FLORIDA KEYS ELECTRIC COOPERATIVE ASSOCIATION, INC. - FKEC

91605 OVERSEAS HIGHWAY P.O. BOX 700377, TAVERNIER, FL 33070-0377 PHONE (305) 852-2431 FAX: (305) 852-4794

RECEIVED
FEB 17 2000
BUREAU OF AIR REGULATION

Mr. Al A. Linero
Department of Environmental Protection
Bureau of Air Resources, Mail Station 5505
2600 Blairstone Road
Tallahassee, FL 32399

February 14, 2000

Re: Application for new diesel generator (Unit 9) for Marathon Generation Plant.

0870004-004-AC
PSD-FL-285

Dear Mr. Linero:

Florida Keys Electric Cooperative Association, Inc. (FKEC) is submitting the enclosed application for the construction of a new 3.58 MW diesel generator (the Project) at the Marathon Generation Plant. As part of the Project, the stack height of the existing 3.58 MW diesel generator (Unit #8) will be increased from 38.7 feet to 45 feet. Also enclosed with the application is a check in the amount of seven thousand five hundred dollars to cover the application processing fee for a PSD New Source Review.

FKEC purchases its electricity from Florida Power & Light (FP&L) to distribute to Florida Keys residents. The Marathon Plant is maintained in a standby generating capacity, ready to generate power in the event that FP&L cannot supply power to the Keys. In May 1992, FKEC entered into a long-term contract with FP&L which requires that FKEC maintain the capability of generating electricity in the event that the mainland power supply fails. Due to this contractual obligation to FP&L, FKEC cannot accept operating limitations on the proposed source.

However, the proposed unit, like all other Marathon Plant's units, will operate only during emergencies and during peak power demand periods. Since 1992, annual operation at Marathon has averaged only 640 hours per year during non-hurricane and other 'typical' operating years. Due to these limited operating hours, emissions of various pollutants from the new source will be minimized.

Three copies of the application have been included for your review and distribution. Please contact either Deborah Shaw or Tim Planer at (305) 852-2431 if you have any questions or should require additional information.

Very truly yours,

Charles A. Russell
Chief Executive Officer and General Manager

cc: C. Holladay, BAR
SD
EPA
NPS

c: T. Planer, Assistant General Manager
C. Pankow, Supv. of Generation
D. Shaw, Environmental Affairs Coordinator

Q:\011\sharon\LineroU9.wpd

THIS CHECK IS VOID WITHOUT A COLORED BACKGROUND AND AN ARTIFICIAL WATERMARK ON THE BACK - HOLD AT ANGLE TO VIEW

Florida Keys Electric Cooperative
Association, Inc.
P.O. Box 377
Tavernier, FL 33070
(305) 852-2431 www.fkec.com

First State Bank of the Florida Keys
97670 Overseas Highway
Key Largo, FL 33037
63-43/670

Check Number: 00005473

Check Date: 02/15/2000

Net Amount: $ ****7,500.00

Accounts Payable

PAY ***Seven Thousand Five Hundred and 00/100 Dollars***

Void After 120 Days

TO THE ORDER OF
FL DEPT OF ENVIRON PROTECTION
BUREAU OF AIR RESOURCES
MAIL STATION 5505
2600 BLAIR STONE RD
TALLAHASSEE FL 32399-2400

FIRST STATE BANK
FIRST IN THE KEYS
FIRST FOR THE KEYS

SIGNATURE HAS A COLORED BACKGROUND • BORDER CONTAINS MICROPRINTING

⑈00000547 3⑈ ⑆067000438⑆ 03000234 04⑈

FL DEPT OF ENVIRON PROTECTION 02/15/00 CHECK NO. 00005473

SUMMARY OF INVOICES

INVOICES #	INV. DATE	AMOUNT	INVOICES #	INV. DATE	AMOUNT
APP FEE	02/15/00	7500.00			
				TOTAL	7500.00

SUMMARY OF EXPENSE DISTRIBUTION

EXP. ACCT.	DEPT.	AMOUNT	EXP. ACCT.	DEPT.	AMOUNT	EXP. ACCT.	DEPT.	AMOUNT
107.20	00	7500.00						
						TOTAL		7500.00

Florida Keys Electric Cooperative STUB 01 OF 01

FLORIDA KEYS ELECTRIC COOPERATIVE, INC.

AIR CONSTRUCTION PERMIT APPLICATION FOR MARATHON GENERATION PLANT

TABLE OF CONTENTS

RECEIVED
FEB 17 2000
BUREAU OF AIR REGULATION

SECTION 1
DESCRIPTION OF PROJECT

This Prevention of Significant Deterioration (PSD) permit application is submitted by Florida Keys Electric Cooperative Association, Inc. (FKEC) for the construction and operation of one nominally rated 3,580 kW high-speed diesel engine electric generator at FKEC's existing Marathon Generation Plant. This unit will be fired exclusively on No. 2 low sulfur (less than or equal to 0.05 percent sulfur, by weight) fuel. The proposed addition is being referred to as Unit 9.

The two pollutants for which Unit 9 is subject to PSD review are NO_X and PM_{10}. Emissions of NO_X from the proposed unit will exceed the PSD threshold for a major modification (40 tpy). PM_{10} emissions, when combined with PM_{10} emissions from the existing PSD source (Unit 8), will slightly exceed the PSD threshold (15 tpy). However, with a combination of good combustion practices and low sulfur fuel, it is likely that PM_{10} emissions will actually be reduced to below the threshold concentration. Additionally, the engines at the Marathon Generation Facility are 'peaking' units and total, annual operation has averaged 640 hours per year, during non-hurricane and other typical years, since 1992. Therefore, emissions of all pollutants will be minimized through the infrequent operation of the units at Marathon.

Currently, two 2,000 kW (Units 1 and 2), three 3,000 kW (Units 3, 4 and 5), two 2,500 kW (Units 6 and 7) and one 3,580 kW (Unit 8) diesel electric generators are operating at the Marathon Plant. Unit 8 was permitted for unlimited operation with maximum allowable NO_X emissions of 68 lbs/hr or 298 tpy. Additionally, the operating permit limits Units 1 through 7 to either 4,380 hrs/yr per unit or to a total fuel oil consumption of 6,200,000 gal/yr, whichever is more restrictive. As part of the proposed Project, the stack height for Unit 8 will be increased from 38.7 feet to 45 feet.

Further details and information on the Marathon Generation Facility and the proposed Project, including the addition of Unit 9 and the stack height increase for Unit 8, can be found in Section 2 which contains the Florida Department of Environmental Protection (FL DEP) forms. These forms were completed with FLDEP's Electronic Submission of Application (ELSA) program.

FKEC buys its electricity from Florida Power & Light (FP&L) to distribute to Florida Keys consumers. The Marathon Generation Plant is maintained in a standby generating capacity, ready to generate power in the event that FP&L cannot supply power to the Keys. FKEC entered into a 20-year extendable contract with FP&L which requires that FKEC maintain the capability of generating electricity in the event the mainland power supply fails and can no longer continue to deliver alternate economic energy. Due to this contractual

obligation to FP&L, FKEC cannot accept operating limitations on the proposed Unit 9. Therefore, it is anticipated that Unit 9 will operate under conditions comparable to those for the similar Unit 8, including maximum allowable NO_X emissions of 68 lbs/hr or 298 tpy. The proposed engine will operate below these NO_X levels through a combination of ignition timing retardation and a 4-pass aftercooler with a separately cooled aftercooler circuit. Additionally, due to good combustion controls and low sulfur fuel, PM_{10} emissions will be reduced. These control methods are determined to be Best Available Control Technology (BACT) for the engine (Section 3).

An air dispersion modeling analysis was performed to compare the predicted impacts of the Project to the National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) Class II Increments. It was determined that the proposed Unit 9 will not cause or contribute to adverse impacts on the air quality in the region of the Marathon Plant. Additionally, impacts were modeled on the closest PSD Class I Area, Everglades National Park. Due to the distance of the Project to the Everglades, impacts were found to be small enough to eliminate the need for further evaluations. The Air Quality Analysis discussion is found in Section 4.

Department of
Environmental Protection

DIVISION OF AIR RESOURCES MANAGEMENT

APPLICATION FOR AIR PERMIT - LONG FORM

I. APPLICATION INFORMATION

Identification of Facility Addressed in This Application

1. Facility Owner/Company Name : Flroida Keys Electric Coop. Assoc., Inc.	
2. Site Name : Marathon Generation Plant	
3. Facility Identification Number : 0870004	[ ] Unknown
4. Facility Location : Marathon Generation Plant Street Address or Other Locator : 3421 Overseas Highway City : Marathon County : Monroe	Zip Code : 33050
5. Relocatable Facility? [ ] Yes [X] No	6. Existing Permitted Facility? [X] Yes [ ] No

0870004-004-AC
PSD-FL-285

DEP Form No. 62-210.900(1) - Form
Effective : 3-21-96

Owner/Authorized Representative or Responsible Official

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

Name : Charles A. Russell
Title : CEO and General Manager

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

Organization/Firm : Florida Keys Electric Coop. Assoc., Inc.
Street Address : 91605 Overseas Highway
City : Tavernier
State : FL Zip Code : 33070

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

Telephone : (305)852-2431 Fax : (305)853-5381

4. Owner/Authorized Representative or Responsible Official Statement :

I, the undersigned, am the owner or authorized representative of the non-Title V source addressed in this Application for Air Permit or the responsible official, as defined in Rule 62-210.200, F.A.C., of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions units.*

Charles A Russell
Signature

2/15/00.
Date

* Attach letter of authorization if not currently on file.

Scope of Application

Emissions Unit ID	Description of Emissions Unit	Permit Type
008	3.58 MW EMD Diesel Generator #8	AFMM
009	3.58 MW EMD Diesel Generator #9	AC1A

Purpose of Application and Category

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

This Application for Air Permit is submitted to obtain :

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

[ ] Initial air operation permit under Chapter 62-213, F.A.C., for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.

Current construction permit number :

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

Operation permit to be renewed :

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

Current construction permit number :
0870004-001-AV (Attachment A)

Operation permit to be revised :
0870004-001-AV

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

Operation permit to be revised/corrected :

[ ] Air operation permit revision for a Title V source for reasons other than construction or modification of an emissions unit.

Operation permit to be revised :

Reason for revision :

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

This Application for Air Permit is submitted to obtain :

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

Current operation/construction permit number(s) :

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

Operation permit to be renewed :

[ ] Air operation permit revision for a synthetic non-Title V source.

Operation permit to be revised :

Reason for revision :

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

This Application for Air Permit is submitted to obtain :

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

Current operation permit number(s), if any :
0870004-001-AV (Attachment A)

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

Current operation permit number(s) :

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

Application Processing Fee

Check one :

[X] Attached - Amount : $7500.00 [ ] Not Applicable.

Construction/Modification Information

1. Description of Proposed Project or Alterations : Proposed construction of one new 3.58 MW EMD Diesel Generator at Florida Keys Electric Cooperative Association, Inc.'s Marathon Stand-By Generation Plant. As part of the proposed project, the stack height for the existing 3.58 MW EMD Diesel Generator Unit #8 at the Marathon Generation Plant will be increas from 38.7 feet to 45 feet.
2. Projected or Actual Date of Commencement of Construction : 01-Sep-2000
3. Projected Date of Completion of Construction : 31-Dec-2000

Professional Engineer Certification

1. Professional Engineer Name : Ivan L. Clark Registration Number : 0049777
2. Professional Engineer Mailing Address : Organization/Firm : R.W. Beck Street Address : 1125 17th Street, Suite 1900 City : Denver State : CO Zip Code : 80202-2615
3. Professional Engineer Telephone Numbers : Telephone : (303)299-5247 Fax : (303)297-2811

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 pollutant 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 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 2/11/00

(seal)

* Attach any exception to certification statement.

Application Contact

1. Name and Title of Application Contact :

Name : Deborah A. Shaw
Title : Environmental Affairs Coordinator

2. Application Contact Mailing Address :

Organization/Firm : FKEC Assoc., Inc.
Street Address : 91605 Overseas Highway
City : Tavernier
State : FL Zip Code : 33070

3. Application Contact Telephone Numbers :

Telephone : (305)852-2431 Fax : (305)852-9129

Application Comment

Florida Keys Electric Cooperative Association, Inc. (FKEC) supplies electric power to the Middle and Upper Florida Keys. FKEC buys its electricity from Florida Power & Light (FP&L) to distribute to Florida Keys consumers. The Marathon Generation Plant is maintained in a standby generating capacity, ready to generate power in the event that FP&L cannot supply power to the Keys. FKEC entered into a 20-year extendable contract with FP&L that became effective May 1, 1992 and which requires that FKEC maintain the capability of generating electricity in the event the mainland power supply fails and can no longer continue to deliver alternate economic energy above the effective base demand.

Since the implementation of that contract agreement, the Marathon Generation Plant's total, annual operating hours have averaged 640 hours during 'non-hurricane' and other typical operating years. (Attachment B)

Because FKEC must be able to generate electricity for the Keys during emergencies, operating limitations on the Marathon Generation Plant cannot be accepted. Therefore, even though the Plant's annual emissions are far below the levels which define a major air pollution source, FKEC is applying for this permit as a major source.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility, Location, and Type

1. Facility UTM Coordinates : Zone : 17 East (km) : 490.70 North (km) : 2732.70			
2. Facility Latitude/Longitude : Latitude (DD/MM/SS) : 24 42 38 Longitude (DD/MM/SS) : 81 5 30			
3. Governmental Facility Code : 0	4. Facility Status Code : A	5. Facility Major Group SIC Code : 49	6. Facility SIC(s) : 4911
7. Facility Comment : This facility is a standby electric generating plant consisting of eight (8) diesel engines driving electric generators. A ninth (9th) unit is being added. Total capacity of the facility with nine (9) units will be 25.2 MW. This facility generates power only during emergencies or during peak power demand periods when Florida Power & Light cannot provide sufficient power to supply Florida Keys Electric Cooperative Association, Inc.'s customers.			

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Contact

1. Name and Title of Facility Contact :

   Charles A. Russell
   CEO and General Manager

2. Facility Contact Mailing Address :
   Organization/Firm : FKEC Assoc., Inc
   Street Address : 91605 Overseas Highway
   City : Tavernier State : FL Zip Code : 33070

3. Facility Contact Telephone Numbers :
   Telephone : (305)852-2431 Fax : (305)853-5381

Facility Regulatory Classifications

1. Small Business Stationary Source?	N
2. Title V Source?	Y
3. Synthetic Non-Title V Source?	N
4. Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)?	Y
5. Synthetic Minor Source of Pollutants Other than HAPs?	N
6. Major Source of Hazardous Air Pollutants (HAPs)?	N
7. Synthetic Minor Source of HAPs?	N
8. One or More Emissions Units Subject to NSPS?	N
9. One or More Emission Units Subject to NESHAP?	N
10. Title V Source by EPA Designation?	Y
11. Facility Regulatory Classifications Comment : The facility is classified as a major Title V source only because it has the potential to emit 250 tons of air pollutants, however, the plant typically operates less than 10% of the time.	

B. FACILITY REGULATIONS

Rule Applicability Analysis

B. FACILITY REGULATIONS

List of Applicable Regulations

40 CFR 70 - State Operating Permits

62-4.001 through 62-4.160, FAC - Permits Part I General

62-4.210, FAC - Construction Permits

62-4.220, FAC - Operating Permits

62-103.150, FAC - Public Notice of Application and Proposed Agency Action

62-204.240, FAC - Ambient Air Quality Standards

62-210, FAC - Stationary Sources

62-212.300, FAC - General Preconstruction Review Requirements

62-212.400, FAC - Prevention of Significant Deterioration

62-213, FAC - Operation Permits for Major Sources of Air Pollution (Title V)

62-296.320(2), FAC - General Pollutant Emission Limiting Standards, Objectionable Odor

62-296.320(4)(b), FAC - General Visible Emission Standards

62-296.320(4)(c), FAC - Unconfined Emissions of Particulate Matter

62-297.310, FAC - General Test Requirements

B. FACILITY REGULATIONS

List of Applicable Regulations

62-297.401, FAC - EPA Test Procedures

62-297.620, FAC - Exceptions and Approvals of Alternative Procedures and Requirements

62-204.800, FAC - Federal Regulations Adopted by Reference

62-297.400, FAC - EPA Methods Adopted by Reference

62-297.440, FAC - Supplementary Test Procedures

C. FACILITY POLLUTANTS

Facility Pollutant Information

1. Pollutant Emitted	2. Pollutant Classification
SO2	A
CO	A
NOX	A
PM	A
PM10	A
VOC	B

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant 1

1. Pollutant Emitted :	SO2
2. Requested Emissions Cap :	(lbs/hour) (tons/year)
3. Basis for Emissions Cap Code :	AMBIENT
4. Facility Pollutant Comment :	Diesel generator units #1 through #7 at Marathon Generation Plant are limited to either 4,380 hrs/yr per unit or to a total fuel oil comsumption of 6,200,000 gal/yr, whichever limit is more restrictive. SO2 emissions will be restricted as a result of these operating limits.

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant ___2___

1. Pollutant Emitted : CO
2. Requested Emissions Cap : (lbs/hour) (tons/year)
3. Basis for Emissions Cap Code : AMBIENT
4. Facility Pollutant Comment : Diesel generator units #1 through #7 at Marathon Generation Plant are limited to either 4,380 hrs/yr per unit or to a total fuel oil comsumption of 6,200,000 gal/yr, whichever limit is more restrictive. CO emissions will be restricted as a result of these operating limits.

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant 3

1. Pollutant Emitted :	NOX
2. Requested Emissions Cap :	(lbs/hour) (tons/year)
3. Basis for Emissions Cap Code :	AMBIENT
4. Facility Pollutant Comment :	Diesel generator units #1 through #7 at Marathon Generation Plant are limited to either 4,380 hrs/yr per unit or to a total fuel oil comsumption of 6,200,000 gal/yr, whichever limit is more restrictive.thus restricting NOx emissions. The maximum NOx emission rate for Unit #8 is 68 lbs/hr (298 tpy). It is anticipated that Unit #9 will also operate under the NOx limit of 68 lb/hr (298 tpy).

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant 4

1. Pollutant Emitted : PM
2. Requested Emissions Cap : (lbs/hour) (tons/year)
3. Basis for Emissions Cap Code : AMBIENT
4. Facility Pollutant Comment : Diesel generator units #1 through #7 at Marathon Generation Plant are limited to either 4,380 hrs/yr per unit or to a total fuel oil comsumption of 6,200,000 gal/yr, whichever limit is more restrictive. PM emissions will be restricted as a result of these operating limits.

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant 5

1. Pollutant Emitted : PM10
2. Requested Emissions Cap : (lbs/hour) (tons/year)
3. Basis for Emissions Cap Code : AMBIENT
4. Facility Pollutant Comment : Diesel generator units #1 through #7 at Marathon Generation Plant are limited to either 4,380 hrs/yr per unit or to a total fuel oil comsumption of 6,200,000 gal/yr, whichever limit is more restrictive. PM10 emissions will be restricted as a result of these operating limits.

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant 6

1. Pollutant Emitted : VOC
2. Requested Emissions Cap : (lbs/hour) (tons/year)
3. Basis for Emissions Cap Code : AMBIENT
4. Facility Pollutant Comment : Diesel generator units #1 through #7 at Marathon Generation Plant are limited to either 4,380 hrs/yr per unit or to a total fuel oil comsumption of 6,200,000 gal/yr, whichever limit is more restrictive. VOC emissions will be restricted as a result of these operating limits.

D. FACILITY SUPPLEMENTAL INFORMATION

Supplemental Requirements for All Applications

1. Area Map Showing Facility Location :	Figure 1
2. Facility Plot Plan :	Figure 2
3. Process Flow Diagram(s) :	Figures 3a & 3b
4. Precautions to Prevent Emissions of Unconfined Particulate Matter :	Attachment C
5. Fugitive Emissions Identification :	NA
6. Supplemental Information for Construction Permit Applica	NA

Additional Supplemental Requirements for Category I Applications Only

7. List of Proposed Exempt Activities :	NA
8. List of Equipment/Activities Regulated under Title VI :	NA
9. Alternative Methods of Operation :	NA
10. Alternative Modes of Operation (Emissions Trading) :	NA
11. Identification of Additional Applicable Requirements :	NA
12. Compliance Assurance Monitoring Plan :	NA
13. Risk Management Plan Verification :	NA
14. Compliance Report and Plan :	NA
15. Compliance Certification (Hard-copy Require	NA

III. EMISSIONS UNIT INFORMATION

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

Emissions Unit Information Section 1

3.58 MW EMD Diesel Generator #8

Type of Emissions Unit Addressed in This Section

1. Regulated or Unregulated Emissions Unit? Check one :

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

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

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

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

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

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

Emissions Unit Information Section 1

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

Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section : 3.58 MW EMD Diesel Generator #8		
2. Emissions Unit Identification Number : 008 [ ] No Corresponding ID [ ] Unknown		
3. Emissions Unit Status Code : A	4. Acid Rain Unit? [ ] Yes [X] No	5. Emissions Unit Major Group SIC Code : 49
6. Emissions Unit Comment : As part of the proposed project, the stack height for the existing 3.58 MW EMD diesel generator unit (#8) is being increased from 38.7 feet to 45 feet.		

Emissions Unit Information Section 1

3.58 MW EMD Diesel Generator #8

Emissions Unit Control Equipment 1

1. Description : Retarded injection timing - Reduces firing pressure and combustion temperature.
2. Control Device or Method Code : 99

Emissions Unit Information Section 1

3.58 MW EMD Diesel Generator #8

Emissions Unit Control Equipment 2

1. Description :
   Increased flow capacity aftercoolers (4-pass,4-flange,Counterflow) with low temperature separate aftercooling circuit - Increases combustion air density thereby increasing the ratio of air to fuel.

2. Control Device or Method Code : 99

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

Emissions Unit Information Section 1
3.58 MW EMD Diesel Generator #8

Emissions Unit Details

1. Initial Startup Date :	01-Jan-1998
2. Long-term Reserve Shutdown Date :	
3. Package Unit : Manufacturer : Electro-Motive Diesel (EMD)	Model Number : 20-710G4B
4. Generator Nameplate Rating : 4 MW	
5. Incinerator Information : Dwell Temperature : Dwell Time : Incinerator Afterburner Temperature :	 Degrees Fahrenheit Seconds Degrees Fahrenheit

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate :	30	mmBtu/hr	
2. Maximum Incinerator Rate :		lb/hr	tons/day
3. Maximum Process or Throughput Rate :			
4. Maximum Production Rate :			
5. Operating Capacity Comment : This unit, like all other Florida Keys Electric Cooperative Association, Inc.'s units, will operate only during emergencies and during peak power demand periods.			

Emissions Unit Operating Schedule

Requested Maximum Operating Schedule :	
24 hours/day	7 days/week
52 weeks/year	8,760 hours/year

D. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

Emissions Unit Information Section 1
3.58 MW EMD Diesel Generator #8

Rule Applicability Analysis

Emissions Unit Information Section 1
3.58 MW EMD Diesel Generator #8

List of Applicable Regulations

40 CFR 70 - State Operating Permits

62-4.001 through 62-4.160, FAC - Permits Part I General

62-4.210, FAC - Construction Permits

62-4.220, FAC - Operating Permits

62-103.150, FAC - Public Notice of Application and Proposed Agency Action

62-204.240, FAC - Ambient Air Quality Standards

62-210, FAC - Stationary Sources

62-212.300, FAC - General Preconstruction Review Requirements

62-212.400, FAC - Prevention of Significant Deterioration

62-213, FAC - Operation Permits for Major Sources of Air Pollution (Title V)

62-296.320(2), FAC - General Pollutant Emission Limiting Standards, Objectionable Odor

62-296.320(4)(b), FAC - General Visible Emission Standards

62-297.310, FAC - General Test Requirements

Emissions Unit Information Section 1
3.58 MW EMD Diesel Generator #8

List of Applicable Regulations

62-297.401, FAC - EPA Test Procedures

62-297.620, FAC - Exceptions and Approvals of Alternative Procedures and Requirements

62-204.800, FAC - Federal Regulations Adopted by Reference

62-297.400, FAC - EPA Methods Adopted by Reference

62-297.440, FAC - Supplementary Test Procedures

F. SEGMENT (PROCESS/FUEL) INFORMATION

Emissions Unit Information Section 1

3.58 MW EMD Diesel Generator #8

Segment Description and Rate : Segment 1

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) :

   No. 2 Fuel Oil Burned in Diesel Engine.

2. Source Classification Code (SCC) : 20100102

3. SCC Units : Thousand Gallons Burned (all liquid fuels)

4. Maximum Hourly Rate : 0.23

5. Maximum Annual Rate : 2,015.00

6. Estimated Annual Activity Factor :

7. Maximum Percent Sulfur : 0.05

8. Maximum Percent Ash :

9. Million Btu per SCC Unit : 132

10. Segment Comment :

E. EMISSION POINT (STACK/VENT) INFORMATION

Emissions Unit Information Section 1

3.58 MW EMD Diesel Generator #8

Emission Point Description and Type :

1. Identification of Point on Plot Plan or Flow Diagram :	Figure 2, #8	
2. Emission Point Type Code :	1	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking : (limit to 100 characters per point)		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common :		
5. Discharge Type Code :	W	
6. Stack Height :	45	feet
7. Exit Diameter :	2.3	feet
8. Exit Temperature :	666	°F
9. Actual Volumetric Flow Rate :	29008	acfm
10. Percent Water Vapor :	0.00	%
11. Maximum Dry Standard Flow Rate :	0	dscfm
12. Nonstack Emission Point Height :	0	feet
13. Emission Point UTM Coordinates : Zone : 17 East (km) : 490.700 North (km) : 2732.700		
14. Emission Point Comment : The stack height for the existing 3.58 MW EMD diesel unit will be increased from 38.7 feet to 45 feet. The UTM coordinates for this emission point are approximate (see Figures 1 and 2).		

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

Emissions Unit Information Section 1
3.58 MW EMD Diesel Generator #8

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
1 - SO2			NS
2 - CO			NS
3 - NOX	099		EL
4 - PM			NS
5 - PM10			NS
6 - VOC			NS

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

Emissions Unit Information Section 1
3.58 MW EMD Diesel Generator #8

Pollutant Potential/Estimated Emissions : Pollutant 1

1. Pollutant Emitted : **SO2**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 1.6500000 lb/hour 7.2000000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor Units : Reference : Mass Balance
7. Emissions Method Code : 2
8. Calculations of Emissions : 1000 gal/132 MMBtu x 7.2 lbs/gal x 0.05% S x 2 = 0.0545 lbs/MMBtu 0.0545 lbs/MMBtu x 30.2 MMBtu/hr = 1.65 lbs/hr 1.65 lbs/hr x 8760 hrs/yr x ton/2000 lbs = 7.2 tpy
9. Pollutant Potential/Estimated Emissions Comment : SO2 emissions will be minimized through the use of low sulfur fuel (less than or equal to 0.05% sulfur, by weight).

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

Emissions Unit Information Section 1
3.58 MW EMD Diesel Generator #8

Pollutant Potential/Estimated Emissions : Pollutant - 2

1. Pollutant Emitted : **CO**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 5.4000000 lb/hour 23.7000000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor Units : Reference : Emissions Testing
7. Emissions Method Code : 1
8. Calculations of Emissions : 4988 bhp x 0.49 g/bhp-hr x lb/453.6 g = 5.4 lb/hr 5.4 lb/hr x 8760 hrs/yr x ton/2000 lbs = 23.7 tpy
9. Pollutant Potential/Estimated Emissions Comment : Emissions testing results can be found in Attachment G.

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

Emissions Unit Information Section 1
3.58 MW EMD Diesel Generator #8

Pollutant Potential/Estimated Emissions : Pollutant 3

1. Pollutant Emitted : **NOX**
2. Total Percent Efficiency of Control : 32.00 %
3. Potential Emissions : 66.0900000 lb/hour 289.5000000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor Units : Reference : Emissions Testing
7. Emissions Method Code : 1
8. Calculations of Emissions : 4988 bhp x 6.01 g/bhp-hr x lb/453.6 g = 66.09 lbs/hr 66.09 lbs/hr x 8760 hrs/yr x ton/2000 lbs = 289.5 tpy
9. Pollutant Potential/Estimated Emissions Comment : Emissions testing results can be found in Attachment G. The permitted maximum allowable emission rates for NOx are 68 lbs/hr and 298 tpy.

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

Emissions Unit Information Section 1
3.58 MW EMD Diesel Generator #8

Pollutant Potential/Estimated Emissions : Pollutant 4

1. Pollutant Emitted : **PM**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 2.1000000 lb/hour 9.2200000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units : lbs/MMBtu Reference : AP-42
7. Emissions Method Code : 3
8. Calculations of Emissions : 0.0697 lbs/MMBtu x 30.2 MMBtu/hr = 2.10 lbs/hr 2.10 lbs/hr x 8760 hrs/yr x ton/2000 lbs = 9.22 tpy
9. Pollutant Potential/Estimated Emissions Comment : The use of low sulfur fuel (less than or equal to 0.05% sulfur, by weight) and good combustion practices will reduce PM emissions.

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

Emissions Unit Information Section 1
3.58 MW EMD Diesel Generator #8

Pollutant Potential/Estimated Emissions : Pollutant 5

1. Pollutant Emitted : **PM10**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 1.7300000 lb/hour 7.5800000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units : lbs/MMBtu Reference : AP-42
7. Emissions Method Code : 3
8. Calculations of Emissions : 0.0573 lbs/MMBtu x 30.2 MMBtu/hr = 1.73 lbs/hr 1.73 lbs/hr x 8760 hrs/yr x ton/2000 lbs = 7.58 tpy
9. Pollutant Potential/Estimated Emissions Comment : The use of low sulfur fuel (</= 0.05% sulfur, by weight) and good combustion practices will reduce PM10 emissions. Based on ave. actual operation of 640 hrs/yr, PM10 emissions will also be minimized.

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

Emissions Unit Information Section 1
3.58 MW EMD Diesel Generator #8

Pollutant Potential/Estimated Emissions : Pollutant 6

1. Pollutant Emitted : **VOC**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 3.0200000 lb/hour 13.2300000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units : lbs/MMBtu Reference : AP-42
7. Emissions Method Code : 3
8. Calculations of Emissions : 0.1 lbs/MMBtu x 30.2 MMBtu/hr = 3.02 lbs/hr 3.02 lbs/hr x 8760 hrs/yr x ton/2000 lbs = 13.23 tpy
9. Pollutant Potential/Estimated Emissions Comment :

Emissions Unit Information Section 1
3.58 MW EMD Diesel Generator #8

Pollutant Information Section 3

Allowable Emissions 1

1. Basis for Allowable Emissions Code :	OTHER			
2. Future Effective Date of Allowable Emissions :				
3. Requested Allowable Emissions and Units :				
4. Equivalent Allowable Emissions :	68.00	lb/hour	298.00	tons/year
5. Method of Compliance : Emission controls determined as BACT (Attachment E).				
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : Maximum allowable emission rates during normal operation based on current permit conditions (Attachment A).				

I. VISIBLE EMISSIONS INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Information Section 1
3.58 MW EMD Diesel Generator #8

Visible Emissions Limitation : Visible Emissions Limitation 1

1. Visible Emissions Subtype :	20	
2. Basis for Allowable Opacity :	RULE	
3. Requested Allowable Opacity :		
Normal Conditions :	20	%
Exceptional Conditions :	100	%
Maximum Period of Excess Opacity Allowed :	10	min/hour

4. Method of Compliance :

EPA Method 9 or state approved equivalent method.

5. Visible Emissions Comment :

General emission standard 62-296.320, FAC. As per 62-210.700(1), FAC, excess emissions during startup, shutdown or malfunction shall be permitted but in no case exceed 2 hours in any 24 hour period.

I. VISIBLE EMISSIONS INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Information Section 1
3.58 MW EMD Diesel Generator #8

Visible Emissions Limitation : Visible Emissions Limitation 2

1. Visible Emissions Subtype :	X		
2. Basis for Allowable Opacity :	RULE		
3. Requested Allowable Opacity :			
Normal Conditions :	100	%	
Exceptional Conditions :	100	%	
Maximum Period of Excess Opacity Allowed :	60	min/hour	
4. Method of Compliance :			
Emissions monitored to not exceed 2 hrs in any 24 hr period.			
5. Visible Emissions Comment :			
As per 62-210.700(1), FAC, excess emissions during startup, shutdown, malfunction or annual low load testing requirements shall be permitted but in no case exceed 2 hours in any 24 hour period.			

K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION

Emissions Unit Information Section 1

3.58 MW EMD Diesel Generator #8

PSD Increment Consumption Determination

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

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

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

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

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

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

2. Increment Consuming for Nitrogen Dioxide?

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

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

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

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

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

3. Increment Consuming/Expanding Code :

PM : C SO2 : C NO2 : C

4. Baseline Emissions :

PM :	lb/hour	tons/year
SO2 :	lb/hour	tons/year
NO2 :		tons/year

5. PSD Comment :

L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION

Emissions Unit Information Section 1

3.58 MW EMD Diesel Generator #8

Supplemental Requirements for All Applications

1. Process Flow Diagram :	Figure 3a
2. Fuel Analysis or Specification :	Attachment D
3. Detailed Description of Control Equipment :	Attachment E
4. Description of Stack Sampling Facilities :	NA
5. Compliance Test Report :	NA
6. Procedures for Startup and Shutdown :	Attachment F
7. Operation and Maintenance Plan :	NA
8. Supplemental Information for Construction Permit Application :	NA
9. Other Information Required by Rule or Statue :	NA

Additional Supplemental Requirements for Category I Applications Only

10. Alternative Methods of Operations :	NA
11. Alterntive Modes of Operation (Emissions Trading) :	NA

12. Identification of Additional Applicable Requirements :	NA
13. Compliance Assurance Monitoring Plan :	NA

14. Acid Rain Application (Hard-copy Required) :

NA	Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
NA	Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
NA	New Unit Exemption (Form No. 62-210.900(1)(a)2.)
NA	Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)

III. EMISSIONS UNIT INFORMATION

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

Emissions Unit Information Section 2

3.58 MW EMD Diesel Generator #9

Type of Emissions Unit Addressed in This Section

1. Regulated or Unregulated Emissions Unit? Check one :

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

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

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

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

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

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

Emissions Unit Information Section 2

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

Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section : 3.58 MW EMD Diesel Generator #9		
2. Emissions Unit Identification Number : 009 [ ] No Corresponding ID [ ] Unknown		
3. Emissions Unit Status Code : C	4. Acid Rain Unit? [ ] Yes [X] No	5. Emissions Unit Major Group SIC Code : 49
6. Emissions Unit Comment : This is a new unit necessary for Florida Keys Electric Cooperative Association, Inc. to maintain contractural generating capacity for use during emergency and peak power demand periods.		

Emissions Unit Information Section 2

3.58 MW EMD Diesel Generator #9

Emissions Unit Control Equipment 1

1. Description : Retarded injection timing - Reduces firing pressure and combustion temperature.
2. Control Device or Method Code : 99

Emissions Unit Information Section 2

3.58 MW EMD Diesel Generator #9

Emissions Unit Control Equipment 2

1. Description : Increased flow capacity aftercoolers (4-pass,4-flange,Counterflow) with low temperature separate aftercooling circuit - Increases combustion air density thereby increasing the ratio of air to fuel.
2. Control Device or Method Code : 99

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

Emissions Unit Information Section 2
3.58 MW EMD Diesel Generator #9

Emissions Unit Details

1. Initial Startup Date :	31-Dec-2000
2. Long-term Reserve Shutdown Date :	
3. Package Unit : Manufacturer : Electro-Motive Diesel (EMD)	Model Number : 20-710G4B
4. Generator Nameplate Rating : 4 MW	
5. Incinerator Information : Dwell Temperature : Dwell Time : Incinerator Afterburner Temperature :	 Degrees Fahrenheit Seconds Degrees Fahrenheit

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate :	30	mmBtu/hr	
2. Maximum Incinerator Rate :		lb/hr	tons/day
3. Maximum Process or Throughput Rate :			
4. Maximum Production Rate :			
5. Operating Capacity Comment : While unlimited operating capacity is requested, this unit, like all other FKEC's units, will operate only during emergencies and during peak power demand periods.			

Emissions Unit Operating Schedule

Requested Maximum Operating Schedule :	
24 hours/day	7 days/week
52 weeks/year	8,760 hours/year

D. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

Emissions Unit Information Section 2
3.58 MW EMD Diesel Generator #9

Rule Applicability Analysis

Emissions Unit Information Section 2
3.58 MW EMD Diesel Generator #9

List of Applicable Regulations

40 CFR 70 - State Operating Permits

62-4.001 through 62-4.160, FAC - Permits Part I General

62-4.210, FAC - Construction Permits

62-4.220, FAC - Operating Permits

62-103.150, FAC - Public Notice of Application and Proposed Agency Action

62-204.240, FAC - Ambient Air Quality Standards

62-210, FAC - Stationary Source

62-212.300, FAC - General Preconstruction Review Requirements

62-212.400, FAC - Prevention of Significant Deterioration

62-213, FAC - Operation Permits for Major Sources of Air Pollution (Title V)

62-296.320(2), FAC - General Pollutant Emission Limiting Standards, Objectionable Odor

62-296.320(4)(b), FAC - General Visible Emission Standards

62-297.310, FAC - General Test Requirements

Emissions Unit Information Section 2
3.58 MW EMD Diesel Generator #9

List of Applicable Regulations

62-297.401, FAC - EPA Test Procedures

62-297.620, FAC - Exceptions and Approvals of Alternative Procedures and Requirements

62-204.800, FAC - Federal Regulations Adopted by Reference

62-297.400, FAC - EPA Methods Adopted by Reference

62-297.440, FAC - Supplementary Test Procedures

E. EMISSION POINT (STACK/VENT) INFORMATION

Emissions Unit Information Section 2

3.58 MW EMD Diesel Generator #9

Emission Point Description and Type :

1. Identification of Point on Plot Plan or Flow Diagram :	Figure 2, #9	
2. Emission Point Type Code :	1	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking : (limit to 100 characters per point)		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common :		
5. Discharge Type Code :	W	
6. Stack Height :	45	feet
7. Exit Diameter :	2.3	feet
8. Exit Temperature :	666	°F
9. Actual Volumetric Flow Rate :	29008	acfm
10. Percent Water Vapor :	0.00	%
11. Maximum Dry Standard Flow Rate :	0	dscfm
12. Nonstack Emission Point Height :	0	feet
13. Emission Point UTM Coordinates : Zone : 17 East (km) : 490.698 North (km) : 2732.707		
14. Emission Point Comment : The UTM coordinates for this emission point are approximate (see Figures 1 and 2).		

F. SEGMENT (PROCESS/FUEL) INFORMATION

Emissions Unit Information Section 2

3.58 MW EMD Diesel Generator #9

Segment Description and Rate : Segment 1

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) :

   No. 2 Fuel Oil Burned in Diesel Engine.

2. Source Classification Code (SCC) : 20100102

3. SCC Units : Thousand Gallons Burned (all liquid fuels)

4. Maximum Hourly Rate : 0.23

5. Maximum Annual Rate : 2,015.00

6. Estimated Annual Activity Factor :

7. Maximum Percent Sulfur : 0.05

8. Maximum Percent Ash :

9. Million Btu per SCC Unit : 132

10. Segment Comment :

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

Emissions Unit Information Section 2
3.58 MW EMD Diesel Generator #9

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
1 - SO2			NS
2 - CO			NS
3 - NOX	099		EL
4 - PM			NS
5 - PM10			NS
6 - VOC			NS

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

Emissions Unit Information Section 2
3.58 MW EMD Diesel Generator #9

Pollutant Potential/Estimated Emissions : Pollutant 1

1. Pollutant Emitted : **SO2**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 1.6500000 lb/hour 7.2000000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor Units : Reference : Mass Balance
7. Emissions Method Code : 2
8. Calculations of Emissions : 1000 gal/132 MMBtu x 7.2 lbs/gal x 0.05% S x 2 = 0.0545 lbs/MMBtu 0.0545 lbs/MMBtu x 30.2 MMBtu/hr = 1.65 lbs/hr 1.65 lbs/hr x 8760 hrs/yr x ton/2000 lbs = 7.2 tpy
9. Pollutant Potential/Estimated Emissions Comment : SO2 emissions will be minimized through the use of low sulfur fuel (less than or equal to 0.05% sulfur, by weight).

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

Emissions Unit Information Section __ 2 __
3.58 MW EMD Diesel Generator #9

Pollutant Potential/Estimated Emissions : Pollutant __ 2 __

1. Pollutant Emitted : **CO**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 5.4000000 lb/hour 23.7000000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor Units : Reference : Emissions Testing
7. Emissions Method Code : 1
8. Calculations of Emissions : 4988 bhp x 0.49 g/bhp-hr x lb/453.6 g = 5.4 lbs/hr 5.4 lbs/hr x 8760 hrs/yr x ton/2000 lbs = 23.7 tpy
9. Pollutant Potential/Estimated Emissions Comment : Emission testing results for the identical Unit #8 can be found in Attachment G.

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

Emissions Unit Information Section 2
3.58 MW EMD Diesel Generator #9

Pollutant Potential/Estimated Emissions : Pollutant 3

1. Pollutant Emitted : **NOX**
2. Total Percent Efficiency of Control : 32.00 %
3. Potential Emissions : 66.0900000 lb/hour 289.5000000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor Units : Reference : Emissions Testing
7. Emissions Method Code : 1
8. Calculations of Emissions : 4988 bhp x 6.01 g/bhp-hr x lb/453.6 g = 66.09 lbs/hr 66.09 lbs/hr x 8760 hrs/yr x ton/2000 lbs = 289.5 tpy
9. Pollutant Potential/Estimated Emissions Comment : Emission testing results for the identical Unit #8 can be found in Attachment G. The permitted maximum allowable emission rates for Unit #8 are 68 lbs/hr and 298 tpy.

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

Emissions Unit Information Section 2
3.58 MW EMD Diesel Generator #9

Pollutant Potential/Estimated Emissions : Pollutant 4

1. Pollutant Emitted : **PM**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 2.1000000 lb/hour 9.2200000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units : lbs/MMBtu Reference : AP-42
7. Emissions Method Code : 3
8. Calculations of Emissions : 0.0697 lbs/MMBtu x 30.2 MMBtu/hr = 2.10 lbs/hr 2.10 lbs/hr x 8760 hrs/yr x ton/2000 lbs = 9.22 tpy
9. Pollutant Potential/Estimated Emissions Comment : The use of low sulfur fuel (less than or equal to 0.05% sulfur, by weight) and good combustion practices will reduce PM emissions.

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

Emissions Unit Information Section 2
3.58 MW EMD Diesel Generator #9

Pollutant Potential/Estimated Emissions : Pollutant 5

1. Pollutant Emitted : **PM10**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 1.7300000 lb/hour 7.5800000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units : lbs/MMBtu Reference : AP-42
7. Emissions Method Code : 3
8. Calculations of Emissions : 0.0573 lbs/MMBtu x 30.2 MMBtu/hr = 1.73 lbs/hr 1.73 lbs/hr x 8760 hrs/yr x ton/2000 lbs = 7.58 tpy
9. Pollutant Potential/Estimated Emissions Comment : The use of low sulfur fuel (</= 0.05% sulfur, by weight) and good combustion practices will reduce PM10 emissions. Based on ave. actual operation of 640 hrs/yr, PM10 emissions will also be minimized.

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

Emissions Unit Information Section 2
3.58 MW EMD Diesel Generator #9

Pollutant Potential/Estimated Emissions : Pollutant 6

1. Pollutant Emitted : **VOC**
2. Total Percent Efficiency of Control : %
3. Potential Emissions : 3.0200000 lb/hour 13.2300000 tons/year
4. Synthetically Limited? [ ] Yes [X] No
5. Range of Estimated Fugitive/Other Emissions: to tons/year
6. Emissions Factor 0 Units : lbs/MMBtu Reference : AP-42
7. Emissions Method Code : 3
8. Calculations of Emissions : 0.1 lbs/MMBtu x 30.2 MMBtu/hr = 3.02 lbs/hr 3.02 lbs/hr x 8760 hrs/yr x ton/2000 lbs = 13.23 tpy
9. Pollutant Potential/Estimated Emissions Comment :

Emissions Unit Information Section 2
3.58 MW EMD Diesel Generator #9

Pollutant Information Section 3

Allowable Emissions 1

1. Basis for Allowable Emissions Code :	OTHER			
2. Future Effective Date of Allowable Emissions :				
3. Requested Allowable Emissions and Units :				
4. Equivalent Allowable Emissions :	68.00	lb/hour	298.00	tons/year
5. Method of Compliance : Emission controls determined as BACT (Section 3).				
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : Maximum allowable emission rates during normal operation based on current permit conditions for Unit #8 (Attachment A).				

I. VISIBLE EMISSIONS INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Information Section 2
3.58 MW EMD Diesel Generator #9

Visible Emissions Limitation : Visible Emissions Limitation 1

1. Visible Emissions Subtype :	20	
2. Basis for Allowable Opacity :	RULE	
3. Requested Allowable Opacity :		
Normal Conditions :	20	%
Exceptional Conditions :	100	%
Maximum Period of Excess Opacity Allowed :	10	min/hour
4. Method of Compliance :		
EPA Method 9 or state approved equivalent method.		
5. Visible Emissions Comment :		
General emission standard 62-296.320, FAC. As per 62-210.700(1), FAC, excess emissions during startup, shutdown or malfunction shall be permitted but in no case exceed 2 hours in any 24 hour period.		

I. VISIBLE EMISSIONS INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Information Section 2
3.58 MW EMD Diesel Generator #9

Visible Emissions Limitation : Visible Emissions Limitation 2

1. Visible Emissions Subtype : X

2. Basis for Allowable Opacity : RULE

3. Requested Allowable Opacity :

Normal Conditions :	100	%
Exceptional Conditions :	100	%
Maximum Period of Excess Opacity Allowed :	60	min/hour

4. Method of Compliance :

Emissions monitored to not exceed 2 hrs in any 24 hr period.

5. Visible Emissions Comment :

As per 62-210.700(1), FAC, excess emissions during startup, shutdown, malfunction or annual low load testing requirements shall be permitted but in no case exceed 2 hours in any 24 hour period.

K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION

Emissions Unit Information Section 2

3.58 MW EMD Diesel Generator #9

PSD Increment Consumption Determination

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

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

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

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

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

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

2. Increment Consuming for Nitrogen Dioxide?

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

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

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

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

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

3. Increment Consuming/Expanding Code :

PM : C SO2 : C NO2 : C

4. Baseline Emissions :

PM :	lb/hour	tons/year
SO2 :	lb/hour	tons/year
NO2 :		tons/year

5. PSD Comment :

L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION

Emissions Unit Information Section 2

3.58 MW EMD Diesel Generator #9

Supplemental Requirements for All Applications

1. Process Flow Diagram :	Figure 3b
2. Fuel Analysis or Specification :	Attachment D
3. Detailed Description of Control Equipment :	Section 3
4. Description of Stack Sampling Facilities :	NA
5. Compliance Test Report :	NA
6. Procedures for Startup and Shutdown :	Attachment F
7. Operation and Maintenance Plan :	NA
8. Supplemental Information for Construction Permit Application :	NA
9. Other Information Required by Rule or Statue :	NA

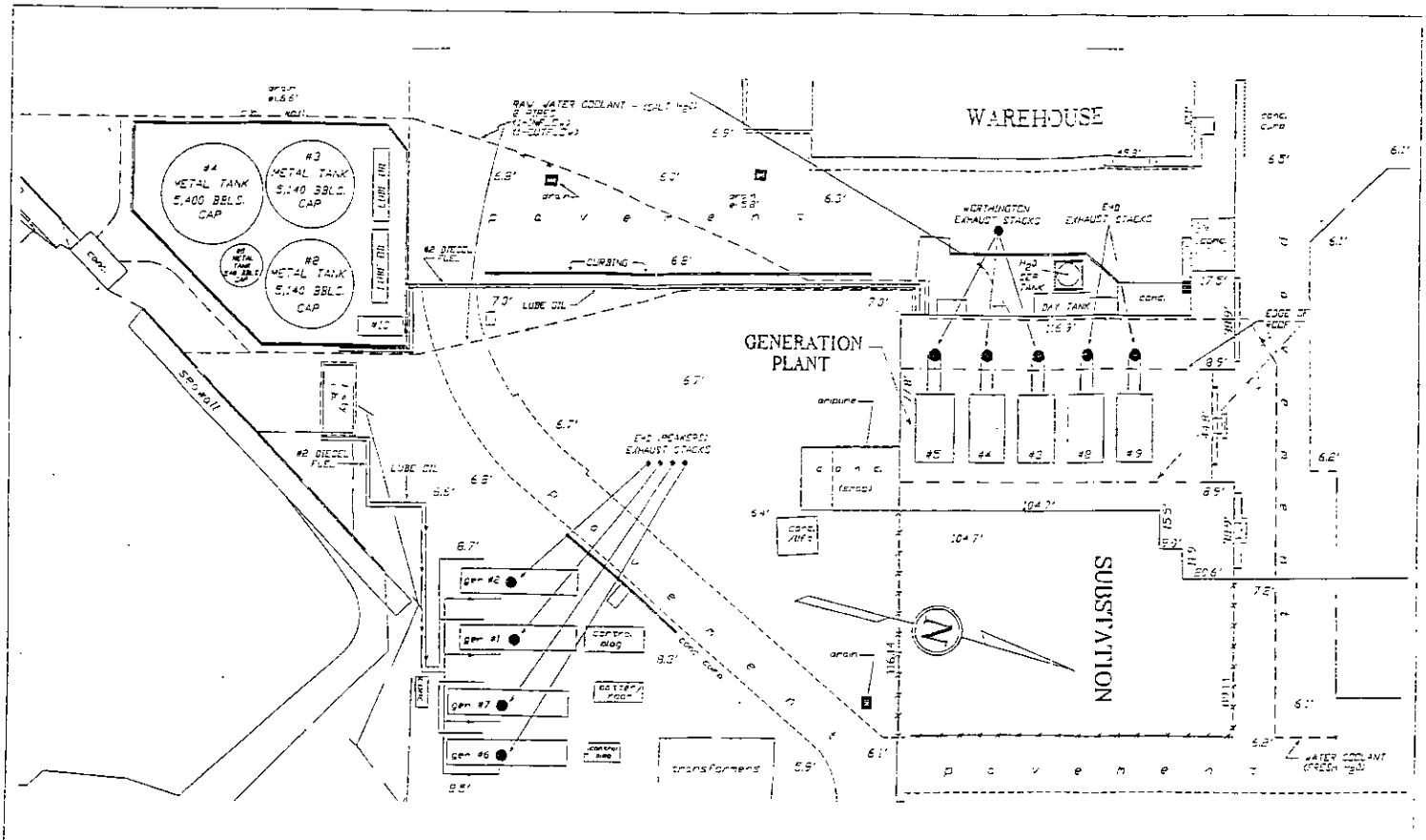
Additional Supplemental Requirements for Category I Applications Only

10. Alternative Methods of Operations :	NA
11. Alterntive Modes of Operation (Emissions Trading) :	NA

12. Identification of Additional Applicable Requirements :	NA
13. Compliance Assurance Monitoring Plan :	NA

14. Acid Rain Application (Hard-copy Required) :

NA	Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
NA	Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
NA	New Unit Exemption (Form No. 62-210.900(1)(a)2.)
NA	Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)



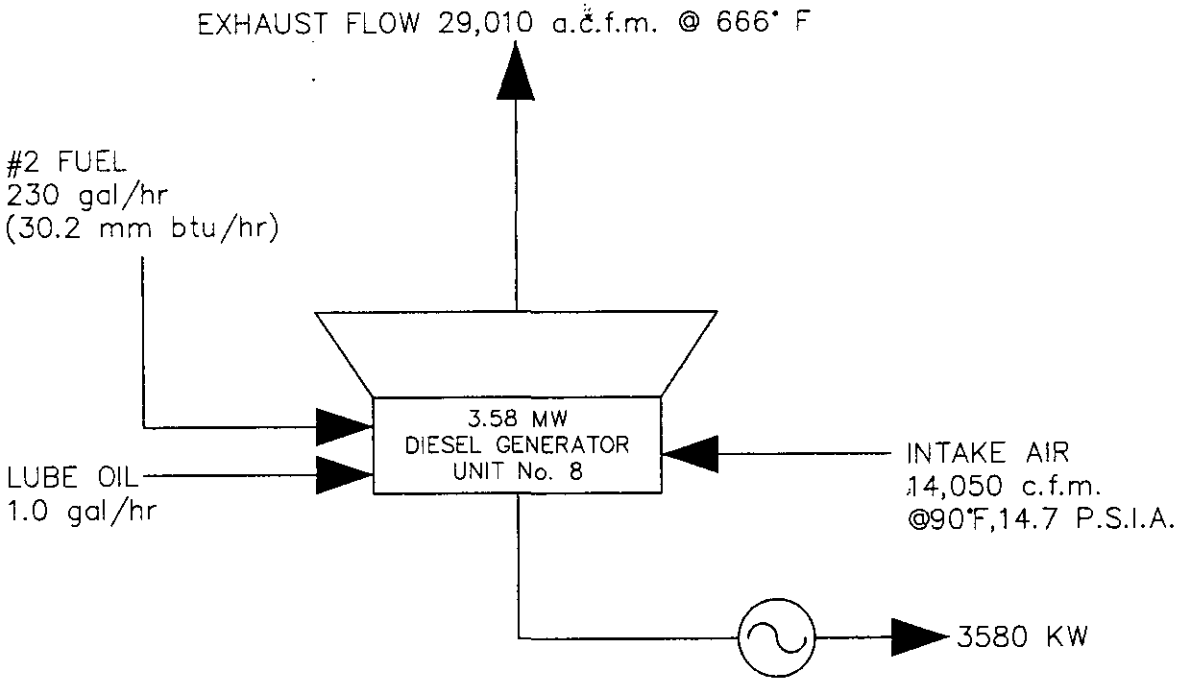
1" = 40'0"

R·W·BECK

FIGURE 2
FACILITY PLOT PLAN

MARATHON GENERATING PLANT

FLORIDA KEYS ELECTRIC COOPERATIVE ASSOCIATION, INC.



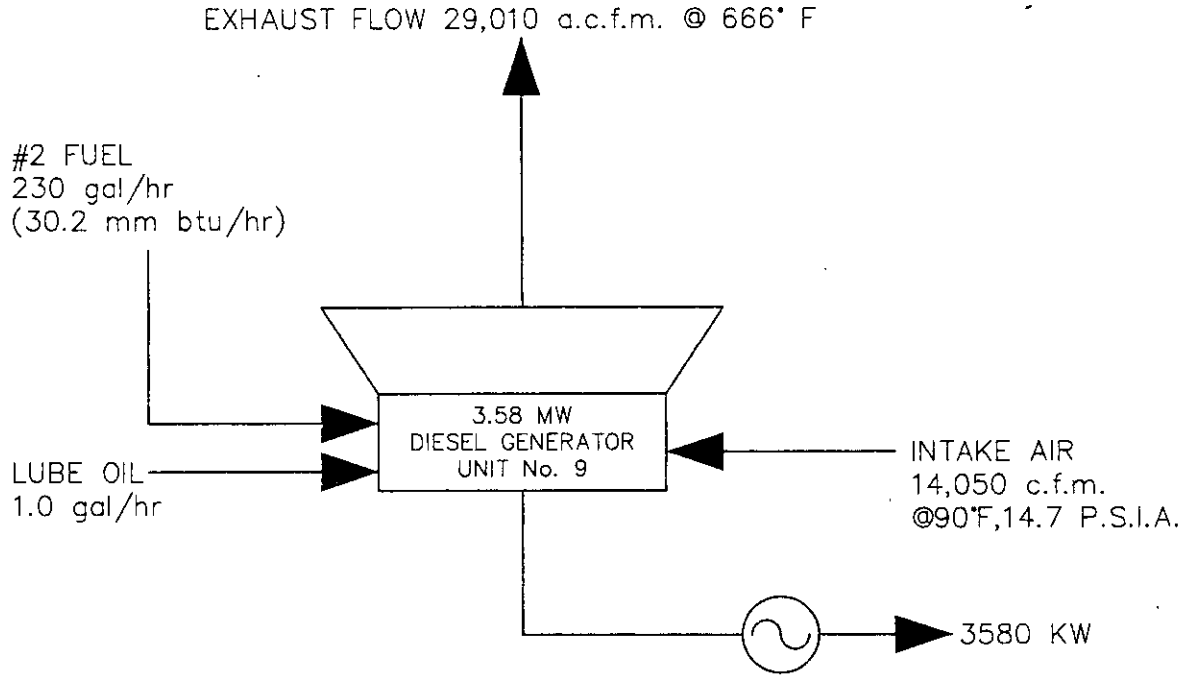
DES	CIVIL REV	ELEC REV
DWN	MECH REV	STRUC REV
CK'D	APPD	DATE

R·W·BECK

FLORIDA KEYS ELECTRIC COOPERATIVE ASSOCIATION, INC.
MARATHON GENERATING PLANT
FIGURE 3a
UNIT No. 8 PROCESS FLOW DIAGRAM

FILE NO. 002557
W/O 0200811010001000
DWG NO 8110-SK-1.

DLL t:\002557\008110\8110sk1.dwg 1-13-00 @ 10:15



DES	CIVL REV	ELEC REV
DWN	MECH REV	STRUC REV
CK'D	APPD	DATE

R·W·BECK

FLORIDA KEYS ELECTRIC COOPERATIVE ASSOCIATION, INC.
MARATHON GENERATING PLANT
FIGURE 3b
UNIT No. 9 PROCESS FLOW DIAGRAM

FILE NO 002557
W/O 0200811010001000
DWG NO 8110-SK-2.

DLL k:\002557\008110\8110sk2.dwg 1-13-00 @ 12:18

Department of Environmental Protection

Jeb Bush
Governor

South District
P.O. Box 2549
Fort Myers, Florida 33902-2549

David B. Struhs
Secretary

NOTICE OF FINAL PERMIT

March 17, 1999

CERTIFIED MAIL #Z 252 620 678
RETURN RECEIPT REQUESTED

In the Matter of an
Application for Permit by:

Mr. Charles A. Russell
General Manager
Florida Keys Electric Cooperative
Post Office Box 700377
Tavernier, Florida 33070-0377

Re: Monroe County - AP
FINAL Permit No.: 0870004-001-AV
Marathon Generation Plant
EMA - Florida Keys

Enclosed is FINAL Permit Number 0870004-001-AV for the operation of the Marathon Generation Plant located at 3421 Overseas Highway, Marathon, Monroe County, issued pursuant to Chapter 403, Florida Statutes (F.S.).

Any party to this order (permit) has the right to seek judicial review of it under Section 120.68 of the Florida Statutes., by the filing of a Notice of Appeal under Rule 9.110 of the Florida Rules of Appellate Procedure, with the clerk of the Department of Environmental Protection in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within thirty days from the date this notice is filed with the clerk of the permitting authority.

Executed in Fort Myers, Florida.

Sincerely,

Margaret F. Highsmith
Director of
District Management

MFH/JRS/jw

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF FINAL PERMIT (including the FINAL permit) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on March 17, 1999 to the person(s) listed or as otherwise noted:

Charles A. Russell
Ivan Clark, P.E.
Mary Fillingim, Air Resources Management
Ms. Carla E. Pierce, USEPA, Region 4 (INTERNET E-mail Memorandum)
Ms. Gracy Danois, U.S. EPA, Region 4 (INTERNET E-mail Memorandum)

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to Section 120.52(7), Florida Statutes, with the designated agency Clerk, receipt of which is hereby acknowledged.

Clerk Hack 3-17-99
(Clerk) (Date)

Florida Keys Electric Cooperative Association
Marathon Generation Plant
Facility ID No.: 0870004
Monroe County

Initial Title V Air Operation Permit
FINAL Permit No.: 0870004-001-AV

Permitting Authority:
State of Florida Department of Environmental Protection
Post Office Box 2549
Fort Myers, Florida 33902-2549
Telephone: (941) 332-6975
Fax: (941) 332-6969

Initial Title V Air Operation Permit
FINAL Permit No.: 0870004-001-AV

Table of Contents

Florida Keys Electric Cooperative
Association, Inc.
Marathon Generation Plant

FINAL Permit No.: 0870004-001-AV
Facility ID No.: 0870004
SIC Nos.: 4911
Project: Initial Title V Air Operation Permit

This permit is for the operation of the eight diesel electric generators, fired with low sulfur (0.5% or less) No. 2 fuel oil. This facility is located at 3421 Overseas Highway, Marathon, Monroe County; UTM Coordinates: Zone 17, 490.7 km East; and 2732.70 km North; Latitude: 24° 42' 38" North and Longitude: 81° 05' 30" West.

STATEMENT OF BASIS: This Title V air operation permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Chapters 62-4, 62-210, and 62-213. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents, attached hereto or on file with the permitting authority, in accordance with the terms and conditions of this permit.

Referenced attachments made a part of this permit:
APPENDIX TV-1, TITLE V CONDITIONS

Effective Date: [March 16, 1999]
Renewal Application Due Date: [September 19, 2004]
Expiration Date: [March 16, 2004]

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Margaret F. Highsmith
Director of
District Management

MFH/JRS/jw

Section I. Facility Information.

Subsection A. Facility Description.

This facility consists of eight diesel electric generators, fired with low sulfur (0.5% or less) No. 2 fuel oil.

Based on the initial Title V permit application received June 12, 1996 this facility is a major source of air pollutants.

Subsection B. Summary of Emissions Unit ID No(s). and Brief Description(s).

E.U. ID No.	Brief Description
001	2.0 MW Diesel Electric Generator
002	2.0 MW Diesel Electric Generator
003	3.0 MW Diesel Electric Generator
004	3.0 MW Diesel Electric Generator
005	3.0 MW Diesel Electric Generator
006	2.5 MW Diesel Electric Generator
007	2.5 MW Diesel Electric Generator
008	3.58 MW Diesel Electric Generator

Eight Diesel electric generators, fired with low sulfur (0.5% or less) No. 2 fuel oil.

Please reference the Permit No., Facility ID No., and appropriate Emissions Unit(s) ID No(s). on all correspondence, test report submittals, applications, etc.

Subsection C. Relevant Documents.

The documents listed below are not a part of this permit, however, are specifically related to this permitting action.

These documents are provided to the permittee for information purposes only:
Table 1-1, Summary of Air Pollutant Standards and Terms
Table 2-1, Summary of Compliance Requirements
Appendix A-1, Abbreviations, Acronyms, Citations, and Identification Numbers
Appendix H-1, Permit History/ID Number Changes

These documents are on file with permitting authority:
Initial Title V Permit Application received June 12, 1996.
Construction permit for Unit 8, Issued September 12, 1997
Modification of Construction Permit, Issued April 29, 1998.

Section II. Facility-wide Conditions.

The following conditions apply facility-wide.

1. APPENDIX TV-1, TITLE V CONDITIONS, version dated 12/02/97 is a part of this permit. {Permitting note: APPENDIX TV-1, TITLE V CONDITIONS, is distributed to the permittee only. Other persons requesting copies of these conditions shall be provided one copy when requested or otherwise appropriate.}

2. **Not federally enforceable.]** General Pollutant Emission Limiting Standards. Objectionable Odor Prohibited. The permittee shall not cause, suffer, allow, or permit the discharge of air pollutants which cause or contribute to an objectionable odor.
[Rule 62-296.320(2), F.A.C.]

3. General Particulate Emission Limiting Standards. General Visible Emissions Standard. Except for emissions units that are subject to a particulate matter or opacity limit set forth or established by rule and reflected by conditions in this permit, no person shall cause, let, permit, suffer or allow to be discharged into the atmosphere the emissions of air pollutants from any activity, the density of which is equal to or greater than that designated as Number 1 on the Ringelmann Chart (20 percent opacity). EPA Method 9 is the method of compliance pursuant to Chapter 62-297, F.A.C. [Rule 62-296.320(4)(b)1., F.A.C.]

4. Prevention of Accidental Releases (Section 112® of CAA). If required by 40 CFR 68, the permittee shall submit to the implementing agency:
   a. a risk management plan (RMP) when, and if, such requirement becomes applicable; and
   b. certification forms and/or RMP's according to the promulgated rule schedule.
[40 CFR 68]

5. **[Not federally enforceable.]** General Pollutant Emission Limiting Standards. Volatile Organic Compounds (VOC) Emissions or Organic Solvents (OS) Emissions. The permittee shall allow no person to store, pump, handle, process, load, unload or use in any process or installation, volatile organic compounds (VOC) or organic solvents (OS) without applying known and existing vapor emission control devices or systems deemed necessary and ordered by the Department. [Rule 62-296.320(1)(a), F.A.C.]

6. The hours of operation of this facility are not limited. [Reference Construction Permit Application dated December 22, 1972 and Permit PSD-FL-237, 0870004-002-AC, Issued September 12, 1997.]

7. All equipment, pipes, hoses, lids, fittings, etc. shall be operated/maintained in such a manner as to minimize leaks, fugitive emissions, and spills of solvent materials.
[Rule 62-296.320, F.A.C.]

8. When appropriate, any recording, monitoring, or reporting requirements that are time-specific shall be in accordance with the effective date of the permit, which defines day one. [Rule 62-213.440, F.A.C.]

9. The permittee shall submit all compliance related notifications and reports required of this permit to the Department's South District office and to the Department's Marathon office:

Department of Environmental Protection
South District
Post Office Box 2549
Fort Myers, Florida 33902-2549
Telephone: 941/332-6975
Fax: 941/332-6969

Department of Environmental Protection
South District Branch Office
2796 Overseas Highway, Suite 221
Marathon, Florida 33050
Telephone: 305/289-2310
Fax: 305/289-2314

10. Any reports, data, notifications, certifications, and requests required to be sent to the United States Environmental Protection Agency, Region 4, should be sent to:

United Sates Environmental Protection Agency
Region 4
Air, Pesticide & Toxics Management Division
Operating Permit Section
61 Forsyth Street
Atlanta, Georgia 30303
Telephone: 404/562-9099
Fax: 404/562-9095

Construction Requirements

11. Applicable Regulations: Unless otherwise indicated in this permit, the construction and operation of the subject emission unit(s) shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of Chapter 403, F.S. and Florida Administrative Code Chapter 62-4, 62-103, 62-204, 62-210, 62-212, 62-213, 62-296, 62-297; and the applicable requirements of the Code of Federal Regulations Section 40, Part 60, adopted by reference in the Florida Administrative Code regulation [Rule 62-204.800, F.A.C.]. Issuance of this permit does not relieve the facility owner or operator from compliance with any applicable federal, state, or local permitting requirements or regulations. [Rule 62-210.300, F.A.C.]

Reports and Records

12. Duration: All reports and records required by this permit shall be kept for at least (5) years from the date the information was recorded. [Rule 62-4.160(14)(b), F.A.C.]

13. Emission Compliance Stack Test Reports:

(a) A *test report* indicating the results of the required compliance tests shall be filed with the Permitting Authority as soon as practical, but no later than 45 days after the last sampling run is completed. [Rule 62-297.310(8), F.A.C.]

(b) The *test report* shall provide sufficient detail on the tested emission unit and the procedures used to allow the Department to determine if the test was properly conducted and if the test results were properly computed. At a minimum, the test report shall provide the applicable information listed in Rule 62-297.310(8), F.A.C.

14. Excess Emissions Report: If excess emissions occur, the owner or operator shall notify the Permitting Authority within (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem. In addition the Department may request a written summary report of the incident. Pursuant to the New Source Performance Standards, excess emissions shall also be reported in accordance with 40 CFR 60.7, Subpart A. [Rules 62-4.130 and 62-210.700(6), F.A.C.]

Section III. Emissions Unit(s) and Conditions.

Subsection A. Listing of Emissions Units

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

Essential Potential to Emit (PTE) Parameters

EMISSION UNIT NO.	SYSTEM	EMISSIONS UNITS DESCRIPTION
001#	Power	2.0 MW Diesel Electric Generator
002#	Power	2.0 MW Diesel Electric Generator
003#	Power	3.0 MW Diesel Electric Generator
004#	Power	3.0 MW Diesel Electric Generator
005#	Power	3.0 MW Diesel Electric Generator
006#	Power	2.5 MW Diesel Electric Generator
007#	Power	2.5 MW Diesel Electric Generator
008*	Power	3.58 MW Diesel Electric Generator

Existing Emissions Unit
•New Emission Unit

Subsection B. Specific Conditions (Unit 008):

EMISSION UNIT NO.	SYSTEM	EMISSION UNIT DESCRIPTION
008	Power	3.58 MW Diesel Electric Generator

Emissions Limitations

B.1 The maximum allowable emission rates for NO_x for Unit No. 008 shall not exceed 68 pounds per hour (lb/hr) and 298 tons per year (TPY) pursuant to the Best Available Control Technology (BACT) Determination. [Rule 62-212.410, F.A.C.]

B.2 In order to minimize excess emissions during startup/shutdown/malfunction this emission unit shall adhere to best operation practices. [Rule 62-210.700, F.A.C.]

Operational Limitations

B.3 The emission unit is allowed to operate continuously (8760 hours/year). [Rule 62-210.200, F.A.C., Definitions; Potential-to-Emit].

B.4 Only No. 2 fuel oil can be fired in the diesel generator. The maximum sulfur content of the No. 2 fuel oil shall not exceed 0.05 percent by weight.
[Rule 62-210.200, F.A.C., Definitions: Potential-to-Emit].

B.5 The maximum heat input rate to Unit No. 008 shall not exceed 30.2 million Btu per hour (MMBtu/hr) [Rule 62-210.200, F.A.C., Definitions: Potential-to-Emit].

B.6 The maximum No. 2 fuel oil consumption allowed to be burned in Unit No. 008 is 2,015,000 gallons per year, which is equivalent to 8760 hours per year of operation at full load. [Rule 62-210.200, F.A.C., Definitions: Potential-to-Emit].

Test Methods and Procedures

B.7 Compliance with the allowable emission limiting standards for NO_x in B.1 shall be determined by using EPA Reference Method 7E (or equivalent) as described in 40 CFR 60, Appendix A (1996, version) adopted by reference in Rule 62-204.800, F.A.C. An annual compliance test shall be performed on the unit if operated for more than 400 hours in the preceding 12 month period. [Rule 62-297.310, F.A.C.]

B.8 The fuel shall be monitored initially and annually for the sulfur content using ASTM D4294 Method (or equivalent). [Rule 62-297.440, F.A.C.]

B.9 The permittee shall maintain daily records of fuel oil consumption for the emission unit. [Rule 62-210.200, F.A.C.]

B.10 Compliance with the visible emission standards shall be demonstrated with EPA Reference Method 9 as described in 40 CFR 60, Appendix A (1996, version) adopted by reference in Rule 62-204.800, F.A.C. [Rule 62-297.401, F.A.C.]

Recordkeeping and Reporting Requirements

B.11 Two copies of the results of the emission tests for the pollutant listed in Condition B.1 for Unit No. 8 shall be submitted with forty-five days of the last sampling run to the South District office in Fort Myers. All reports shall be in a format consistent with and shall include the information in accordance with Rule 62-297.310(8), F.A.C.
[Rule 62-297.310(8) F.A.C.]

Test Requirements:

B.12 Visible emissions tests are required to show continuing compliance with the standards of the Department. The test results must provide reasonable assurance that the unit is capable of compliance at the permitted maximum operating rate. Test shall be conducted in accordance with EPA Method 9 as published in 40 CFR 60, Appendix A, or State approved equivalent method. Such tests shall be conducted once per year. Results shall be submitted to the Department within 45 days after testing. The Department shall be notified at least 15 days prior to testing to allow witnessing. [Reference Rule 62-297.340(1), F.A.C.]

B.13 Test **Performance** Within 60 days after achieving the maximum production rate at which these emission units will be operated, but not later than 180 days after initial startup and annually thereafter, the owner or operator of this facility shall conduct performance test(s) pursuant to 40 CFR 60.8, Subpart A, General Provisions and 40 CFR 60, Appendix A. No other test method shall be used unless approval from the Department has been received in writing. Unless otherwise stated in the applicable emission limiting standard rule, testing of emissions shall be conducted with the emission unit(s) operating at permitted capacity pursuant to Rule 62-297.310(2), F.A.C. [Rules 62-204.800, 62-297.310, 62-297.400, 62-297.401, F.A.C.]

B.14 Test Procedures shall meet all applicable requirements of the Florida Administrative Code Chapter 62-297. [Rule 62-297.310, F.A.C.]

B.15 Test Notification: The owner or operator shall notify the Permitting Authority in writing at least *(30) days* (initial) and *15 days* (annual) prior to each scheduled compliance test to allow witnessing. The notification shall include the compliance test date, place of such test, the expected test time, the facility contact person for the test, and the person or company conducting the test. The (3) or (15) day notification requirement may be waived at the discretion of the Department. Likewise, if circumstances prevent testing during the test window specified for the emission unit, the owner or operator may request an alternate test date before the expiration of this window. [Rule 62-297.310 and 40 CFR 60.8, F.A.C.]

B.16 Special Compliance Tests: When the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained In Rule 62-204, 62-210, 62-212, 62-296, and 62-297, F.A.C. or in a permit issued pursuant to those rules is being violated, it may require the owner or operator of the facility to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions units and to provide a report on the results of said tests to the Permitting Authority. [Rule 62-297.310(7)(b), F.A.C.]

B.17 Stack Testing Facilities: The owner or operator shall install stack testing facilities in accordance with Rule 62-297.310(6), F.A.C.

B.18 Exceptions and Approval of Alternate Procedures and Requirements: An Alternate Sampling Procedure (ASP) may be requested from the Bureau of Air Monitoring and Mobil Sources of the Florida Department of Environmental Protection in accordance with the procedures specified in Rule 62-297.620 F.A.C.

B.19 Operating Rate During Testing: Unless otherwise stated in the applicable emission limiting standard rule, testing of emission shall be conducted with the emission unit operation at permitted capacity. Permitted capacity is defined as 90 to 100 percent of the maximum operation rate allowed by the permit. If it is impracticable to test at permitted capacity, an emissions unit my be tested at less than the minimum permitted capacity; in this case, subsequent emission unit operation is limited to 110 percent of the test load until a new test is conducted. Once the unit is so limited, operation at high capacities is allowed for no more than 15 consecutive days for the purpose of additional compliance testing to regain the authority to operate at the permitted capacity. [Rule 62-297.310(2) and (3), F.A.C.]

Subsection C. Specific Conditions (Units 001-007)

The following Specific Conditions apply to the following emission units:

EMISSION UNIT NO.	SYSTEM	EMISSIONS UNITS DESCRIPTION
001#	Power	2.0 MW Diesel Electric Generator
002#	Power	2.0 MW Diesel Electric Generator
003#	Power	3.0 MW Diesel Electric Generator
004#	Power	3.0 MW Diesel Electric Generator
005#	Power	3.0 MW Diesel Electric Generator
006#	Power	2.5 MW Diesel Electric Generator
007#	Power	2.5 MW Diesel Electric Generator

Emission Limitation

C.1 In order to minimize excess emissions during startup/shutdown/malfunction this emission unit shall adhere to best operating practices. [Rule 62-210.700, F.A.C.]

Operation Limitations

C.2 The combined maximum heat input to Units No. 001-007 shall not exceed 187 MMBtu/hr while firing No. 2 fuel oil. [Rule 62-210.200, F.A.C., Definitions: Potential-to-Emit]

C.3 The existing Units No. 001-007 operations shall be limited to either 4380 hours per year per unit or to a total fuel oil consumption of 6,200,000 gallons per year for all seven units, whichever limit is more restrictive. [Rule 62-210.200, F.A.C., Definitions: Potential-to-Emit]

C.4 No. 2 fuel oil can be fired in the diesel generators 001-007. The maximum sulfur content of the No. 2 fuel oil shall not exceed 0.50 percent, by weight. [Rule 62.210. F.A.C., Definitions: Potential-to-Emit]

Test Methods and Compliance Procedures

C.5 The No. 2 fuel oil shall be monitored initially and annually for the sulfur content using ASTM D4294 Method (or equivalent). [Rule 62-297.440, F.A.C.]

C.6 The permittee shall maintain daily records of the fuel oil consumption for the emission units. [Rule 62-210.200, F.A.C., Definitions: Potential-to-Emit]

C.7 Compliance with the visible emission standard shall be demonstrated once per year with EPA Reference Method 9 as described in 40 CFR 60, Appendix A (1996, version) adopted by reference in 62-204.800, F.A.C. [Rule 62-297.3310, F.A.C.]

Appendix H-1, Permit History/ID Number Changes

Permit History (for tracking purposes):

E.U. ID No.	Description Expiration Date	Extended Date[1, 2]	Permit No. Revised Date(s)	Issue Date
1 - 5	01-29-78		AO44-1140	01-29-73
1 - 5	06-19-83		AO44-5072	06-19-78
1	07-08-88		AO44-69510	07-08-83
2	07-08-88		AO44-69511	07-08-83
3	07-08-88		AO44-69512	07-08-83
4	07-08-88		AO44-69513	07-08-83
5	07-08-88		AO44-69514	07-08-83
3	04-25-93		AO44-147446	04-25-88
4	04-25-93		AO44-147447	04-25-88
5	04-25-93		AO44-147448	04-25-88
3 - 5	05-27-98		AO44-227958	05-27-93
6 - 7	12-01-73		AC532	12-22-72
6 - 7	09-13-78		AO44-2158	09-13-73
6 - 7	01-11-84		AO44-5516	01-11-79
6 - 7	03-07-89		AO44-82705	03-07-84
1 - 2	11-22-89		AC44-147170	11-22-88
6 - 7	03-30-94		AO44-161577	03-30-89
1, 2, 6, 7	08-14-94		AO44-167945	08-14-89
1, 2, 6, 7	08-15-99		AO44-252749	08-15-94
8	01-31-99		0870004-002-AC PSD-FL-237	09-12-97

Notes:

Unit 1 Retired 01-88
Unit 2 Retired 02-88

1 - AO permit(s) automatic extension(s) in Rule 62-210.300(2)(a)3.a., F.A.C., effective 03/21/96.

2 - AC permit(s) automatic extension(s) in Rule 62-213.420(1)(a)4., F.A.C., effective 03/20/96. {Rule 62-213.420(1)(b)2., F.A.C., effective 03/20/96, allows Title V Sources to operate under existing valid permits}

ATTACHMENT B
MARATHON GENERATION PLANT ACTUAL OPERATING HOURS AND FUEL CONSUMPTION 1992-1999

RW BECK

MARATHON GENERATION PLANT

OPERATING HOURS AND FUEL CONSUMPTION
1992 - 1999

YEAR[1]	TOTAL RUNNING HOURS	FUEL CONSUMPTION GALLONS
1992	2,155.0	344,527
1993	681.0	105,090
1994	496.0	74,277
1995	611.0	80,673
1996	415.2	66,936
1997	1,801.9	287,925
1998	757.0	116,600
1999	894.2	145,099
AVERAGE[2]	642.4	

[1] Abnormal conditions, which caused increased annual operation at the Marathon Plant, occurred during the following years:

1992 - Hurricane Andrew

1997 - Power Transformer Failed

1998 - Various storms

1999 - Various storms

[2] The average annual operating hours were calculated for 1992 through 1999, with the exception of 1992 and 1997, due to the extremely high usage and abnormal conditions during these two years.

ATTACHMENT C
PRECAUTIONS TO PREVENT EMISSIONS OF UNCONFINED PARTICULATE MATTER

RW BECK

MARATHON GENERATION PLANT

PRECAUTIONS TO PREVENT EMISSIONS OF UNCONFINED PARTICULATE MATTER

The only potential source of unconfined particulate matter emissions associated with the operation of the facility are fugitive emissions from vehicular traffic providing fuel deliveries. Paved fuel delivery areas and roads are used as precautions taken to prevent and control unconfined emissions of particulate matter.

[redacted] LABORATORY, INC.
4301 N.W. 72 AVE., MIAMI, FL 33166 (305) 594-9055 FAX (305) 477-9137

TOTAL P.02

1/11/00

Florida Keys Electric Cooperative Assoc. Inc.
3421 Overseas Highway
Generating Plant
Marathon, FL 33050

Reference: We show the following data for diesel fuel samples received on 1/7/00.

Lab No.	Source	Date sampled	Sulfer content % MASS (D1266)
36087T	Tank 2	Not stated	0.04
36088T	Tank 3	Not stated	0.05

Carl E. Johnson

Carl E. Johnson, President

ATTACHMENT E
DETAILED DESCRIPTION OF CONTROL EQUIPMENT FOR UNIT #8

R·W·BECK

MARATHON GENERATION PLANT

DETAILED DESCRIPTION OF CONTROL EQUIPMENT FOR UNIT #8

The air pollution control considered as Best Available Control Technology (BACT) for Unit #8 consists of a combination of fuel injection timing retardation and 4-pass aftercooler with a separately cooled aftercooler circuit. Retarding the fuel injector timing reduces the firing pressure, which results in a 20 percent reduction of NO_X emissions. Additionally, through separately cooling the 4-pass aftercooler circuit, the combustion air density increases thus improving the ratio of air to fuel and reducing the output of NO_X by an additional 10 to 20 percent.

ATTACHMENT F
PROCEDURES FOR STARTUP AND SHUTDOWN

R·W·BECK

MARATHON GENERATION PLANT

PROCEDURES FOR STARTUP AND SHUTDOWN

Each of the eight existing diesel engines, as well as the proposed Unit #9, used for generation will be constantly kept at operating temperatures through the use of immersion heaters and electrically heated oil filter units. This practice allows each engine to come on line with an absolute minimum of idle, or warm-up time. Further, engines will be shut down completely when the requirements for electrical generation are no longer present.

Regularly scheduled inspection and maintenance of each engine provides both economical and efficient operation.

ATTACHMENT G
EMISSIONS TESTING RESULTS

RW BECK

3.1 INTRODUCTION AND BACT APPROACH

Among the requirements of New Source Review under Prevention of Significant Deterioration (PSD) regulations is a Best Available Control Technology (BACT) analysis to demonstrate that the control of air contaminant emissions from a proposed source will represent BACT. BACT is specifically determined for each PSD affected proposed source on a case-by-case basis. USEPA policy requires that the BACT analysis utilize a "top-down" procedure which requires identifying and implementing the most stringent, technically feasible control for each applicable PSD regulated pollutant unless economic, energy or environmental impacts are shown to be excessive. For example, if the costs associated with the most stringent, technically feasible control for a pollutant are shown to be excessive, the next most stringent level of control must be analyzed to determine economic, energy and environmental impacts. This progression is continued until the most effective, technically feasible control is identified for which the impacts are not excessive (USEPA, 1990). Therefore, in conformance with USEPA policy requiring a top-down analysis, the basic approach of the analysis presented herein is to: 1) determine the applicability of each PSD regulated pollutant; 2) identify available pollution control technologies for pollutants which BACT is required and review specific BACT determinations for similar recent projects; 3) eliminate pollution control technologies which are shown to be not technically feasible; and 4) evaluate the effectiveness of feasible technologies.

The Project consists of the addition of one EMD 20-710G4B high-speed diesel engine to the existing Marathon Power Plant. The diesel engine, which will be used for electric generation, is rated at 3,580 (gross) kW output with a HHV heat input of 30.2 million Btu per hour (MMBtu/hr) and fueled on No. 2 low sulfur (less than or equal to 0.05 percent sulfur, by weight) fuel oil. The annual emission rates for the Project at 100 percent base load with and without pollution control are presented in Table 3-1.

Unit 9's emissions indicate that the Project is significant with respect to PSD thresholds for one regulated pollutant (NO_X) which, therefore, requires a BACT determination. A BACT analysis is also required for PM_{10}, due to emissions from the proposed Project slightly exceeding the PSD threshold when combined with emissions from the existing PSD source (Unit 8), as shown in Table 3-1. However, through the use of good combustion controls and the exclusive use of low sulfur fuel (less than or equal to 0.05 percent sulfur, by weight), total PM_{10} emissions from Units 8 and 9 will most likely be less than the PSD threshold of 15 tpy.

Additionally, these Units are 'peakers' and total operation at Marathon has averaged only 640 hrs/yr during non-hurricane or otherwise typical years.

A brief introduction explaining the mechanisms of emissions formation is provided for a pollutant requiring a BACT determination. Applicable technologies are then identified for that pollutant and individually reviewed for their feasibility for application to the Project. Once a particular pollution control is determined feasible for the Project, an analysis is conducted to evaluate the economic, energy, and environmental impacts associated with its use. Annual potential emissions are used to determine the cost effectiveness of a given control. The most effective, technically feasible control option for which the impacts are not excessive is then identified as BACT for that significant pollutant.

Specifics on the various evaluation factors used in the BACT analysis are presented below.

3.1.1 TECHNOLOGY IDENTIFICATION

Review of the USEPA's RACT/BACT/LAER Clearinghouse (RBLC) is used as part of the analysis to determine appropriate pollution control technologies. The RBLC gives access to some of the latest pollution control technologies employed and their control levels for previously permitted similar projects. These specific determinations for similar recent projects were analyzed for applicability and comparison to the Project.

3.1.2 TECHNOLOGY FEASIBILITY

Control methods and devices are listed in descending order from most stringent to least stringent and, starting with the most stringent, are reviewed for their technical feasibility. Those that are found to be technically infeasible are identified and the basis for the finding is discussed. Technically infeasible controls are then excluded from further analysis and the remaining control options are evaluated. From this analysis, the most stringent, technically feasible control option is identified.

3.1.3 IMPACT ANALYSIS

Each option is evaluated with respect to its economic, energy and environmental impacts, starting with the most stringent feasible control. The first acceptable option is then determined as BACT.

3.1.3.1 ECONOMIC ANALYSIS

The economic impact analyses presented herein compare the total capital and operating costs of feasible pollution control technologies in terms of their cost effectiveness (dollars per ton of pollutant removed). Also, in accordance with the USEPA top-down procedure, in addition to calculating the top-down overall cost effectiveness of a given control option, incremental cost effectiveness can be

calculated in comparing two technically feasible control options. As such, the incremental cost effectiveness of a pollution control alternative is examined in combination with the total cost effectiveness in order to justify elimination of a control option. Finally, note that the analyses presented utilize the cost estimating methodology outlined in the most recent USEPA guidance document on this subject (USEPA, 1990).

Capital costs include purchase, installation costs, engineering fees, and other expenses of all required components, which comprise the pollution control system. The purchased equipment costs represent the delivered costs of the basic control equipment, auxiliary equipment, and instrumentation. Auxiliary equipment consists of all structural, mechanical, and electrical components required for the operation of the control device. Auxiliary equipment costs reflect vendor data provided for this project. Instrumentation and controls are usually not included in the basic equipment cost. The purchased equipment costs which include the FOB equipment cost, auxiliaries, instrumentation and controls, and freight, are then the basis for determining the direct and indirect installation costs.

Installation costs consist of both direct and indirect expenditures. Direct expenditures include materials and labor for site preparation, foundation, structural steel erection, piping, electrical, painting, and ancillary facilities. Indirect costs include contractor's engineering and supervision, construction and field expenses, construction fees, contingencies, and start-up and performance tests. Direct installation costs are expressed as a function of the basic equipment cost, based on average installation requirements of typical systems. Indirect costs are designated as a percentage of the direct costs (purchased equipment costs plus the direct installation costs) of the system. The factors are based on the assumption that the installation is performed by an outside contractor and not by plant personnel.

The capital cost estimation factors utilized in this analysis are shown in Table 3-2. These costs are comprised of the delivered equipment cost for the basic control equipment and all auxiliary equipment, plus direct and indirect installation costs. The capital cost estimates are based on information obtained from vendors, USEPA Office of Air Quality Planning and Standards (OAQPS) guidance, and experience with similar systems.

Annual operating costs consist of the financial requirements to operate the control system including overhead, maintenance, labor, raw materials, utilities, and other expenses incurred over the life of the project as a result of the application of the control technology. Table 3-3 depicts the annualized cost factors, which are comprised of the direct costs of materials and labor for maintenance and operation, utilities and waste disposal, as well as the indirect charges including plant overhead, general administration, insurance and capital recovery.

The cost effectiveness of a given pollution control system is based on an annualized cost of the system and its annual pollutant reduction. It is

determined by dividing the total annualized cost of the alternative by the tons of pollutant removed by that alternative per year. The basis for determining the uncontrolled tons, control effectiveness, and controlled tons of each pollutant are presented within each respective section of this BACT analysis. Table 3-1 presents estimated "realistic upper-bound" annual emissions for the Project with uncontrolled emissions and with emissions controlled using the proposed BACT. Realistic upper-bound annual emissions for the Project were calculated based on 8,760 hours of operation at 100 percent baseload and actual site conditions.

3.1.3.2 ENERGY ANALYSIS

Energy impacts associated with pollution control can generally be translated into economic costs. For example, an energy impact associated with a particular pollution control system may consist of a fuel penalty due to an increased heat rate. Consequently, the cost of the requirement for increased fuel consumption can be calculated and added to the economic analysis as an associated operating cost. Therefore, the energy impact analysis for each pollution control alternative presented herein is included as part of the economic analysis and, consequently, included in the operating cost component of each control system evaluated.

3.1.3.3 ENVIRONMENTAL ANALYSIS

An environmental analysis is performed for each feasible pollution control alternative to evaluate adverse environmental impacts resulting from application of the technology. As such, the environmental impacts associated with each feasible pollution control alternative for each pollutant are presented to determine whether the impacts are excessive and should preclude use of the control technology.

3.1.4 CONCLUSION

The pollution control technology chosen as representing BACT for the Project is provided for each PSD regulated pollutant which exceeds its respective PSD threshold, accompanied by a summary of supporting reasons. Additionally, should there be a more stringent pollution control technology that was not chosen as BACT for the evaluated pollutant, a summary of the findings eliminating it from consideration as BACT is provided.

3.2 BACT FOR NITROGEN OXIDES

3.2.1 INTRODUCTION

NO_X is formed in combustion sources by the thermal oxidation of nitrogen in the combustion air and the reduction and subsequent oxidation of fuel bound nitrogen. The predominant mechanism for NO_X formation in the diesel engine is through thermal oxidation of nitrogen in the combustion air. The rate of formation of the thermal NO_X is a function of the residence time, free oxygen,

turbulence, and peak flame temperature. Primary control techniques for thermal NO_X are aimed at minimizing one or more of these variables. Other secondary control methods, involving post-combustion techniques, remove the NO_X from the exhaust gas stream.

3.2.2 TECHNOLOGY IDENTIFICATION

NO_X limits for diesel engines range from approximately 50 ppm to 1500 ppm, with the majority being between 500 ppm and 1000 ppm. The low end of the range (50-ppm) corresponds to medium or high speed diesels fired on gas and equipped with SCR, while the high end of the range (1,500 ppm) corresponds to uncontrolled, low-speed diesels. The mid-range corresponds to medium-speed diesels with primary NO_X control techniques such as timing retardation, water emulsion (or injection), or a combination thereof.

Review of the RBLC database covering the past eight years resulted in the identification of over 30 stationary diesel engines fired on liquid fuel for which BACT determinations have been made and PSD applications approved. Control techniques identified in the RBLC included fuel injection timing retardation, water injection, lean combustion, intake air cooling, turbocharger with intercooling or aftercooling, and selective catalytic reduction (SCR). The engines that were identified and reviewed in the RBLC database, and are fired primarily on diesel fuel, range from 0.3 MW to 7.86 MW.

It should be noted that when identifying BACT determinations in the RBLC or elsewhere, care must be exercised in comparing emissions limits among the various projects. Emissions from the various types of diesels (low, medium, and high speed) vary widely. Therefore, small, high-speed diesels fired on low sulfur fuel oil should be compared to other small, high-speed diesels fired on low sulfur fuel oil, medium-speed diesels to other medium-speed diesels, and so on. It would not be prudent to use limits given for one diesel type to set limits for another.

3.2.3 TECHNOLOGY FEASIBILITY

NO_X control technologies available for diesel engines, from the most stringent to the least stringent level of control, are identified as follows:

1. Selective Catalytic Reduction (SCR)
2. Ignition Timing Retardation
3. Water Injection
4. Engine Performance Improvements (Inlet Air Cooling, Turbocharger with Intercooling or Aftercooling)

These alternatives are described and evaluated below for their respective feasibility as BACT.

3.2.3.1 SELECTIVE CATALYTIC REDUCTION

The SCR technology has been applied primarily to natural gas-fired combined-cycle combustion turbine systems. In SCR systems, ammonia is injected into the flue gas upstream of the catalyst bed where NO_x and ammonia react on the catalyst surface, forming elemental nitrogen and water. There are several types of commercially available SCR catalysts, including platinum-based, vanadium-based, and zeolite and ceramic molecular sieve-based catalysts. Each catalyst exhibits advantages and disadvantages in terms of operating temperature, ammonia/NO_x ratio, and optimum oxygen concentration. The function of the catalyst is to effectively lower the activation energy of the NO_x reduction reaction. Thus, the reaction is allowed to proceed under cooler conditions than normally required.

The rate at which the reactions proceed that reduce NO_x to molecular nitrogen and water are, even on the catalyst surface, a function of reactant concentration and temperature. A characteristic common to all types of SCR is the narrow "window" of temperatures in which the reactions are optimized. The optimum temperature range for operating an SCR system is between 500°F - 850°F. Operation above the optimum temperature could result in the formation of NO_x from ammonia as well as damage to the SCR system. Operation below the minimum temperature results in no substantial reduction of NO_x.

The SCR process typically employs a relatively low ammonia to NO_x stoichiometric ratio (a molar ratio of between 1.0 to 1.2). In order for this system to be effective as a pollution control technique, the injected ammonia must be carefully balanced with the NO_x concentration in the exhaust gas stream. Too much ammonia results in unreacted ammonia being discharged. This phenomenon is referred to as "ammonia slip." As the NO_x reduction is a complex function of both the temperature and reactant concentration, the proper control of an SCR unit is complex because of the precarious balance that must be achieved and maintained.

The SCR process is subject to loss of catalyst activity over time. Since the catalyst itself is the most costly part of the process, steps to prevent catalyst deactivation must be taken to improve economical operation of the process. There is no simple method of monitoring catalyst activity, rather ammonia use and corresponding NO_x emissions must both be monitored. Catalyst deactivation occurs through either physical masking or chemical poisoning. Physical masking is generally the result of either prolonged exposure to excess temperature or masking of the catalyst due to entrainment of particulate matter, whereas chemical poisoning is caused by the irreversible reaction of the catalyst with a contaminant of the gas stream and is a permanent condition. The presence of heavy metals in a gas stream is often responsible for the permanent deactivation of a catalyst through poisoning. It is typical for catalyst suppliers to assign a two to three year lifetime to catalyst systems employed on gas turbines when natural gas is the fuel. It is expected that the catalyst life with diesel operation on fuel oil

firing will be reduced due to particulate, sulfur and trace metals in the fuel. Thus, catalyst replacement cost would be prohibitive.

Virtually all of the recent experience with the application of SCR to combustion sources has been associated with natural gas-fired combined-cycle installations with the SCR system installed in the Heat Recovery Steam Generator (HRSG). Review of the RBLC database indicates that only one facility has installed SCR on small diesel engines. SCR was determined as BACT for the Philadelphia Northeast Water Treatment Plant due to a local ordinance that set strict emission limits without regard to cost.

In conclusion, SCR is not a technically feasible option for the Project due to the high costs and limited application on small, high-speed diesel engines. SCR evaluations for combined-cycle, gas-fired installations typically have cost effectiveness values of approximately $1,500/ton. Significantly higher cost effectiveness would be expected on high-speed diesel engines due to lack of economies of scale for relatively low flue gas flow rates and expected higher frequency of catalyst replacement. Additionally, there are significant potential negative environmental impacts associated with SCR catalyst materials and reagents (as described in Section 3.2.4.1).

3.2.3.2 IGNITION TIMING RETARDATION

Ignition Timing Retardation (ITR) is accomplished in a diesel engine by delaying the injection of the fuel into the compressed air in the cylinder. The result is that combustion occurs at lower peak pressures and temperatures. In addition, the duration of the peak pressure and temperatures is shorter than for standard timing of the fuel injection. The lower peak flame temperature and the shorter exposure reduces the formation of NO_X. However, as a result of the reduction in peak pressures and temperatures, timing retardation reduces maximum power output and engine efficiency while increasing particulate emissions and fuel consumption. Vendor data indicates reduction of NO_X concentrations by approximately 20 percent with four degrees of injection retard on small, high-speed, oil-fired diesels with a concomitant 1.5 percent increase in fuel consumption.

3.2.3.3 WATER INJECTION

This NO_X control method sprays water into the mixing chamber. As the water evaporates, considerable heat from the air stream is absorbed. Through decreasing inlet air temperature, the conversion of N_2 and O_2 into NO_X during the combustion process is affected. However, this control method appears to have limited applicability in Florida due to climate constraints. Relative humidity on Vaca Key is typically between 75 percent and 85 percent. At these high levels of humidity, significant evaporative cooling is not physically possible. Additionally, water injection is found to be the most effective on peaking units during cold ambient temperatures. The annual minimum temperature on Vaca

Key is approximately 65°F. Therefore, water injection is not considered further in this BACT analysis due to limited effectiveness.

3.2.3.4 ENGINE PERFORMANCE IMPROVEMENTS

Various engine performance improvements, such as inlet air cooling or a combination of a turbocharger and intercooling or aftercooling, reduce the temperature of the charge air entering the cylinder, thereby also reducing the maximum compressed air temperature. This reduces the peak combustion temperature and thus reduces the rate of NO_X formation. Vendor data suggests NO_X reductions of 10 percent with a decrease of 20°F to 25°F in the charge air temperature. Additionally, reductions in PM emissions (approximately 10 percent) and fuel consumption (approximately 0.5 percent) are typical of this control method. The reduced charge air temperature also allows for an increase in power, as more air enters the cylinder due to its increased density.

3.2.4 IMPACT ANALYSIS

The most stringent technically feasible control technologies were found to be:

- 4° ignition timing retardation; and
- 4-pass aftercooler with a separate aftercooler circuit.

These controls were then evaluated with respect to their economic, energy, and environmental impacts. Additionally, it was determined that a combination of these two technologies will significantly reduce NO_X emissions while maintaining PM emissions and fuel consumption at an acceptable level. Although SCR has been shown to be technically infeasible for the Project and has been removed from further consideration for BACT, the adverse environmental impacts associated with the use of SCR were considered noteworthy and are, therefore, also described below.

3.2.4.1 SELECTIVE CATALYTIC REDUCTION

3.2.4.1.1 ENVIRONMENTAL ANALYSIS

In addition to being technically infeasible for the Project, there are significant adverse environmental impacts associated with the use of SCR including disposal of spent catalyst, transportation, storage and handling of ammonia, and emissions of unreacted ammonia, referred to as ammonia slip.

The SCR catalyst material will be subject to loss of activity and poisoning and must be periodically replaced. The disposal of catalyst is complicated by the fact that many SCR catalysts contain various heavy metals including titanium and vanadium, which are hazardous wastes. Thus, use of SCR entails hazardous waste handling and disposal, which is an environmental burden and potential liability. It is expected that if SCR were applied to the Project, the catalyst would require frequent replacement.

An additional adverse environmental impact associated with SCR is the transportation of the ammonia (NH_3) to the site, and the subsequent on-site storage. Ammonia is a designated "Extremely Hazardous Substance" (EHS). Under federal regulations, the facility would most likely exceed certain thresholds for on-site storage of ammonia, thus requiring the preparation of risk assessments and management plans for the prevention of accidental releases.

Additionally, as with any chemical process, not all of the reactants will be consumed in the NO_X reduction reactions. Emissions of unreacted ammonia (ammonia slip) are thus another adverse environmental consideration in the application of SCR.

3.2.4.2 IGNITION TIMING RETARDATION AND AFTERCOOLER WITH SEPARATELY COOLED AFTERCOOLER CIRCUIT

3.2.4.2.1 ECONOMIC AND ENERGY ANALYSIS

Tables 3-4 and 3-5, respectively, present the capital and annualized cost for the combined timing retard and aftercoolers control option. The costs are itemized to include capital cost of equipment required such as installation, structural support and instrumentation. Direct and indirect operation costs include operating personnel, maintenance, replacement parts, energy penalties and utilities. The total capital cost is estimated at $351,300 and the total annualized cost is estimated at $218,100. The top-down cost effectiveness ratio for this control option is estimated at $1,600 per ton of NO_X removed. This ratio is considered high, but cost effective, when considered against other proposed controls.

3.2.4.2.2 ENVIRONMENTAL ANALYSIS

Ignition timing retardation (4°) will decrease NO_X emissions by approximately 20 percent. However, other environmental impacts associated with timing retard include increased PM emissions and fuel consumption. A 20 to 25 percent increase of PM emissions is caused both by cooler combustion conditions and by decreased engine efficiency. The decrease in efficiency means that fuel must be burned at a higher rate to obtain the same amount of power, thus causing an approximate 1.5-percent increase in fuel consumption. In turn, the rate of certain pollutant emissions increases.

However, with the addition of a 4-pass aftercooler with a separate aftercooler circuit, PM emissions will be reduced along with fuel consumption. According to vendor data, the 4-pass aftercooler will reduce PM emissions by about 10 percent and fuel consumption by about 0.7 percent. Additionally, NO_X emissions will decrease by 10 percent with the 4-pass aftercooler. The separate aftercooling circuit will decrease PM by approximately another 10 percent and fuel consumption by 0.5 percent, while also reducing NOX emissions by 10 percent.

The combination of these two technologies will work together to effectively minimize environmental impacts. However, emission reductions due to the

chosen controls are not cumulative, and must be considered 'step-by-step'. With the combination of control technologies, NO_X emissions will be reduced by approximately 35 percent. An increase or decrease of PM emissions due to the control devices is considered negligible when combined with additional combustion controls, such as low sulfur fuel (less than or equal to 0.05 percent sulfur, by weight) and good combustion practices.

3.2.5 CONCLUSION

The most stringent control technology option for NO_X associated with combustion source operation is the SCR system. SCR should not be considered BACT for the Project because it is currently not technically feasible, as:

1. No. 2 fuel oil contains sulfur and trace elements that will likely mask and/or poison the catalyst, resulting in prohibitive replacement cost.
2. The only SCR on a small, high-speed diesel engine in the United States that we are aware of is found at the Philadelphia Southwest Water Treatment Plant. This facility was required to implement stringent controls, due to strict emissions limits, without regard to cost.
3. In addition to being technically infeasible due to high cost and limited application for the Project, SCR includes adverse environmental impacts associated with ammonia slip, ammonia transportation, handling and storage, and disposal, which are greater than for other control alternatives.

The next most stringent control technology after SCR is a combination of timing retard and aftercoolers. This technology should be viewed as representing BACT for NO_X control because:

1. Its cost effectiveness ratio of $1,600 per ton is within high, but reasonable, limits when compared to similar units and similar applications.
2. The 66 lb/hr emission level has been demonstrated in similar applications and is consistent with similarly designed and operated units that have been recently permitted.
3. Timing retard combined with an aftercooler and separate aftercooler circuit has minimal adverse environmental impacts. NO_X control to 66 lb/hr gives adequate reduction without increasing other pollutant emissions to unacceptable levels.

3.3 BACT FOR PARTICULATE MATTER

3.3.1 INTRODUCTION

Emissions of particulate matter are primarily the result of fuel impurities and byproducts of incomplete combustion. Primary particulate matter control consists of burning clean fuel oil in combination with proper engine design,

operation and maintenance. Post-combustion controls for particulate matter include cyclones, electrostatic precipitators, baghouses, and scrubbers.

3.3.2 CONCLUSION

A review of the RBLC and other projects with which we are familiar indicates that no post-combustion particulate control systems such as electrostatic precipitators or baghouses have been employed on diesel engines. The high gas velocities and volumetric flow rates, along with the high combustion efficiency, associated with diesel engines make the application of post-combustion particulate control devices technically infeasible. Rather, particulate emissions from diesel engines are controlled through combustion controls via proper engine design, operation and maintenance. With respect to combustion controls, there are no significant economic, energy, or environmental impacts. Therefore, BACT for particulate matter should be determined to be the minimum emission rate achievable through proper engine design, operation and maintenance. Additionally, the Project will exclusively burn low sulfur fuel oil (less than or equal to 0.05 percent sulfur, by weight). This fuel restriction will contribute to limiting the emissions of particulates.

TABLE 3-1
POLLUTANT SUMMARY
BASELINE ANNUAL EMISSIONS[1]

Pollutant	Unit 9 Uncontrolled (TPY)	Unit 9 Controlled (TPY)	Combined Emissions For Units 8 and 9 (TPY)	PSD Significance Level[2] (TPY)
NO_X (as NO_2)	423	289.5[3]	579.0	40
CO	23.7[4]		47.4	100
SO_2	7.2		14.4	40
PM	9.22		18.44	25
PM_{10}[5]	7.58	<7.58	15.2	15

(1) All emissions based on Units 8 and 9 operating at 100 percent load and 8,760 hours per year.
(2) From 40 CFR 52.21(b)(23).
(3) The controlled NO_X emissions are based on emissions tests for the identical Unit 8. These results indicate a 32 percent efficiency of control.
(4) CO emissions are based on emissions tests for the identical Unit 8.
(5) The use of low sulfur fuel (less than or equal to 0.05% sulfur, by weight) and good combustion practices will decrease PM_{10} emissions. Additionally, based on average operating hours of 640 hours per year, actual PM_{10} emissions for each unit (8 and 9) will be further reduced.

TABLE 3-2

CAPITAL COST ESTIMATION FACTORS

DIRECT COSTS	FACTOR
1) Purchased Equipment	
a) Basic Equipment	Vendor Data
b) Auxiliaries	Vendor Data
c) Instrumentation	0.10(1a+1b)
d) Structural Support	0.10(1a+1b)
e) Freight	0.05(sum 1a . . . 1d)
2) Direct Installation	(0.25 to 0.30)(sum 1a . . . 1e)
Total Direct Cost (TDC)	**(1) + (2)**
INDIRECT COSTS	**FACTOR**
3) Indirect Installation	
a) Engineering	(0.05 to 0.1)(TDC)
b) Construction and Field Expenses	0.1(TDC)
c) Construction Fee	0.05(TDC)
d) Contingencies	0.2(TDC)
4) Other Indirect Costs	
a) Start-up and Testing	0.01(TDC)
Total Indirect Costs (TIC)	**(3) + (4)**
TOTAL CAPITAL COSTS	**TDC + TIC**

TABLE 3-3

ANNUALIZED COST ESTIMATION FACTORS

DIRECT OPERATING COSTS	FACTOR
1) Operating Labor and Supervisor	Labor: $40.00/man-hour Supervisor: 15% of Operating Labor
2) Maintenance	5% of Direct Costs
3) Replacement Parts	3% of Direct Costs
4) Utilities	
a) Electricity	$0.07/kW-hr
c) Fuel Penalty	
INDIRECT OPERATING COSTS	**FACTOR**
6) Overhead	30% of Labor + 12% Maintenance
7) Property Tax	1% Total Capital Cost
8) Insurance	1% Total Capital Cost
9) Administration	2% Total Capital Cost
10) Capital Recovery	Capital Recovery x TDC
Total Annualized Cost	**Sum (1. . . 10)**
COST EFFECTIVENESS	**ANNUAL COST/TONS REMOVED**

Source: EPA OAQPS, 1990

TABLE 3-4

CAPITAL COSTS FOR PRIMARY NO_x CONTROLS
EMD 20-210G4B ENGINE
($1,000)

DIRECT COSTS	
Item	**Cost[1]**
1) Purchased Equipment	
a) Timing Retardation 4°	5.7
b) Separately Cooled Aftercooler	26.1
c) Aftercooler	107.5
d) Instrumentation	13.9
e) Structural Support	13.9
f) Freight	8.4
2) Direct Installation	52.7
Total Direct Costs	**228.2**
INDIRECT COSTS	
Item	**Cost**
3) Indirect Installation	
a) Engineering	22.8
b) Construction and Field Expenses	22.8
c) Construction Fee	11.4
d) Contingencies	45.6
4) Other Indirect Costs	
a) Start-up and Testing	20.4
Total Indirect Costs	**123.1**
TOTAL CAPITAL COSTS	**351.3**

(1) An explanation for the basis of cost can be found in Table 3-2.

TABLE 3-5

ANNUALIZED COSTS FOR NO_x CONTROLS
EMD 20-210G4B ENGINE
($1000) (1)

DIRECT OPERATING COSTS	FACTOR(2)
1) Personnel	
a) Labor at $40/man-hr	41.6
b) Supervisor at 15% of Labor	6.2
2) Maintenance at 5% of Direct Costs	11.4
3) Replacement Parts	
a) Parts at 3% of Direct Costs	68.5
4) Utilities	
a) Electricity	34.3
c) Fuel Penalty	3.5
INDIRECT OPERATING COSTS	
6) Overhead at 30% of Labor and 12% of Maintenance	15.7
7) Property Tax at 1% of Total Capital Costs	3.5
8) Insurance at 1% of Total Capital Costs	3.5
9) Administration at 2% of Total Capital Costs	7.0
10) Capital Recovery at 10% x TDC	22.8
TOTAL ANNUALIZED COSTS	**218.1**
TONS REMOVED	**133.5**
DOLLARS PER TON REMOVAL	**1,600**

(1) Except for "TONS REMOVED" and "DOLLARS PER TON REMOVAL".
(2) An explanation for the basis of cost can be found in Table 3-3.

4.1 INTRODUCTION

The addition of Unit 9 (a 3.58 MW diesel generating unit) at Florida Key Electric Cooperative's Marathon Generation Plant will constitute an addition of a major source. Under the provisions of the regulations for Prevention of Significant Deterioration (PSD) of air quality, an air quality compliance assessment is required as technical support for the PSD permit application. The primary objective of this air quality assessment is to demonstrate compliance with applicable PSD Class I and Class II increments and National Ambient Air Quality Standards (NAAQS) for those pollutants emitted from the source in quantities defined by the regulations as significant (40 CFR 52.21 (b)(23)(i) and Table 17-212.400-2, F.A.C.).

Dispersion modeling has been conducted to determine the significance of the impacts from Unit 9 and the existing Units 1 through 8 on the regional ambient air quality due to the emissions of NO_X and PM_{10}. This assessment presents the results of the comprehensive air quality analysis that indicates that the addition of the source will not cause or contribute to a violation of the NAAQS. The analysis also demonstrates that Class I and Class II PSD increments will not be exceeded.

4.2 MODELING METHOD

4.2.1 MODEL SELECTION

The model used for this air dispersion analysis was USEPA's Industrial Source Complex Short Term, Version 3 (ISCST3) model. This steady-state Gaussian plume model contains algorithms for predicting area and volume source impacts, modified downwash algorithms for non-buoyant plumes, and an Huber-Snyder algorithm which incorporates wind-direction specific building heights and widths similar to the Schulman-Scire algorithm. This software also allows each model run to include several averaging intervals and multiple receptors.

4.2.2 TOPOGRAPHICAL FEATURES

Vaca Key, on which Marathon is located, and the surrounding islands are essentially flat. The Marathon Plant site is at an elevation of approximately 2.5-m above mean sea level (msl), with the surrounding area dropping to an elevation of about 2-m msl. Since the variation in terrain is minimal and less than the

height of the Unit 9 exhaust stack (13.72 m), the use of a flat terrain dispersion model is appropriate for the analysis.

4.2.3 METEOROLOGICAL LAND USE CLASSIFICATION

The meteorological land use classification is used to determine the profile of the vertical wind speed and associated mechanical turbulence due to surface roughness. The wind speed profile is then used to extrapolate wind speeds at various heights for use in the estimates of atmospheric pollutant dispersion. USEPA's *Guideline on Air Quality Models* stipulates that the land use within the total area circumscribed by a 3-km radius around the source can be classified using Auer's scheme of meteorological land use typing proposed in the *Journal of Applied Meteorology* (1976). Auer's classifications are as follows:

Type	Description
I1	Heavy Industrial
I2	Light/Moderate Industrial
C1	Commercial
R1	Common Residential
R2/R3	Compact Residential
R4	Estate Residential
A1	Metropolitan Natural
A2	Agricultural Rural
A3/A4	Undeveloped
A5	Water Surfaces

According to the *Guideline*, if more than 50 percent of the total area in the circle is classified by land use as I1, I2, C1, R2, or R3, urban dispersion coefficients should be used in the modeling, otherwise, appropriate rural dispersion coefficients should be used. After reviewing various maps of the region surrounding the Marathon Plant, it was estimated that more than half of this area is classified as type A5 (Water Surfaces). Therefore, default rural dispersion coefficients were used in the analysis.

4.2.4 BACKGROUND AMBIENT AIR QUALITY

Marathon is designated attainment or unclassified for all criteria pollutants. This designation is consistent with several features of the area. First, there are no large sources of air pollution nearby. Second, there is no significant terrain that could trap pollution and cause exceedances of the NAAQS. Third, the prevailing winds are east and southeast bringing clean air off of the Atlantic Ocean.

4.2.5 SOURCE DATA

The existing diesel stacks and their emissions at the Marathon Plant are described in Table 4-1. The installation of Unit 9, one nominal 3.58-MW diesel

generator, is the proposed addition to the site. Emissions of NO_x from the new unit will be controlled using a combination of retarded injection timing and 4-pass increased flow capacity aftercoolers with a low temperature separate aftercooling circuit. Through the use of good combustion control practices and low sulfur fuel (less than or equal to 0.05% sulfur, by weight), PM_{10} emissions from Unit 9 will be reduced. The modeling parameters presented in Table 4-1 represent Unit 9 operating at 100% of capacity with these controls in place.

Additionally, as part of the proposed project, the stack height of the existing 3.58 MW EMD Diesel Generator Unit 8 will be increased from 38.7 feet to 45 feet. This stack height adjustment is included in Table 4-1.

4.2.6 METEOROLOGICAL DATA

The refined analysis presented herein used five complete years (1987 through 1991) of wind and stability data consisting of actual surface observations in Key West and twice-per-day upper air soundings concurrently recorded at a station in Miami. Default wind speed profile exponents (indicative of increasing wind speed with increasing distance from the surface) and vertical potential temperature gradients (indicative of decreasing temperature with increasing distance above the surface) were used in the modeling. Five years of meteorology were processed using the source parameters found in Table 4-1.

4.2.7 STACK HEIGHT CONSIDERATIONS

According to 40 CFR 51.100(hh), a good engineering practice (GEP) stack height is the greater of:

65 meters

or $H_g = H_b + 1.5L$

where:
- H_g = the GEP stack height
- H_b = the height of the dominant nearby building, and
- L = the lesser dimension of the height or projected width of the dominant nearby building.

As shown in Table 4-1, the Unit 9 stack and the stacks of the existing units are less than 65 m. This in combination with the building dimensions indicate the potential for building downwash. For this reason, a building downwash analysis was included in the dispersion modeling.

Structures tend to disrupt airflow across a region and create turbulence around the structure. This disruption is referred to as the building wake effect or building downwash effect. This effect can result in high local ground-level pollutant concentrations if the emission point of the source is not far enough above or away from the structure to avoid the effect. A stack constructed at a height approximately 2.5 times the height of a nearby building is not likely to be affected by structural turbulence. If a stack is located within 5L of a building,

and the building height is greater than approximately 40 percent of the stack height, then the stack is considered to be affected by building downwash.

The ISCST3 model used in the ambient air quality assessment uses a combination of two algorithms for predicting building wake effects. The Schulman-Scire algorithm is applicable when the stack height is less than 1.5 H_b and takes into account wind-direction-specific building heights and widths when determining wake effects. The Huber-Snyder algorithm is applicable when the stack height is between 1.5 H_b and 2.5 H_b and uses the actual building height and maximum projected width for all wind directions. Software packages are available to determine the values of the building heights and widths that can influence each stack. One such package, Building Profile Input Program (BPIP), has been used for this analysis to estimate the wake effects caused by the structures at the Marathon Plant. The only structure at the Marathon Plant site with the potential to affect airflow is the Power Plant Building, with a height of 30 feet. The site layout can be found in Section 2 (Figure 2).

After BPIP was run, it was found that the Units 6 and 7 were located at a distance greater than 5L from the building and were therefore not included in the building downwash analysis. All other units were included, and the results of BPIP can be found in the input for the modeling runs (Attachment 1).

4.2.8 RECEPTOR NETWORKS

The receptor grid used for the refined air quality analysis consists of a polar coordinate system centered on the Unit 8 stack. The grid network is made up of 36 direction radials separated by 10-degree increments. Receptors were placed at ground level at 50, 100, 200, 300, 400, 500, 750 and 1000m intervals. The polar grid is rotated so that 0° is located 104° off True North to accommodate for the orientation of the site (Section 2, Figure 2). This grid network provided sufficient resolution and downwind coverage to identify the areas of expected maximum concentrations.

4.3 RESULTS OF MODELING ANALYSIS

4.3.1 REFINED ANALYSIS

ISCST3 was used with real-time meteorological data to account for the consistency of the meteorology from the east and southeast. Further, the influence of structural downwash on the exhaust plumes was included in the refined modeling calculations.

The parameters found in Table 4-1, which include Unit 9 and the increased stack height for Unit 8, were modeled over five years of meteorology. The results can be seen in Tables 4-2 and 4-3.

A first-high concentration of 117.0 $\mu g/m^3$ for NAAQS and 17.4 $\mu g/m^3$ for PSD - Class II Increment (Attachment 1) was produced when NO_X emissions were

modeled. In accordance with USEPA-approved practices and consistent with modeling protocol, these concentrations can be reduced by 25 percent for NO_x, due to the ratio of NO_2 to NO_x, as outlined in Supplement C to the *Guideline on Air Quality Models* (revised) (Appendix W of 40 CFR Part 51), EPA, August 1995 (Attachment 2). Therefore, the first-high concentrations for NAAQS and PSD - Class II are 87.75 $\mu g/m^3$ and 13.05 $\mu g/m^3$, respectively. Both these concentrations fall below the annual NO_x NAAQS of 100 $\mu g/m^3$ and the annual NO_x PSD – Class II Increment of 25 $\mu g/m^3$.

Additionally, PM_{10} emissions were modeled for the facility, which included the addition of Unit 9 and the stack height increase for Unit 8. The first-high annual concentration was predicted to be 6.5 $\mu g/m^3$ for NAAQS and 0.44 $\mu g/m^3$ for PSD – Class II Increments. Second-high twenty-four hour concentrations were found to be 65.56 $\mu g/m^3$ and 7.37 $\mu g/m^3$ for the NAAQS and PSD – Class II Increments, respectively. These predicted impacts do not exceed the PM_{10} annual standards of 50 $\mu g/m^3$ (NAAQS) and 17 $\mu g/m^3$ (PSD – Class II Increment) or twenty-four hour standards of 150 $\mu g/m^3$ (NAAQS) and 30 $\mu g/m^3$ (PSD – Class II Increments). It is appropriate to consider the second-high concentration for the twenty-four hour averaging interval when modeling and reviewing five complete years of meteorological data. The modeled concentrations of NO_X and PM_{10} are compared to the appropriate standards in Tables 4-2 and 4-3.

4.3.2 CLASS I INCREMENT ANALYSIS

The National Park Service (NPS) has developed a guidance document for assessing source impacts on Class I areas (*Permit Application Guidance for New Air Pollution Sources*, March 1993). Modeling procedures, similar to those applicable in Class II areas, have been developed by the NPS for Class I areas. Those guidelines were used in this application to show that the net effect of adding Unit 9 will be insignificant on regional Class I areas.

The receptors used in this analysis were similar to those used in the PSD Class II and NAAQS analysis except the distance was increased. The receptors were limited to represent only the intersection of the direction radials from 10° to 60° and the nearest boundary of the Everglades Class I area (see Figure 1). The receptors are identified in Table 4-4. Table 4-5 sets forth the NO_X annual maximum impact concentrations of Marathon's Units 8 and 9 on the Everglades over five years (1987 through 1991). Maximum predicted annual and twenty-four hour PM_{10} impacts are also found in Table 4-5.

The distance between Marathon and the Everglades is approximately 30 km. At this distance, as demonstrated when the modeled values are compared with the corresponding PSD – Class I Increment concentrations (Table 4-5), the addition of Unit 9 and the stack height increase for Unit 8 will have an insignificant impact on the Class I area.

4.3.3 AIR QUALITY RELATED ISSUES

Due to the small size of the proposed new diesel unit and the nature of operation (peaking operation), the air quality impacts on growth, visibility, soils, vegetation, and aquatic life are considered insignificant.

TABLE 4-1
SOURCE PARAMETERS

Source	Stack Height (m)	NO_x Emission Rate[2] (g/s)	PM_{10} Emission Rate[3] (g/s)	Stack Temperature (K)	Stack Velocity (m/s)	Stack Diameter (m)
Unit 1	6.15	2.96	0.218	669	27.3	0.71
Unit 2	6.15	3.85	0.218	669	27.3	0.71
Unit 3	11.43	4.64	0.218	677	38.9	0.66
Unit 4	11.43	4.44	0.218	677	38.9	0.66
Unit 5	11.43	5.11	0.218	677	38.9	0.66
Unit 6	7.2	4.72	0.218	664	23.8	0.76
Unit 7	7.2	4.40	0.218	664	23.8	0.76
Unit 8	13.72[1]	8.57	0.218	625	34.6	0.71
Unit 9	13.72	8.57	0.218	625	34.6	0.71

(1) The stack height for the existing Unit 8 is being increased from 11.79 m to 13.72 m as part of this permit application.
(2) The NO_x rates included in this table are the maximum allowable emissions for Units 1 through 8 as stated in the Plant's Operation Permit (#0870004-001-AV). It is anticipated that the proposed Unit 9 will have NO_x emissions restrictions similar to those for the existing and identical Unit 8.
(3) The PM_{10} emission rates for Units 8 and 9 were calculated from emission factors found in AP-42. To be conservative, these calculated rates were also used for Units 1 through 7 (all seven units are smaller, and therefore would have lower actual emission rates, than Units 8 and 9).

TABLE 4-2
NAAQS AND PSD-CLASS II AIR QUALITY ANALYSIS
ANNUAL NO_x
MAXIMUM PREDICTED CONCENTRATIONS

Year	NAAQS[1]			PSD[2]		
	Maximum Concentration (ug/m^3)	Revised Concentration[3] (ug/m^3)	Annual Standard (ug/m^3)	Maximum Concentration (ug/m^3)	Revised Concentration[3] (ug/m^3)	Annual standard (ug/m^3)
1987	91.8	68.9		15.5	11.6	
1988	112.1	84.1		12.9	9.7	
1989	111.3	83.5	100.0	16.2	12.2	25.0
1990	102.7	77.0		16.6	12.5	
1991	117.0	87.8		17.4	13.1	

(1) The NAAQS analysis results include Units 1 through 9.
(2) The PSD-Class II analysis results include Units 8 and 9.
(3) The NO_x concentrations can be reduced by 25% due to the ratio of NO_2 to NO_x as outlined in Supplement C to EPA's *Guideline on Air Quality Models*, August 1995 (Attachment 2)

TABLE 4-3
NAAQS AND PSD-CLASS II AIR QUALITY ANALYSIS
ANNUAL AND 24-HOUR PM_{10}
MAXIMUM PREDICTED CONCENTRATIONS

Year	NAAQS[1,2]				PSD[3]			
	Annual		24-Hour		Annual		24-Hour	
	Maximum Concentration (ug/m^3)	Standard (ug/m^3)	Second-High Concentration (ug/m^3)	Standard (ug/m^3)	Maximum Concentration (ug/m^3)	Standard (ug/m^3)	Second-High Concentration (ug/m^3)	Standard (ug/m^3)
1987	4.84		55.20		0.39		6.56	
1988	6.46		65.56		0.33		7.37	
1989	6.50	50.0	53.35	150.0	0.41	17.0	4.64	30.0
1990	5.23		63.07		0.42		7.00	
1991	6.17		53.79		0.44		5.79	

(1) The NAAQS analysis results include Units 1 through 9. PM_{10} emission rates for Units 8 and 9 were calculated from emission factors found in AP-42. To be conservative, these calculated rates were also used for Units 1 through 7 (all seven units are smaller, and therefore would have lower actual emission rates, than Units 8 and 9). If actual emission rates were used for Units 1 through 7, the maximum impact concentrations would be lower than what is shown here.
(2) The PSD-Class II analysis results include Units 8 and 9.

TABLE 4-4
PSD - CLASS I
RECEPTOR LOCATIONS

Receptor	Distance (m)[1]	Radials (°)[2]
1	41000	108
2	33500	118
3	31150	128
4	30000	138
5	30000	148
6	30000	158
7	31150	168

(1) Distance from the Unit 8 stack.
(2) The radials are based on the polar grid rotated 104° from True North.

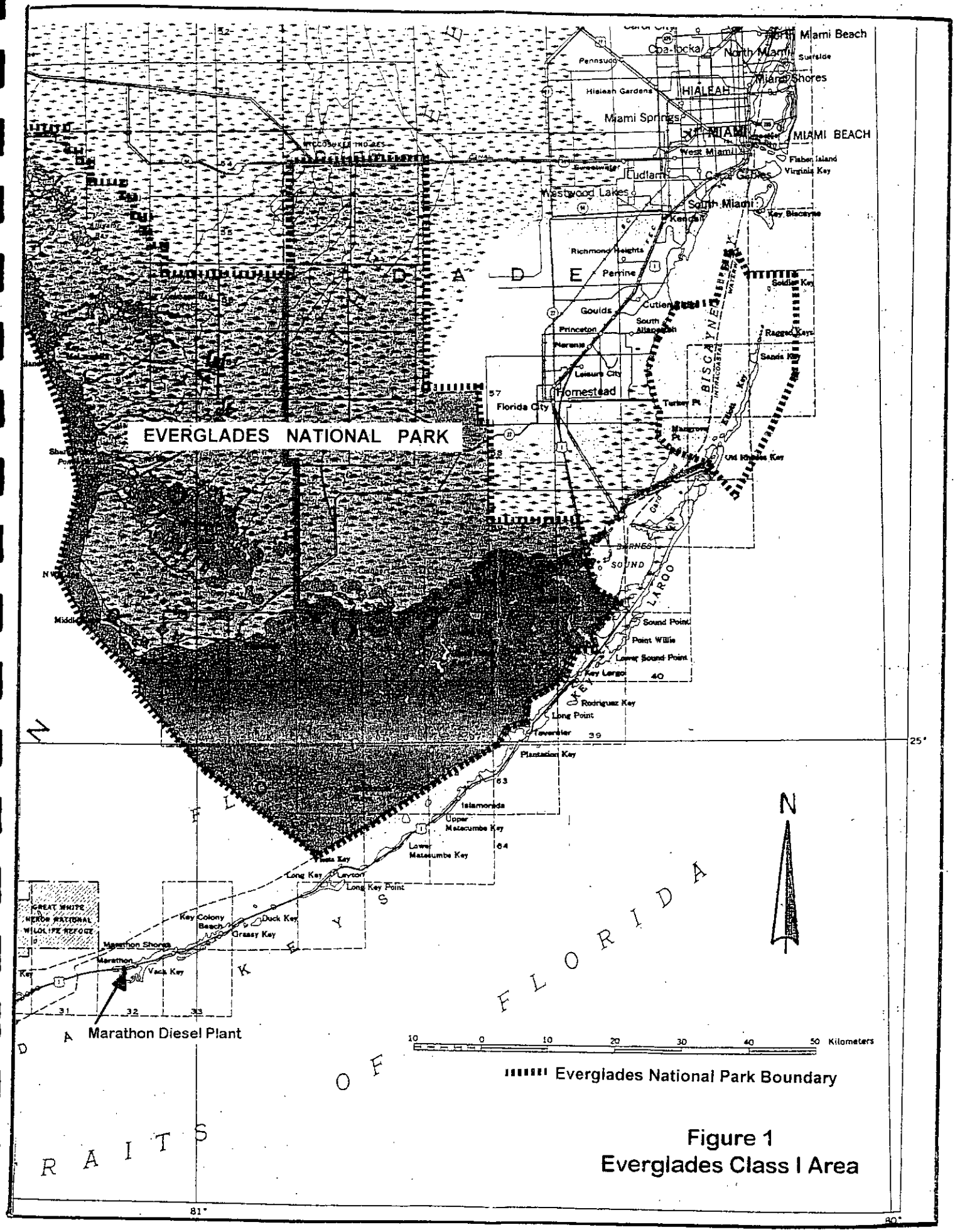
TABLE 4-5
PSD - CLASS I
MAXIMUM CUMULATIVE IMPACT CONCENTRATIONS[1,2]

Year	NO_x		PM_{10}			
	Annual		Annual		24-Hour	
	Maximum Modeled Concentration (ug/m^3)	PSD Class I Increment Concentration (ug/m^3)	Maximum Modeled Concentration (ug/m^3)	PSD Class I Increment Concentration (ug/m^3)	Maximum Modeled Concentration (ug/m^3)	PSD Class I Increment Concentration (ug/m^3)
1987	0.074	SI 0.1	0.0019	0.1	0.071	0.3
1988	0.075		0.0019		0.043	
1989	0.062	2.5	0.0016	5.0	0.056	10.0
1990	0.041		0.0010		0.073	
1991	0.038		0.0010		0.056	

[1] The impacts are the highest concentrations predicted at the border of the nearest Class I area (the Everglades).
[2] The predicted impacts are made up of contributions from both PSD sources (Units 8 and 9).

FIGURE 1
EVERGLADES CLASS I AREA

R·W·BECK


EVERGLADES NATIONAL PARK
Miami Beach
North Miami
Miami Shores
HIALEAH
Miami Springs
MIAMI
MIAMI BEACH
Coral Gables
South Miami
Homestead
Florida City
Key Largo
Marathon
Marathon Diesel Plant
Everglades National Park Boundary
Kilometers
Figure 1
Everglades Class I Area

ATTACHMENT 1
AIR DISPERSION MODELING RUNS

R·W·BECK

```
CO STARTING
CO TITLEONE 1991 FLORIDA KEYS ELECTRIC COOP - NO2 - AAQS & PSD 1/12/00 R.W.BECK
CO TITLETWO ANN 24-All ex 8&9@50%(8&9 @ permit rate,45m)-RE894591.IN
CO MODELOPT DFAULT CONC  RURAL
CO AVERTIME PERIOD
CO POLLUTID OTHER
CO DCAYCOEF  .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING
SO LOCATION     unit1  POINT    -71.1  -34.8   0.0
SO LOCATION     unit2  POINT    -71.1  -28.2   0.0
SO LOCATION     unit3  POINT     -6.7   0.0    0.0
SO LOCATION     unit4  POINT    -14.8   0.0    0.0
SO LOCATION     unit5  POINT    -20.4   0.0    0.0
SO LOCATION     unit6  POINT    -74.0  -48.9   0.0
SO LOCATION     unit7  POINT    -74.0  -43.0   0.0
SO LOCATION     unit8  POINT     0.0    0.0    0.0
SO LOCATION     unit9  POINT     6.7    0.0    0.0

** POINT:  SRCID        QS     HS     TS     VS     DS
SO SRCPARAM  unit1      2.96   6.15  669   27.3    0.71
SO SRCPARAM  unit2      3.85   6.15  669   27.3    0.71
SO SRCPARAM  unit3      4.64  11.43  677   38 9    0.66
SO SRCPARAM  unit4      4.44  11 43  677   38.9    0.66
SO SRCPARAM  unit5      5.11  11.43  677   38.9    0.66
SO SRCPARAM  unit6      4.72   7.20  664   23.8    0.76
SO SRCPARAM  unit7      4.40   7.20  664   23.8    0.76
SO SRCPARAM  unit8      8.57  13.72  625   34.6    0.71
SO SRCPARAM  unit9      8.57  13.72  625   34.6    0.71

SO BUILDHGT unit1   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit1   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit1   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit1   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit1   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit1   0.00  0.00 10.00 10.00 10.00 10.00
SO BUILDWID unit1   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit1   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit1   0.00  0.00  0.00  0.00  0.00  0 00
SO BUILDWID unit1   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit1   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit1   0.00  0.00 46.65 43.61 39.24 33.69


SO BUILDHGT unit2  10.00  0 00  0.00  0 00  0.00  0.00
SO BUILDHGT unit2   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit2   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit2   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit2   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit2   0.00  0.00  0.00 10.00 10.00 10.00
SO BUILDWID unit2  27.11  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit2   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit2   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit2   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit2   0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit2   0.00  0.00  0.00 43.61 39.24 33.69


SO BUILDHGT unit3  10.00 10.00 10.00 10.00 10 00 10.00
SO BUILDHGT unit3  10.00 10.00 10.00 10.00 10.00 10 00
SO BUILDHGT unit3  10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDHGT unit3  10.00 10.00 10.00 10.00 10.00 10.00
```

SO BUILDHGT unit3	10.00	10.00	10.00	10.00	10.00	10.00
SO BUILDHGT unit3	10.00	10.00	10.00	10.00	10.00	10.00
SO BUILDWID unit3	27.11	28.50	34.89	40.22	44.33	47.09
SO BUILDWID unit3	48.42	48.28	46.68	43.65	44.36	47.11
SO BUILDWID unit3	48.43	48.27	46.65	43.61	39.24	33.69
SO BUILDWID unit3	27.11	28.50	34.89	40.22	44.33	47.09
SO BUILDWID unit3	48.42	48.28	46.68	43.65	44.36	47.11
SO BUILDWID unit3	48.43	48.27	46.65	43.61	39.24	33.69

SO BUILDHGT unit4	10.00	10.00	10.00	10.00	10.00	10.00
SO BUILDHGT unit4	10.00	10.00	10.00	10.00	10.00	10.00
SO BUILDHGT unit4	10.00	10.00	10.00	10.00	10.00	10.00
SO BUILDHGT unit4	10.00	10.00	10.00	10.00	10.00	10.00
SO BUILDHGT unit4	10.00	10.00	10.00	10.00	10.00	10.00
SO BUILDHGT unit4	10.00	10.00	10.00	10.00	10.00	10.00
SO BUILDWID unit4	27.11	28.50	34.89	40.22	44.33	47.09
SO BUILDWID unit4	48.42	48.28	46.68	43.65	44.36	47.11
SO BUILDWID unit4	48.43	48.27	46.65	43.61	39.24	33.69
SO BUILDWID unit4	27.11	28.50	34.89	40.22	44.33	47.09
SO BUILDWID unit4	48.42	48.28	46.68	43.65	44.36	47.11
SO BUILDWID unit4	48.43	48.27	46.65	43.61	39.24	33.69

SO BUILDHGT unit5	10.00	10.00	10.00	10.00	10.00	10.00
SO BUILDHGT unit5	10.00	10.00	10.00	10.00	10.00	10.00
SO BUILDHGT unit5	10.00	10.00	10.00	10.00	10.00	10.00
SO BUILDHGT unit5	10.00	10.00	10.00	10.00	10.00	10.00
SO BUILDHGT unit5	10.00	10.00	10.00	10.00	10.00	10.00
SO BUILDHGT unit5	10.00	10.00	10.00	10.00	10.00	10.00
SO BUILDWID unit5	27.11	28.50	34.89	40.22	44.33	47.09
SO BUILDWID unit5	48.42	48.28	46.68	43.65	44.36	47.11
SO BUILDWID unit5	48.43	48.27	46.65	43.61	39.24	33.69
SO BUILDWID unit5	27.11	28.50	34.89	40.22	44.33	47.09
SO BUILDWID unit5	48.42	48.28	46.68	43.65	44.36	47.11
SO BUILDWID unit5	48.43	48.27	46.65	43.61	39.24	33.69

SO BUILDHGT unit6	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDHGT unit6	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDHGT unit6	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDHGT unit6	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDHGT unit6	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDHGT unit6	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDWID unit6	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDWID unit6	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDWID unit6	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDWID unit6	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDWID unit6	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDWID unit6	0.00	0.00	0.00	0.00	0.00	0.00

SO BUILDHGT unit7	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDHGT unit7	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDHGT unit7	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDHGT unit7	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDHGT unit7	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDHGT unit7	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDWID unit7	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDWID unit7	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDWID unit7	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDWID unit7	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDWID unit7	0.00	0.00	0.00	0.00	0.00	0.00
SO BUILDWID unit7	0.00	0.00	0.00	0.00	0.00	0.00

SO BUILDHGT unit8	10.00	10.00	10.00	10.00	10.00	10.00

```
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDWID unit8    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit8    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit8    48.43  48.27  46.65  43.61  39.24  33.69
SO BUILDWID unit8    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit8    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit8    48.43  48.27  46.65  43.61  39.24  33.69


SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDWID unit9    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit9    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit9    48.43  48.27  46.65  43.61  39.24  33.69
SO BUILDWID unit9    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit9    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit9    48.43  48.27  46.65  43.61  39.24  33.69

SO EMISUNIT    .100000E+07 (GRAMS/SEC)        (MICROGRAMS/CUBIC-METER)
SO SRCGROUP NAAQS unit1-unit9
SO SRCGROUP PSD unit8-unit9
SO FINISHED

RE STARTING
RE GRIDPOLR POL STA
**GRID ORIGIN CENTERED ON unit 8
RE GRIDPOLR POL ORIG   0.0  0.0
RE GRIDPOLR POL DIST   50.0  100  200. 300. 400. 500. 750. 1000.
RE GRIDPOLR POL GDIR  36 10.0 10.0
RE GRIDPOLR POL END
RE FINISHED

ME STARTING
ME INPUTFIL KYWPRE91.ASC
ME ANEMHGHT 6 700 METERS
ME SURFDATA 12836  1991          key west
ME UAIRDATA 12844  1991          miami
ME FINISHED

OU STARTING
OU RECTABLE ALLAVE FIRST SECOND
OU FINISHED

**********
*** SETUP Finishes Successfully ***
**********
```

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF OTHER IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
NAAQS	1ST HIGHEST VALUE IS	116.96910 AT (-86.60, 50.00, 0.00, 0.00)	GP	POL
	2ND HIGHEST VALUE IS	106.60316 AT (-93.97, 34.20, 0.00, 0.00)	GP	POL
	3RD HIGHEST VALUE IS	94.60606 AT (-76.60, 64.28, 0.00, 0.00)	GP	POL
	4TH HIGHEST VALUE IS	75.43366 AT (-98.48, 17.36, 0.00, 0.00)	GP	POL
	5TH HIGHEST VALUE IS	56.69728 AT (-64.28, 76.60, 0.00, 0.00)	GP	POL
	6TH HIGHEST VALUE IS	54.03368 AT (-153.21, 128.56, 0.00, 0.00)	GP	POL
PSD	1ST HIGHEST VALUE IS	17.41699 AT (-383.02, 321.39, 0.00, 0.00)	GP	POL
	2ND HIGHEST VALUE IS	16.56292 AT (-574.53, 482.09, 0.00, 0.00)	GP	POL
	3RD HIGHEST VALUE IS	16.19117 AT (-153.21, 128.56, 0.00, 0.00)	GP	POL
	4TH HIGHEST VALUE IS	15.84502 AT (-433.01, 250.00, 0.00, 0.00)	GP	POL
	5TH HIGHEST VALUE IS	15.61868 AT (-649.52, 375.00, 0.00, 0.00)	GP	POL
	6TH HIGHEST VALUE IS	15.17626 AT (-306.42, 257.11, 0.00, 0.00)	GP	POL

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

**MODELOPTs: CONC RURAL FLAT DFAULT

*** Message Summary : ISCST3 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 180 Informational Message(s)

A Total of 180 Calm Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
*** NONE ***

****
*** ISCST3 Finishes Successfully ***
****

```
CO STARTING
CO TITLEONE 1988 FLORIDA KEYS ELECTRIC COOP - PM10 - AAQS & PSD 1/28/00 R.W.BECK
CO TITLETWO ANN 24-All ex 8&9@50%(8&9 @ 45m)-PM894588.IN
CO MODELOPT DFAULT CONC   RURAL
CO AVERTIME PERIOD 24
CO POLLUTID OTHER
CO DCAYCOEF   .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING
SO LOCATION     unit1   POINT    -71.1  -34.8   0.0
SO LOCATION     unit2   POINT    -71.1  -28.2   0.0
SO LOCATION     unit3   POINT     -6.7   0.0    0.0
SO LOCATION     unit4   POINT    -14.8   0.0    0.0
SO LOCATION     unit5   POINT    -20.4   0.0    0.0
SO LOCATION     unit6   POINT    -74.0  -48.9   0.0
SO LOCATION     unit7   POINT    -74.0  -43.0   0.0
SO LOCATION     unit8   POINT     0.0    0.0    0.0
SO LOCATION     unit9   POINT     6.7    0.0    0.0

** POINT:  SRCID        QS      HS      TS      VS      DS
SO SRCPARAM  unit1      0.218   6.15    669     27.3    0.71
SO SRCPARAM  unit2      0.218   6.15    669     27.3    0.71
SO SRCPARAM  unit3      0.218   11.43   677     38.9    0.66
SO SRCPARAM  unit4      0.218   11.43   677     38.9    0.66
SO SRCPARAM  unit5      0.218   11.43   677     38.9    0.66
SO SRCPARAM  unit6      0.218   7.20    664     23.8    0.76
SO SRCPARAM  unit7      0.218   7.20    664     23.8    0.76
SO SRCPARAM  unit8      0.218   13.72   625     34 6    0.71
SO SRCPARAM  unit9      0.218   13.72   625     34.6    0.71

SO BUILDHGT unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit1   0.00   0.00   0.00   0 00   0.00   0.00
SO BUILDHGT unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit1   0.00   0.00   10.00  10.00  10.00  10.00
SO BUILDWID unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit1   0.00   0.00   0.00   0.00   0 00   0.00
SO BUILDWID unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit1   0.00   0.00   46.65  43 61  39.24  33.69

SO BUILDHGT unit2   10 00  0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit2   0.00   0.00   0.00   10.00  10.00  10.00
SO BUILDWID unit2   27.11  0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit2   0.00   0 00   0.00   0.00   0.00   0.00
SO BUILDWID unit2   0.00   0.00   0.00   43.61  39.24  33.69

SO BUILDHGT unit3   10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit3   10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit3   10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit3   10.00  10.00  10.00  10.00  10.00  10.00
```

```
SO BUILDHGT unit3    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit3    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDWID unit3    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit3    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit3    48.43  48.27  46.65  43.61  39.24  33.69
SO BUILDWID unit3    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit3    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit3    48.43  48.27  46.65  43.61  39.24  33.69

SO BUILDHGT unit4    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit4    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit4    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit4    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit4    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit4    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDWID unit4    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit4    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit4    48.43  48.27  46.65  43.61  39.24  33.69
SO BUILDWID unit4    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit4    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit4    48.43  48.27  46.65  43.61  39.24  33.69

SO BUILDHGT unit5    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit5    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit5    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit5    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit5    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit5    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDWID unit5    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit5    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit5    48.43  48.27  46.65  43.61  39.24  33.69
SO BUILDWID unit5    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit5    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit5    48.43  48.27  46.65  43.61  39.24  33.69

SO BUILDHGT unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit6    0.00  0.00  0.00  0.00  0.00  0.00

SO BUILDHGT unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit7    0.00  0.00  0.00  0.00  0.00  0.00

SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
```

```
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDWID unit8    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit8    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit8    48.43  48.27  46.65  43.61  39.24  33.69
SO BUILDWID unit8    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit8    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit8    48.43  48.27  46.65  43.61  39.24  33.69


SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDWID unit9    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit9    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit9    48.43  48.27  46.65  43.61  39.24  33.69
SO BUILDWID unit9    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit9    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit9    48.43  48.27  46.65  43.61  39.24  33.69

SO EMISUNIT    .100000E+07 (GRAMS/SEC)        (MICROGRAMS/CUBIC-METER)
SO SRCGROUP NAAQS unit1-unit9
SO SRCGROUP PSD unit8-unit9
SO FINISHED

RE STARTING
RE GRIDPOLR POL STA
**GRID ORIGIN CENTERED ON unit 8
RE GRIDPOLR POL ORIG   0.0  0.0
RE GRIDPOLR POL DIST   50.0  100. 200. 300. 400. 500. 750. 1000.
RE GRIDPOLR POL GDIR  36 10.0 10 0
RE GRIDPOLR POL END
RE FINISHED

ME STARTING
ME INPUTFIL KYWPRE88.ASC
ME ANEMHGHT 6.700 METERS
ME SURFDATA 12836  1988          key west
ME UAIRDATA 12844  1988          miami
ME FINISHED

OU STARTING
OU RECTABLE ALLAVE FIRST SECOND
OU FINISHED

**********
*** SETUP Finishes Successfully ***
**********
```

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE SUMMARY OF MAXIMUM PERIOD (8784 HRS) RESULTS ***

** CONC OF OTHER IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
NAAQS	1ST HIGHEST VALUE IS	6.45579 AT (-93.97, 34.20, 0.00, 0.00)	GP	POL
	2ND HIGHEST VALUE IS	5.53912 AT (-86.60, 50.00, 0.00, 0.00)	GP	POL
	3RD HIGHEST VALUE IS	5.37443 AT (-98.48, 17.36, 0.00, 0.00)	GP	POL
	4TH HIGHEST VALUE IS	4.49316 AT (-76.60, 64.28, 0.00, 0.00)	GP	POL
	5TH HIGHEST VALUE IS	3.06799 AT (-64.28, 76.60, 0.00, 0.00)	GP	POL
	6TH HIGHEST VALUE IS	2.70619 AT (-100.00, 0.00, 0.00, 0.00)	GP	POL
PSD	1ST HIGHEST VALUE IS	0.32842 AT (-433.01, 250.00, 0.00, 0.00)	GP	POL
	2ND HIGHEST VALUE IS	0.32102 AT (-173.21, 100.00, 0.00, 0.00)	GP	POL
	3RD HIGHEST VALUE IS	0.31694 AT (-153.21, 128.56, 0.00, 0.00)	GP	POL
	4TH HIGHEST VALUE IS	0.31391 AT (-383.02, 321.39, 0.00, 0.00)	GP	POL
	5TH HIGHEST VALUE IS	0.31082 AT (-649.52, 375.00, 0.00, 0.00)	GP	POL
	6TH HIGHEST VALUE IS	0.28993 AT (-346.41, 200.00, 0.00, 0.00)	GP	POL

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF OTHER IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
NAAQS	HIGH 1ST HIGH VALUE IS	72.39799	ON 88082024: AT (-93.97, 34.20, 0.00, 0.00)	GP	POL
	HIGH 2ND HIGH VALUE IS	65.55708	ON 88012024: AT (-93.97, 34.20, 0.00, 0.00)	GP	POL
PSD	HIGH 1ST HIGH VALUE IS	11.48685	ON 88091424: AT (-86.60, 50.00, 0.00, 0.00)	GP	POL
	HIGH 2ND HIGH VALUE IS	7.37324	ON 88040124: AT (-86.60, 50.00, 0.00, 0.00)	GP	POL

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

**MODELOPTs: CONC RURAL FLAT DFAULT

*** Message Summary : ISCST3 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 111 Informational Message(s)

A Total of 111 Calm Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
*** NONE ***

****
*** ISCST3 Finishes Successfully ***
****

```
CO STARTING
CO TITLEONE 1989 FLORIDA KEYS ELECTRIC COOP - PM10 - AAQS & PSD 1/28/00 R.W.BECK
CO TITLETWO ANN 24-All ex 8&9@50%(8&9 @ 45m)-PM894589.IN
CO MODELOPT DFAULT CONC  RURAL
CO AVERTIME PERIOD 24
CO POLLUTID OTHER
CO DCAYCOEF  .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING
SO LOCATION     unit1  POINT    -71.1  -34.8   0.0
SO LOCATION     unit2  POINT    -71.1  -28.2   0.0
SO LOCATION     unit3  POINT     -6.7   0.0    0.0
SO LOCATION     unit4  POINT    -14.8   0.0    0.0
SO LOCATION     unit5  POINT    -20.4   0 0    0.0
SO LOCATION     unit6  POINT    -74.0  -48.9   0.0
SO LOCATION     unit7  POINT    -74.0  -43.0   0.0
SO LOCATION     unit8  POINT     0.0    0.0    0.0
SO LOCATION     unit9  POINT     6.7    0.0    0.0

** POINT:  SRCID        QS      HS     TS     VS      DS
SO SRCPARAM  unit1      0.218   6.15  669   27 3    0.71
SO SRCPARAM  unit2      0 218   6 15  669   27.3    0.71
SO SRCPARAM  unit3      0.218  11.43  677   38.9    0.66
SO SRCPARAM  unit4      0.218  11.43  677   38.9    0.66
SO SRCPARAM  unit5      0.218  11.43  677   38.9    0.66
SO SRCPARAM  unit6      0 218   7 20  664   23 8    0 76
SO SRCPARAM  unit7      0.218   7.20  664   23.8    0.76
SO SRCPARAM  unit8      0.218  13.72  625   34.6    0.71
SO SRCPARAM  unit9      0 218  13 72  625   34.6    0 71

SO BUILDHGT unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit1   0.00   0.00   0 00   0.00   0.00   0 00
SO BUILDHGT unit1   0.00   0.00   0 00   0 00   0.00   0 00
SO BUILDHGT unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit1   0.00   0 00  10.00  10.00  10.00  10.00
SO BUILDWID unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit1   0.00   0.00   0.00   0.00   0 00   0.00
SO BUILDWID unit1   0.00   0 00   0.00   0.00   0.00   0.00
SO BUILDWID unit1   0.00   0.00   0.00   0 00   0.00   0 00
SO BUILDWID unit1   0 00   0.00  46.65  43.61  39.24  33.69


SO BUILDHGT unit2  10.00   0.00   0.00   0.00   0.00   0 00
SO BUILDHGT unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit2   0.00   0.00   0.00  10.00  10.00  10.00
SO BUILDWID unit2  27.11   0 00   0.00   0.00   0.00   0.00
SO BUILDWID unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit2   0.00   0.00   0.00   0 00   0.00   0 00
SO BUILDWID unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit2   0.00   0 00   0.00   0.00   0.00   0.00
SO BUILDWID unit2   0.00   0 00   0 00  43.61  39.24  33.69


SO BUILDHGT unit3  10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit3  10.00  10.00  10 00  10.00  10.00  10.00
SO BUILDHGT unit3  10 00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit3  10.00  10.00  .10 00  10.00  10 00  10.00
```

SO BUILDHGT unit3 10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDHGT unit3 10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDWID unit3 27.11 28.50 34.89 40.22 44.33 47.09
SO BUILDWID unit3 48.42 48.28 46.68 43.65 44.36 47.11
SO BUILDWID unit3 48.43 48.27 46.65 43.61 39.24 33.69
SO BUILDWID unit3 27.11 28.50 34.89 40.22 44.33 47.09
SO BUILDWID unit3 48.42 48.28 46.68 43.65 44.36 47.11
SO BUILDWID unit3 48.43 48.27 46.65 43.61 39.24 33.69

SO BUILDHGT unit4 10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDHGT unit4 10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDHGT unit4 10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDHGT unit4 10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDHGT unit4 10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDHGT unit4 10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDWID unit4 27.11 28.50 34.89 40.22 44.33 47.09
SO BUILDWID unit4 48.42 48.28 46.68 43.65 44.36 47.11
SO BUILDWID unit4 48.43 48.27 46.65 43.61 39.24 33.69
SO BUILDWID unit4 27.11 28.50 34.89 40.22 44.33 47.09
SO BUILDWID unit4 48.42 48.28 46.68 43.65 44.36 47.11
SO BUILDWID unit4 48.43 48.27 46.65 43.61 39.24 33.69

SO BUILDHGT unit5 10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDHGT unit5 10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDHGT unit5 10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDHGT unit5 10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDHGT unit5 10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDHGT unit5 10.00 10.00 10.00 10.00 10.00 10.00
SO BUILDWID unit5 27.11 28.50 34.89 40.22 44.33 47.09
SO BUILDWID unit5 48.42 48.28 46.68 43.65 44.36 47.11
SO BUILDWID unit5 48.43 48.27 46.65 43.61 39.24 33.69
SO BUILDWID unit5 27.11 28.50 34.89 40.22 44.33 47.09
SO BUILDWID unit5 48.42 48.28 46.68 43.65 44.36 47.11
SO BUILDWID unit5 48.43 48.27 46.65 43.61 39.24 33.69

SO BUILDHGT unit6 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDHGT unit6 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDHGT unit6 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDHGT unit6 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDHGT unit6 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDHGT unit6 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDWID unit6 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDWID unit6 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDWID unit6 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDWID unit6 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDWID unit6 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDWID unit6 0.00 0.00 0.00 0.00 0.00 0.00

SO BUILDHGT unit7 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDHGT unit7 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDHGT unit7 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDHGT unit7 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDHGT unit7 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDHGT unit7 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDWID unit7 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDWID unit7 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDWID unit7 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDWID unit7 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDWID unit7 0.00 0.00 0.00 0.00 0.00 0.00
SO BUILDWID unit7 0.00 0.00 0.00 0.00 0.00 0.00

SO BUILDHGT unit8 10.00 10.00 10.00 10.00 10.00 10.00

```
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDWID unit8    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit8    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit8    48.43  48.27  46.65  43.61  39.24  33.69
SO BUILDWID unit8    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit8    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit8    48.43  48.27  46.65  43.61  39.24  33.69

SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDWID unit9    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit9    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit9    48.43  48.27  46.65  43.61  39.24  33.69
SO BUILDWID unit9    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit9    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit9    48.43  48.27  46.65  43.61  39.24  33.69

SO EMISUNIT    .100000E+07 (GRAMS/SEC)        (MICROGRAMS/CUBIC-METER)
SO SRCGROUP NAAQS unit1-unit9
SO SRCGROUP PSD unit8-unit9
SO FINISHED

RE STARTING
RE GRIDPOLR POL STA
**GRID ORIGIN CENTERED ON unit 8
RE GRIDPOLR POL ORIG   0.0  0.0
RE GRIDPOLR POL DIST   50.0  100. 200  300. 400. 500. 750. 1000.
RE GRIDPOLR POL GDIR  36 10.0 10.0
RE GRIDPOLR POL END
RE FINISHED

ME STARTING
ME INPUTFIL KYWPRE89.ASC
ME ANEMHGHT 6.700 METERS
ME SURFDATA 12836  1989          key west
ME UAIRDATA 12844  1989          miami
ME FINISHED

OU STARTING
OU RECTABLE ALLAVE FIRST SECOND
OU FINISHED

**********
*** SETUP Finishes Successfully ***
**********
```

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF OTHER IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
NAAQS	1ST HIGHEST VALUE IS	6.49994 AT (-93.97, 34.20, 0.00, 0.00)	GP	POL
	2ND HIGHEST VALUE IS	5.91234 AT (-98.48, 17.36, 0.00, 0.00)	GP	POL
	3RD HIGHEST VALUE IS	5.57096 AT (-86.60, 50.00, 0.00, 0.00)	GP	POL
	4TH HIGHEST VALUE IS	4.34003 AT (-76.60, 64.28, 0.00, 0.00)	GP	POL
	5TH HIGHEST VALUE IS	2.90637 AT (-64.28, 76.60, 0.00, 0.00)	GP	POL
	6TH HIGHEST VALUE IS	2.66756 AT (-100.00, 0.00, 0.00, 0.00)	GP	POL
PSD	1ST HIGHEST VALUE IS	0.41119 AT (-649.52, 375.00, 0.00, 0.00)	GP	POL
	2ND HIGHEST VALUE IS	0.40706 AT (-433.01, 250.00, 0.00, 0.00)	GP	POL
	3RD HIGHEST VALUE IS	0.39597 AT (-383.02, 321.39, 0.00, 0.00)	GP	POL
	4TH HIGHEST VALUE IS	0.38153 AT (-574.53, 482.09, 0.00, 0.00)	GP	POL
	5TH HIGHEST VALUE IS	0.35053 AT (-866.03, 500.00, 0.00, 0.00)	GP	POL
	6TH HIGHEST VALUE IS	0.34337 AT (-321.39, 383.02, 0.00, 0.00)	GP	POL

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF OTHER IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
NAAQS	HIGH 1ST HIGH VALUE IS	59.84761	ON 89022124: AT (-98.48, 17.36, 0.00, 0.00)	GP	POL
	HIGH 2ND HIGH VALUE IS	53.34970	ON 89071824: AT (-93.97, 34.20, 0.00, 0.00)	GP	POL
PSD	HIGH 1ST HIGH VALUE IS	9.30202	ON 89022324: AT (64.28, -76.60, 0.00, 0.00)	GP	POL
	HIGH 2ND HIGH VALUE IS	4.63773	ON 89120324: AT (0.00, -100.00, 0.00, 0.00)	GP	POL

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

**MODELOPTs: CONC RURAL FLAT DFAULT

*** Message Summary : ISCST3 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 223 Informational Message(s)

A Total of 223 Calm Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
*** NONE ***

****
*** ISCST3 Finishes Successfully ***
****

```
CO STARTING
CO TITLEONE 1991 FLORIDA KEYS ELECTRIC COOP - PM10 - AAQS & PSD 1/27/00 R.W.BECK
CO TITLETWO ANN 24-All ex 8&9@50%(8&9 @ 45m)-PM894591.IN
CO MODELOPT DFAULT CONC  RURAL
CO AVERTIME PERIOD 24
CO POLLUTID OTHER
CO DCAYCOEF  .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING
SO LOCATION    unit1  POINT   -71.1  -34.8   0.0
SO LOCATION    unit2  POINT   -71.1  -28.2   0.0
SO LOCATION    unit3  POINT    -6.7   0.0    0.0
SO LOCATION    unit4  POINT   -14.8   0.0    0.0
SO LOCATION    unit5  POINT   -20.4   0.0    0.0
SO LOCATION    unit6  POINT   -74.0  -48.9   0.0
SO LOCATION    unit7  POINT   -74.0  -43.0   0.0
SO LOCATION    unit8  POINT    0.0    0.0    0.0
SO LOCATION    unit9  POINT    6.7    0.0    0.0

** POINT:  SRCID       QS     HS     TS     VS     DS
SO SRCPARAM  unit1     0.218   6.15  669   27.3   0.71
SO SRCPARAM  unit2     0.218   6.15  669   27.3   0.71
SO SRCPARAM  unit3     0.218  11.43  677   38.9   0.66
SO SRCPARAM  unit4     0.218  11.43  677   38.9   0.66
SO SRCPARAM  unit5     0.218  11.43  677   38.9   0.66
SO SRCPARAM  unit6     0.218   7.20  664   23.8   0.76
SO SRCPARAM  unit7     0.218   7.20  664   23.8   0.76
SO SRCPARAM  unit8     0.218  13.72  625   34.6   0.71
SO SRCPARAM  unit9     0.218  13.72  625   34.6   0.71

SO BUILDHGT unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit1   0.00   0.00  10.00  10.00  10.00  10.00
SO BUILDWID unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit1   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit1   0.00   0.00  46.65  43.61  39.24  33.69


SO BUILDHGT unit2  10.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT unit2   0.00   0.00   0.00  10.00  10.00  10.00
SO BUILDWID unit2  27.11   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit2   0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID unit2   0.00   0.00   0.00  43.61  39.24  33.69


SO BUILDHGT unit3  10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit3  10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit3  10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit3  10.00  10.00  10.00  10.00  10.00  10.00
```

```
SO BUILDHGT unit3    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit3    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDWID unit3    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit3    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit3    48.43  48.27  46.65  43.61  39.24  33.69
SO BUILDWID unit3    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit3    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit3    48.43  48.27  46.65  43.61  39.24  33.69

SO BUILDHGT unit4    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit4    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit4    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit4    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit4    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit4    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDWID unit4    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit4    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit4    48.43  48.27  46.65  43.61  39.24  33.69
SO BUILDWID unit4    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit4    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit4    48.43  48.27  46.65  43.61  39.24  33.69

SO BUILDHGT unit5    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit5    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit5    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit5    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit5    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit5    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDWID unit5    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit5    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit5    48.43  48.27  46.65  43.61  39.24  33.69
SO BUILDWID unit5    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit5    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit5    48.43  48.27  46.65  43.61  39.24  33.69

SO BUILDHGT unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit6    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit6    0.00  0.00  0.00  0.00  0.00  0.00

SO BUILDHGT unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDHGT unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit7    0.00  0.00  0.00  0.00  0.00  0.00
SO BUILDWID unit7    0.00  0.00  0.00  0.00  0.00  0.00

SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
```

```
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit8    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDWID unit8    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit8    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit8    48.43  48.27  46.65  43.61  39.24  33.69
SO BUILDWID unit8    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit8    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit8    48.43  48.27  46.65  43.61  39.24  33 69


SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDHGT unit9    10.00  10.00  10.00  10.00  10.00  10.00
SO BUILDWID unit9    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit9    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit9    48.43  48.27  46.65  43.61  39.24  33.69
SO BUILDWID unit9    27.11  28.50  34.89  40.22  44.33  47.09
SO BUILDWID unit9    48.42  48.28  46.68  43.65  44.36  47.11
SO BUILDWID unit9    48.43  48.27  46.65  43.61  39.24  33.69

SO EMISUNIT    .100000E+07 (GRAMS/SEC)        (MICROGRAMS/CUBIC-METER)
SO SRCGROUP NAAQS unit1-unit9
SO SRCGROUP PSD unit8-unit9
SO FINISHED

RE STARTING
RE GRIDPOLR POL STA
**GRID ORIGIN CENTERED ON unit 8
RE GRIDPOLR POL ORIG   0.0  0.0
RE GRIDPOLR POL DIST   50.0  100. 200. 300. 400. 500. 750. 1000.
RE GRIDPOLR POL GDIR  36 10.0 10.0
RE GRIDPOLR POL END
RE FINISHED

ME STARTING
ME INPUTFIL KYWPRE91.ASC
ME ANEMHGHT 6.700 METERS
ME SURFDATA 12836  1991          key west
ME UAIRDATA 12844  1991          miami
ME FINISHED

OU STARTING
OU RECTABLE ALLAVE FIRST SECOND
OU FINISHED

*************************************
*** SETUP Finishes Successfully ***
*************************************
```

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF OTHER IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
NAAQS	1ST HIGHEST VALUE IS	6.17000 AT (-86.60, 50.00, 0.00, 0.00)	GP	POL
	2ND HIGHEST VALUE IS	6.15450 AT (-93.97, 34.20, 0.00, 0.00)	GP	POL
	3RD HIGHEST VALUE IS	4.94235 AT (-98.48, 17.36, 0.00, 0.00)	GP	POL
	4TH HIGHEST VALUE IS	4.86929 AT (-76.60, 64.28, 0.00, 0.00)	GP	POL
	5TH HIGHEST VALUE IS	2.94968 AT (-64.28, 76.60, 0.00, 0.00)	GP	POL
	6TH HIGHEST VALUE IS	2.39710 AT (-153.21, 128.56, 0.00, 0.00)	GP	POL
PSD	1ST HIGHEST VALUE IS	0.44305 AT (-383.02, 321.39, 0.00, 0.00)	GP	POL
	2ND HIGHEST VALUE IS	0.42132 AT (-574.53, 482.09, 0.00, 0.00)	GP	POL
	3RD HIGHEST VALUE IS	0.41186 AT (-153.21, 128.56, 0.00, 0.00)	GP	POL
	4TH HIGHEST VALUE IS	0.40306 AT (-433.01, 250.00, 0.00, 0.00)	GP	POL
	5TH HIGHEST VALUE IS	0.39730 AT (-649.52, 375.00, 0.00, 0.00)	GP	POL
	6TH HIGHEST VALUE IS	0.38605 AT (-306.42, 257.11, 0.00, 0.00)	GP	POL

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF OTHER IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
NAAQS	HIGH 1ST HIGH VALUE IS	59.45385	ON 91051524: AT (-93.97, 34.20, 0.00, 0.00)	GP	POL
	HIGH 2ND HIGH VALUE IS	53.78853	ON 91032924: AT (-98.48, 17.36, 0.00, 0.00)	GP	POL
PSD	HIGH 1ST HIGH VALUE IS	11.69194	ON 91052124: AT (-76.60, 64.28, 0.00, 0.00)	GP	POL
	HIGH 2ND HIGH VALUE IS	5.78601	ON 91031024: AT (0.00, -100.00, 0.00, 0.00)	GP	POL

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

**MODELOPTs: CONC RURAL FLAT DFAULT

*** Message Summary : ISCST3 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 180 Informational Message(s)

A Total of 180 Calm Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
*** NONE ***

****
*** ISCST3 Finishes Successfully ***
****

DRAFT

SUPPLEMENT C

TO THE

GUIDELINE ON

AIR QUALITY MODELS (REVISED)

(Appendix W of 40 CFR Part 51)

June 1994

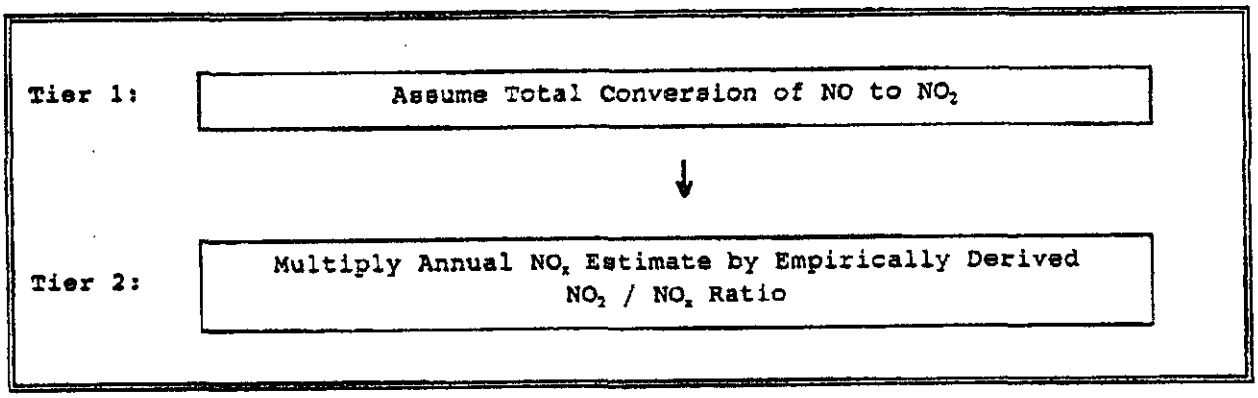
U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

6.2.3 Models for Nitrogen Dioxide (Annual Average)

A tiered screening approach is recommended to obtain annual average estimates of NO_2 from point sources for New Source Review analysis, including PSD, and for SIP planning purposes. This multi-tiered approach is conceptually shown in Figure 6-1 below:

FIGURE 6-1

Multi-tiered Screening Approach for Estimating Annual NO_2 Concentrations from Point Sources



a) For Tier 1 (the initial screen), use an appropriate Gaussian model from Appendix A to estimate the maximum annual average concentration and assume a total conversion of NO to NO_2. If the concentration exceeds the NAAQS and/or PSD increments for NO_2, proceed to the 2nd level screen.

b) For Tier 2 (2nd level) screening analysis, multiply the Tier 1 estimate(s) by an empirically derived NO_2 / NO_x value of 0.75 (annual national default).[36] An annual NO_2 / NO_x ratio differing from 0.75 may be used if it can be shown that such a ratio is based on data likely to be representative of the location(s) where maximum annual impact from the individual source under review occurs. In the case where several sources contribute to consumption of a PSD increment, a locally derived annual NO_2 / NO_x ratio should also be shown to be representative of the location where the maximum collective impact from the new plus existing sources occurs.

In urban areas, a proportional model may be used as a preliminary assessment to evaluate control strategies to meet the NAAQS for multiple minor sources, i.e. minor point, area and mobile sources of NO_x; concentrations resulting from major point sources should be estimated separately as discussed above, then added to the impact of the minor sources. An acceptable screening technique for urban complexes is to assume that all NO_x is emitted in the form of NO_2 and to use a model from Appendix A for nonreactive pollutants to estimate NO_2 concentrations. A more accurate estimate can be obtained by: (1) calculating the annual average concentrations of NO_x with an urban model, and (2) converting these estimates to NO_2 concentrations using an empirically derived annual NO_2 / NO_x ratio. A value of 0.75 is recommended for

this ratio. However, a spatially averaged annual NO_2 / NO_x ratio may be determined from an existing air quality monitoring network and used in lieu of the 0.75 value if it is determined to be representative of prevailing ratios in the urban area by the reviewing agency. To ensure use of appropriate locally derived annual NO_2 / NO_x ratios, monitoring data under consideration should be limited to those collected at monitors meeting siting criteria defined in 40 CFR 58, Appendix D as representative of "neighborhood", "urban", or "regional" scales. Furthermore, the highest annual spatially averaged NO_2 / NO_x ratio from the most recent 3 years of complete data should be used to foster conservatism in estimated impacts.

To demonstrate compliance with NO_2 PSD increments in urban areas, emissions from major and minor sources should be included in the modeling analysis. Point and area source emissions should be modeled as discussed above. If mobile source emissions do not contribute to localized areas of high ambient NO_2 concentrations, they should be modeled as area sources. When modeled as area sources, mobile source emissions should be assumed uniform over the entire highway link and allocated to each area source grid square based on the portion of highway link within each grid square. If localized areas of high concentrations are likely, then mobile sources should be modeled as line sources with the preferred model ISCLT2.

More refined techniques to handle special circumstances may be considered on a case-by-case basis and agreement with the reviewing authority should be obtained. Such techniques should consider individual quantities of NO and NO_2 emissions, atmospheric transport and dispersion, and atmospheric transformation of NO to NO_2. Where they are available, site-specific data on the conversion of NO to NO_2 may be used. Photochemical dispersion models, if used for other pollutants in the area, may also be applied to the NO_x problem.