, ug/m3
1987	163.9	441.9
1988	278.7	515.1
1989	166.7	445.5
1990	183.4	516.1
1991	171.0	612.7
Background Level		180
Max. Predicted Level		792
Allowable Level	512	1300

NOTES:

(1) The impacts represent the highest-high impact.

(2) The impacts are based on the difference between the existing and proposed SO2 emissions from the Nos.1, 2 and 3 Sulfuric acid plants, as previously submitted. The 3-hr SO2 emission rates for the Nos. 1, 2 and 3 plants were revised to 71.4 g/s (566.7 lbs/hr), respectively.

TABLE 2

SO2 PSD INCREMENT INVENTORY

(ON DISK)

TABLE 3

SO2 NAAQS INVENTORY

(ON DISK)

4. Professional Engineer Statement:

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

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

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

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

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

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

Signature _____ Date 5/14/02

(seal)

* Attach any exception to certification statement.

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
352/377-5822 ▪ FAX/377-7158

KA 124-01-03

May 16, 2002

Mr. Cleve Holladay
Florida Department of
Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: IMC Phosphates MP, Inc. (New Wales)
Additional Information - Sulfuric Acid Production Increase
DEP File No. 1050059-036-AC, PSD-FL-325

Dear Mr. Holladay:

The enclosed disk accompanies the information submitted yesterday.

If you have any questions, please call me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler, Ph.D., P.E.

JBK:par.
Encl.

c: S. Arif, FDEP
C. D. Turley, IMC

4. Professional Engineer Statement:

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

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

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

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Signature (seal)

5/16/02
Date

* Attach any exception to certification statement.

THIS COMPACT DISK CONTAINS SULFUR DIOXIDE, MODELING FILES FOR THE IMC NEW WALES PHOSPHATES FACILITY IN NEW WALES FLORIDA. INCLUDED ARE SIGNIFICANCE IMPACT ANALYSIS, INCREMENT ANALYSIS AND AMBIENT AIR QUALITY STANDARD (AQS). FOR CLASS 1 AND CLASS 2 AREAS. THE FOLLOWING DIRECTORIES CONTAIN FILES ORGANIZED BY MODELING CONCERN:

ASI <DIR> CLASS 2 AREA OF SIGNIFICANT IMPACT ISCST FILES
PUFF <DIR> CALPUFF INPUT AND OUTPUT FILES
POST <DIR> CALPOST POST PROCESSING AND RESULTS ANALYSIS
8KM <DIR> RADIUS OF SIGNIFICANCE FOR 8 KM
7KM <DIR> RADIUS OF SIGNIFICANCE FOR 7 KM
6KM <DIR> RADIUS OF SIGNIFICANCE FOR 6 KM
PSD <DIR> INCREMENT ANALYSIS FILES FOR CLASS 2 AREA
AQS <DIR> AMBIENT AIR QUALITY STANDARD

DIRECTORY <ASI> CONTAIN THE CLASS 2 AREA OF SIGNIFICANT IMPACT INPUT AND OUTPUT FILES FOR SO2:

ST-ASI87.OUT 297,293 05/07/02
ST-ASI88.OUT 297,293 05/07/02
ST-ASI89.OUT 297,159 05/07/02
ST-ASI90.OUT 297,159 05/07/02
ST-ASI91.OUT 297,159 05/07/02

DIRECTORY <PUFF> CONTAIN THE CALPUFF INPUT AND OUTPUT FILES FOR SO2:

SO2NEGCN.DAT 510,389 05/08/02 NEGATIVE SO2 SOURCE VISIBILITY DATA FILE
SO2PSCNC.DAT 510,389 05/08/02 POSITIVE SO2 SOURCE VISIBILITY DATA FILE
SO2NEG90.INP 67,147 05/08/02 NEGATIVE SO2 SOURCE INPUT FILE
SO2POS90.INP 67,146 05/08/02 POSITIVE SO2 SOURCE INPUT FILE
SO2NG.LST 233,118 05/08/02 NEGATIVE SO2 SOURCE LISTING FILE
SO2PS.LST 233,118 05/08/02 POSITIVE SO2 SOURCE LISTING FILE

DIRECTORY <POST> CONTAIN THE CALPOST INPUT OUTPUT AND POSTPROCESSING FILES FOR SO2:

NEG03.DAT 615,658 05/08/02 DATA FILE OF NEGATIVE SO2 IMPACT
POS03.DAT 615,658 05/08/02 DATA FILE OF POSITIVE SO2 IMPACT
NEG-PST.INP 19,853 05/08/02 INPUT FILE OF NEGATIVE SO2 IMPACT
POS-PST.INP 19,853 05/08/02 INPUT FILE OF POSITIVE SO2 IMPACT
NEG-PST.LST 63,072 05/08/02 LISTING FILE OF NEGATIVE SO2 IMPACT
POS-PST.LST 63,072 05/08/02 LISTING FILE OF POSITIVE SO2 IMPACT
NEG03.PRN 568,465 05/08/02 PROCESSED DATA FILE OF NEGATIVE SO2 IMPACT
POS03.PRN 608,659 05/08/02 PROCESSED DATA FILE OF POSITIVE SO2 IMPACT
ADD3SO2.WK1 2,437,580 05/08/02 LOTUS FORMAT POSITIVE AND NEGATIVE IMPACT ANALYSIS

DIRECTORY <PSD> CONTAINS ISCST3 MODELING OF INCREMENT ANALYSIS FOR THE

CLASS 2 AREA:

ST-PSD87.OUT	*313,416*	*05/13/02*	*SO2 MODELING FOR 1987*
ST-PSD88.OUT	*313,416*	*05/13/02*	*SO2 MODELING FOR 1988*
ST-PSD89.OUT	*313,416*	*05/13/02*	*SO2 MODELING FOR 1989*
ST-PSD90.OUT	*313,416*	*05/13/02*	*SO2 MODELING FOR 1990*
ST-PSD91.OUT	*313,416*	*05/13/02*	*SO2 MODELING FOR 1991*

DIRECTORY <AQS> CONTAINS ISCST3 MODELING OF AQS STANDARD ANALYSES FILES:

ST-AQS87.OUT	*325,474*	*05/14/02*	*SO2 MODELING FOR 1987*
ST-AQS88.OUT	*325,474*	*05/14/02*	*SO2 MODELING FOR 1988*
ST-AQS89.OUT	*325,474*	*05/14/02*	*SO2 MODELING FOR 1989*
ST-AQS90.OUT	*325,474*	*05/14/02*	*SO2 MODELING FOR 1990*
ST-AQS91.OUT	*325,474*	*05/14/02*	*SO2 MODELING FOR 1991*

AND IN THE ROOT DIRECTORY THIS FILE:

README.TXT	*3,372*	*05-15-02*	*THIS FILE*

IF I MAY PROVIDE ADDITIONAL FILES, OR CLARIFICATION PLEASE CONTACT ME.

MAY 15, 2002

MARILYN KOLETZKE
KOOGLER AND ASSOCIATES
(352) 377-5822
MARILYN@KOLETZ.COM

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
352/377-5822 ▪ FAX/377-7158

KA 124-01-03

May 14, 2002

RECEIVED
MAY 16 2002
BUREAU OF AIR REGULATION

Mr. Syed Arif, P.E.
Florida Department of
Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: IMC Phosphates MP, Inc. (New Wales)
Additional Information - Sulfuric Acid Production Increase
DEP File No. 1050059-036-AC, PSD-FL-325

Dear Mr. Arif:

The following additional information is in reference to your discussion with Pradeep Raval yesterday regarding a modeling update for the above referenced project.

The modeling was updated, in accordance with discussions with Mr. Cleve Holladay, to determine the maximum predicted ambient air impacts as a result of sulfur dioxide emissions for the 3-hour period only, reflecting an emission rate of 4 pounds per ton of 100% acid for each of the three plants modeled.

The results of the modeling, tabulated in Attachment 1, indicate that the proposed emission rates will not cause or contribute to an exceedance of the ambient air quality standard or allowable PSD increment.

If you have any questions, please call me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler, Ph.D., P.E.

JBK:par.
Encl.

c: C. D. Turley, IMC
M. Daigle, IMC

ATTACHMENT 1

REVISED AMBIENT AIR IMPACT ANALYSES

IMC is requesting an emission limitation of 4 pounds per ton of 100% acid, 3-hr average, and accepting an emission limitation of 3.5 pounds per ton of 100% acid, 24-hour average.

As required by FDEP, the air dispersion modeling was revised to reflect the higher 3-hr average. The all modeling inputs previously submitted to FDEP were left unchanged, except for the higher 3-hr emission rate of 71.4 g/s for each of the three plants.

The results of the modeling to determine the area of significant impact, presented in Table 1, indicate that the maximum predicted impacts are significant in the Class II area and less than significant in the Class I area.

The Class II refined modeling was conducted up to a distance of 7 kilometers from the source. This distance is one kilometer beyond the distance at which the highest-high impacts indicted significant impact.

The emission inventories for the ambient air quality standard and PSD increment analyses were updated based on information from Cleve Holladay. The resulting maximum predicted impacts are well within the allowable impacts, as shown in Table 1. The emissions inventories are presented in Tables 2 and 3.

For the ambient standards analysis, a background concentration was added to the maximum predicted impact in order to account for miscellaneous sources that may not have been included in the emissions inventory. The 2001 ambient air monitoring data from the nearest monitoring station (Anderson Road) indicated a maximum 3-hr concentration of 0.059 ppm, or about 180 ug/m3.

The resulting maximum predicted 3-hr impacts, including the background levels are well within the allowable concentration, as shown in Table 1.

TABLE 1

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	SIGNIFICANT IMPACT ANALYSIS	
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1987		38.1
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1990	0.62	44.2
1991		34.9
Sig. Impact Level	1	25

MET. YR.	REFINED MODELING CLASS II AREA IMPACTS (1)	
	3-HR PSD INCREMENT, ug/m3	3-HR NAAQS, ug/m3
1987	163.9	441.9
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Max. Predicted Level		792
Allowable Level	512	1300

NOTES:

(1) The impacts represent the highest-high impact.

(2) The impacts are based on the difference between the existing and proposed SO2 emissions from the Nos.1, 2 and 3 Sulfuric acid plants, as previously submitted. The 3-hr SO2 emission rates for the Nos. 1, 2 and 3 plants were revised to 71.4 g/s (566.7 lbs/hr), respectively.

TABLE 2

SO2 PSD INCREMENT INVENTORY

(ON DISK)

TABLE 3

SO2 NAAQS INVENTORY

(ON DISK)

4. Professional Engineer Statement:

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

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

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

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

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

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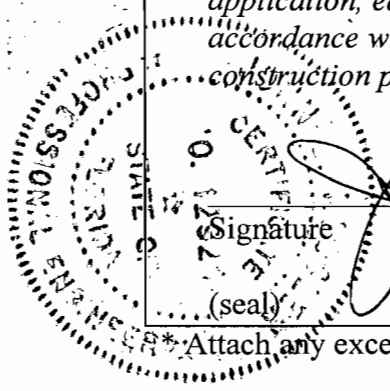

Signature

5/14/02
Date

(seal)

* Attach any exception to certification statement.

THIS DISK CONTAINS SULFUR DIOXIDE (SO2) MODELING FILES FOR THE IMC NEW WALES PHOSPHATES FACILITY IN NEW WALES FLORIDA. INCLUDED ARE INCREMENT ANALYSIS FILES FOR CLASS 2 AREA, AND AMBIENT AIR QUALITY STANDARD (AQS).

C2.EXE 05/14/02 183,318 CLASS 2 AREA ISCST INPUT AND OUTPUT FILES
AQS.EXE 05/14/02 179,411 AMBIENT AIR QUALITY STANDARD INPUT AND OUTPUT FILES

TO UNARCHIVE THESE FILES COPY THEM TO A HARD DISK DRIVE AND TYPE THE FILE NAME. FOR EXAMPLE TO UNARCHIVE THE SO2 ASI CLASS 2 ISCST3 OUTPUT FILES, TYPE "C2" AND PRESS ENTER. THE FILES WILL AUTOMATICALLY UNARCHIVE TO THE HARD DISK DRIVE. THESE ARCHIVED FILES CONTAIN THE MODELING AND ANALYSIS FILES IN ASCII FORMAT DESCRIBED AS FOLLOWS;

C2.EXE CONTAINS ISCST3 MODELING OF INCREMENT ANALYSIS FOR AQS, AND CLASS 2 AREA:

ST-PSD87.OUT	05/13/02	313,416	SO2 MODELING FOR 1987
ST-PSD88.OUT	05/13/02	313,416	SO2 MODELING FOR 1988
ST-PSD89.OUT	05/13/02	313,416	SO2 MODELING FOR 1989
ST-PSD90.OUT	05/13/02	313,416	SO2 MODELING FOR 1990
ST-PSD91.OUT	05/13/02	313,416	SO2 MODELING FOR 1991

AQS.EXE CONTAINS ISCST3 MODELING OF INCREMENT ANALYSIS FOR AQS, AND CLASS 2 AREA:

ST-AQS87.OUT	05/14/02	325,474	SO2 MODELING FOR 1987
ST-AQS88.OUT	05/14/02	325,474	SO2 MODELING FOR 1988
ST-AQS89.OUT	05/14/02	325,474	SO2 MODELING FOR 1989
ST-AQS90.OUT	05/14/02	325,474	SO2 MODELING FOR 1990
ST-AQS91.OUT	05/14/02	325,474	SO2 MODELING FOR 1991

AND IN THE ROOT DIRECTORY THIS FILE:

README.TXT	05-14-02	1,736	THIS FILE

IF I MAY PROVIDE ADDITIONAL FILES, OR CLARIFICATION PLEASE CONTACT ME.

MAY 14, 2002
MARILYN KOLETZKE
KOOGLER AND ASSOCIATES
(352) 377-5822
MARILYN@KOLETZ.COM

SO2 "20 D" SOURCE INVENTORY IMC-NEW WALES				Source Location	396.600	3078.900	
SOURCE DESCRIPTION	DESIGNATION	UTM Coordinates (km) EAST	NORTH	SO2 TPY	Distance (Km)	20-D Emission (TPY)	Significant?
ASPHALT PAVERS	BOTH	359.900	3162.400	78	91	1824	NO
ASPHALT PAVERS	BOTH	361.400	3168.400	61	96	1923	NO
ATLANTIC SUGAR	NAAQS	553.300	2945.000	567	206	4122	NO
AUBURNDALE	BOTH	420.800	3103.300	221	34	687	NO
BORDEN	PSD	414.500	3109.000	184	35	700	NO
BORDEN	PSD	394.800	3069.600	225	9	189	YES
BREWSTER/IMPERIAL	PSD	404.800	3069.500	670	12	249	YES
CARGILL/GARDINIER MINE	NAAQS	415.300	3063.300	670	24	487	YES
CARGILL/Riverview	BOTH	363.400	3082.400	21311	33	668	YES
CARGILL/SEMINOLE/W.R. GRACE -	BOTH	409.770	3086.990	14931	15	309	YES
CF BARTOW	BOTH	408.500	3082.500	29567	12	249	YES
CF PLANT CITY	BOTH	388.000	3116.000	9452	38	762	YES
CITRUS WORLD	NAAQS	441.000	3087.300	2062	45	904	YES
CLM CHLORIDE METALS	BOTH	361.800	3088.300	731	36	721	YES
COCA COLA - AUBURNDALE	NAAQS	421.600	3103.700	1393	35	704	YES
CONSOLIDATED MINERALS	NAAQS	393.800	3096.300	943	18	352	YES
COUCH CONST-ODESSA	BOTH	340.700	3119.500	252	69	1382	NO
COUCH CONST-ZEPHYRHILLS	BOTH	390.300	3129.400	123	51	1018	NO
DOLIME	PSD	404.813	3069.548	355	12	249	YES
DRIS PAVING	BOTH	340.600	3119.200	8	69	1380	NO
ER JAHNA	BOTH	386.700	3155.800	29	78	1551	NO
ESTECH/SWIFT	PSD	411.500	3074.200	4856	16	312	YES
EVANS	BOTH	383.300	3135.800	2188	58	1169	YES
FARMLAND	BOTH	410.516	3079.624	8545	14	279	YES
FDOC	BOTH	382.200	3166.100	104	88	1768	NO
FLA MINING & MATERIALS	BOTH	356.200	3169.900	50	100	1991	NO
FLORIDA CRUSHED STONE	BOTH	360.008	3162.398	3423	91	1823	YES
FPC ANCLOTE	NAAQS	324.400	3118.700	116916	82	1649	YES
FPC BARTOW	NAAQS	342.400	3082.600	62685	54	1087	YES
FPC CRYSTAL	BOTH	334.200	3204.500	133484	140	2805	YES
FPC DEBARY	BOTH	467.500	3197.200	16224	138	2758	YES
FPC HIGGINS	NAAQS	336.500	3098.400	12082	63	1264	YES
FPC INT. CITY PROP	BOTH	446.300	3126.000	8168	68	1369	YES
FPC OSCEOLA	BOTH	446.300	3126.000	16958	68	1369	YES
FPC POLK	BOTH	414.400	3073.910	859	18	370	YES
FPL FT MYERS	NAAQS	422.100	2952.900	26872	129	2571	YES
FPL MANATEE	NAAQS	367.200	3054.100	83410	38	769	YES
GAINESVILLE REGIONAL UTILITIES	BOTH	365.500	3292.700	197	216	4321	NO
GEN. PORT. CEMENT	PSD	358.000	3090.600	4602	40	807	YES
GOLD BOND	NAAQS	347.300	3082.700	320	49	989	NO
GULF COAST LEAD	NAAQS	364.000	3093.500	1711	36	714	YES
HARDEE	BOTH	404.800	3057.400	9657	23	460	YES
HILLS. CO. RESOURCE RECOVERY	BOTH	368.200	3092.700	744	32	632	YES
HOSP CORP OF AM	BOTH	333.400	3141.000	6	89	1772	NO
IMC - AGRICO /NICHOLS/CONSERV	BOTH	398.400	3084.200	3495	6	112	YES
IMC-AGRICO/NEW WALES	BOTH	396.600	3078.900	12507	0	0	YES
IMC-AGRICO/NORALYN	NAAQS	414.700	3080.300	504	18	363	YES
IMC-AGRICO/PIERCE	PSD	404.100	3078.950	1646	8	150	YES
IMC-AGRICO/SO. PIERCE	BOTH	407.500	3071.300	5114	13	266	YES
KISSIMMEE KANE IS.	BOTH	447.680	3127.920	1023	71	1416	NO
KISSIMMEE UTIL	BOTH	460.100	3129.300	1563	81	1621	NO
LAFARGE CORP.	NAAQS	357.700	3090.600	20293	41	812	YES
LAKE CO. COGEN. FACILITY	BOTH	434.000	3198.800	175	126	2512	NO
LAKELAND LARSEN	BOTH	409.300	3102.800	4944	27	541	YES
LAKELAND MCINTOSH	BOTH	409.200	3106.200	30563	30	601	YES
MOBIL BIG-4	BOTH	394.850	3069.770	591	9	186	YES
MOBIL NICHOLS	BOTH	398.300	3084.300	971	6	113	YES
MOBILE ELECTROPHOS	PSD	405.600	3079.400	3337	9	180	YES
MULBERRY PROSPHATES/ROYSTE	BOTH	406.753	3085.151	5312	12	238	YES
NEW PORT RICHEY HOSP	BOTH	331.200	3124.500	3	80	1595	NO
NITRAM	NAAQS	363.100	3089.000	108	35	700	NO
OMAN CONST	BOTH	359.800	3164.900	73	94	1871	NO

SO2 "20 D" SOURCE INVENTORY IMC-NEW WALES				Source Location	396.600	3078.900	
SOURCE DESCRIPTION	DESIGNATION	UTM Coordinates (km) EAST	 NORTH	SO2 TPY	Distance (Km)	20-D Emission (TPY)	Significant?
ORLANDO UTIL STANTON	BOTH	483.500	3150.600	24100	113	2253	YES
OVERSTREET PAV.	BOTH	355.900	3143.700	128	77	1530	NO
PANDA KATHLEEN	BOTH	398.700	3101.400	25	23	452	NO
PASCO CO. COGEN. FACLITY	BOTH	385.600	3139.000	175	61	1222	NO
PASCO COUNTY RRF	BOTH	347.100	3139.200	490	78	1560	NO
PINELLAS RRF	BOTH	335.300	3084.400	2165	62	1231	YES
PINEY POINT/ROYSTER	NAAQS	348.700	3057.300	1719	53	1051	YES
REEDY CREEK	BOTH	442.000	3139.000	127	75	1506	NO
REEDY CREEK SERVICES	BOTH	443.000	3144.300	5	80	1604	NO
RIDGE COGENERATION	BOTH	416.700	3100.400	480	29	589	NO
SEBRING UTIL	BOTH	464.300	3035.400	3868	80	1609	YES
SECI HARDEE	BOTH	404.900	3057.400	452	23	461	NO
STAUFFER	PSD	325.600	3116.700	2265	80	1609	YES
SUGAR CANE	NAAQS	534.900	2953.300	4936	187	3736	YES
SULFUR TERMINALS	NAAQS	358.000	3090.000	104	40	803	NO
TAMPA GENERAL HOSP	NAAQS	356.400	3091.000	59	42	840	NO
TAMPA MCKAY BAY RRF	BOTH	360.000	3091.000	744	39	771	NO
TECO BIG BEND	BOTH	361.900	3075.000	415986	35	698	YES
TECO GANNON TURBINE	NAAQS	360.000	3087.500	127495	38	752	YES
TECO HOOKERS POINT	NAAQS	358.000	3091.000	13535	40	809	YES
TECO POLK POWER	BOTH	402.488	3066.914	4031	13	267	YES
THATCHER GLASS	NAAQS	361.800	3088.300	177	36	721	NO
USS AGRI-CHEM BARTOW	PSD	413.200	3086.300	1580	18	363	YES
USSAC FT MEADE	BOTH	416.120	3068.620	3377	22	441	YES

SO2 SOURCE INVENTORY FOR IMC NEW WALES		A A Q S					
SOURCE DESCRIPTION	Emissions (g/s)	UTM COORDINATES (km EAST	NORTH	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
CARGILL/GARDINIER MINE ROCK DRYER	17.60	415.300	3063.300	19.20	290.0	7.00	2.90
CARGILL/GARDINIER/Riverview DAP (U55)	1.59	363.400	3082.400	40.54	329.0	19.66	1.83
CARGILL/GARDINIER GTSP (UAA)	1.90	363.400	3082.400	38.40	328.0	11.56	2.44
CARGILL/GARDINIER SAP #7 (U04)	67.20	363.400	3082.400	45.72	340.0	12.64	2.29
CARGILL/GARDINIER SAP #8 (U05)	56.70	363.400	3082.400	45.72	347.0	13.08	2.44
CARGILL/GARDINIER SAP #9 (INCR IN9 OF8/9 U06	71.40	363.400	3082.400	45.60	350.0	12.66	2.74
CARGILL/SEMINOLE/W.R. GRACE DAP 4 - Bartow	0.30	409.770	3086.990	40.20	316.0	26.20	2.10
CARGILL/SEMINOLE/W.R. GRACE SAP 4, 5 & 6	143.64	409.770	3086.990	60.96	347.0	34.00	1.52
CF BARTOW DAP 1-3	3.97	408.500	3082.500	36.40	339.0	16.11	2.13
CF BARTOW DAP 1-3	7.93	408.500	3082.500	36.40	339.0	16.11	2.13
CF BARTOW H2SO4 5 (2400 TPD)	50.40	408.500	3082.500	63.41	361.0	10.88	2.13
CF BARTOW H2SO4 6 (2400 TPD)	50.40	408.500	3082.500	63.41	370.0	7.28	2.13
CF BARTOW H2SO4 7 (2000 TPD)	42.00	408.500	3082.500	67.10	351.0	9.80	2.40
CF PLANT CITY Zephyrhills (U01)	19.98	388.000	3116.000	7.62	560.8	17.74	1.07
CF PLANT CITY (U22)	0.12	388.000	3116.000	2.44	373.0	0.33	0.61
CF PLANT CITY DAP A (U10)	3.00	388.000	3116.000	28.70	326.0	7.90	3.00
CF PLANT CITY DAP X (U16)	13.20	388.000	3116.000	54.90	325.0	9.80	2.80
CF PLANT CITY DAP Z (U11)	13.20	388.000	3116.000	54.90	331.0	13.10	2.80
CF PLANT CITY GTSP X (U12)	13.20	388.000	3116.000	54.90	314.0	7.90	2.80
CF PLANT CITY H2SO4 A&B (U02&03)	88.20	388.000	3116.000	33.50	316.0	19.50	1.52
CF PLANT CITY PROPOSED C & D (U07-08)	109.20	388.000	3116.000	60.35	353.0	17.77	2.44
CF PLANT CITY Y-GTSP (U17)	11.33	388.000	3116.000	54.9	333.1	13.37	2.8
CF PLANT CITY (U23-24)	0.17	388.000	3116.000	3.7	373.1	1.65	0.09
CF PLANT CITY (U22)	0.11	388.000	3116.000	2.4	373.1	1.63	0.27
CITRUS WORLD DRYER 1	11.8	441.000	3087.300	22.90	323.0	10.70	1.00
CITRUS WORLD DRYER 2	23.74	441.000	3087.300	22.90	325.0	12.20	0.80
CITRUS WORLD DRYER 3	23.74	441.000	3087.300	24.40	313.0	21.90	0.80
CLM CHLORIDE METALS	13.00	361.800	3088.300	30.00	375.0	20.10	0.61
CLM CHLORIDE METALS	8.02	361.800	3088.300	30.00	375.0	20.00	0.61
COCA COLA - AUBURNDALE U01	18.00	421.600	3103.700	28.35	333.2	16.76	1.07
COCA COLA - AUBURNDALE U03	0.52	421.600	3103.700	30.48	344.8	14.93	0.98
COCA COLA - AUBURNDALE U08	21.52	421.600	3103.700	12.19	434.8	18.29	1.22
CONSOLIDATED MINERALS	0.12	393.800	3096.300	6.10	605.2	20.21	0.37
CONSOLIDATED MINERALS FLUID BED REACTOR	11.57	393.800	3096.300	46.33	299.7	12.14	1.77
CONSOLIDATED MINERALS KILNS 3, 4 & 5	15.43	393.800	3096.300	46.33	298.0	13.17	1.77
EVANS BOILER	28.70	383.300	3135.800	12.20	505.0	11.90	1.00
EVANS DRYER	34.00	383.300	3135.800	25.90	346.0	17.30	1.00
EVANS PACKING	0.20	383.300	3135.800	12.30	466.2	9.20	0.40
FARMLAND	2.33	410.330	3079.655	28.96	605.2	3.58	1.68
FARMLAND SULFUR SYSTEM (EXISTING)	0.39	410.330	3079.655	12.19	366.3	2.67	0.61
FARMLAND SULFUR SYSTEM (PROPOSED)	0.16	410.330	3079.655	12.19	366.3	2.67	0.61
FARMLAND 3 & 4 H2SO4 (2100 TPD)	88.20	410.330	3079.655	30.48	355.0	12.02	2.29
FARMLAND 5 H2SO4 (2800 TPD)	58.80	410.330	3079.655	45.72	355.0	13.42	2.44
FARMLAND 6 H2SO4 (2800 TPD)	57.75	410.516	3079.624	45.72	355.0	10.60	2.74
FLORIDA CRUSHED STONE KILN 1	98.40	360.008	3162.398	97.60	442.0	23.23	4.88
FPC ANCLOTE UNITS 1 & 2	3361.00	324.400	3118.700	152.10	433.0	18.90	7.30
FPC BARTOW PEAKING 1-4	192.89	342.400	3082.600	13.70	772.0	22.30	5.30
FPC BARTOW PIPELINE HEATER (U04)	1.80	342.400	3082.600	9.10	541.0	5.20	0.90
FPC BARTOW UNIT 1 & 2 (U01&02)	896.80	342.400	3082.600	91.40	429.0	36.30	2.70
FPC BARTOW UNIT 3 (U03)	710.54	342.400	3082.600	91.40	408.0	34.40	3.40
FPC BAYBORO PEAKING 1-4	197.80	338.800	3071.300	12.20	755.0	6.40	7.00
FPC CRYSTAL RIVER 1	997.40	334.200	3205.400	152.10	451.0	43.90	4.60
FPC CRYSTAL RIVER 2	822.30	334.200	3205.400	153.30	444.0	43.30	4.90
FPC CRYSTAL RIVER 4	1008.80	334.200	3204.500	182.90	398.0	21.00	6.90
FPC CRYSTAL RIVER 5	1008.80	334.200	3204.500	182.90	398.0	21.00	6.90
FPC DEBARY PROP TURBINES AT 20 DEG F	466.40	467.500	3197.200	15.24	819.8	56.21	4.21
FPC HIGGINS OTHER UNITS	25.21	336.500	3098.400	16.76	727.4	113.47	4.60
FPC HIGGINS UNIT 3	129.90	336.500	3098.400	53.00	423.0	7.30	3.80
FPC HIGGINS UNITS 1&2	192.20	336.500	3098.400	53.00	429.0	8.20	3.80
FPC INT. CITY PROP TURBINES/7EA AT 20 DEG F	124.40	446.300	3126.000	15.24	819.8	56.21	4.21

SO2 SOURCE INVENTORY FOR IMC NEW WALES		A A Q S					
SOURCE DESCRIPTION	Emissions (g/s)	UTM COORDINATES (km EAST	NORTH	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
FPC INT. CITY PROP TURBINES/7FA AT 20 DEG F	110.40	446.300	3126.000	15.24	880.8	32.07	7.04
FPC OSCEOLA PEAKING 1-6	273.06	446.300	3126.000	7.90	703.7	18.06	4.24
FPC OSCEOLA PEAKING 7-10	111.88	446.300	3126.000	15.20	834.8	0.05	4.21
FPC OSCEOLA PEAKING 11-12	102.56	446.300	3126.000	15.2	895.9	0.03	7.04
FPC POLK	24.7	414.400	3073.910	34.40	400.0	40.50	4.10
FPL FT MYERS 1	192.40	422.100	2952.900	92.00	422.0	29.90	2.90
FPL FT MYERS 2	555.40	422.100	2952.900	124.10	408.0	19.20	5.50
FPL FT MYERS PEAKING 1-12	24.70	422.100	2952.900	9.80	797.0	57.60	3.50
FPL MANATEE UNIT 1 & 2 (U01&02)	2397.80	367.200	3054.100	152.10	426.0	17.10	8.00
GULF COAST LEAD (U01)	48.45	364.000	3093.500	29.57	344.1	37.59	0.61
GULF COAST LEAD	0.75	364.000	3093.500	8.84	309.1	20.85	0.34
HARDEE	277.60	404.800	3057.400	22.90	389.0	23.90	4.88
HILLS. CO. RESOURCE RECOVERY	21.40	368.200	3092.700	50.00	491.0	18.30	1.80
IMC - AGRICO /NICHOLS/CONSERVE (2500 TPD @	52.50	398.400	3084.200	45.70	352.0	12.00	2.30
IMC - AGRICO /NICHOLS/CONSERVE DAP DRYER	1.01	398.400	3084.200	24.40	333.0	23.10	1.07
IMC - AGRICO /NICHOLS/CONSERVE DRYER	3.34	398.400	3084.200	24.69	327.4	3.77	2.29
IMC-AGRICO/NEW WALES AFI PLANT	0.20	396.600	3078.900	52.40	322.0	13.10	2.40
IMC-AGRICO/NEW WALES DAP	5.54	396.600	3078.900	36.60	319.1	20.15	1.83
IMC-AGRICO/NEW WALES DAP 1	3.70	396.700	3079.400	40.50	314.0	14.90	2.10
IMC-AGRICO/NEW WALES GTSP	9.20	396.700	3079.400	40.50	316.0	20.40	1.80
IMC-AGRICO/NEW WALES MULTIPHOS	4.80	396.600	3078.900	52.40	314.0	15.80	1.40
IMC-AGRICO/NEW WALES SAP #4,5 (2 AT 2900 TP	121.90	396.600	3078.900	60.70	350.0	15.31	2.60
IMC-AGRICO/NORALYN	13.30	414.700	3080.300	18.30	341.0	8.50	2.80
IMC-AGRICO/NORALYN	1.20	414.700	3080.300	23.20	394.0	17.10	2.00
IMC-AGRICO/SO. PIERCE DAP PLANT	4.41	407.500	3071.330	38.10	328.0	14.60	3.10
IMC-AGRICO/SO. PIERCE GTSP PLANT	16.60	407.500	3071.300	42.70	305.0	10.40	2.70
IMC-AGRICO/SO. PIERCE H2SO4 (2 @ 2700 TPD)	125.99	407.500	3071.300	44.18	350.0	13.29	2.74
LAFARGE CORP.	583.37	357.7	3090.6	44.50	494.8	40.24	2.44
LAKELAND LARSEN	0.20	409.300	3102.800	9.75	699.7	171.38	1.52
LAKELAND LARSEN 4	93.37	409.300	3102.800	50.29	433.0	5.64	3.05
LAKELAND LARSEN 5	0.40	409.300	3102.800	50.29	444.1	6.47	3.05
LAKELAND LARSEN 6	0.35	409.300	3102.800	50.29	444.1	6.47	3.05
LAKELAND LARSEN 7	18.71	409.300	3102.800	50.29	444.1	6.86	3.05
LAKELAND LARSEN CT	29.11	409.300	3102.800	30.48	783.2	28.22	5.79
LAKELAND MCINTOSH	8.32	409.200	3106.200	10.97	791.3	0.39	2.80
LAKELAND MCINTOSH	2.94	409.200	3106.200	6.10	652.4	23.54	0.79
LAKELAND MCINTOSH 1	341.56	409.300	3106.200	45.72	419.1	23.96	2.74
LAKELAND MCINTOSH 2	25.68	409.200	3106.200	47.55	402.4	21.29	3.17
LAKELAND MCINTOSH 3	500.10	409.200	3106.200	76.20	350.0	19.70	4.88
MOBIL BIG-4 BOILER (UAA)	0.60	394.800	3069.770	8.20	505.0	7.57	0.41
MOBIL BIG-4 DRYER (U01)	16.38	394.850	3069.770	30.50	334.0	7.26	1.82
MOBIL NICHOLS DRYER 1	12.73	398.300	3084.300	25.90	342.0	14.10	2.29
MOBIL NICHOLS DRYER 2	12.73	398.300	3084.300	25.90	342.0	14.10	2.29
MOBIL NICHOLS DRYER 4	2.44	398.300	3084.300	25.90	339.0	16.05	2.29
MULBERRY COGENERATION CT	13.40	413.600	3080.600	38.10	377.0	9.31	1.98
MULBERRY PROSPHATES/ROYSTER (1700 TPD @	35.70	406.700	3085.200	61.00	360.0	12.20	2.13
MULBERRY PROSPHATES/ROYSTER DAP	9.30	406.700	3085.200	31.10	316.0	7.90	2.70
MULBERRY PROSPHATES/ROYSTER SAP	25.70	406.753	3085.151	60.96	343.2	10.01	1.81
ORLANDO UTIL STANTON 1	601.00	483.500	3150.600	167.60	325.7	21.60	5.80
ORLANDO UTIL STANTON 2 (24-HR)	91.80	483.500	3150.600	167.60	324.2	23.50	5.80
PINELLAS RRF	62.24	335.300	3084.400	49.10	522.0	27.72	2.74
PINEY POINT/ROYSTER DAP	7.40	348.700	3057.300	61.00	328.0	15.50	3.00
PINEY POINT/ROYSTER SAP	42.02	348.700	3057.300	60.98	350.0	8.08	2.36
SEBRING UTIL 1 & 2	111.20	464.300	3035.400	45.70	446.0	24.10	1.80
SUGAR CANE GROWERS BOILER 1	17.10	534.900	2953.300	24.40	338.0	21.60	1.30
SUGAR CANE GROWERS BOILER 2	17.10	534.900	2953.300	24.40	336.0	23.20	1.30
SUGAR CANE GROWERS BOILER 3	18.00	534.900	2953.300	24.40	341.0	15.80	1.60
SUGAR CANE GROWERS BOILER 4	34.50	534.900	2953.300	33.50	338.0	8.20	2.90
SUGAR CANE GROWERS BOILER 5	25.20	534.900	2953.300	24.40	341.0	21.30	1.60
SUGAR CANE GROWERS BOILER 8	30.00	534.900	2953.300	47.20	345.0	9.10	2.90

SO2 SOURCE INVENTORY FOR IMC NEW WALES		A A Q S					
SOURCE DESCRIPTION	Emissions (g/s)	UTM COORDINATES (km EAST	NORTH	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
TECO BIG BEND TURBINE 1 (U07)	11.30	361.900	3075.000	10.70	816.0	136.20	1.50
TECO BIG BEND TURBINE 2&3 (U05&06)	79.12	361.900	3075.000	22.86	770.8	18.74	4.27
TECO BIG BEND UNIT 1&2 (U01&02)	3309.00	361.900	3075.000	149.35	404.7	13.74	7.32
TECO BIG BEND UNIT 2 (U02)	3275.32	361.900	3075.000	149.35	404.7	13.02	7.32
TECO BIG BEND UNIT 3 (U03)	3372.92	361.900	3075.000	149.35	410.2	14.47	7.32
TECO BIG BEND UNIT 4 (U04)	654.70	361.900	3075.000	149.40	342.2	19.81	7.32
TECO GANNON 1 & 2 (U01&02)	760.86	360.000	3087.500	93.27	420.8	30.85	3.05
TECO GANNON 3 (U03)	483.96	360.000	3087.500	93.27	419.7	38.64	3.23
TECO GANNON 4 (U04)	567.71	360.000	3087.500	93.27	426.9	22.97	3.05
TECO GANNON 5 (U05)	691.28	360.000	3087.500	93.27	423.6	23.18	4.45
TECO GANNON 6 (U06)	1149.41	360.000	3087.500	93.27	433.0	24.74	5.36
TECO GANNON TURBINE (U07)	11.90	360.000	3087.500	10.67	816.3	136.61	1.52
TECO HOOKERS POINT 1 & 2 (U01&02)	82.60	358.000	3091.000	85.30	419.0	6.10	3.40
TECO HOOKERS POINT 3 & 4 (U03&04)	114.00	358.000	3091.000	85.30	434.0	7.90	3.70
TECO HOOKERS POINT 5 (U05)	84.60	358.000	3091.000	85.30	448.0	11.00	3.40
TECO HOOKERS POINT 6 (U06)	107.90	358.000	3091.000	85.30	434.0	22.30	2.90
TECO POLK POWER	49.68	402.450	3067.350	45.72	400.0	16.76	5.79
TECO POLK POWER	8.20	402.328	3067.472	60.70	1033.0	10.70	1.40
TECO POLK POWER	5.42	402.488	3066.954	22.86	812.0	27.43	5.49
TECO POLK POWER	1.27	402.298	3067.297	60.70	1033.0	9.10	1.10
TECO POLK POWER	0.30	402.420	3067.320	6.10	533.0	13.10	0.91
TECO POLK POWER	0.016	402.016	3067.640	22.90	1000.0	20.00	1.20
TECO POLK POWER 4 CC	17.60	402.450	3067.216	45.72	389.0	16.15	4.42
TECO POLK POWER 5 CT	33.40	402.488	3066.914	22.86	785.0	31.39	5.49
USSAC FT MEADE H2SO4 1 & 2 (2200 TPD)	92.48	416.120	3068.620	53.40	355.0	10.00	2.59

Class 2 SO2 SOURCE INVENTORY
FOR IMC-NEW WALES

PSD CLASS 2

SOURCE DESCRIPTION	Emissions (g/s)	UTM COORDINATES (km) EAST	NORTH	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
BORDEN DRYER	-6.48	394.800	3069.600	30.48	344.0	14.79	1.82
BREWSTER/IMPERIAL DRYER	-19.26	404.800	3069.500	27.44	339.0	15.25	2.29
CARGILL/GARDINIER DRYER	-28.89	363.400	3082.400	20.73	310.0	13.12	1.07
CARGILL/GARDINIER SAP #4,5,6	-182.70	363.400	3082.400	22.60	363.0	7.00	1.52
CARGILL/GARDINIER SAP #7	-189.40	363.400	3082.400	28.04	357.0	6.80	2.87
CARGILL/GARDINIER SAP #8	-211.60	363.400	3082.400	29.26	352.0	7.37	3.26
CARGILL/GARDINIER NaSiF MFG (U41)	-0.03	363.400	3082.400	8.53	308.0	3.55	0.76
CARGILL/SEMINOLE/W.R. GRACE DRYER	-39.66	409.770	3086.990	15.24	327.0	17.32	2.04
CARGILL/SEMINOLE/W.R. GRACE SAP #1 & #2	-216.00	409.770	3086.990	45.72	352.0	16.50	1.37
CARGILL/SEMINOLE/W.R. GRACE SAP #3	-52.50	409.770	3086.990	45.72	311.0	16.70	1.52
CARGILL/SEMINOLE/W.R. GRACE SAP 4, 5 & 6	-121.07	409.770	3086.990	60.96	347.0	25.10	1.52
CF BARTOW H2SO4 1 (400 TPD)	-60.90	408.500	3082.500	30.49	350.0	12.20	1.37
CF BARTOW H2SO4 2 (500 TPD)	-110.25	408.500	3082.500	30.49	350.0	10.37	1.68
CF BARTOW H2SO4 3 (600 TPD)	-107.10	408.500	3082.500	30.49	364.0	4.27	2.74
CF BARTOW H2SO4 4 (900 TPD)	-174.83	408.500	3082.500	30.49	358.0	7.93	2.13
CF BARTOW H2SO4 5 (900 TPD)	-226.80	408.500	3082.500	63.41	358.0	10.67	2.13
CF BARTOW H2SO4 6 (900 TPD)	-170.10	408.500	3082.500	63.41	359.0	10.37	2.13
CF PLANT CITY BASELINE A & B	-105.00	388.000	3116.000	23.80	316.0	18.80	1.52
CF PLANT CITY BASELINE C & D	-100.80	388.000	3116.000	60.35	353.0	16.40	2.44
DOLIME BOILER	-4.52	404.813	3069.548	27.43	494.1	7.25	0.61
DOLIME DRYER	-5.68	404.813	3069.548	27.43	333.0	20.67	1.52
ESTECH/SWIFT DRYER	-22.80	411.500	3074.200	18.75	340.0	5.06	2.95
ESTECH/SWIFT DRYER	-23.94	411.500	3074.200	18.29	339.0	8.47	2.95
ESTECH/SWIFT SAP (610 TPD & 29 LB/TON)	-92.87	411.500	3074.200	30.79	358.0	3.90	2.13
FARMLAND 1,2 H2SO4	-83.98	410.330	3079.655	30.48	311.0	20.18	1.37
FARMLAND 3 & 4 H2SO4 (1620 TPD)	-67.16	410.330	3079.655	30.48	355.0	9.27	2.29
FARMLAND 5 H2SO4 (2400 TPD)	-50.40	410.330	3079.655	45.72	355.0	11.55	2.44
FARMLAND 3 H2SO4	-44.1	410.330	3079.655	30.48	355.0	9.27	2.29
FPC CRYSTAL RIVER 1	-314.00	334.200	3204.500	152.00	422.0	42.10	4.57
FPC CRYSTAL RIVER 2	-1859.00	334.200	3204.500	153.00	422.0	42.10	4.88
GEN. PORT. CEMENT KILN 4	-62.99	358.000	3090.600	35.97	505.2	17.61	2.74
GEN. PORT. CEMENT KILN 5	-69.30	358.000	3090.600	45.42	494.1	5.80	3.81
IMC - AGRICO /NICHOLS/CONSERVE (2 @ 1300 TPD	-54.60	398.400	3084.200	30.50	308.0	18.90	1.80
IMC - AGRICO /NICHOLS/CONSERVE (2000 TPD	-42.00	398.400	3084.200	45.70	352.0	10.30	2.30
IMC - AGRICO /NICHOLS/CONSERVE ROCK DRYER	-3.88	398.400	3084.200	24.40	339.0	12.90	1.52
IMC-AGRICO/NEW WALES ROCK DRYER	-34.27	396.600	3078.900	21.00	347.0	18.60	2.13
IMC-AGRICO/PIERCE DRYERS 1,2	-24.32	404.100	3078.950	24.38	339.0	12.94	1.52
IMC-AGRICO/PIERCE DRYERS 3,4	-23.00	404.100	3078.950	24.38	339.0	18.82	2.43
IMC-AGRICO/SO. PIERCE H2SO4 (2 @1800 TPD)	-75.60	407.500	3071.300	45.73	350.0	26.40	1.60
MOBIL NICHOLS 75 HP BOILER	-0.87	398.300	3084.300	4.00	522.0	1.80	0.80
MOBIL NICHOLS CALCINER	-13.89	398.300	3084.300	28.40	340.0	19.24	1.09
MOBILE ELECTROPHOS 400HP BOILER	-6.53	405.600	3079.400	7.32	464.0	3.23	0.91
MOBILE ELECTROPHOS 600HP BOILER	-10.05	405.600	3079.400	6.10	464.0	7.71	0.91
MOBILE ELECTROPHOS CALCINER	-7.11	405.600	3079.400	25.61	306.0	6.97	2.13
MOBILE ELECTROPHOS COKE DRYER	-3.17	405.600	3079.400	18.29	322.0	22.87	0.70
MOBILE ELECTROPHOS FURNACE (31.25 TPH ROCK	-47.25	405.600	3079.400	29.27	314.0	8.52	2.13
MOBILE ELECTROPHOS ROCK DRYER	-21.81	405.600	3079.400	18.29	350.0	6.79	1.83
MULBERRY PROSPHATES/ROYSTER (1003 TPD @ 2	-152.71	406.700	3085.200	51.00	356.0	9.90	2.13
STAUFFER BOILER	-4.86	325.600	3116.700	7.32	464.0	3.23	0.91
STAUFFER DRYER	-1.50	325.600	3116.700	18.29	322.0	22.87	0.70
STAUFFER FURNACE	-50.93	325.600	3116.700	49.00	335.0	3.60	1.20
STAUFFER KILN	-7.36	325.600	3116.700	25.61	306.0	6.97	2.13
STAUFFER ROASTER	-0.45	325.600	3116.700	25.61	322.0	6.97	0.91
TECO BIG BEND UNIT 3 (24-HR)	-1218.00	361.900	3075.000	149.40	418.0	14.33	7.32
TECO BIG BEND UNITS 1&2 (24-HR)	-2436.00	361.900	3075.000	149.40	422.0	28.65	7.32
USS AGRI-CHEM BARTOW DRYER	-3.41	413.200	3086.300	15.80	332.0	10.01	1.83
USS AGRI-CHEM BARTOW SAP (800 TPD &	-42.00	413.200	3086.300	28.96	305.0	7.50	2.12
USSAC FT MEADE GTSP	-18.27	416.000	3069.000	28.35	330.0	17.60	1.52
USSAC FT MEADE H2SO4 (1500 TPD @ 10 LB/TON)	-78.80	416.210	3068.740	29.00	314.0	6.77	3.02
CARGILL/GARDINIER/Riverview DAP (U55)	1.59	363.400	3082.400	40.54	329.0	19.66	1.83
CARGILL/GARDINIER SAP #7 (U04)	67.20	363.400	3082.400	45.72	340.0	12.64	2.29
CARGILL/GARDINIER SAP #8 (U05)	56.70	363.400	3082.400	45.72	347.0	13.08	2.44

Class 2 SO2 SOURCE INVENTORY
FOR IMC-NEW WALES

PSD CLASS 2

SOURCE DESCRIPTION	Emissions (g/s)	UTM COORDINATES (km) EAST	NORTH	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
CARGILL/GARDINIER SAP #9 (INCR IN9 OF8/9 U06)	71.40	363.400	3082.400	45.60	350.0	12.66	2.74
CARGILL/SEMINOLE/W.R. GRACE SAP 4, 5 & 6	143.64	409.770	3086.990	60.96	347.0	34.00	1.52
CF BARTOW DAP 1-3	3.97	408.500	3082.500	36.40	339.0	16.11	2.13
CF BARTOW H2SO4 5 (2400 TPD)	50.40	408.500	3082.500	63.41	361.0	10.88	2.13
CF BARTOW H2SO4 6 (2400 TPD)	50.40	408.500	3082.500	63.41	370.0	7.28	2.13
CF BARTOW H2SO4 7 (2000 TPD)	42.00	408.500	3082.500	67.10	351.0	9.80	2.40
CF PLANT CITY H2SO4 A&B (U02&03)	88.20	388.000	3116.000	33.50	316.0	19.50	1.52
CF PLANT CITY PROPOSED C & D (U07-08)	109.20	388.000	3116.000	60.35	353.0	17.77	2.44
CLM CHLORIDE METALS	13.00	361.800	3088.300	30.00	375.0	20.10	0.61
EVANS PACKING	0.20	383.300	3135.800	12.30	466.2	9.20	0.40
FARMLAND 3 & 4 H2SO4 (2100 TPD)	88.20	410.330	3079.655	30.48	355.0	12.02	2.29
FARMLAND 5 H2SO4 (2800 TPD)	58.80	410.330	3079.655	45.72	355.0	13.42	2.44
FARMLAND 6 H2SO4 (2800 TPD)	57.75	410.516	3079.624	45.72	355.0	10.60	2.74
FLORIDA CRUSHED STONE KILN 1	98.40	360.008	3162.398	97.60	442.0	23.23	4.88
FPC CRYSTAL RIVER 4	1008.80	334.200	3204.500	182.90	398.0	21.00	6.90
FPC CRYSTAL RIVER 5	1008.80	334.200	3204.500	182.90	398.0	21.00	6.90
FPC DEBARY PROP TURBINES AT 20 DEG F	466.40	467.500	3197.200	15.24	819.8	56.21	4.21
FPC INT. CITY PROP TURBINES/7EA AT 20 DEG F	124.40	446.300	3126.000	15.24	819.8	56.21	4.21
FPC INT. CITY PROP TURBINES/7FA AT 20 DEG F	110.40	446.300	3126.000	15.24	880.8	32.07	7.04
FPC OSCEOLA PEAKING 7-10	111.88	446.300	3126.000	15.20	834.8	0.05	4.21
FPC OSCEOLA PEAKING 11-12	102.56	446.300	3126.000	15.2	895.9	0.03	7.04
FPC POLK	24.7	414.400	3073.910	34.40	400.0	40.50	4.10
HARDEE	277.60	404.800	3057.400	22.90	389.0	23.90	4.88
HILLS. CO. RESOURCE RECOVERY	21.40	368.200	3092.700	50.00	491.0	18.30	1.80
IMC - AGRICO /NICHOLS/CONSERVE (2500 TPD @ 4 LB/TON)	52.50	398.400	3084.200	45.70	352.0	12.00	2.30
IMC-AGRICO/NEW WALES AFI PLANT	0.20	396.600	3078.900	52.40	322.0	13.10	2.40
IMC-AGRICO/NEW WALES DAP	5.54	396.600	3078.900	36.60	319.1	20.15	1.83
IMC-AGRICO/NEW WALES MULTIPHOS	4.80	396.600	3078.900	52.40	314.0	15.80	1.40
IMC-AGRICO/NEW WALES SAP #4,5 (2 AT 2900 TPD)	121.90	396.600	3078.900	60.70	350.0	15.31	2.60
IMC-AGRICO/SO. PIERCE DAP PLANT	4.41	407.500	3071.330	38.10	328.0	14.60	3.10
IMC-AGRICO/SO. PIERCE H2SO4 (2 @ 2700 TPD)	125.99	407.500	3071.300	44.18	350.0	13.29	2.74
LAKELAND LARSEN CT	29.11	409.300	3102.800	30.48	783.2	28.22	5.79
LAKELAND MCINTOSH 3	500.10	409.200	3106.200	76.20	350.0	19.70	4.88
MOBIL BIG-4 BOILER (UAA)	0.60	394.800	3069.770	8.20	505.0	7.57	0.41
MOBIL BIG-4 DRYER (U01)	16.38	394.850	3069.770	30.50	334.0	7.26	1.82
MOBIL NICHOLS DRYER 4	2.44	398.300	3084.300	25.90	339.0	16.05	2.29
MULBERRY COGENERATION CT	13.40	413.600	3080.600	38.10	377.0	9.31	1.98
MULBERRY PROSPHATES/ROYSTER (1700 TPD @ 4 LB/TON)	35.70	406.700	3085.200	61.00	360.0	12.20	2.13
MULBERRY PROSPHATES/ROYSTER SAP	25.70	406.753	3085.151	60.96	343.2	10.01	1.81
ORLANDO UTIL STANTON 1	601.00	483.500	3150.600	167.60	325.7	21.60	5.80
ORLANDO UTIL STANTON 2 (24-HR)	91.80	483.500	3150.600	167.60	324.2	23.50	5.80
PINELLAS RRF	62.24	335.300	3084.400	49.10	522.0	27.72	2.74
SEBRING UTIL 1 & 2	111.20	464.300	3035.400	45.70	446.0	24.10	1.80
TECO BIG BEND UNIT 4 (U04)	654.70	361.900	3075.000	149.40	342.2	19.81	7.32
TECO POLK POWER	49.68	402.450	3067.350	45.72	400.0	16.76	5.79
TECO POLK POWER	8.20	402.328	3067.472	60.70	1033.0	10.70	1.40
TECO POLK POWER	5.42	402.488	3066.954	22.86	812.0	27.43	5.49
TECO POLK POWER	1.27	402.298	3067.297	60.70	1033.0	9.10	1.10
TECO POLK POWER	0.30	402.420	3067.320	6.10	533.0	13.10	0.91
TECO POLK POWER	0.016	402.016	3067.640	22.90	1000.0	20.00	1.20
TECO POLK POWER 4 CC	17.60	402.450	3067.216	45.72	389.0	16.15	4.42
TECO POLK POWER 5 CT	33.40	402.488	3066.914	22.86	785.0	31.39	5.49
USSAC FT MEADE H2SO4 1 & 2 (2200 TPD)	92.48	416.120	3068.620	53.40	355.0	10.00	2.59

303-969-2822

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
352/377-5822 ▪ FAX/377-7158

KA 124-01-03

May 1, 2002

RECEIVED
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BUREAU OF AIR REGULATION

Mr. Syed Arif, P.E.
Florida Department of
Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: IMC Phosphates MP, Inc. (New Wales)
Additional Information - Sulfuric Acid Production Increase
DEP File No. 1050059-036-AC, PSD-FL-325

Dear Mr. Arif:

The following additional information is a follow up to the information previously submitted to FDEP on April 26, 2002.

As suggested by the US Fish and Wildlife Service, the visibility analysis was revised using CALPUFF modeling and the updated protocol. The methodology was also discussed with Mr. Cleve Holladay.

The emission rates of sulfur dioxide, sulfuric acid mist and nitrogen oxides from the proposed project were included in the analysis. The results of the analysis indicate a change in extinction of 1%. Based on this information, additional refined analysis was not required.

If you have any questions, please call me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler, Ph.D., P.E.

JBK:par.
Encl.

c: C. D. Turley, IMC
M. Daigle, IMC

Summary of Top SO2, NOx, and SAM 24-hour
Change of Visibility

Table 1

01/30/1990	
RH	f_RH
100	18.1
87	3.8
90	4.7
97	15.1
97	15.1
100	18.1
97	15.1
100	18.1
100	18.1
100	18.1
93	7
82	3
76	2.3
76	2.3
69	1.9
65	1.7
61	1.5
65	1.7
76	2.3
66	1.7
68	1.8
90	4.7
97	15.1
100	18.1
100	18.1
Daily Avg.	9.1

Table 2

First High for	01/30/1990	
Viz Ref Level	----------	
Eq-6 P38		
b_ext = b_hydro*f(RH)+b_nonhydro+b_ray		
b_ref =	26.69	Mm-1
For chassahowitzka		
b_hydro	0.9	
b_nonhyd	8.5	
b_ray =	10	
f(RH) =	9.1	
Source Extinction	----------	
b_Source	b_(NH4)2SO4 * fRH + b_EC	
	0.3	Mm-1
Change in Extinction	----------	
Db = (b_Source/b_ref)*100		
Db =	1.0	%

4. Professional Engineer Statement:

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

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

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

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

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

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

Signature

5/1/02
Date

(seal)

* Attach any exception to certification statement.

U.S. FISH AND WILDLIFE SERVICE
AIR QUALITY BRANCH

P.O. BOX 25287, Denver, CO 80225

FACSIMILE COVER SHEET

Date: May 10, 2002

Telephone: (303) 969-2617
Fax: (303) 969-2822

To: Cleve Holladay

From: Ellen Porter

Subject: comments on IMC – I'll probably also have this sent from our regional office with a letter. Essentially, we're fine with the project.

Number of Pages:
(Including this cover sheet)

Office Location: 7333 W. Jefferson, Room 450, Lakewood, CO 80235

(Send Mail to: 12795 W. Alameda Parkway, Lakewood, CO 80228)

Technical Review of Prevention of Significant Deterioration Permit Application
for
IMC Phosphates Company New Wales Facility
Polk County, Florida

by

Air Quality Branch, Fish and Wildlife Service – Denver
May 10, 2002

IMC Phosphates Company (IMC) has submitted a Prevention of Significant Deterioration (PSD) permit application to increase the allowable sulfuric acid production for their phosphate fertilizer manufacturing facility from 14,500 to 17,000 tons per day 100% sulfuric acid. The facility is 103 km southeast of Chassahowitzka Wilderness, a Class I air quality area administered by the U.S. Fish and Wildlife Service (FWS). This project will result in PSD significant increases in emissions of sulfur dioxide (SO_2), sulfuric acid mist (SAM), and nitrogen oxides (NO_X). IMC emissions (in tons per year – TPY) are summarized below.

POLLUTANT	EMISSIONS INCREASE (TPY)
SO_2	1376
SAM	141
NO_X	113

Best Available Control Technology (BACT)

IMC will control SO_2 emissions to 3.5 pounds per ton of 100% sulfuric acid with the use of the double absorption system, and SAM emissions to 0.10 pounds per ton of 100% sulfuric acid with the use of mist eliminators. We agree that these limits represent BACT.

Class I Area Modeling Analyses

IMC used CALPUFF to evaluate impacts to Class I increments at Chassahowitzka. The analysis predicted that the project's emissions would not contribute significantly to the Class I increments.

IMC used CALPUFF to evaluate impacts to visibility at Chassahowitzka. However, in their original November 2001 application, IMC used incorrect background values for the analysis. In a December 21, 2001, note, we advised the Florida Department of Environmental Protection (FDEP) that the analysis should be revised in accordance with guidance from the Federal Land Managers Air Quality Related Values Workgroup (FLAG). IMC revised the analysis and submitted a new analysis on May 1, 2002. Their analysis predicted a maximum change in light extinction of 1%, well below the threshold value of 5% recommended by the FLAG guidance. Therefore, impacts to visibility at Chassahowitzka are expected to be insignificant.

Although nitrogen deposition is a concern at Chassahowitzka, we advised the applicant that a

deposition analysis would not be required because of the relatively low NO_x emissions from the project. However, in the future, we would like applicants to include estimates of both nitrogen and sulfur deposition, as these estimates are easily obtained from the CALPUFF model.

Contact: Ellen Porter, Air Quality Branch (303) 969-2617.

REPORT IN SUPPORT OF PSD APPLICATION

FOR

INCREASE IN DAP 1 PLANT PRODUCTION

IMC PHOSPHATES COMPANY

REPORT PREPARED BY

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OCTOBER 2002

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1.0 INTRODUCTION

IMC Phosphates Company (IMC) proposes to increase the hourly production rate of the DAP 1 Plant, located at the New Wales facility, from 150 to 155 tons per hour (tph). No changes to the currently permitted annual production rates are requested. This application is in response to FDEP's Southwest District's request to address applicable construction permitting issues associated with an increase in the production rate of the plant.

IMC's New Wales facility manufactures sulfuric acid, phosphoric acid, ammoniated fertilizers and animal feed ingredients. The existing DAP 1 Plant can make either product, monoammonium or diammonium phosphate fertilizer, depending on market demand. The product can be enhanced by the addition of small quantities of various compounds. It is expected that the higher hourly production rate will be accomplished without any changes to the existing equipment. Plant maps and process flow diagrams are presented in Figures 1-1 to 1-5.

The proposed project is expected to result in a significant increase, as defined in Rule 62-212, Florida Administrative Code (FAC), in the emissions of fluorides and particulate matter (see Tables 1-1 and 1-2). This technical evaluation addresses rule applicability, Best Available Control Technology (BACT) and air impact analyses pursuant to Rule 62-212, FAC.

IMC proposes the continued use of the existing venturi and cyclonic scrubbers as BACT for the DAP 1 Plant with a fluoride emissions limit of 0.04 lb/ton P2O5 input; and, a particulate matter emissions limit of 0.2 lb/ton P2O5 input. These emission limits represent some of the most stringent limitations imposed on MAP/DAP Plants in the US.

FIGURE 1-1

SITE LOCATION MAP

IMC PHOSPHATES COMPANY
NEW WALES PLANT

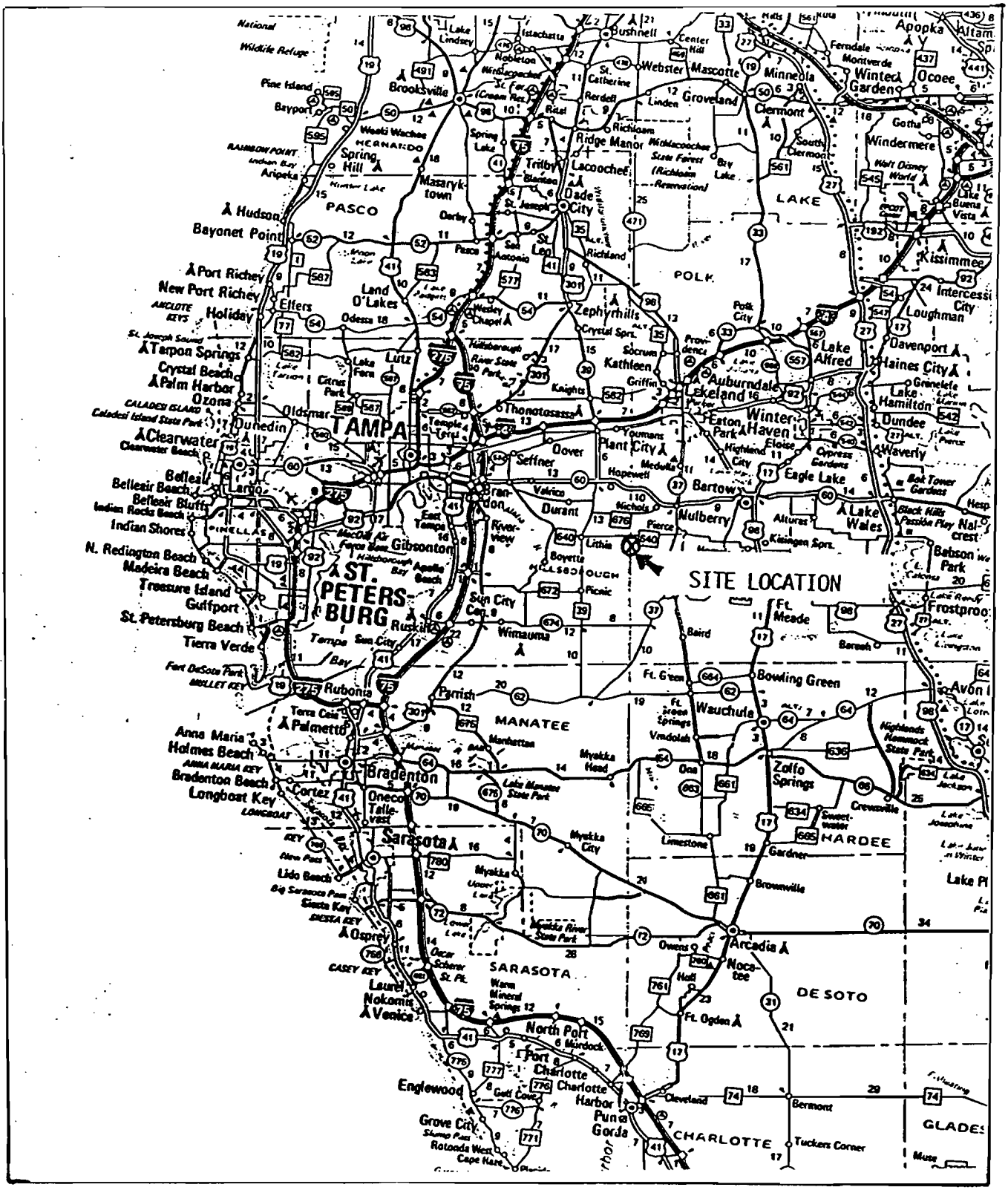
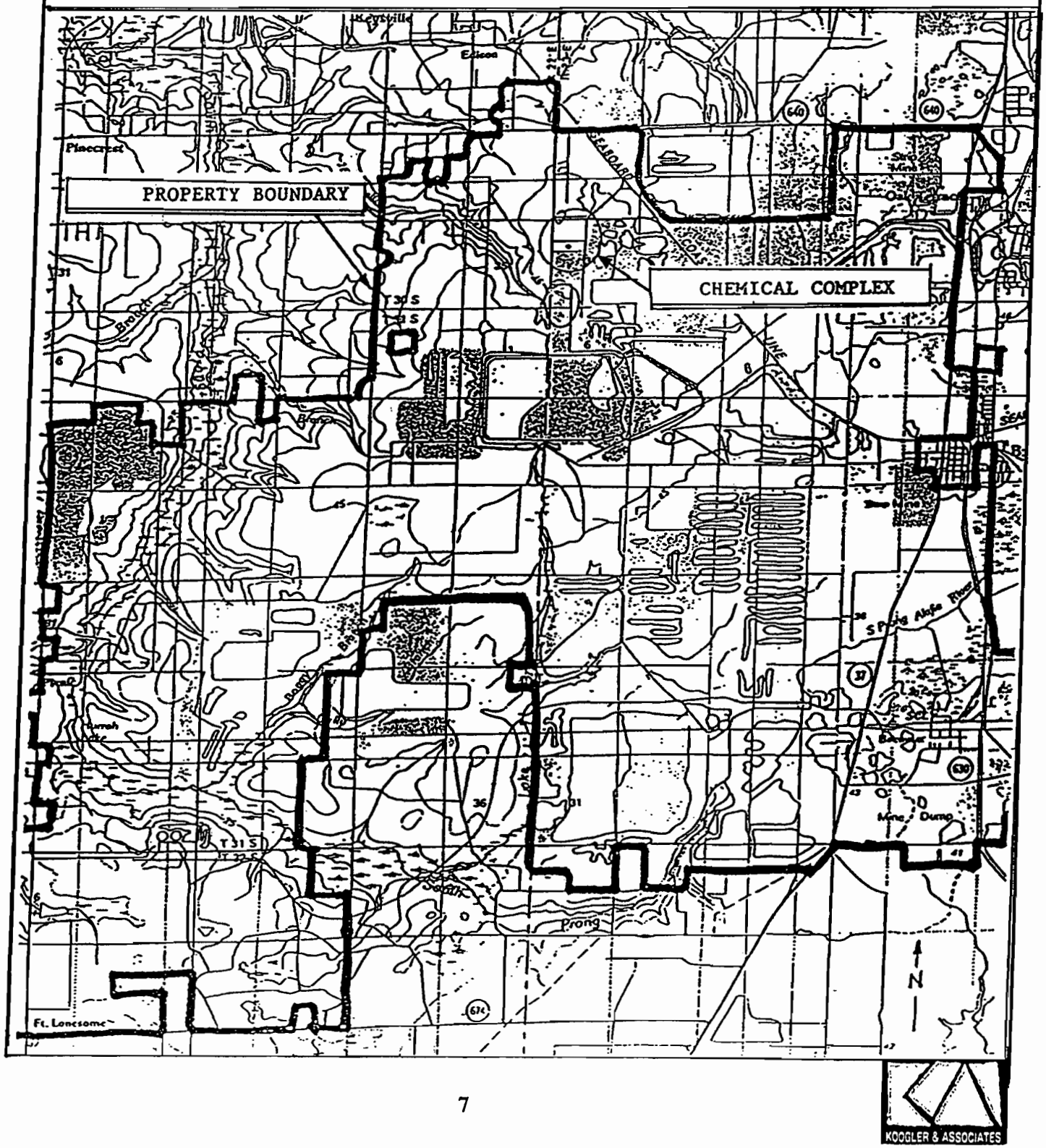


FIGURE 1-2

AREA LOCATION MAP

IMC PHOSPHATES COMPANY
NEW WALES PLANT



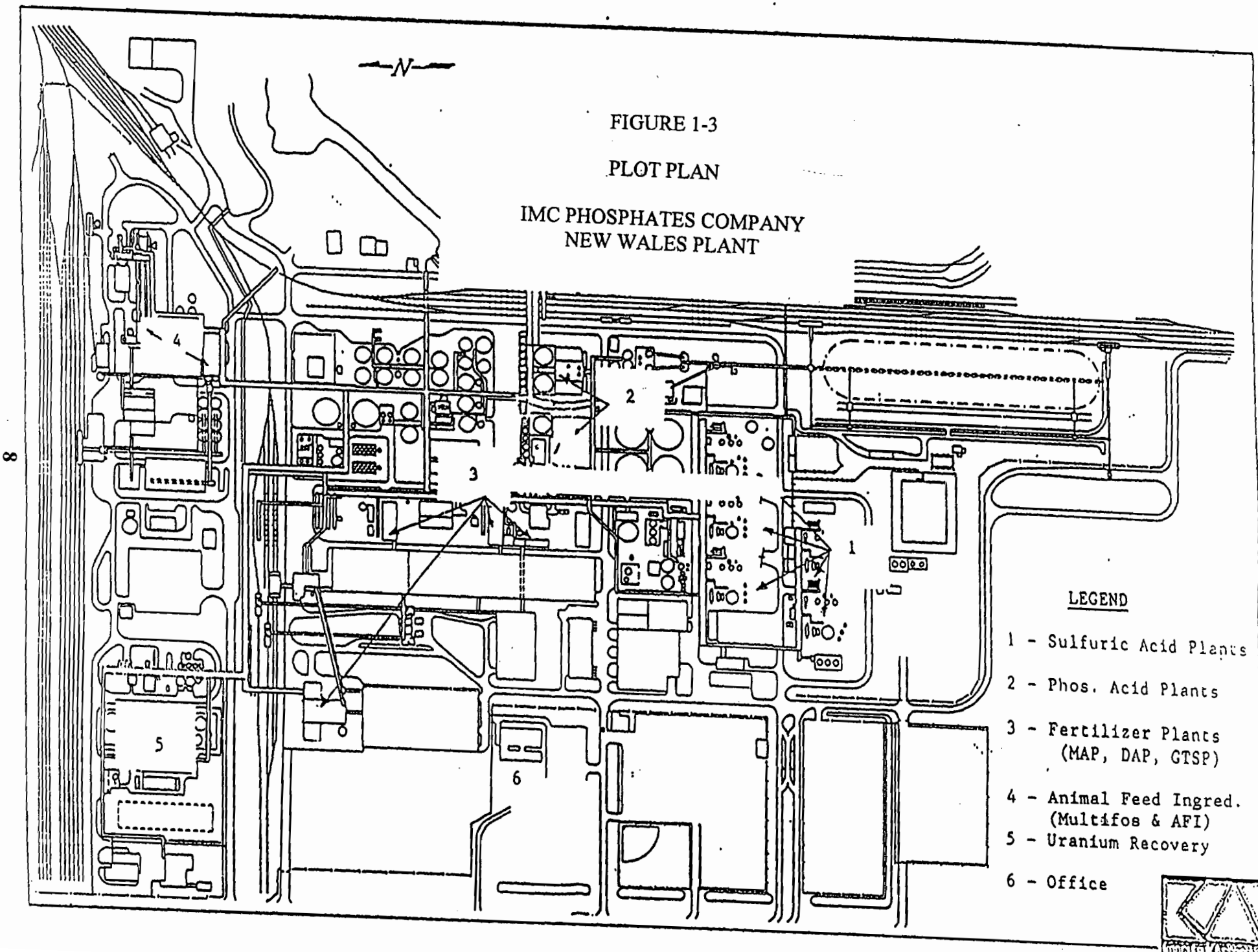


FIGURE 1-3

PLOT PLAN

IMC PHOSPHATES COMPANY
NEW WALES PLANT

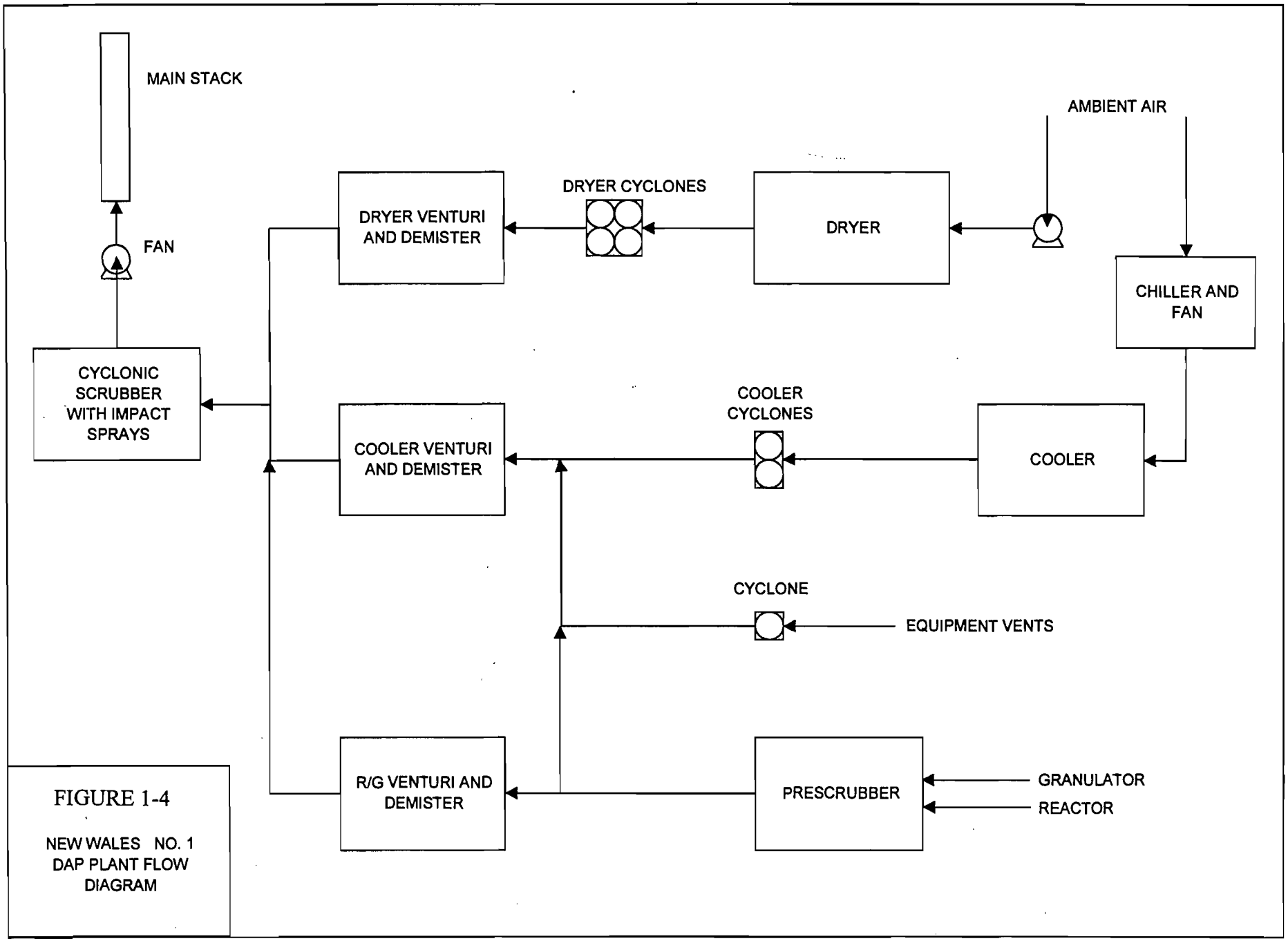


FIGURE 1-4

NEW WALES NO. 1 DAP PLANT FLOW DIAGRAM

TABLE 1-1

SUMMARY OF EMISSION CHANGES
DAP 1 PLANT

	EMISSIONS (TPY)		
ACTUAL EMISSIONS:			
Fluorides (F)	1.7		
Particulates (PM/PM10)	31.7		
Sulfur Dioxide (SO2)	45.7		
Nitrogen Oxides (NOX)	7.0		
PROPOSED EMISSIONS:			
Fluorides (F)	14.0		
Particulates (PM/PM10)	70.1		
Sulfur Dioxide (SO2)	80.0		
Nitrogen Oxides (NOX)	45.0		
NET EMISSIONS:		PSD LEVEL (TPY)	PSD REVIEW
Fluorides (F)	12.3	3	YES
Particulates (PM/PM10)	38.4	15 (PM10)	YES
Sulfur Dioxide (SO2)	34.3	40	NO
Nitrogen Oxides (NOX)	38.0	40	NO

2.0 RULE REVIEW

The following are the state and federal air regulatory requirements that apply to new or modified sources subject to a PSD review.

In accordance with EPA and state of Florida PSD review requirements, all major new or modified sources of air pollutants regulated under the Clean Air Act (CAA) are subject to preconstruction review. Florida's State Implementation Plan (SIP), approved by the EPA, authorizes the Florida Department of Environmental Protection (FDEP) to manage the air pollution program in Florida.

The PSD review determines whether or not significant air quality deterioration will result from a new or modified facility. Federal PSD regulations are contained in 40CFR52.21, Prevention of Significant Deterioration of Air Quality. The state of Florida has adopted PSD regulations that are essentially identical to the federal regulations and are contained in Chapter 62-212 of the Florida Administration Code (FAC). All new major sources and major modifications to existing sources are subject to control technology review, source impact analysis, air quality analysis and additional impact analyses for each pollutant subject to a PSD review. A facility must also comply with the Good Engineering Practice (GEP) stack height rule.

A major facility is defined in the PSD rules as any one of the 28 specific source categories (see Table 2-1) which has the potential to emit 100 tons per year (tpy) or more, or any other stationary facility which has the potential to emit 250 tpy or more, of any pollutant regulated under the CAA. A major modification is defined in the PSD rules as a change at an existing major facility which increases the actual emissions by greater than significant amounts (see Table 2-2).

2.1 Ambient Air Quality Standards

The EPA and the state of Florida have developed/adopted ambient air quality standards, AAQS (see Table 2-3). Primary AAQS protect the public health while the secondary AAQS protect the public welfare from adverse effects of air pollution. Areas of the country have been designated as attainment or nonattainment for specific pollutants. Areas not meeting the AAQS for a given pollutant are designated as nonattainment areas for that pollutant. Any new source or expansion of existing sources in or near these nonattainment areas is usually subject to more stringent air permitting requirements. Projects proposed in attainment areas are subject to air permit requirements that ensure continued attainment status.

2.2 PSD Increments

In promulgating the 1977 CAA Amendments, Congress quantified concentration increases above an air quality baseline concentration levels for sulfur dioxide (SO_2) and particulate matter (PM/TSP) which would constitute significant deterioration. The size of the allowable

increment depends on the classification of the area in which the source would be located or have an impact. Class I areas include specific national parks, wilderness areas and memorial parks. Class II areas are all areas not designated as Class I areas and Class III areas are industrial areas in which greater deterioration than Class II areas would be allowed. There are no designated Class III areas in Florida.

In 1988, EPA promulgated PSD regulations for nitrogen oxides (NOx) and PSD increments for nitrogen dioxide (NO_2) concentrations. FDEP adopted the NO_2 increments in July 1990 (see Table 2-4 for PSD increments).

In the PSD regulations, as amended August 7, 1980, baseline concentration is defined as the ambient concentration level for a given pollutant which exists in the baseline area at the time of the applicable baseline date and includes the actual emissions representative of facilities in existence on the applicable baseline date, and the allowable emissions of major stationary facilities which commenced construction before January 6, 1975, but were not in operation by the applicable baseline date.

The emissions not included in the baseline concentration and, therefore, affecting PSD increment consumption are the actual emissions from any major stationary facility on which construction commenced after January 6, 1975, for SO_2 and PM (TSP) and February 8, 1988, for NO_2, and the actual emission increases and decreases at any stationary facility occurring after the baseline date.

2.3 Control Technology Evaluation

The PSD control technology review requires that all applicable federal and state emission limiting standards be met and that Best Available Control Technology (BACT) be applied to the source. The BACT requirements are applicable to all regulated pollutants subject to a PSD review.

BACT is defined in Chapter 62-212, FAC as an emission limitation, including a visible emission standard, based on the maximum degree of reduction of each pollutant emitted which the Department, on a case-by-case basis, taking into account energy, environmental, and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques (including fuel cleaning or treatment or innovative fuel combustion techniques) for control of such pollutant.

If the Department determines that technological or economic limitations on the application of measurement methodology to a particular part of a source or facility would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard or combination thereof, may be prescribed instead, to satisfy the requirement for the application of BACT. Such standard shall, to the degree possible, set forth the emissions reductions achievable by implementation of such design, equipment, work practice or operation. Each BACT determination shall include applicable test methods

or shall provide for determining compliance with the standard(s) by means that achieve equivalent results.

The reason for evaluating the BACT is to minimize as much as possible the consumption of PSD increments and to allow future growth without significantly degrading air quality. The BACT review also analyzes if the most current control systems are incorporated in the design of a proposed facility. The BACT, as a minimum, has to comply with the applicable New Source Performance Standard for the source. The BACT analysis requires the evaluation of the available air pollution control methods including a cost-benefit analysis of the alternatives. The cost-benefit analysis includes consideration of materials, energy, and economic penalties associated with the control systems, as well as environmental benefits derived from the alternatives.

EPA determined that the bottom-up approach (starting at NSPS and working up to BACT) was not providing the level of BACT originally intended. As a result, in December 1987, EPA strongly suggested changes in the implementation of the PSD program including the "top-down" approach to BACT. The top-down approach requires an applicant to start with the most stringent control alternative, often Lowest Achievable Emission Rate (LAER), and justify its rejection or acceptance as BACT. Rejection of control alternatives may be based on technical or economical infeasibility, physical differences, locational differences, and environmental or energy impact differences when comparing a proposed project with a project previously subject to that BACT.

2.4 Air Quality Monitoring

An application for a PSD permit requires an analysis of ambient air quality in the area affected by the proposed facility or major modification. For a new major facility, the affected pollutants are those that the facility would potentially emit in significant amounts. For a major modification, the pollutants are those for which the net emissions increase exceeds the significant emission rate.

Ambient air monitoring for a period of up to one year, but no less than four months, is required. Existing ambient air data for a location in the vicinity of the proposed project is acceptable if the data meet FDEP quality assurance requirements. If not, additional data would need to be gathered. There are guidelines available for designing a PSD air monitoring network in EPA's "Ambient Monitoring Guidelines for Prevention of Significant Deterioration."

FDEP may exempt a proposed major stationary facility or major modification from the monitoring requirements with respect to a particular pollutant if the emissions increase of the pollutant from the facility or modification would cause air quality impacts less than the de minimus levels (see Table 2-2).

2.5 Ambient Impact Analysis

A source impact analysis is required for a proposed major source subject to PSD for each pollutant for which the increase in emissions exceeds the significant emission rate. Specific atmospheric dispersion models are required in performing the impact analysis. The analysis should demonstrate the project's compliance with AAQS and allowable PSD increments. The impact analysis for criteria pollutants may be limited to only the new or modified source if the net increase in impacts due to the new or modified source is below significant impact levels.

Typically, a five-year period is used for the evaluation of the highest, second-highest short-term concentrations for comparison to AAQS or PSD increments. The term "highest, second-highest" refers to the highest of the second-highest concentrations at all receptors. The second-highest concentration is considered because short-term AAQS specify that the standard should not be exceeded at any location more than once a year. If less than five years of meteorological data are used in the modeling analysis, the highest concentration at each receptor is normally used.

2.6 Additional Impact Analysis

The PSD rules also require analyses of the impairment to visibility and the impact on soils and vegetation resulting from a project. A visibility impairment analysis must be conducted for PSD Class I areas. Impacts due to commercial, residential, industrial, and other growth associated with the source must be addressed. The National Park Service also requires an Air Quality Related Values (AQRV) Analysis for a Class I area.

2.7 Good Engineering Practice Stack Height

In accordance with Chapter 62, FAC, the degree of emission limitation required for control of any pollutant should not be affected by a stack height that exceeds GEP, or any other dispersion technique. GEP stack height is defined as the greater of:

1. 65 meters (m), or
2. A height established by applying the formula:

   $Hg = H + 1.5\ L$

   where:

   Hg - GEP stack height,

   H - Height of the structure or nearby structure, and

   L - Lesser dimension, height or projected width of nearby structure(s)

3. A height demonstrated by a model or field study.

The GEP stack height regulations require that the stack height used in modeling for determining compliance with AAQS and PSD increments not exceed the GEP stack height. The actual stack height may be higher or lower.

2.8 Rule Applicability

The proposed project at IMC, as previously described herein, is classified as a major modification to a major source subject to both state and federal regulations as set forth in Rule 62-212, FAC.

The facility is located in an area classified as attainment for each of the regulated air pollutants in accordance with Rule 62-275, FAC.

The proposed project will result in significant increases in the emissions of fluorides and particulate matter, as defined in Rule 62-212, FAC; and, will therefore be subject to PSD preconstruction review requirements.

The PSD review will include a determination of Best Available Control Technology, an air quality review, Good Engineering Practice stack height analysis and an evaluation of impacts on soils, vegetation and visibility.

The provisions associated with NESHAP applicability are currently under discussion with FDEP. However, the proposed plant emission limits are less than the respective MACT rule limits for the source category.

TABLE 2-1

MAJOR FACILITY CATEGORIES

Fossil fuel fired steam electric plants of more than 250 MMBTU/hr heat input
Coal cleaning plants (with thermal dryers)
Kraft pulp mills
Portland cement plants
Primary zinc smelters
Iron and steel mill plants
Primary aluminum ore reduction plants
Primary copper smelters
Municipal incinerators capable of charging more than 250 tons of refuse per day
Hydrofluoric acid plants
Sulfuric acid plants
Nitric acid plants
Petroleum refineries
Lime plants
Phosphate rock processing plants
Coke oven batteries
Sulfur recovery plants
Carbon black plants (furnace process)
Primary lead smelters
Fuel conversion plants
Sintering plants
Secondary metal production plants
Chemical process plants
Fossil fuel boilers (or combinations thereof) totaling more than 250 million
BTU/hr heat input
Petroleum storage and transfer units with total storage capacity exceeding 300,000 barrels
Taconite ore processing plants
Glass fiber processing plants
Charcoal production plants

TABLE 2-2

REGULATED AIR POLLUTANTS - SIGNIFICANT EMISSION RATES

Significant Pollutant	De-Minimus Ambient Emission Rate tons/yr	Impacts ug/m^3
CO	100	575 (8-hour)
NOx	40	14 (NO_2, Annual)
SO_2	40	13 (24-hour)
Ozone	40 (VOC)	-
PM	25	10 (24-hour)
PM10	15	10 (24-hour)
TRS (including H2S)	10	0.2 (1-hour)
H_2SO_4 mist	7	-
Fluorides	3	0.25 (24-hour)
MSW Combustor:		
Organics (Dioxins/Furans)	3.5E-6	
Metals (PM)	15	
Acid Gases (SO2/HCl)	40	
MSW Landfill Gases (NMOC)	50	
	pounds/yr	
Lead	1200	0.1 (Quarterly avg)
Mercury	200	0.25 (24-hour)

TABLE 2-3

AMBIENT AIR QUALITY STANDARDS

Pollutant	FDEP (State) ug/m^3	FDEP (State) PPM	USEPA (National) Primary ug/m^3	USEPA (National) Primary PPM	USEPA (National) Secondary ug/m^3	USEPA (National) Secondary PPM
SO_2, 3-hour	1,300	0.5	-	-	1300	0.5
24-hour	260	0.1	365	0.14	-	-
Annual	60	0.02	80	0.03	-	-
PM10, 24-hour	150	-	150	-	150	-
Annual	50	-	50	-	50	-
CO, 1-hour	40,000	35	40,000	35	-	-
8-hour	10,000	9	10,000	9	-	-
Ozone, 1-hour	235	0.12	235	0.12	235	0.12
NO_2, Annual	100	0.053	100	-	100	-
Lead, Quarterly	1.5	-	1.5	-	1.5	-

TABLE 2-4

PSD INCREMENTS

Pollutant	Allowable PSD Increments (State/National) Class I ug/m^3	Class II ug/m^3	Class III ug/m^3
PM10, Annual	4	17	34
24-hour	8	30	60
SO_2, Annual	2	20	40
24-hour	5	91	182
3-hour	25	512	700
NO_2, Annual	2.5	25	50

3.0 BEST AVAILABLE CONTROL TECHNOLOGY

As indicated in the rule applicability in the permit application, the proposed project is subject to PSD review requirements pursuant to Rule 62-212, FAC. A Best Available Control Technology (BACT) evaluation is presented below for fluoride emissions from the proposed project.

IMC proposes an increase in the hourly production rate of the existing DAP 1 Plant from 150 tph to 155 tph. The proposed maximum production rate of 155 tph MAP corresponds to 82 tph P2O5 input. No changes are proposed to the existing air pollution control equipment consisting of venturi and cyclonic scrubbers, as shown on the process flow diagrams. The available compliance test information indicates that the plant is in compliance with some of the most stringent emission limits imposed on GMAP/DAP Plants.

3.1 Emission Standards for MAP/DAP Plants

Federal New Source Performance Standards (NSPS) for DAP plants, codified in 40 CFR 60, Subpart V, limit fluoride emissions to no more than 0.06 pounds per ton P2O5 input. For the purposes of the standard, the affected facility includes any combination of reactors, granulators, dryers, coolers, screens and mills.

More recently, additional federal standards were promulgated under 40 CFR 63 Subpart BB, National Emission Standards for Hazardous Air Pollutants From Phosphate Fertilizer Production Plants. The fluoride emission standard under these NESHAPs for existing GMAP/DAP plants is identical to that under NSPS, at 0.06 lb/ton P2O5 feed. The fluoride emission standard for new plants is limited to 0.058 lb/ton P2O5 feed. However, these standards apply only to major sources of HAPs. At the time of this application, an applicability determination for this facility has not been completed. If it is determined that IMC is not a major source of HAPs, these emission standards will not apply to the proposed project.

3.2 Control Technologies

The most common pollution control equipment used to control fluorides from a GMAP/DAP plant is a wet scrubber. There is some variation in the wet scrubbing system configurations from plant to plant, often depending on the preference of the plant designers and suppliers. Particulate matter emissions are most often controlled using venturi scrubbers.

The use of fresh water as scrubbing medium, in place of pond water, would result in increased capture of gaseous fluorides. However, this option is not possible given the current severe water restrictions implemented in the area by the Water Management District.

The existing IMC scrubbing system consists of venturi and cyclonic scrubbers. They are popular with the industry as they operate with low maintenance/repair costs, and increased on-line operation.

Packed scrubbers offer superior gaseous fluoride removal, however the industry experience indicates that the packing tends to plug frequently causing maintenance problems. The resulting plant down time cuts into the overall plant efficiency and productivity. Consequently, the use of packed scrubbers, in place of the existing venturi scrubbers, is not considered for this application. However, the use of packed scrubbers, in series with the existing venturi scrubbers can be evaluated.

A preliminary cost, associated with the use of a packed scrubber, based on a recent cost proposal for a similar application scaled to higher gas flow rate, is estimated below.

Total Capital Cost:	With Equipment Cost of $270,000		
	Purchased Equip. Cost (1.18, EPA factor)	= $	318,600
	Installation Cost (0.85 PEC, EPA factor)	= $	270,810
	Indirect Cost (0.35 PEC, EPA factor)	= $	111,510
	Total Capital Cost	= $	700,920
Direct Annual Cost	Labor (O.5 hr/shift, EPA factor)	=$	10,000
	Maintenance (1.0 hr/shift, EPA factor)	=$	20,000
	Electricity (pump)	=$	42,000
	Total DC	=$	72,000
Indirect Annual Cost	(0.1715 TCI, EPA combined factor) (includes capital recovery at 15 year life, 10% int.)	=$	120,200
Total Annual Cost	(DC + IC)	= $	192,200

Although the above costs are not all-inclusive, they provide a preliminary estimate of the annual cost. Based on this projected annual cost, the cost of fluoride control can be estimated with a conservative assumption that all fluorides from the venturi scrubber, of 14.4 tpy, are captured.

Annual Cost of fluoride control	($192,200 / 14.4 tpy)	= $	13,350/ton

This alternative is rejected as BACT based on the above control cost.

Another alternative would be the replacement of the existing tail-gas scrubber with a packed scrubber. A preliminary estimate of the scaled annual cost is presented below.

Previous Total Capital Cost (without extra ducting)	= $	690,500

Added Ducting and Production Loss Cost	= $ 700,000
Revised Total Capital Cost	= $ 1,390,500
Revised Indirect Cost (use EPA factor of 0.1715 x TCC)	= $ 238,500
Direct costs (assumed to be the same as above)	= $ 72,000
Annual Cost (DC+IC)	= $ 310,500

To determine the cost of fluoride control, the total annual quantity of fluorides removed by the new scrubber needs to be calculated. As the fluoride loading to the scrubber has not been measured, it has to be estimated. In reality, it is expected that the first set of venturis control most of the fluorides. The tail-gas scrubber inlet loading can be estimated as follows:

Projected annual fluoride emissions		= 14.4 tpy
Potential efficiency of the scrubber being replaced (reasonably conservative assumption)		= 40 %
Estimated fluorides to scrubber	= 14.4 tpy/(1-0.4)	= 24 tpy

The total amount of fluorides controlled by a new packed cross-flow scrubber can be estimated based on a projected control efficiency of 99%.

Fluorides controlled	= 24 tpy x 0.99	= 23.8 tpy

The resulting cost of control can be estimated as follows:

Control Cost ($/ton fluorides removed)	= $310,500 / 23.8 tpy	= $ 13,000

This preliminary projected cost also exceeds the presumed BACT guideline cost of around $8,000 per ton of fluorides removed and, therefore, is also rejected as BACT.

The proposed fluorides emission limit using the existing equipment, is in line with another recently permitted facility (Cargill project PSD-FL-315).

Treated water recirculation is rejected as BACT based on costs evaluated for a similar project for a lined pond and lime treatment that exceed even the costs associated with a packed scrubber. Further, the treated water containment integrity and storm contingencies can add considerable unnecessary environmental liability.

It should be noted that the historical fluoride emissions measurements indicate that the current scrubber configuration results in emissions of fluorides well below the NSPS. A summary of recent emissions measurements at IMC is included along with the emissions calculations in Appendix A. Furthermore, it is our understanding that the proposed fluoride emission rate, of 0.04 lb/ton P2O5 input, will be one of the most stringent limits imposed by FDEP on a GMAP/DAP Plant.

For particulate matter, the use of venturi scrubbers has consistently been considered BACT by FDEP for fertilizer plants. As IMC proposes to continue the use of the existing venturi scrubbers, no further discussion is presented herein. Furthermore, it is our understanding that the proposed particulate matter emission limit, of 0.2 lb/ton P2O5 input, will be one of the most stringent limits imposed by FDEP on a GMAP/DAP Plant.

3.3 BACT Conclusion

Based on the above discussion, IMC proposes the continued use of the existing venturi and cyclonic scrubbers as BACT and will limit fluoride emissions from the DAP 1 Plant to 0.04 lb/ton P2O5 input; limit particulate matter emissions to 0.2 lb/ton P2O5 input and, limit visible emissions to 20 percent opacity.

4.0 AIR IMPACTS ANALYSIS

An ambient air standards analysis is required for fluorides and particulate matter as there are applicable particulate matter ambient air standards and applicable monitoring thresholds for fluorides.

4.1 Significant Impact Analysis

The fluoride and particulate matter emission rates used for air quality modeling purposes for Significant Impact Analysis (SIA) represent the proposed net increase in the emission rate associated with the proposed project. Table 4-1 contains modeling input parameters used in the ambient air quality impacts analysis.

The SIA was conducted using the Industrial Source Complex-Short Term air quality model, Version 02035 (ISC3), in accordance with guidelines established by EPA and published in the document, Guideline for Air Quality Modeling. The meteorological data used with the model were for Tampa, Florida and represented the period 1987-1991.

The maximum F and PM emissions from the DAP 1 Plant were modeled in the SIA. The current emission rates were represented as a negative input while the proposed emission rates were represented as positive inputs to the model.

The SIA modeling included discrete receptors at the facility property boundary and additional receptors established by the polar grid system extending to 20 kilometers from the plant. The discrete receptors were placed along the property boundary at 100-meter intervals. Twenty-eight sets of receptor rings were placed at distances ranging from about 1500 to 20,000 meters from the plant with receptors placed at 10 degree intervals from 10^{o} to 360^{o} on each receptor ring, with the exclusion of receptors within property boundary. The downwind receptor distances were selected in order to provide a higher concentration of receptors closer to the source where the maximum impacts were expected. Receptor locations are shown in Figure 4-1. Additional receptors were located on a 1000-meter square grid surrounding the location of each maximum predicted impact to confirm the maximum impact levels.

The results of the SIA modeling, summarized in Table 4-2, demonstrate that the maximum predicted air impact of the fluorides and particulate matter emissions from the proposed project are below the 24-hour de-minimus levels; below the significant levels for the 24-hour and annual periods for the Class II area; and, below the significant level for the Class I area. Based on the results of the SIA, additional modeling was not required for the proposed project.

FIGURE 4-1

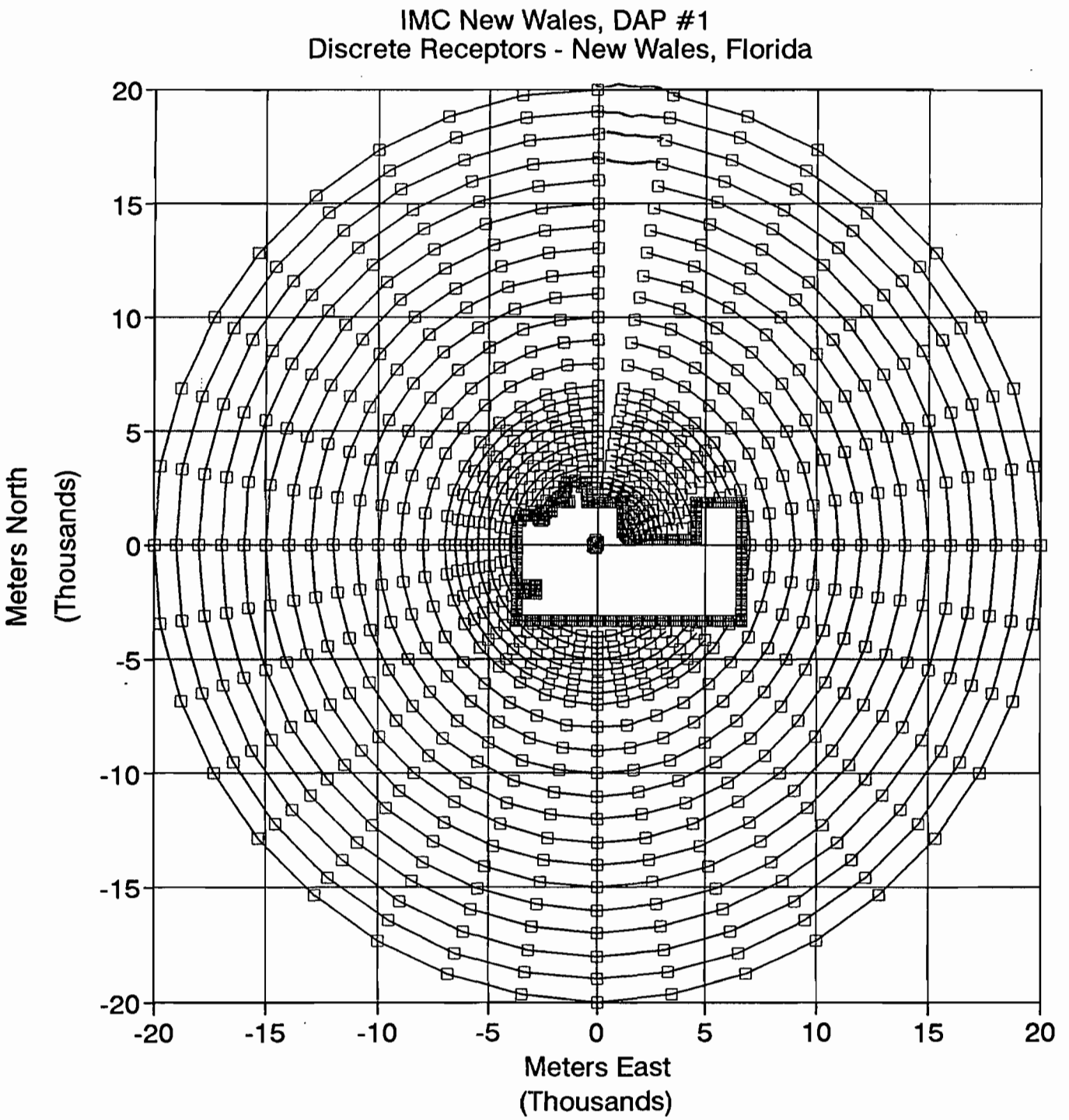

IMC New Wales, DAP #1
Discrete Receptors - New Wales, Florida
Meters North
(Thousands)
20
15
10
5
0
-5
-10
-15
-20
-20
-15
-10
-5
0
5
10
15
20
Meters East
(Thousands)

TABLE 4-1

AIR QUALITY MODELING PARAMETERS

DAP 1 PLANT

Where did this come from?

Emission Unit	Stack		Stack Gas		Emissions	
	Ht (m)	Dia (m)	Vel (mps)	Temp (°K)	PM (g/s)	F (g/s)
Plant Existing (1)	40.50	2.13	22.40	314	1.39	0.30
Plant Proposed (2)	40.50	2.13	23.80	314	2.07	0.41

11.03 lbs/hr

16.40 lbs/hr

NOTES:

(1) This reflects current plant parameters.

(2) This reflects proposed plant parameters.

(3) Building downwash effects, from the EPA approved BPIP program, were included in the modeling.

BPIP

TABLE 4-2

SUMMARY OF SIGNIFICANT IMPACT ANALYSIS

DAP 1 PLANT

MET. DATA	CLASS I AREA IMPACTS (1) PM 24-HR	PM ANNUAL	CLASS II AREA IMPACTS (1) F 24-HR	PM 24-HR	PM ANNUAL
1987	0	0	0.22	2.29	0.09
1988	0	0	0.21	1.59	0.08
1989	0	0	0.21	1.66	0.11
1990	0.006	0 (2) 0,00042	0.20	2.19	0.11
1991	0	0	0.21	2.10	0.12
MAXIMUM	0.006	0	0.22	2.29	0.12
DI-MINIMUS (3)	NA	NA	0.25	10	NA
SIG. IMPACT (3)	0.3	0.2	NA	5	1

NOTE: highest is 0.018

(1) The impacts represent the highest-high impact.
(2) CALPUFF modeling conducted using 1990 meteorological data.
(3) As defined in Rule 62-212, FAC.
(4) The impacts are based on the difference between the existing and proposed plant (see Table 4-1).

5.0 IMPACTS ON SOILS, VEGETATION AND VISIBILITY

5.1 Impacts on Soils and Vegetation

The U. S. Environmental Protection Agency was directed by Congress to develop primary and secondary ambient air quality standards. The primary standards were to protect human health and the secondary standards were to "... protect the public welfare from any known or anticipated adverse effects of a pollutant."

The public welfare was to include soils, vegetation and visibility.

As a basis for promulgating the air quality standards, EPA undertook studies related to the effects of all major air pollutants and published criteria documents summarizing the results of the studies. The studies included in the criteria documents were related to both acute and chronic effects of air pollutants. Based on the results of these studies, the criteria documents recommended air pollutant concentration limits for various periods of time that would protect against both chronic and acute effects of air pollutants with a reasonable margin of safety.

The air quality modeling that has been conducted as a requirement for the PSD application demonstrates that the levels of fluorides and particulate matter expected in the vicinity of the proposed project are below the ambient air quality standards. In fact, the maximum predicted long term impacts based on the project as modeled are zero. As a result, it is reasonable to conclude that there will be no adverse effect to the soils, vegetation or visibility of the area.

IMC's New Wales property and the surrounding areas are comprised of mining lands (phosphate), flatwoods, marshes, and sloughs. The soils of the area are primarily sandy and are typically low in both clay and silt content. These characteristics and the semi-tropic climatic factors of high temperature and rainfall are the natural factors that determine the terrestrial communities of the region.

The land in the vicinity of the plant supports various plant communities. Much of the natural vegetation on the site and the surrounding areas has been altered due to mining and industrial use; primarily the phosphate fertilizer industry. As a result of mining and industrial activity, there is very little undisturbed land in existence in the vicinity of the plant. As a result, no adverse impacts from the proposed project are expected on the soils and vegetation in the vicinity of the facility.

5.2 Growth Related Impacts

The proposed project will require no increase in personnel to operate the facility. Also, an increase in traffic due is not expected, and any changes will likely have a negligible impact on traffic in the area as compared with traffic levels that presently exist. Therefore, no additional growth impacts are expected as a result of the proposed project. The issue, of

growth related impacts from new development in the area, is under discussion with FDEP staff.

5.3 Visibility Impacts

The proposed project will result in an increase in air emissions and therefore has the potential for adverse impacts on visibility.

A screening approach suggested by EPA (Workbook for Plume Visual Impact Screening and Analysis, 1988) and computerized in a model referred to as VISCREEN was used for the analysis. The emissions of particulate matter were input to the model. The VISCREEN - Level 1 modeling results, presented in Table 5-1, indicate that there will be no adverse visibility impacts from the proposed project.

5.4 Impacts on Air Quality Related Values for the Class I Area

The analysis addressed in this section addresses the review of the impact of increased emissions on air quality related values associated with the Chassahowitzka Wildlife Refuge, a Class I area located in excess of 100 kilometers northwest of the IMC facility.

Given that the maximum predicted Class I area impacts based on the ISC3 modeling are near zero, no adverse impact to the Class I area vegetation, soils, wildlife or visibility are expected.

A regional haze analysis was performed using the maximum predicted particulate matter impacts based on the NPS protocol. The results of the regional haze analysis, presented in Table 5-2, indicate that no adverse visibility impacts are expected as a result of the proposed project.

TABLE 5-1

Visual Effects Screening Analysis for
Source: DAP 1 PLANT
Class I Area: CHASSAHOWITZKA

Level-1 Screening Input Emissions

Particulates	2.07	G	/S
NOx (as NO2)	.00	G	/S
Primary NO2	.00	G	/S
Soot	.00	G	/S
Primary SO4	.00	G	/S

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	.04 ppm
Background Visual Range:	65.00 km
Source-Observer Distance:	103.00 km
Min. Source-Class I Distance:	103.00 km
Max. Source-Class I Distance:	110.00 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.	103.0	84.	2.00	.082	.05	.001
SKY	140.	84.	103.0	84.	2.00	.015	.05	-.001
TERRAIN	10.	84.	103.0	84.	2.00	.044	.05	.000
TERRAIN	140.	84.	103.0	84.	2.00	.009	.05	.000

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.	25.	73.6	144.	2.00	.106	.05	.001
SKY	140.	25.	73.6	144.	2.00	.018	.05	-.001
TERRAIN	10.	50.	90.0	119.	2.00	.056	.05	.001
TERRAIN	140.	50.	90.0	119.	2.00	.012	.05	.000

TABLE 5-2

REGIONAL HAZE ANALYSIS

12/24/1990	
RH	f_RH
90	4.7
93	7
97	15.1
97	15.1
100	18.1
100	18.1
97	15.1
100	18.1
100	18.1
93	7
93	7
93	7
97	15.1
81	2.8
63	1.5
55	1.3
55	1.3
68	1.8
75	2.2
84	3.2
87	3.8
83	3.1
62	1.5
62	1.5
100	18.1
Daily Avg.	8.304

First High for	12/24/1990	
Viz Ref Level	----------	
Eq-6 P38		
b_ext = b_hydro*f(RH)+b_nonhydro+b_ray		
b_ref =	25.9736	Mm-1
For chassahowitzka		
b_hydro	0.9	
b_nonhyd	8.5	
b_ray =	10	
f(RH) =	8.3	
Source Extinction	----------	
b_Source b_(NH4)2SO4 * fRH + b_EC		
	0.0	Mm-1
Change in Extinction	----------	
Db = (b_Source/b_ref)*100		
Db =	**0.0**	**%**

Need
N deposition
S deposition

6.0 GOOD ENGINEERING PRACTICE STACK HEIGHT

The criteria for good engineering practice stack height states that the height of a stack should not exceed the greater of 65 meters (213) feet or the height of nearby structures plus the lesser of 1.5 times the height or cross-wind width of the nearby structure. This stack height policy is designed to prevent achieving ambient air quality goals solely through the use of excessive stack heights and air dispersion. The stacks associated with the proposed project are less than 213 feet in height above-grade. This satisfies the good engineering practice (GEP) stack height criteria.

7.0 CONCLUSION

It can be concluded from the information in this report that the proposed increase in the production rate of the DAP 1 Plant, as described in this report, will not cause or contribute to a violation of any air quality standard, PSD increment, or any other provision of Chapter 62, FAC.

APPENDIX A - EMISSIONS CALCULATIONS

ACTUAL EMISSION RATES

The actual emissions are based on 1999 and 2000 data, as these years are considered representative of normal plant operation, as previously discussed with FDEP. Fuel oil emission estimates based on AP-42 factors:

What is the S-T number for current operated

1999 7865
2000 7868

Fluorides:

1999 F = 7865 hrs/yr x 0.45 lb/hr x ton/2000 lbs = 1.8 tpy
2000 F = 7868 hrs/yr x 0.41 lb/hr x ton/2000 lbs = 1.6 tpy
Avg. F = (1.8 + 1.6)/2 tpy = 1.7 tpy

Particulates:

1999 PM = 7865 hrs/yr x 5.2 lb/hr x ton/2000 lbs = 20.4 tpy
2000 PM = 7868 hrs/yr x 10.9 lb/hr x ton/2000 lbs = 42.9 tpy
Avg. PM = (20.4 + 42.9)/2 tpy = 31.7 tpy

10.9 lbs/hr

Sulfur Dioxide:

1999 SO2= 305.018 x 10E3 gals x 157 (2.3 %S) lb/10E3 gals x ton/2000 lbs = 55.1 tpy
2000 SO2= 200.675 x 10E3 gals x 157 (2.3 %S) lb/10E3 gals x ton/2000 lbs = 36.2 tpy
Avg. SO2 = (55.1 + 36.2)/2 tpy = 45.7 tpy

Nitrogen Oxides:

1999 NOX= 305.018 x 10E3 gals x 55 lb/10E3 gals x ton/2000 lbs = 8.4 tpy
2000 NOX= 200.675 x 10E3 gals x 55 lb/10E3 gals x ton/2000 lbs = 5.5 tpy
Avg. NOX= (8.4 + 5.5)/2 tpy = 7.0 tpy

MAX. ALLOWABLE EMISSION RATES

GMAP/DAP, F = 82 tph P2O5 x 0.04 lb F/ton P2O5
= 3.3 lb/hr

Annual F = 80 tph P2O5 x 0.04 lb F/ton P2O5 x 8760 hrs/2000 lb/ton
= 14.0 tpy

GMAP/DAP, PM = 82 tph P2O5 x 0.2 lb F/ton P2O5
= 16.4 lb/hr

Annual PM = 80 tph P2O5 x 0.2 lb F/ton P2O5 x 8760 hrs/2000 lb/ton
= 70.1 tpy

GMAP/DAP, SO2 = 45.7 tpy (2-yr avg.) + 34.3 tpy (increase)
= 80 tpy

GMAP/DAP, NOx = 7.0 tpy (2-yr avg.) + 38 tpy (increase)
= 45 tpy

NET EMISSIONS INCREASES

F	=	(14.0 – 1.7) tpy
	=	12.3 tpy (exceeds fluorides PSD significant level of 3 tpy)
PM	=	(70.1 – 31.7) tpy
	=	38.4 tpy (exceeds PM10 PSD significant level of 15 tpy)
SO2	=	(80 – 45.7) tpy
	=	34.3 tpy (below SO2 PSD significant level of 40 tpy)
NOX	=	(45 – 7) tpy
	=	38 tpy (below NOX PSD significant level of 40 tpy)

APPENDIX B - CURRENT AIR PERMIT CONDITIONS

Subsection F. This section addresses the following emissions unit(s).

E.U. ID No.	Brief Description
-009	DAP Plant #1
-054	DAP Plant #1 Cooler

The Diammonium Phosphate (DAP) Plant No. 1 produces ammoniated phosphates (DAP and Granular MAP) at a process input rate of 150 tons per hour. Emissions are controlled by a prescrubber, two (2) venturi scrubbers, one (1) tailgas scrubber, and two cyclonic wet scrubbers in series.

Emissions from the No. 1 DAP Plant Product Cooler are controlled by a baghouse. The design air flow rate through the baghouse is 45,000 ACFM. The production rate is 150 tons per hour of DAP.

{Permitting note(s): These emissions units are regulated under Rule 62-296.700, F.A.C., RACT Particulate Matter; and Rule 62-296.403, F.A.C., Phosphate Processing.}

The following conditions apply to the emissions unit(s) listed above:

Essential Potential to Emit (PTE) Parameters

F.1. Capacity.
a. The process rate shall not exceed 150 tons per hour of monoammonium or diammonium phosphate product.
b. The heat input rate for the dryer shall not exceed 27.7 MMBtu per hour.
[Rule 62-4.160(2), F.A.C. and Rule 62-210.200, F.A.C., Definitions - (PTE)]

F.2. Fuels. The DAP Plant No. 1 dryer shall be fired by natural gas, or No. 6 fuel oil, or better grade fuel oil (See Condition No. 19).

Emission Limitations and Standards

F.3. The maximum allowable fluoride emissions from DAP Plant No. 1 shall not exceed 0.06 pounds per ton of P_2O_5 input and 2.92 pounds/hour (based upon 48.7 tons P_2O_5/hour feed.
[Construction Permit 1050059-013-AC]

F.4. The maximum allowable particulate emissions from DAP Plant No. 1 shall not exceed 28.6 pounds/hour. This particulate matter emission rate limitation qualifies the facility for the PM-RACT exemption per Rule 62-296.700(2)(b), F.A.C.
[Construction Permit 1050059-013-AC]

F.5. The maximum allowable particulate matter emission rate from the No. 1 DAP Plant Product Cooler baghouse exhaust shall not exceed 7.7 pounds per hour and 33.7 tons per year. This particulate matter emission rate limitation qualifies the facility for the PM-RACT exemption per Rule 62-296.700(2)(b), F.A.C.
[Requested by permittee, November 29, 1994]

F.6. Visible emissions shall not be equal to or greater than 20% opacity in accordance with Rule 62-296.320(4)(b)(1).

Test Methods and Procedures

F.7. Frequency of Compliance Testing. Test the No. 1 DAP Plant for visible emissions, particulates and fluorides emissions per Conditions F.3., F.4., and F.6., annually, within 60 days prior to the due date of March 20.
[Rule 62-297.310(7)(a)4., F.A.C.]

F.8. Test the No. 1 DAP Plant Product Cooler Baghouse exhaust for visible emissions per Condition F.6 annually, on or during the 60 day period prior to October 23. Testing at conditions that are not representative of actual operating conditions may invalidate the test.
[Rule 62-297.310(7)(a)4, F.A.C.]

F.9. Test the No. 1 DAP Plant Product Cooler Baghouse exhaust for particulate matter emissions per Condition F.5 on or during the 180 day period prior to the expiration date of this permit.
[Rule 62-297.310(7)(a)3, F.A.C.]

F.10. Compliance with the emission limitations of Condition Nos. F.3, F.4, F.5 and F.6 shall be determined using EPA Methods 1, 2, 3, 4, 5, 9, and 13A or 13B contained in 40 CFR 60, Appendix A and adopted by reference in Rule 62-297, F.A.C.
[Rule 62-297, F.A.C.]

F.11. Compliance testing shall be conducted while firing oil, if oil of any type, has been used in the DAP Plant No. 1 dryer for a sum total of more than 400 hours from the previous test. If a test is conducted while firing natural gas, and in the 12 month period following the test, oil of any type is burned for a sum total of more than 400 hours, then an additional visible emission test per Condition F.6 shall be conducted , while burning in that source, within 30 days of having exceeded the 400 hour oil burning limit. A compliance test submitted using a better grade oil, other than No. 6 grade fuel oil, will automatically amend this operation permit to allow subsequent operation on only that better grade oil or a higher ranked oil, unless a compliance test is submitted based on any other allowable permitted oil within 30 days of fuel switching.
[Rules 62-297.310(7)(a)5., and 62-4.070(3), F.A.C.]

Monitoring Requirements

F.12. In order to provide reasonable assurance, when DAP Plant #1 is operating, that the pollution control equipment (e.g., dryer venturi scrubber, reactor-granulator venturi scrubber, and two cyclonic scrubbers) is operating properly, the permittee shall comply with Facility-wide Condition No. 14.
[Rule 62-4.070(3), F.A.C.]

F.13. In order to provide reasonable assurance that the control equipment is operating properly, the permittee shall create and keep a record log of the DAP Plant #1 Cooler baghouse operating parameters. The record log shall contain, at a minimum, the gas pressure drop (inches of water), the date and time of the measurements, and the person responsible for performing the measurements. A record log entry shall be made at least once for every 12 hour period that the DAP Plant #1 operates.
[Rule 62-4.070(3), F.A.C.]

F.14. Raw material input to the plant shall be monitored continuously by a flow measurement device capable of measuring material flows with an accuracy of ± 5 percent over the normal operating range.
[Construction permit 1050059-013-AC]

F.15. Total liquid flow rate and pressure drop across the scrubbing system and each individual scrubber shall be continuously measured, and permanently recorded (at least once per 12 hour period) by a monitoring device or devices. The "scrubbing system" is defined as beginning at the entrance to the dryer venturi scrubber.
[Rule 62-4.070, F.A.C., and Construction Permit 1050059-013-AC]

Recordkeeping and Reporting Requirements

F.16. A daily record log(s) shall be established and maintained to document, at a minimum, the following:

a. The daily equivalent P_2O_5 feed.
b. Hours of operation.
c. The quantity of the fuel oil utilized in the dryer.
d. The sulfur content (percent, by weight) of the fuel oil utilized in the dryer.

[Rule 62-4.070(3), F.A.C.]

APPENDIX C - MODELING OUTPUT

THIS COMPACT DISK CONTAINS PARTICULATE (PM10), AND FLUORIDE (FL) MODELING FILES FOR THE IMC NEW WALES PHOSPHATES FACILITY IN NEW WALES FLORIDA. THE FOLLOWING DIRECTORIES CONTAIN FILES ORGANIZED BY MODELING CONCERN:

ASI	CLASS 2 AREA ISCST INPUT AND OUTPUT FILES
BPIP	BUILDING DOWNWASH CALCULATIONS
C1PUFF	CALPUFF CLASS 1 AREA MODELING FILES
C1POST	CALPOST CLASS 1 POST PROCESSING FILES
VIZPUFF	CALPUFF VISIBILITY CLASS 1 AREA MODELING FILES
VIZPOST	CALPOST VISIBILITY CLASS 1 POST PROCESSING FILES

IN THE DIRECTORY <ASI> THERE ARE THREE SUB DIRECTORIES CONTAINING ISCST3 MODELING FILES FOR AREA OF SIGNIFICANT IMPACT (ASI) FOR FAAQS AND CLASS 2:

\ASI\PM	PARTICULATE ASI ANALYSIS
\ASI\PMMEI	MAXIMUM EXPOSED INDIVIDUAL (MEI) ANALYSIS
\ASI\FL	FLUORIDE ASI ANALYSIS

Directory: \ASI\PM

DAPASI87.OUT	391,147	08/25/02	PM10 MODELING FOR 1987
DAPASI88.OUT	391,147	08/25/02	PM10 MODELING FOR 1988
DAPASI89.OUT	391,147	08/25/02	PM10 MODELING FOR 1989
DAPASI90.OUT	391,147	08/25/02	PM10 MODELING FOR 1990
DAPASI91.OUT	391,147	08/25/02	PM10 MODELING FOR 1991

Directory: \ASI\PMMEI

DAPMEI87.OUT	38,176	08/25/02	PM10 MEI MODELING FOR 1987
DAPMEI88.OUT	38,176	08/25/02	PM10 MEI MODELING FOR 1988
DAPMEI89.OUT	38,042	08/25/02	PM10 MEI MODELING FOR 1989
DAPMEI90.OUT	38,176	08/25/02	PM10 MEI MODELING FOR 1990
DAPMEI91.OUT	38,042	08/25/02	PM10 MEI MODELING FOR 1991

Directory: \ASI\FL

DAP-FL87.OUT	321,996	08/25/02	FLUORIDE MODELING FOR 1987
DAP-FL88.OUT	321,996	08/25/02	FLUORIDE MODELING FOR 1988
DAP-FL89.OUT	321,996	08/25/02	FLUORIDE MODELING FOR 1989
DAP-FL90.OUT	321,996	08/25/02	FLUORIDE MODELING FOR 1990
DAP-FL91.OUT	321,996	08/25/02	FLUORIDE MODELING FOR 1991

THE DIRECTORY <BPIP> CONTAINS BUILDING INPUT PROFILE PROGRAM (BPIP) FILES THESE BUILDING DOWNWASH CALCULATIONS ARE USED IN ALL MODELS. THE FOLLOWING BPIP FILES ARE PROVIDED:

NW-DAP.INP	1,236	08/25/02	INPUT
NW-DAP.OUT	2,929	08/25/02	OUTPUT
NW-DAP.SUM	33,372	08/25/02	SUMMARY

DIRECTORY <C1PUFF> CONTAINS CALPUFF INPUT AND OUTPUT FILES FOR THE CLASS 1 AREA PM10 IMPACT ANALYSIS:

Directory: \C1PUFF

DAPNEG90.INP	65,069	08/25/02	NEGATIVE PM10 SOURCE INPUT FILE
DAPPOS90.INP	65,069	08/25/02	POSITIVE PM10 SOURCE INPUT FILE
DAPNG.LST	228,528	08/25/02	NEGATIVE PM10 SOURCE LISTING FILE
DAPPS.LST	228,528	08/25/02	POSITIVE PM10 SOURCE LISTING FILE

DAPNGCNC.DAT	491,993	09/15/02	NEGATIVE PM10 SOURCE LISTING FILE
DAPPSCNC.DAT	489,715	09/15/02	POSITIVE PM10 SOURCE LISTING FILE

DIRECTORY <C1POST> CONTAINS CALPOST POSTPROCESSING INPUT AND OUTPUT FILES FOR THE CLASS 1 AREA PM10 IMPACT ANALYSIS:

DAPNGPST.INP	19,848	08/26/02	NEGATIVE PM10 SOURCE INPUT FILE
DAPPSPST.INP	19,845	08/26/02	POSITIVE PM10 SOURCE INPUT FILE
PST-NEG.LST	67,956	08/26/02	NEGATIVE PM10 SOURCE LISTING FILE
PST-POS.LST	67,956	08/26/02	POSITIVE PM10 SOURCE LISTING FILE
TSNEG24.DAT	77,876	08/26/02	NEGATIVE PM10 SOURCE DATA FILE
TSPOS24.DAT	77,876	08/26/02	POSITIVE PM10 SOURCE DATA FILE
ANN-POS.PRN	562	08/26/02	NEGATIVE PM10 SOURCE ANNUAL DATA FILE
NEG-ANN.PRN	800	08/26/02	POSITIVE PM10 SOURCE ANNUAL DATA FILE
TSNEG24.PRN	73,032	08/26/02	NEGATIVE PM10 SOURCE PLOT FILE
TSPOS24.PRN	73,390	08/26/02	POSITIVE PM10 SOURCE PLOT FILE
ADD.WK1	305,623	08/26/02	CONTRIBUTION ADDITION IMPACT ANALYSIS

DIRECTORY <VIZPUFF> CONTAINS CALPUFF INPUT AND OUTPUT FILES FOR THE CLASS 1 AREA VISIBILITY ANALYSIS:

Directory: \VIZPUFF

DAPNEG90.INP	65,081	09/15/02	NEGATIVE VISIBILITY SOURCE LISTING FILE
DAPPOS90.INP	65,073	09/15/02	POSITIVE VISIBILITY SOURCE LISTING FILE
DAPNG.LST	431,617	09/15/02	NEGATIVE VISIBILITY SOURCE LISTING FILE
DAPPS.LST	228,631	09/15/02	POSITIVE VISIBILITY SOURCE LISTING FILE
DAPNG-RH.DAT	397,908	09/15/02	NEGATIVE VISIBILITY SOURCE INPUT FILE
DAPPOSRH.DAT	397,908	09/15/02	POSITIVE VISIBILITY SOURCE INPUT FILE

DIRECTORY <VIZPOST> CONTAINS CALPOST POSTPROCESSING INPUT AND OUTPUT FILES FOR THE CLASS 1 AREA VISIBILITY ANALYSIS:

Directory: \VIZPOST

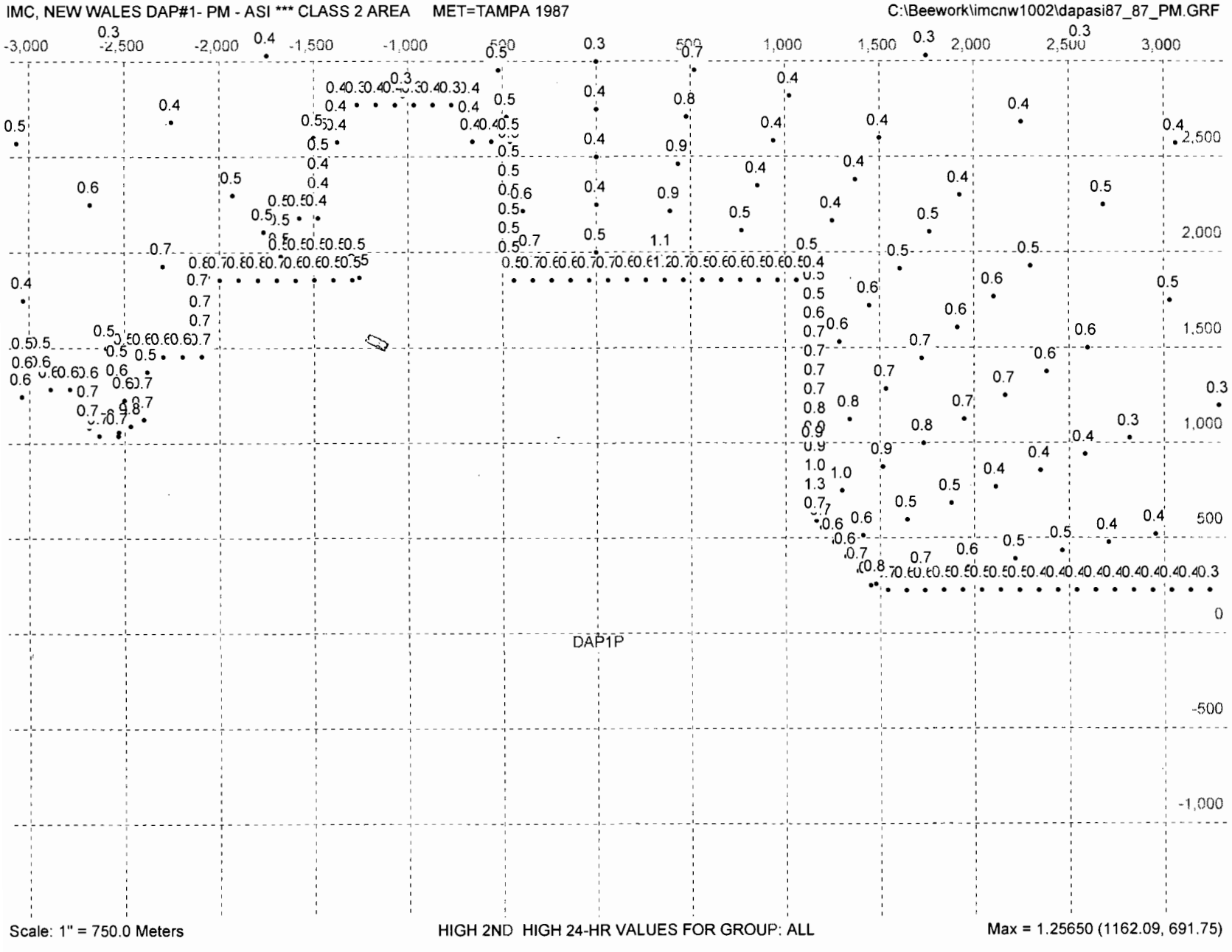
NGVIZPST.INP	19,903	09/15/02	NEGATIVE VISIBILITY SOURCE INPUT FILE
PZVIZPST.INP	19,898	09/15/02	POSITIVE VISIBILITY SOURCE INPUT FILE
NGVZ-PST.LST	172,568	09/15/02	NEGATIVE VISIBILITY SOURCE LISTING FILE
PSVZ-PST.LST	172,568	09/15/02	POSITIVE VISIBILITY SOURCE LISTING FILE
NEGTS24.DAT	77,876	09/15/02	NEGATIVE VISIBILITY SOURCE DATA FILE
NEGV24.DAT	112,283	09/15/02	POSITIVE VISIBILITY SOURCE DATA FILE
POSTS24.DAT	77,876	09/15/02	NEGATIVE VISIBILITY SOURCE DATA FILE
POSV24.DAT	112,283	09/15/02	POSITIVE VISIBILITY SOURCE DATA FILE
NEGTS24.PRN	73,032	09/15/02	NEGATIVE VISIBILITY SOURCE PLOT FILE
POSTS24.PRN	73,032	09/15/02	POSITIVE VISIBILITY SOURCE PLOT FILE
ADD-VIZ.WK1	306,062	09/21/02	CONTRIBUTION ADDITION IMPACT ANALYSIS

AND IN THE ROOT DIRECTORY THIS FILE:

README.TXT	5535	092102	THIS FILE

IF I MAY PROVIDE ADDITIONAL FILES, OR CLARIFICATION PLEASE CONTACT ME.

SEPTEMBER 21, 2002
MARILYN KOLETZKE
KOOGLER AND ASSOCIATES
(352) 377-5822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2,000
1,500
1,000
500
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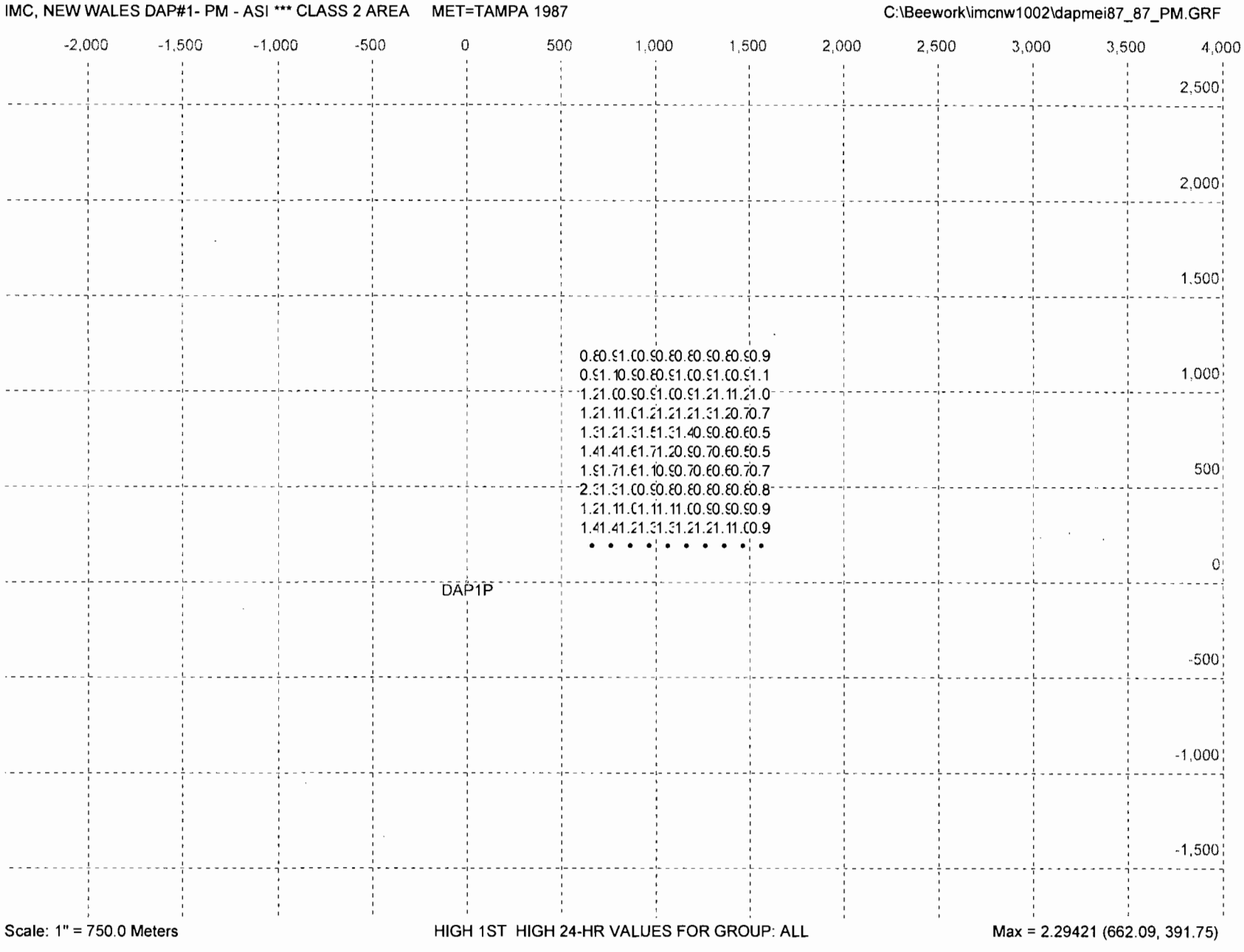
DAP1P
Scale: 1" = 750.0 Meters
HIGH 2ND HIGH 24-HR VALUES FOR GROUP: ALL
Max = 1.25650 (1162.09, 691.75)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1.31.21.31.51.31.40.90.80.60.5
1.41.41.61.71.20.90.70.60.50.5
1.91.71.61.10.90.70.60.60.70.7
2.31.31.00.90.80.80.80.80.80.8
1.21.11.01.11.11.00.90.90.90.9
1.41.41.21.31.31.21.21.11.00.9
DAP1P
Scale: 1" = 750.0 Meters
HIGH 1ST HIGH 24-HR VALUES FOR GROUP: ALL
Max = 2.29421 (662.09, 391.75)

HISTORICAL DATA
IMC NEW WALES - DAP 1

	Production	Fuel Oil		Nat Gas	Hours	
	tons	No 6 Gals	%S	Nat Gas Therms	hours	
1995	605561	19544		116639	7730	
1996	693257	17109		32420	7556	
1997	736825	28379	<2.35	40462	7799	
1998	708949	71031	<2.35	0	7575	
1999	782224	305018	<2.35	17668	7865	
2000	912819	200675	<2.35	561550	7868	
2001	792792	79855	<2.34	164437	7728	
2002	326479	0		106536	3318	through June

100,000
avg. 4 days

NEG

CALPUFF Version: 5.5 Level: 010730_1

Clock time: 11:43:22
Date: 08/25/2002

Run Title:

IMC, NEW WALES DAP - PM10 - ASI *** CLASS 1 AREA NEG MET=TAMPA 1990

Subgroup (0a)

The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

Default Name	Type	File Name
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INPUT GROUP: 1 -- General run control parameters

Option to run all periods found
in the met. file (METRUN) Default: 0 ! METRUN = 1 !

METRUN = 0 - Run period explicitly defined below
METRUN = 1 - Run all periods in met. file

Starting date: Year (IBYR) -- No default ! IBYR = 1990 !
(used only if Month (IBMO) -- No default ! IBMO = 0 !
METRUN = 0) Day (IBDY) -- No default ! IBDY = 0 !
Hour (IBHR) -- No default ! IBHR = 0 !

Base time zone (XBTZ) -- No default ! XBTZ = 5.0 !
PST = 8., MST = 7.
CST = 6., EST = 5.

Length of run (hours) (IRLG) -- No default ! IRLG = 0 !

Number of chemical species (NSPEC)
Default: 5 ! NSPEC = 1 !

Number of chemical species
to be emitted (NSE) Default: 3 ! NSE = 1 !

Flag to stop run after
SETUP phase (ITEST) Default: 2 ! ITEST = 2 !
(Used to allow checking
of the model inputs, files, etc.)
ITEST = 1 - STOPS program after SETUP phase
ITEST = 2 - Continues with execution of program
after SETUP

```
      Restart Configuration:

         Control flag (MRESTART)      Default: 0       ! MRESTART =  0   !

            0 = Do not read or write a restart file
            1 = Read a restart file at the beginning of
                the run
            2 = Write a restart file during run
            3 = Read a restart file at beginning of run
                and write a restart file during run

         Number of periods in Restart
         output cycle (NRESPD)        Default: 0       ! NRESPD =  0   !

            0 = File written only at last period
           >0 = File updated every NRESPD periods

      Meteorological Data Format (METFM)
                                      Default: 1       ! METFM =  1   !

            METFM = 1 - CALMET binary file (CALMET.MET)
            METFM = 2 - ISC ASCII file (ISCMET.MET)
            METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
            METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                        surface parameters file (SURFACE.DAT)

      PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
      Averaging Time (minutes) (AVET)
                                      Default: 60.0    ! AVET = 60. !
      PG Averaging Time (minutes) (PGTIME)
                                      Default: 60.0    ! PGTIME = 60. !

 !END!

-------------------------------------------------
NOTICE: Starting year in control file sets the
        expected century for the simulation.  All
        YY years are converted to YYYY years in
        the range:         1940        2039
-------------------------------------------------


 ---------------------------------------------------------------------------

 INPUT GROUP: 2 -- Technical options
 --------------


      Vertical distribution used in the
      near field (MGAUSS)                 Default: 1     ! MGAUSS =  1   !
         0 = uniform
         1 = Gaussian

      Terrain adjustment method
      (MCTADJ)                            Default: 3     ! MCTADJ =  0   !
         0 = no adjustment
         1 = ISC-type of terrain adjustment
         2 = simple, CALPUFF-type of terrain
             adjustment
         3 = partial plume path adjustment
```

```
Subgrid-scale complex terrain
flag (MCTSG)                          Default: 0     ! MCTSG =  0   !
   0 = not modeled
   1 = modeled

Near-field puffs modeled as
elongated 0 (MSLUG)                   Default: 0     ! MSLUG =  0   !
   0 = no
   1 = yes (slug model used)

Transitional plume rise modeled ?
(MTRANS)                              Default: 1     ! MTRANS =  0   !
   0 = no  (i.e., final rise only)
   1 = yes (i.e., transitional rise computed)

Stack tip downwash? (MTIP)            Default: 1     ! MTIP =  1  !
   0 = no  (i.e., no stack tip downwash)
   1 = yes (i.e., use stack tip downwash)

Vertical wind shear modeled above
stack top? (MSHEAR)                   Default: 0     ! MSHEAR =  0  !
   0 = no  (i.e., vertical wind shear not modeled)
   1 = yes (i.e., vertical wind shear modeled)

Puff splitting allowed? (MSPLIT)      Default: 0     ! MSPLIT =  0  !
   0 = no (i.e., puffs not split)
   1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM)       Default: 1     ! MCHEM =  0   !
   0 = chemical transformation not
       modeled
   1 = transformation rates computed
       internally (MESOPUFF II scheme)
   2 = user-specified transformation
       rates used
   3 = transformation rates computed
       internally (RIVAD/ARM3 scheme)
   4 = secondary organic aerosol formation
       computed (MESOPUFF II scheme for OH)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3)        Default: 0     ! MAQCHEM =  0   !
   0 = aqueous phase transformation
       not modeled
   1 = transformation rates adjusted
       for aqueous phase reactions

Wet removal modeled ? (MWET)          Default: 1     ! MWET =  0   !
   0 = no
   1 = yes

Dry deposition modeled ? (MDRY)       Default: 1     ! MDRY =  0   !
   0 = no
   1 = yes
   (dry deposition method specified
    for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP)                  Default: 3     ! MDISP =  3   !

   1 = dispersion coefficients computed from measured values
```

```
      of turbulence, sigma v, sigma w
   2 = dispersion coefficients from internally calculated
      sigma v, sigma w using micrometeorological variables
      (u*, w*, L, etc.)
   3 = PG dispersion coefficients for RURAL areas (computed using
      the ISCST multi-segment approximation) and MP coefficients in
      urban areas
   4 = same as 3 except PG coefficients computed using
      the MESOPUFF II eqns.
   5 = CTDM sigmas used for stable and neutral conditions.
      For unstable conditions, sigmas are computed as in
      MDISP = 3, described above.  MDISP = 5 assumes that
      measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5)          Default: 3     ! MTURBVW =  0  !
   1 = use sigma-v or sigma-theta measurements
      from PROFILE.DAT to compute sigma-y
      (valid for METFM = 1, 2, 3, 4)
   2 = use sigma-w measurements
      from PROFILE.DAT to compute sigma-z
      (valid for METFM = 1, 2, 3, 4)
   3 = use both sigma-(v/theta) and sigma-w
      from PROFILE.DAT to compute sigma-y and sigma-z
      (valid for METFM = 1, 2, 3, 4)
   4 = use sigma-theta measurements
      from PLMMET.DAT to compute sigma-y
      (valid only if METFM = 3)

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2)                       Default: 3     ! MDISP2 =  4  !
(used only if MDISP = 1 or 5)
   2 = dispersion coefficients from internally calculated
      sigma v, sigma w using micrometeorological variables
      (u*, w*, L, etc.)
   3 = PG dispersion coefficients for RURAL areas (computed using
      the ISCST multi-segment approximation) and MP coefficients in
      urban areas
   4 = same as 3 except PG coefficients computed using
      the MESOPUFF II eqns.

PG sigma-y,z adj. for roughness?       Default: 0     ! MROUGH =  0  !
(MROUGH)
   0 = no
   1 = yes

Partial plume penetration of           Default: 1     ! MPARTL =  0  !
elevated inversion?
(MPARTL)
   0 = no
   1 = yes

Strength of temperature inversion      Default: 0     ! MTINV =  0  !
provided in PROFILE.DAT extended records?
(MTINV)
   0 = no (computed from measured/default gradients)
   1 = yes

PDF used for dispersion under convective conditions?
                                       Default: 0     ! MPDF =  0  !
(MPDF)
```

```
   0 = no
   1 = yes

Sub-Grid TIBL module used for shore line?
                                        Default: 0      ! MSGTIBL = 0   !
(MSGTIBL)
   0 = no
   1 = yes

Boundary conditions (concentration) modeled?
                                        Default: 0      ! MBCON = 0   !
(MBCON)
   0 = no
   1 = yes


Analyses of fogging and icing impacts due to emissions from
arrays of mechanically-forced cooling towers can be performed
using CALPUFF in conjunction with a cooling tower emissions
processor (CTEMISS) and its associated postprocessors.  Hourly
emissions of water vapor and temperature from each cooling tower
cell are computed for the current cell configuration and ambient
conditions by CTEMISS. CALPUFF models the dispersion of these
emissions and provides cloud information in a specialized format
for further analysis. Output to FOG.DAT is provided in either
'plume mode' or 'receptor mode' format.

Configure for FOG Model output?
                                        Default: 0      ! MFOG =  0   !
(MFOG)
   0 = no
   1 = yes  - report results in PLUME Mode format
   2 = yes  - report results in RECEPTOR Mode format


Test options specified to see if
they conform to regulatory
values? (MREG)                          Default: 1      ! MREG =  0   !

   0 = NO checks are made
   1 = Technical options must conform to USEPA values
                  METFM    1
                  AVET     60. (min)
                  MGAUSS   1
                  MCTADJ   3
                  MTRANS   1
                  MTIP     1
                  MCHEM    1 (if modeling SOx, NOx)
                  MWET     1
                  MDRY     1
                  MDISP    3
                  MROUGH   0
                  MPARTL   1
                  SYTDEP   550. (m)
                  MHFTSZ   0

!END!

------------------------------------------------------------------------------
```

```
INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          PM10 !          !END!

                                                          Dry                  OUTPUT GROUP
    SPECIES           MODELED           EMITTED       DEPOSITED                  NUMBER
     NAME          (0=NO, 1=YES)     (0=NO, 1=YES)    (0=NO,                   (0=NONE,
   (Limit: 12                                          1=COMPUTED-GAS           1=1st CGRUP,
    Characters                                         2=COMPUTED-PARTICLE      2=2nd CGRUP,
    in length)                                         3=USER-SPECIFIED)        3= etc.)

!         PM10  =          1,                1,           0,                   0   !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.


--------------------------------------------------------------------------------


INPUT GROUP: 4 -- Grid control parameters
--------------


METEOROLOGICAL grid:

            No. X grid cells (NX)      No default     ! NX =  15   !
            No. Y grid cells (NY)      No default     ! NY =  17   !
          No. vertical layers (NZ)     No default     ! NZ =  6    !

            Grid spacing (DGRIDKM)     No default     ! DGRIDKM = 20. !
                                       Units: km

                 Cell face heights
                     (ZFACE(nz+1))     No defaults
                                       Units: m
   ! ZFACE = 0., 20., 50., 100., 500., 2000., 3300. !

             Reference Coordinates
            of SOUTHWEST corner of
                 grid cell(1, 1):

             X coordinate (XORIGKM)    No default     ! XORIGKM = 200. !
             Y coordinate (YORIGKM)    No default     ! YORIGKM = 2990. !
                                      Units: km
```

```
                UTM zone (IUTMZN)      No default      ! IUTMZN =  17   !

   Reference coordinates of CENTER
        of the domain (used in the
    calculation of solar elevation
                           angles)


Computational grid:

     The computational grid is identical to or a subset of the MET. grid.
     The lower left (LL) corner of the computational grid is at grid point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of the
     computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
     The grid spacing of the computational grid is the same as the MET. grid.

        X index of LL corner (IBCOMP)      No default      ! IBCOMP =  2   !
                  (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)      No default      ! JBCOMP =  2   !
                  (1 <= JBCOMP <= NY)


        X index of UR corner (IECOMP)      No default      ! IECOMP =  14   !
                  (1 <= IECOMP <= NX)

        Y index of UR corner (JECOMP)      No default      ! JECOMP =  16   !
                  (1 <= JECOMP <= NY)


SAMPLING GRID (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)         Default: T      ! LSAMP = F !
        (T=yes, F=no)

        X index of LL corner (IBSAMP)      No default      ! IBSAMP =  1   !
          (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)      No default      ! JBSAMP =  1   !
          (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)      No default      ! IESAMP =  15   !
          (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)      No default      ! JESAMP =  17   !
          (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                      Default: 1      ! MESHDN =  1  !
```

```
       (MESHDN is an integer >= 1)

!END!

------------------------------------------------------------------------------


INPUT GROUP: 5 -- Output Options
--------------
                                          *                          *
     FILE                        DEFAULT VALUE             VALUE THIS RUN
     ----                        -------------             --------------

   Concentrations (ICON)               1                  !  ICON =  1   !
   Dry Fluxes (IDRY)                   1                  !  IDRY =  0   !
   Wet Fluxes (IWET)                   1                  !  IWET =  0   !
   Relative Humidity (IVIS)            1                  !  IVIS =  0   !
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                          Default: T          ! LCOMPRS = T !

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                        Default: 0          ! IMFLX =  0  !
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                        Default: 0          ! IMBAL =  0  !
         0 = no
         1 = yes (MASSBAL.DAT filename is
              specified in Input Group 0)


    LINE PRINTER OUTPUT OPTIONS:

       Print concentrations (ICPRT)   Default: 0          ! ICPRT =  0   !
       Print dry fluxes (IDPRT)       Default: 0          ! IDPRT =  0   !
       Print wet fluxes (IWPRT)       Default: 0          ! IWPRT =  0   !
       (0 = Do not print, 1 = Print)

       Concentration print interval
       (ICFRQ) in hours               Default: 1          ! ICFRQ =  24   !
       Dry flux print interval
       (IDFRQ) in hours               Default: 1          ! IDFRQ =  1   !
       Wet flux print interval
       (IWFRQ) in hours               Default: 1          ! IWFRQ =  1   !

       Units for Line Printer Output
       (IPRTU)                        Default: 1          ! IPRTU =  3   !
                      for                for
```

```
                  Concentration    Deposition
            1 =       g/m**3         g/m**2/s
            2 =      mg/m**3        mg/m**2/s
            3 =      ug/m**3        ug/m**2/s
            4 =      ng/m**3        ng/m**2/s
            5 =     Odour Units

       Messages tracking progress of run
       written to the screen ?
       (IMESG)                          Default: 2         ! IMESG =  2   !
         0 = no
         1 = yes (advection step, puff ID)
         2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


    SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                 ---- CONCENTRATIONS ----   ------ DRY FLUXES ------   ------ WET FLUXES ------   -- MASS FLUX --
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   SAVED ON DISK?
   -------       ------------------------   ------------------------   ------------------------   ---------------
!         PM10 =     0,           1,           0,           0,           0,           0,           0   !

    OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                 Default: F     ! LDEBUG = F !

       First puff to track
       (IPFDEB)                                 Default: 1     ! IPFDEB =  1  !

       Number of puffs to track
       (NPFDEB)                                 Default: 1     ! NPFDEB =  1  !

       Met. period to start output
       (NN1)                                    Default: 1     ! NN1 =  1   !

       Met. period to end output
       (NN2)                                    Default: 10    ! NN2 =  10  !

!END!

-------------------------------------------------------------------------------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
       Number of terrain features (NHILL)       Default: 0     ! NHILL =  0   !

       Number of special complex terrain
       receptors  (NCTREC)                      Default: 0     ! NCTREC =  0   !

       Terrain and CTSG Receptor data for
       CTSG hills input in CTDM format ?
       (MHILL)                                  No Default     ! MHILL =  0   !
       1 = Hill and Receptor data created
           by CTDM processors & read from
```

```
           HILL.DAT and HILLRCT.DAT files
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M = 1. !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M = 1. !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM = 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM = 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                    1 **
     HILL information

HILL          XC        YC       THETAH  ZGRID  RELIEF    EXPO 1    EXPO 2   SCALE 1    SCALE 2    AMAX1     AMAX2
 NO.         (km)      (km)      (deg.)   (m)     (m)       (m)       (m)       (m)        (m)       (m)       (m)
----         ----      ----      ------  -----  ------    ------    ------   -------    -------    -----     -----

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                     XRCT        YRCT        ZRCT         XHH
                     (km)        (km)         (m)
                    ------      -----       ------        ----


-------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain receptor
```

(NOTE: MUST BE ENTERED AS A REAL NUMBER)

**
NOTE: DATA for each hill and CTSG receptor are treated as a separate
input subgroup and therefore must end with an input group terminator.

INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases

SPECIES NAME	DIFFUSIVITY (cm**2/s)	ALPHA STAR	REACTIVITY	MESOPHYLL RESISTANCE (s/cm)	HENRY'S LAW COEFFICIENT (dimensionless)

!END!

INPUT GROUP: 8 -- Size parameters for dry deposition of particles

For SINGLE SPECIES, the mean and standard deviation are used to
compute a deposition velocity for NINT (see group 9) size-ranges,
and these are then averaged to obtain a mean deposition velocity.

For GROUPED SPECIES, the size distribution should be explicitly
specified (by the 'species' in the group), and the standard deviation
for each should be entered as 0. The model will then use the
deposition velocity for the stated mean diameter.

SPECIES NAME	GEOMETRIC MASS MEAN DIAMETER (microns)	GEOMETRIC STANDARD DEVIATION (microns)

!END!

INPUT GROUP: 9 -- Miscellaneous dry deposition parameters

Reference cuticle resistance (s/cm)
(RCUTR) Default: 30 ! RCUTR = 30.0 !
Reference ground resistance (s/cm)
(RGR) Default: 10 ! RGR = 5.0 !
Reference pollutant reactivity
(REACTR) Default: 8 ! REACTR = 8.0 !

Number of particle-size intervals used to
evaluate effective particle deposition velocity
(NINT) Default: 9 ! NINT = 9 !

Vegetation state in unirrigated areas
(IVEG) Default: 1 ! IVEG = 1 !

```
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
        IVEG=3 for inactive vegetation

!END!

------------------------------------------------------------------------------

INPUT GROUP: 10 -- Wet Deposition Parameters
---------------

                     Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------

!END!

------------------------------------------------------------------------------

INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1            ! MOZ =  0   !
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                    Default: 12*80.
     !  BCKO3 = 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00 !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb                   Default: 12*10.
     !  BCKNH3 = 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                   Default: 0.2          ! RNITE1 = .2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour                   Default: 2.0          ! RNITE2 = 2.0 !

     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                   Default: 2.0          ! RNITE3 = 2.0 !

     H2O2 data input option (MH2O2)    Default: 1            ! MH2O2 =  1   !
     (Used only if MAQCHEM = 1)
        0 = use a monthly background H2O2 value
        1 = read hourly H2O2 concentrations from
            the H2O2.DAT data file

     Monthly H2O2 concentrations
     (Used only if MQACHEM = 1 and
```

```
 MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
(BCKH2O2) in ppb                    Default: 12*1.
!  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !


--- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
    (used only if MCHEM = 4)

    The SOA module uses monthly values of:
         Fine particulate concentration in ug/m^3 (BCKPMF)
         Organic fraction of fine particulate     (OFRAC)
         VOC / NOX ratio (after reaction)         (VCNX)
    to characterize the air mass when computing
    the formation of SOA from VOC emissions.
    Typical values for several distinct air mass types are:

       Month    1    2    3    4    5    6    7    8    9   10   11   12
              Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

    Clean Continental
       BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
       OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20  .15
       VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

    Clean Marine (surface)
       BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
       OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30  .25
       VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

    Urban - low biogenic (controls present)
       BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
       OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20  .20
       VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.

    Urban - high biogenic (controls present)
       BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
       OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35  .25
       VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

    Regional Plume
       BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
       OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30  .20
       VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

    Urban - no controls present
       BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
       OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35  .30
       VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.

    Default: Clean Continental
    !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
    !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
    !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !

!END!

--------------------------------------------------------------------------------

INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
```

```
---------------

     Horizontal size of puff (m) beyond which
     time-dependent dispersion equations (Heffter)
     are used to determine sigma-y and
     sigma-z (SYTDEP)                        Default: 550.   ! SYTDEP = 5.5E02 !

     Switch for using Heffter equation for sigma z
     as above (0 = Not use Heffter; 1 = use Heffter
     (MHFTSZ)                                Default: 0      ! MHFTSZ =  0   !

     Stability class used to determine plume
     growth rates for puffs above the boundary
     layer (JSUP)                            Default: 5      ! JSUP =  5   !

     Vertical dispersion constant for stable
     conditions (k1 in Eqn. 2.7-3)  (CONK1)  Default: 0.01   ! CONK1 = .01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                 Default: 0.1    ! CONK2 = .1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                   Default: 0.5    ! TBD = .5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point

     Range of land use categories for which
     urban dispersion is assumed
     (IURB1, IURB2)                          Default: 10     ! IURB1 =  10  !
                                                      19     ! IURB2 =  19  !

     Site characterization parameters for single-point Met data files ---------
     (needed for METFM = 2,3,4)

        Land use category for modeling domain
        (ILANDUIN)                           Default: 20     ! ILANDUIN =  20  !

        Roughness length (m) for modeling domain
        (Z0IN)                               Default: 0.25   ! Z0IN = .25 !

        Leaf area index for modeling domain
        (XLAIIN)                             Default: 3.0    ! XLAIIN = 3.0 !

        Elevation above sea level (m)
        (ELEVIN)                             Default: 0.0    ! ELEVIN = .0 !

        Latitude (degrees) for met location
        (XLATIN)                             Default: -999.  ! XLATIN = -999.0 !

        Longitude (degrees) for met location
        (XLONIN)                             Default: -999.  ! XLONIN = -999.0 !

     Specialized information for interpreting single-point Met data files -----

        Anemometer height (m) (Used only if METFM = 2,3)
        (ANEMHT)                             Default: 10.    ! ANEMHT = 6.7 !

        Form of lateral turbulance data in PROFILE.DAT file
```

```
   (Used only if METFM = 4 or MTURBVW = 1 or 3)
   (ISIGMAV)                                 Default: 1      ! ISIGMAV =  2  !
       0 = read sigma-theta
       1 = read sigma-v

   Choice of mixing heights (Used only if METFM = 4)
   (IMIXCTDM)                                Default: 0      ! IMIXCTDM =  0  !
       0 = read PREDICTED mixing heights
       1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN)                                     Default: 1.0    ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN)                                    Default: 1.0    ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW)                                      Default: 99     ! MXNEW =  99   !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM)                                      Default: 99     ! MXSAM =  99   !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT)                                     Default: 2      ! NCOUNT =  2   !

Minimum sigma y for a new puff/slug (m)
(SYMIN)                                      Default: 1.0    ! SYMIN = 1.0  !

Minimum sigma z for a new puff/slug (m)
(SZMIN)                                      Default: 1.0    ! SZMIN = 1.0  !

Default minimum turbulence velocities
sigma-v and sigma-w for each
stability class (m/s)
(SVMIN(6) and SWMIN(6))      Default SVMIN : .50,  .50,  .50,  .50,  .50,  .50
                             Default SWMIN : .20,  .12,  .08,  .06,  .03,  .016

                           Stability Class :  A     B     C     D     E     F
                                             ---   ---   ---   ---   ---   ---
                                    ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500!
                                    ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))                                    Default: 0.0,0.0  ! CDIV = .0, .0 !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)                                     Default: 0.5    ! WSCALM = .5 !

Maximum mixing height (m)
```

```
(XMAXZI)                                  Default: 3000.   ! XMAXZI = 3000.0 !

Minimum mixing height (m)
(XMINZI)                                  Default: 50.     ! XMINZI = 50.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))                        Default   :
                                  ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

                           Wind Speed Class :  1     2     3     4     5
                                               ---   ---   ---   ---   ---
                                    ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))                         Default   : ISC RURAL values
                                  ISC RURAL : .07, .07, .10, .15, .35, .55
                                  ISC URBAN : .15, .15, .20, .25, .30, .30

                            Stability Class :  A     B     C     D     E     F
                                               ---   ---   ---   ---   ---   ---
                                       ! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2))                         Default: 0.020, 0.035
                                     ! PTG0 = 0.020,   0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))                     Stability Class :  A     B     C     D     E     F
                                Default  PPC : .50,  .50,  .50,  .50,  .35,  .35
                                               ---   ---   ---   ---   ---   ---
                                     !  PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF)                                Default: 10.       ! SL2PF = 10.0 !

Puff-splitting control variables -----------------------

  VERTICAL SPLIT
  --------------

  Number of puffs that result every time a puff
  is split - nsplit=2 means that 1 puff splits
  into 2
  (NSPLIT)                             Default:   3       ! NSPLIT =  3  !

  Time(s) of a day when split puffs are eligible to
  be split once again; this is typically set once
  per day, around sunset before nocturnal shear develops.
  24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
  0=do not re-split    1=eligible for re-split
  (IRESPLIT(24))                       Default:  Hour 17 = 1
  !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0,0 !

  Split is allowed only if last hour's mixing
```

```
        height (m) exceeds a minimum value
        (ZISPLIT)                          Default: 100.       ! ZISPLIT = 100.0 !

        Split is allowed only if ratio of last hour's
        mixing ht to the maximum mixing ht experienced
        by the puff is less than a maximum value (this
        postpones a split until a nocturnal layer develops)
        (ROLDMAX)                          Default: 0.25       ! ROLDMAX = 0.25 !


        HORIZONTAL SPLIT
        ----------------

        Number of puffs that result every time a puff
        is split - nsplith=5 means that 1 puff splits
        into 5
        (NSPLITH)                          Default:   5        ! NSPLITH =  5  !

        Minimum sigma-y (Grid Cells Units) of puff
        before it may be split
        (SYSPLITH)                         Default:  1.0       ! SYSPLITH = 1.0 !

        Minimum puff elongation rate (SYSPLITH/hr) due to
        wind shear, before it may be split
        (SHSPLITH)                         Default:  2.        ! SHSPLITH = 2.0 !

        Minimum concentration (g/m^3) of each
        species in puff before it may be split
        Enter array of NSPEC values; if a single value is
        entered, it will be used for ALL species
        (CNSPLITH)                         Default:  1.0E-07   ! CNSPLITH = 1.0E-07 !

      Integration control variables ------------------------

        Fractional convergence criterion for numerical SLUG
        sampling integration
        (EPSSLUG)                          Default:   1.0e-04  ! EPSSLUG = 1.0E-04 !

        Fractional convergence criterion for numerical AREA
        source integration
        (EPSAREA)                          Default:   1.0e-06  ! EPSAREA = 1.0E-06 !

        Trajectory step-length (m) used for numerical rise
        integration
        (DSRISE)                           Default:   1.0      ! DSRISE = 1.0 !

!END!


--------------------------------------------------------------------------------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
---------------------------------


---------------
Subgroup (13a)
---------------

      Number of point sources with
      parameters provided below      (NPT1)  No default  !  NPT1 =  1  !
```

```
     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                        a
          POINT SOURCE: CONSTANT DATA
          ---------------------------
                                                                          b          c
  Source      X UTM      Y UTM      Stack    Base      Stack     Exit   Exit     Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.    Dwash   Rates
              (km)       (km)       (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = DAP1N !
   1 ! X =  396.534, 3078.038,    40.5,     .0,      2.13,  22.4,   314.0,  1.0,1.39E00 !
   1 ! FMFAC  =      1.0 !   !END!

--------
```

a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.

SRCNAM is a 12-character name for a source
(No default)
X is an array holding the source data listed by the column headings
(No default)
SIGYZI is an array holding the initial sigma-y and sigma-z (m)
(Default: 0.,0.)
FMFAC is a vertical momentum flux factor (0. or 1.0) used to represent
the effect of rain-caps or other physical configurations that
reduce momentum rise associated with the actual exit velocity.
(Default: 1.0 -- full momentum used)

b
0. = No building downwash modeled, 1. = downwash modeled
NOTE: must be entered as a REAL number (i.e., with decimal point)

c

An emission rate must be entered for every pollutant modeled.
Enter emission rate of zero for secondary pollutants that are
modeled, but not emitted. Units are specified by IPTU
(e.g. 1 for g/s).

Subgroup (13c)

BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH

Source No. — Effective building width and height (in meters) every 10 degrees [a]

```
 1    ! SRCNAM  =   DAP1N !
 1    ! HEIGHT  =  38.1,   38.1,   38.1,   38.1,   38.1,   38.1,
                   38.1,   38.1,   38.1,   38.1,   43.6,   43.6,
                   43.6,   38.1,   38.1,   38.1,   38.1,   38.1,
                   38.1,   38.1,   38.1,   38.1,   38.1,   38.1,
                   38.1,   38.1,   38.1,   38.1,   38.1,   38.1,
                   38.1,   38.1,   38.1,   38.1,   38.1,   38.1!
 1    ! WIDTH   =  46.8,   47.43,   46.61,   44.37,   40.79,   35.97,
                   30.05,   29.21,   27.62,   32.72,   34.44,   36.68,
                   37.65,   43.01,   42.42,   41.98,   44.04,   43.28,
                   45.27,   47.43,   46.61,   44.37,   40.79,   35.97,
                   30.05,   29.21,   27.62,   32.72,   37.07,   40.3,
                   42.3,   43.01,   42.42,   41.98,   44.04,   44.76!
!END!
```

---

[a] Each pair of width and height values is treated as a separate input subgroup and therefore must end with an input group terminator.

Subgroup (13d)

POINT SOURCE: VARIABLE EMISSIONS DATA [a]

Use this subgroup to describe temporal variations in the emission rates given in 13b. Factors entered multiply the rates in 13b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40,

45, 50, 50+)

---

a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

Subgroup (14a)

Number of polygon area sources with
parameters specified below (NAR1) No default ! NAR1 = 0 !

Units used for area source
emissions below (IARU) Default: 1 ! IARU = 1 !
1 = g/m**2/s
2 = kg/m**2/hr
3 = lb/m**2/hr
4 = tons/m**2/yr
5 = Odour Unit * m/s (vol. flux/m**2 of odour compound)
6 = Odour Unit * m/min
7 = metric tons/m**2/yr

Number of source-species
combinations with variable
emissions scaling factors
provided below in (14d) (NSAR1) Default: 0 ! NSAR1 = 0 !

Number of buoyant polygon area sources
with variable location and emission
parameters (NAR2) No default ! NAR2 = 0 !
(If NAR2 > 0, ALL parameter data for
these sources are read from the file: BAEMARB.DAT)

!END!

Subgroup (14b)

---

a
AREA SOURCE: CONSTANT DATA

b

Source No.	Effect. Height (m)	Base Elevation (m)	Initial Sigma z (m)	Emission Rates
-------	------	------	--------	---------

---

a
Data for each source are treated as a separate input subgroup

and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IARU (e.g. 1 for g/m**2/s).

Subgroup (14c)

COORDINATES (UTM-km) FOR EACH VERTEX(4) OF EACH POLYGON

Source No.	Ordered list of X followed by list of Y, grouped by source [a]

---

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

Subgroup (14d)

AREA SOURCE: VARIABLE EMISSIONS DATA [a]

Use this subgroup to describe temporal variations in the emission rates given in 14b. Factors entered multiply the rates in 14b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

0 =	Constant	
1 =	Diurnal cycle	(24 scaling factors: hours 1-24)
2 =	Monthly cycle	(12 scaling factors: months 1-12)
3 =	Hour & Season	(4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
4 =	Speed & Stab.	(6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
5 =	Temperature	(12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

---

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

```
INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------

---------------
Subgroup (15a)
---------------

     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                          No default  !  NLN2 =  0   !

     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)    No default   ! NLINES =  0  !

     Units used for line source
     emissions below            (ILNU)          Default: 1  !  ILNU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)    (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                         Default: 7   ! MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which            Default: 6   ! NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)            No default   ! XL = .0 !
                                                (in meters)

        Average building height (HBL)           No default   ! HBL = .0 !
                                                (in meters)

        Average building width (WBL)            No default   ! WBL = .0 !
                                                (in meters)

        Average line source width (WML)         No default   ! WML = .0 !
                                                (in meters)

        Average separation between buildings (DXL)  No default   ! DXL = .0 !
                                                (in meters)

        Average buoyancy parameter (FPRIMEL)    No default   ! FPRIMEL = .0 !
                                                (in m**4/s**3)

!END!

---------------
Subgroup (15b)
```

BUOYANT LINE SOURCE: CONSTANT DATA

Source No.	Beg. X Coordinate (km)	Beg. Y Coordinate (km)	End. X Coordinate (km)	End. Y Coordinate (km)	Release Height (m)	Base Elevation (m)	Emission Rates [a]

---

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by ILNTU (e.g. 1 for g/s).

Subgroup (15c)

BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA [a]

Use this subgroup to describe temporal variations in the emission rates given in 15b. Factors entered multiply the rates in 15b. Skip sources here that have constant emissions.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

0 =	Constant	
1 =	Diurnal cycle	(24 scaling factors: hours 1-24)
2 =	Monthly cycle	(12 scaling factors: months 1-12)
3 =	Hour & Season	(4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
4 =	Speed & Stab.	(6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
5 =	Temperature	(12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

---

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters

Subgroup (16a)

Number of volume sources with parameters provided in 16b,c (NVL1) — No default ! NVL1 = 0 !

Units used for volume source emissions below in 16b (IVLU) — Default: 1 ! IVLU = 1 !

1 = g/s
2 = kg/hr
3 = lb/hr
4 = tons/yr
5 = Odour Unit * m**3/s (vol. flux of odour compound)
6 = Odour Unit * m**3/min
7 = metric tons/yr

Number of source-species combinations with variable emissions scaling factors provided below in (16c) (NSVL1) — Default: 0 ! NSVL1 = 0 !

Number of volume sources with variable location and emission parameters (NVL2) — No default ! NVL2 = 0 !

(If NVL2 > 0, ALL parameter data for these sources are read from the VOLEMARB.DAT file(s))

!END!

Subgroup (16b)

VOLUME SOURCE: CONSTANT DATA [a]

X UTM Coordinate (km)	Y UTM Coordinate (km)	Effect. Height (m)	Base Elevation (m)	Initial Sigma y (m)	Initial Sigma z (m)	Emission Rates [b]

---

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IVLU (e.g. 1 for g/s).

Subgroup (16c)

VOLUME SOURCE: VARIABLE EMISSIONS DATA [a]

Use this subgroup to describe temporal variations in the emission rates given in 16b. Factors entered multiply the rates in 16b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

0 =	Constant	
1 =	Diurnal cycle	(24 scaling factors: hours 1-24)
2 =	Monthly cycle	(12 scaling factors: months 1-12)
3 =	Hour & Season	(4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
4 =	Speed & Stab.	(6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
5 =	Temperature	(12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

---

a Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information

---

Subgroup (17a)

Number of non-gridded receptors (NREC) No default ! NREC = 14 !

!END!

Subgroup (17b)

NON-GRIDDED (DISCRETE) RECEPTOR DATA[a]

Receptor No.	X UTM Coordinate (km)	Y UTM Coordinate (km)	Ground Elevation (m)	Height Above Ground[b] (m)	
1 ! X =	335.47,	3165.26,	0.000,	0.000!	!END!
2 ! X =	335.72,	3170.46,	0.000,	0.000!	!END!
3 ! X =	335.61,	3175.07,	0.000,	0.000!	!END!
4 ! X =	330.91,	3175.14,	0.000,	0.000!	!END!
5 ! X =	330.91,	3179.64,	0.000,	0.000!	!END!
6 ! X =	330.79,	3183.93,	0.000,	0.000!	!END!
7 ! X =	335.56,	3184.07,	0.000,	0.000!	!END!
8 ! X =	341.24,	3183.78,	0.000,	0.000!	!END!

```
     9 ! X =      343.63,     3179.91,       0.000,       0.000!   !END!
    10 ! X =      342.24,     3174.99,       0.000,       0.000!   !END!
    11 ! X =      340.84,     3169.65,       0.000,       0.000!   !END!
    12 ! X =      340.36,     3165.19,       0.000,       0.000!   !END!
    13 ! X =       339.7,      3177.8,       0.000,       0.000!   !END!
    14 ! X =      335.58,      3179.7,       0.000,       0.000!   !END!
```

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPUFF.INP	1	E:\CALPUFFF\DAPNEG90.INP
CALMET.DAT	7	e:\calpufff\calmet.dat

OUTPUT FILES

Default Name	Unit No.	File Name and Path
CALPUFF.LST	2	dapng.lst
CONC.DAT	8	dapngcnc.dat

Data read from header records of MET output file

CALMET
Alex's 15 x 17 20 km meteorological grid -- wind & met model
Met. stations used: 3 surface, 3 upper air, 0 precip., 0 overwater, 1 MM4

CALMET Version: 5.2 Level: 000602d

```
IBYR    =         1990
IBMO    =            1
IBDY    =            6
IBHR    =            5
IBTZM   =            5
IRLG    =         8635
IRTYPE  =            1
LCALGRD =  T
NXM     =           15
NYM     =           17
NZM     =            6
XGRIDM  =     20000.0
XORIGM  =     200000.
YORIGM  =   0.299000E+07
IUTMZNM =           17
IWFCOD  =            1
NSSTA   =            3
NUSTA   =            3
NPSTA   =            0
NOWSTA  =            0
NLU     =            9
IWAT1   =           50
IWAT2   =           50
```

```
 XLAT0M  =     27.0000
 XLON0M  =     84.0000
 LLCONFM =  F
 CONECM  =    0.643608
 XLAT1M  =     35.0000
 XLAT2M  =     45.0000
 RLAT0M  =     40.0000
 RLON0M  =     74.0000
 ZFACEM  =     0.000,    20.000,    50.000,   100.000,   500.000,  2000.000,  3300.000,
XSSTA    =     268962.        149179.        213695.
YSSTA    =     156920.        104285.       -49585.9
XUSTA    =    -91362.0        195124.        220891.
YUSTA    =   0.175171E+07   0.184138E+07   0.162114E+07
```

Surface roughness lengths (m) Z0

Multiply all values by 10 ** -3

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
17	I	1	1	117	1000	1000	467	308	435	660	812	660	166	166	126	1
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
16	I	1	1	2	1000	1000	707	707	435	660	354	309	234	234	536	1
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
15	I	1	1	1	58	933	407	407	436	355	354	355	871	871	1000	6
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
14	I	1	1	1	2	302	574	574	660	467	305	501	355	355	436	71
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
13	I	1	1	1	1	7	851	660	660	407	379	660	89	89	708	501
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
12	I	1	1	1	1	1	2	660	660	467	379	204	501	501	282	871
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
11	I	1	1	1	1	1	1	193	193	555	461	177	204	204	380	436
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
10	I	1	1	1	1	1	1	260	260	536	501	102	204	204	468	124
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
9	I	1	1	1	1	1	1	100	100	501	354	109	45	45	251	338
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
8	I	1	1	1	1	1	1	180	180	315	616	240	120	120	199	282
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
7	I	1	1	1	1	1	1	609	609	323	323	199	536	536	126	177
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
6	I	1	1	1	1	1	1	316	316	467	308	24	204	204	105	158
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
5	I	1	1	1	1	1	2	32	32	162	436	308	288	288	89	107
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4	I	1	1	1	1	1	1	6	6	186	123	149	149	149	251	169
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
3	I	1	1	1	1	1	1	24	24	199	123	149	149	149	54	169
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
2	I	1	1	1	1	1	1	2	2	129	123	149	149	149	115	169
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
1	I	1	1	1	1	1	1	1	1	58	100	149	149	149	130	130
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Land use categories ILANDU

Multiply all values by 10 ** -2

17	I	5000	5000	4200	4200	4200	4200	2000	2000	4200	4200	4200	4200	4200	4200	5000
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
16	I	5000	5000	5000	4200	4200	4200	4200	2000	4200	4200	4200	4300	4300	4200	5000

```
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
15 I 5000 5000 5000 4200 4300 4200 4200 4200 4200 4300 4200 4200 4200 4200 5000
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
14 I 5000 5000 5000 5000 4300 4200 4200 4200 4200 4200 4200 4200 4200 4200 4200
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
13 I 5000 5000 5000 5000 5000 4300 4200 4200 4200 2000 4200 4200 4200 4200 4200
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
12 I 5000 5000 5000 5000 5000 5000 4200 4200 4200 2000 4200 4200 4200 4200 4200
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
11 I 5000 5000 5000 5000 5000 5000 4200 4200 4200 2000 2000 2000 2000 4300 4300
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
10 I 5000 5000 5000 5000 5000 5000 4300 4300 4200 4300 2000 2000 2000 4300 4200
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 9 I 5000 5000 5000 5000 5000 5000 4200 4200 4200 2000 2000 2000 2000 4300 4200
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 8 I 5000 5000 5000 5000 5000 5000 4300 4300 2000 4300 4300 4300 4300 4300 4300
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 7 I 5000 5000 5000 5000 5000 5000 4300 4300 2000 2000 2000 4300 4300 4300 2000
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 6 I 5000 5000 5000 5000 5000 5000 2000 2000 4300 2000 2000 2000 2000 3000 3000
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 5 I 5000 5000 5000 5000 5000 5000 1000 1000 4300 4200 4300 2000 2000 3000 3000
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 4 I 5000 5000 5000 5000 5000 5000 5000 5000 3000 2000 2000 2000 2000 2000 2000
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 3 I 5000 5000 5000 5000 5000 5000 2000 2000 2000 2000 2000 2000 2000 2000 2000
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 2 I 5000 5000 5000 5000 5000 5000 5000 5000 2000 2000 2000 2000 2000 2000 2000
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 1 I 5000 5000 5000 5000 5000 5000 5000 5000 3000 3000 2000 2000 2000 3000 3000
   I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
   ---------------------------------------------------------------------------
       1    2    3    4    5    6    7    8    9   10   11   12   13   14   15

Terrain heights (m)                                   ELEV

Multiply all values by 10 **  -2

 17 I    0    0  890 1911 2048 1396 1717 3159 3367 4267 3070 1009  778  176    0
    I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 16 I    0    0  287  981 1367 1242 1587 2586 3847 4209 3713 2000  405  505    0
    I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 15 I    0    0    0  300  994  896 1844 2284 2954 2980 2754  898  383  777    6
    I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 14 I    0    0    0    0   92  648 1211 2076 2660 1827 2082  882  551  951  182
    I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 13 I    0    0    0    0    0  210  562 1959 2536 2157 1920 1513  484  774  536
    I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 12 I    0    0    0    0    0    2   53 1672 1859 2279 1847 2518  751 1055  846
    I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 11 I    0    0    0    0    0    0    2 1437 1362 1707 2253 2166 1557 1011  981
    I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
 10 I    0    0    0    0    0    0    0  919 1986 1538 2575 2338 2064 1106  387
    I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
  9 I    0    0    0    0    0    0    0 1347 2888 2080 2927 3331 3067 2169 1251
    I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
  8 I    0    0    0    0    0    0  165 1472 3186 2270 2948 3851 2368 1948 1907
    I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
  7 I    0    0    0    0    0    0  369 1363 1853 2283 3733 4076 2211 1206 1911
    I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
  6 I    0    0    0    0    0    0  476  633 1162 3013 3981 4030 2402 1286 1944
    I    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
```

5	I	0	0	0	0	0	14	288	0	1222	3034	4027	4102	3198	1587	1731
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4	I	0	0	0	0	0	0	0	261	1594	3448	3604	3251	2865	2008	1459
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
3	I	0	0	0	0	0	0	16	427	1616	2337	2277	2027	2952	1548	1101
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
2	I	0	0	0	0	0	0	0	417	994	1365	1560	1993	2597	1636	1000
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
1	I	0	0	0	0	0	0	0	0	172	478	799	1289	1653	1642	744
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Leaf area index XLAI

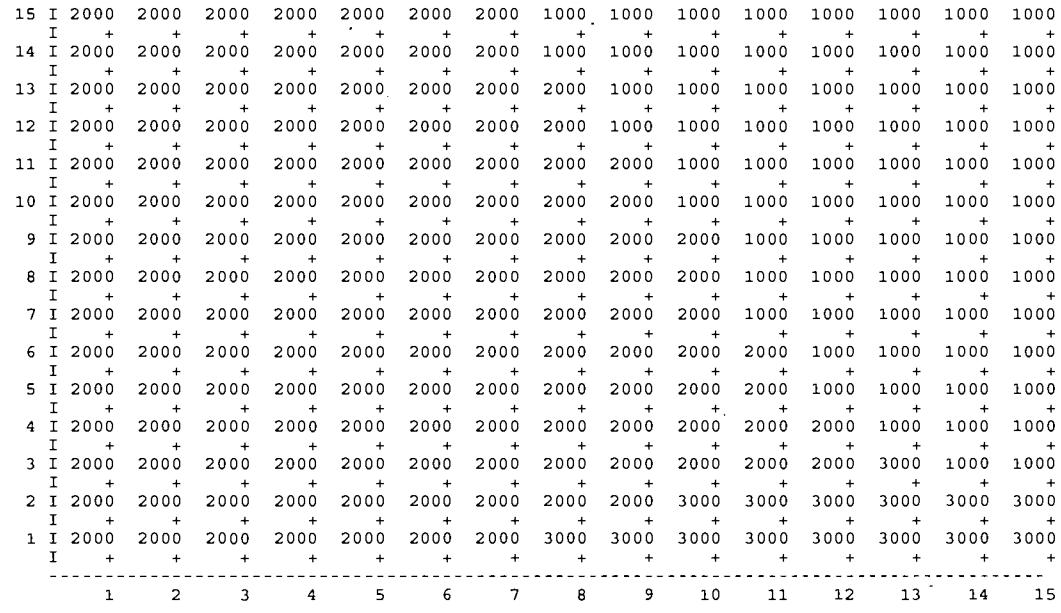
Multiply all values by 10 ** -3

17	I	0	0	4700	7000	7000	5450	4250	4600	6450	6060	6110	5050	5050	4900	0
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
16	I	0	0	700	7000	7000	6000	6000	4600	5800	5300	5210	5400	5400	5850	50
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
15	I	0	0	0	3900	6800	5050	5050	5250	3910	5300	5950	6260	6260	7000	1750
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
14	I	0	0	0	400	5350	5400	5400	6450	5450	4800	6300	5950	5950	5900	3750
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
13	I	0	0	0	0	1500	6400	6450	6450	5050	3860	6450	4550	4550	6650	4940
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
12	I	0	0	0	0	0	100	6450	6450	5450	4200	5000	6300	6300	4810	6600
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
11	I	0	0	0	0	0	0	3850	3850	4760	4700	3300	3360	3360	5160	5900
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
10	I	0	0	0	0	0	0	4850	4850	5510	5650	3000	3700	3700	5760	4150
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
9	I	0	0	0	0	0	0	4100	4100	5310	4650	2860	2550	2550	3930	4550
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
8	I	0	0	0	0	0	0	4240	4240	4320	5260	4200	3500	3500	4300	4050
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
7	I	0	0	0	0	0	0	4480	4480	4060	4060	3030	5850	5850	3910	3950
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
6	I	0	0	0	0	0	0	3330	3330	4090	3910	1710	4010	4010	2480	2400
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
5	I	0	0	0	0	0	20	100	100	2990	5250	4900	4360	4360	2650	2550
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4	I	0	0	0	0	0	0	860	860	2850	2920	2600	2600	2600	3680	2550
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
3	I	0	0	0	0	0	0	1680	1680	3310	2920	2600	2600	2600	2450	2550
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
2	I	0	0	0	0	0	0	20	20	2090	2920	2600	2600	2600	2100	2550
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
1	I	0	0	0	0	0	0	0	0	1370	2010	2600	2600	2600	1770	1770
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Nearest surface station no. to each grid point NEARS

Multiply all values by 10 ** -3

17	I	2000	2000	2000	2000	2000	2000	1000	1000	1000	1000	1000	1000	1000	1000	1000
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
16	I	2000	2000	2000	2000	2000	2000	2000	1000	1000	1000	1000	1000	1000	1000	1000
	I	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+


15 I 2000 2000 2000 2000 2000 2000 2000 1000 1000 1000 1000 1000 1000 1000 1000
14 I 2000 2000 2000 2000 2000 2000 2000 1000 1000 1000 1000 1000 1000 1000 1000
13 I 2000 2000 2000 2000 2000 2000 2000 2000 1000 1000 1000 1000 1000 1000 1000
12 I 2000 2000 2000 2000 2000 2000 2000 2000 1000 1000 1000 1000 1000 1000 1000
11 I 2000 2000 2000 2000 2000 2000 2000 2000 2000 1000 1000 1000 1000 1000 1000
10 I 2000 2000 2000 2000 2000 2000 2000 2000 2000 1000 1000 1000 1000 1000 1000
9 I 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 1000 1000 1000 1000 1000
8 I 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 1000 1000 1000 1000 1000
7 I 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 1000 1000 1000 1000 1000
6 I 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 1000 1000 1000 1000
5 I 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 1000 1000 1000 1000
4 I 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 1000 1000 1000
3 I 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 3000 1000 1000
2 I 2000 2000 2000 2000 2000 2000 2000 2000 2000 3000 3000 3000 3000 3000 3000
1 I 2000 2000 2000 2000 2000 2000 2000 3000 3000 3000 3000 3000 3000 3000 3000
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15