LAKELAND ELECTRIC

Farzie Shelton, chE; REM

Manager of Environmental Affairs

BEST AVAILABLE COPY

November 26, 2002

Mr. Scott M. Sheplak, P.E.
Administrator, Title V Section
Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Title V Permit No.: 1050004-005-AV
C. D. McIntosh Power Plant
Inclusion of Unit No. 5 Combined Cycle PSD-FL-245

Dear Scott:

In compliance with the above referenced air construction permit, we are submitting an application for modification of the C. D. McIntosh power Plant Title V permit to make the necessary changes to the Unit No. 5 existing Title V Permit to enable Lakeland the operation of the Combined Cycle. The application includes the results of NSPS and BACT tests together with the Title IV application.

Therefore, as required by the permit, we are enclosing four copies of this document signed and certified by a P.E and our Responsible Official respectively and will forward a copy of this application to the Department's Southwest District. As always, we appreciate all the help you have offered us in our permitting endeavors and look forward to hear from you soon.

However, if you should have any questions, please do not hesitate to contact me.

Sincerely,

Farzie Shelton

Enclosure

Cc: Mr. Gerald Kissel P.E.
Administrator
Department of Environmental Protection
3804 Coconut Palm Drive
Tampa Fl 33619

TITLE V OPERATION PERMIT APPLICATION FOR UNIT 5 C.D. MCINTOSH, JR. POWER PLANT LAKELAND ELECTRIC POLK COUNTY, FLORIDA

Prepared For:
Lakeland Electric – Power Supply
City of Lakeland
501 East Lemon Street
Lakeland, Florida 33801

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

November 2002
0237622

DISTRIBUTION:
4 Copies – FDEP Bureau of Air Regulation
1 Copy – FDEP Southwest District Office
2 Copies - Lakeland Electric – Environmental Affairs
1 Copy - Golder Associates Inc.

Department of Environmental Protection

Division of Air Resources Management

RECEIVED
NOV 27 2002
BUREAU OF AIR REGULATION

APPLICATION FOR AIR PERMIT - TITLE V SOURCE

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

I. APPLICATION INFORMATION

Identification of Facility

1. Facility Owner/Company Name: **City of Lakeland, Department of Electric Utilities**	
2. Site Name: **C.D. McIntosh, Jr. Power Plant.**	
3. Facility Identification Number: **1050004** [ ] Unknown	
4. Facility Location: Street Address or Other Locator: **3030 East Lake Parker Drive** City: **Lakeland** County: **Polk** Zip Code: **33805**	
5. Relocatable Facility? [ ] Yes [**X**] No	6. Existing Permitted Facility? [**X**] Yes [ ] No

Application Contact

1. Name and Title of Application Contact: **Ms. Farzie Shelton, Manager of Environmental Affairs**
2. Application Contact Mailing Address: Organization/Firm: **Lakeland Electric** Street Address: **501 East Lemon Street** City: **Lakeland** State: **FL** Zip Code: **33801-5079**
3. Application Contact Telephone Numbers: Telephone: (**863**) **834 – 6603** Fax: (**863**) **834 - 8187**

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	11/27/02
2. Permit Number:	1050004/015-AV
3. PSD Number (if applicable):	
4. Siting Number (if applicable):	

Purpose of Application

Air Operation Permit Application

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

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

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

Current construction permit number: _____

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

Current construction permit number: **1050004-004-AC/PSD-FL-245***

Operation permit number to be revised: **1050004-011-AV**

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

Operation permit number to be revised/corrected: _____

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

Operation permit number to be revised: _____

Reason for revision: _____

Air Construction Permit Application

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

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

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

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

*** Current Permit No. 1050004-04-AC (PSD-FL-245) extended to March 31, 2003 and reflects Permit Amendment No. 1050004-010-AC (PSD-FL-245C)**

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official:
   Timothy Bates, Director of Energy Supply
2. Owner/Authorized Representative or Responsible Official Mailing Address:
   Organization/Firm: **Lakeland Electric**
   Street Address: **501 East Lemon Street**
   City: **Lakeland** State: **FL** Zip Code: **33801-5079**
3. Owner/Authorized Representative or Responsible Official Telephone Numbers:
   Telephone: **(863) 834 - 6559** Fax: **(863) 834 - 6362**
4. Owner/Authorized Representative or Responsible Official Statement:

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

Timothy C Bates — Signature

11/26/02 — Date

* Attach letter of authorization if not currently on file.

Professional Engineer Certification

1. Professional Engineer Name: **Kennard F. Kosky**
   Registration Number: **14996**
2. Professional Engineer Mailing Address:
   Organization/Firm: **Golder Associates Inc.***
   Street Address: **6241 NW 23rd Street, Suite 500**
   City: **Gainesville** State: **FL** Zip Code: **32653-1500**
3. Professional Engineer Telephone Numbers:
   Telephone: **(352) 336 - 5600** Fax: **(352) 336 - 6603**

***Board of Professional Engineers Certificate of Authorization #00001670**

4. Professional Engineer Statement:

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

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

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

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

Signature 11/22/02

Date

(seal)

* Attach any exception to certification statement.

Scope of Application

Emissions Unit ID	Description of Emissions Unit	Permit Type	Processing Fee
028	McIntosh Unit 5; W501G Combustion Turbine		
--	Mechanical Draft Cooling Tower		

Application Processing Fee

Check one: [ ] Attached - Amount: $: _____ [X] Not Applicable

Construction/Modification Information

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

Application Comment

This application is a revision to the Title V Operation Permit No. 1050004-011-AV issued to the C.D. McIntosh Power Plant for Unit 5 operating in combined cycle. The emissions from the CT for combined cycle were previously authorized under the air construction permit and PSD approval. The conversion of existing Unit No. 5 simple cycle included the addition of a heat recovery steam generator (HRSG), a HRSG stack, a net nominal 120-megawatt (MW) steam electric turbine, and a mechanical draft cooling tower. The existing simple cycle portion of Unit No. 5 is a Westinghouse 501G CT with a net nominal capacity of about 250 MW. The conversion to combined cycle will add another 120 MW, for a total net nominal capacity of about 370 MW from Unit 5. The emissions from the cooling tower will remain under the PSD significant emission levels and PSD review is not applicable.

F.10. The permittee shall provide manufacturer's emissions performance verses load diagrams for the DLN and ULN systems prior to their installation. DLN and ULN systems shall each be tuned upon initial operation to optimize emissions reductions and shall be maintained to minimize NO_X emissions and CO emissions. Operation of the DLN and ULN systems in the diffusion firing mode shall be minimized when firing natural gas.
[PSD-FL-245]

Emission Limitations and Standards

{Permitting note: Table 1-1, Summary of Air Pollutant Standards and Terms, summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.}

F.11. The following table is a summary of the BACT determination and is followed by the applicable specific conditions **F.12.** through **F.20.** Values for NO_X are corrected to 15% O_2. Values for CO are corrected to 15% O_2 only until May 1, 2002.

Operational Mode	NO_X (ppm)	CO (ppm)	VOC (ppm)	PM/Visibility (% Opacity)	Technology and Comments
Simple Cycle	25 - NG (basis) 262 lb/hr (24-hr avg) 42 - FO (3 hr avg)	25 - NG or 10 - Ox Cat 90 - FO	4 - NG 10 - FO	10	DLN on gas, WI on oil. Applies until 05/1/2002 . Clean fuels, good combustion.
Simple Cycle	9 - NG (basis) 85 lb/hr (24-hr avg) 42 - FO (3 hr avg)	25 - NG or 10 - Ox Cat 90 - FO	4 - NG 10 - FO	10	ULN on gas, WI on oil. Applies after 05/1/2002. Clean fuels, good combustion.
Simple Cycle	9 - NG (3 hr avg) 15 - FO (3-hr avg)	25 - NG or 10 - Ox Cat 90 - FO	4 - NG 10 - FO	10	Hot SCR. Applies not later than 05/1/2002 if 9 ppm NO_X not achievable by ULN. Clean fuels, good combustion.
Combined Cycle	7.5 - NG (3 hr avg) 15 - FO (3-hr avg)	25 - NG or 10 - Ox Cat 90 - FO	4 - NG 10 - FO	10	Conventional SCR unless simple cycle limits are achieved on or before 05/01/2002. Clean fuels, good combustion.

[PSD-FL-245C]

F.12. Nitrogen Oxides. Until May 1, 2002, the concentration of NO_X in the exhaust gas shall not exceed 262 pounds per hour (at ISO conditions) on a 24-hour block average (basis 25 ppm @ 15% O_2, full load) when firing natural gas and 42 ppmvd at 15% O_2 when firing fuel oil on the basis of a 3-hour average, as measured by the continuous emission monitoring system (CEMS). In addition, NO_X emissions calculated as NO_2 (at ISO conditions) shall exceed neither 25 ppm @ 15% O_2 nor 262 pounds per hour (when firing natural gas) and shall exceed neither 42 ppm @ 15% O_2 nor 431 pounds per hour (when firing fuel oil) to be demonstrated by stack tests.
[PSD-FL-245C]

F.13. Nitrogen Oxides. No later than May 1, 2002, the concentration of NO_X in the exhaust gas shall not exceed 85 pounds per hour (at ISO conditions) on a 24-hour block average (basis 9 ppm @ 15% O_2) when firing natural gas and 42 ppmvd at 15% O_2 when firing fuel oil on the basis of a 3-hour average, as measured by the CEMS. In addition, NO_X emissions calculated as NO_2 (at ISO conditions) shall exceed neither 9 ppm @ 15% O_2 nor 85 pounds per hour (when firing natural gas) and shall not exceed 42 ppm @ 15% O_2 or 431 pounds per hour (when firing fuel oil) to be demonstrated by stack tests.
[PSD-FL-245C]

F.14. Nitrogen Oxides. If hot SCR is installed, achievable short-term NO_X concentrations in the exhaust gas shall be demonstrated at baseload during the first compliance test following installation not to exceed 9 ppmvd at 15% O_2 when firing natural gas. NO_X emissions shall not exceed 9 ppmvd at 15% O_2 when firing natural gas and 15 ppmvd at 15% O_2 when firing fuel oil on the basis of a 3-hour average, as measured by the CEMS. In addition, NO_X emissions calculated as NO_2 (at ISO conditions) shall not exceed 85 pounds per hour (when firing natural gas) and 148 pounds per hour (when firing fuel oil) to be demonstrated by stack tests.
[PSD-FL-245]

F.15. Nitrogen Oxides. If conventional SCR is installed in conjunction with the conversion to combined cycle operation, achievable short-term NO_X concentrations in the exhaust gas shall be demonstrated at baseload during the first compliance test following installation not to exceed 7.5 ppmvd at 15% O_2 when firing natural gas. If conventional SCR catalyst is installed, NO_X emissions shall not exceed 7.5 ppmvd at 15% O_2 when firing natural gas and 15 ppmvd at 15% O_2 when firing fuel oil on the basis of a 3-hour average, as measured by the CEMS. In addition, NO_X emissions calculated as NO_2 (at ISO conditions) shall not exceed 71.1 pounds per hour (when firing natural gas) and 148 pounds per hour (when firing fuel oil) to be demonstrated by stack tests.
[PSD-FL-245]

F.16. Carbon Monoxide. Prior to May 1, 2002, the concentration of CO (@ 15% O_2) in the exhaust gas when firing natural gas shall not exceed 25 ppmvd and 90 ppmvd when firing fuel oil as measured by EPA Method 10. CO emissions (at ISO conditions) shall not exceed 161 pounds per hour (when firing natural gas) and 568 pounds per hour (when firing fuel oil).
[PSD-FL-245C]

F.17. Carbon Monoxide. After May 1, 2002, the concentration of CO in the exhaust gas when firing natural gas shall not exceed 25 ppmvd and 90 ppmvd when firing fuel oil as measured by EPA Method 10. CO emissions (at ISO conditions) shall not exceed 106 pounds per hour (when firing natural gas) and 386 pounds per hour (when firing fuel oil).
[PSD-FL-245]

F.18. Sulfur Dioxide. SO_2 emissions (at ISO conditions) shall not exceed 8 pounds per hour when firing pipeline natural gas and 127 pounds per hour when firing maximum 0.05 percent, by weight, sulfur content No. 2 or superior grade distillate fuel oil, as measured by applicable compliance methods (see specific conditions **F.36.**). Emissions of SO_2 shall not exceed 38.4 tons per year.
[PSD-FL-245C and Applicant Request to Escape PSD Review]

F.19. Visible Emissions. Visible emissions shall not exceed 10 percent opacity.
[PSD-FL-245]

F.20. Volatile Organic Compounds. The concentration of VOC in the exhaust gas when firing natural gas shall not exceed 4 ppmvd and 10 ppmvd when firing fuel oil as measured by EPA Method(s) 18 and/or 25A. VOC emissions (at ISO conditions) shall exceed 11 pounds per hour (when firing natural gas) and 25 pounds per hour (when firing fuel oil).
[PSD-FL-245C]

Excess Emissions

{Permitting note: The Excess Emissions Rule at Rule 62-210.700, F.A.C., cannot vary any requirement of a NSPS, NESHAP, or Acid Rain program provision.}

F.21. Excess emissions from this emissions unit resulting from startup, shutdown, malfunction or fuel switching shall be permitted provided that best operational practices to minimize emissions are adhered to and the duration of excess emissions shall be minimized. Excess emissions occurrences shall in no case exceed four hours in any 24 hour period for cold startup or two hours in any 24 hour period for other reasons unless specifically authorized by the Department for longer duration
[Rule 62-210.700(1), F.A.C.; and, PSD-FL-245]

F.22. Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonably be prevented during startup, shutdown or malfunction shall be prohibited.
[Rule 62-210.700(4), F.A.C.]

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates: Zone: **17** East (km): **409.0** North (km): **3106.2**			
2. Facility Latitude/Longitude: Latitude (DD/MM/SS): **26 / 4 / 50** Longitude (DD/MM/SS): **81 / 55 / 32**			
3. Governmental Facility Code: **4**	4. Facility Status Code: **A**	5. Facility Major Group SIC Code: **49**	6. Facility SIC(s): **4911**
7. Facility Comment (limit to 500 characters): **The McIntosh Power Plant consists of 3 fossil fuel fired-steam generators (FFFSG), 2 diesel powered generators, and 1 gas turbine. FFFSG Units 1 and 2 are fired with No. 6 fuel oil and natural gas (distillate oil is used as an ignitor). FFFSG Unit 3 is primarily fired with coal, refuse derived fuel and petroleum coke. Unit 5 is a newly constructed Westinghouse 501G combustion turbine operating in combined cycle only and is primarily fired with natural gas with distillate oil as backup.**			

Facility Contact

1. Name and Title of Facility Contact: **Ms. Farzie Shelton, Manager of Environmental Affairs**
2. Facility Contact Mailing Address: Organization/Firm: **Lakeland Electric** Street Address: **501 East Lemon Street** City: **Lakeland** State: **FL** Zip Code: **33801-5079**
3. Facility Contact Telephone Numbers: Telephone: **(863) 834 – 6603** Fax: **(863) 603 - 8187**

Facility Regulatory Classifications

Check all that apply:

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

List of Applicable Regulations

The facility regulations identified in the Title V permit (Final Permit No. 10150004-011-AV)
will not change as a result of this application.

B. FACILITY POLLUTANTS

List of Pollutants Emitted

1. Pollutant Emitted	2. Pollutant Classif.	3. Requested Emissions Cap		4. Basis for Emissions Cap	5. Pollutant Comment
		lb/hour	tons/year		

C. FACILITY SUPPLEMENTAL INFORMATION

Supplemental Requirements

1. Area Map Showing Facility Location:
   [X] Attached, Document ID: MC-FI-C1 [ ] Not Applicable [ ] Waiver Requested

2. Facility Plot Plan:
   [X] Attached, Document ID: MC-FI-C2 [ ] Not Applicable [ ] Waiver Requested

3. Process Flow Diagram(s):
   [ ] Attached, Document ID: _____ [X] Not Applicable [ ] Waiver Requested

4. Precautions to Prevent Emissions of Unconfined Particulate Matter:
   [ ] Attached, Document ID: _____ [X] Not Applicable [ ] Waiver Requested

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

6. Supplemental Information for Construction Permit Application:
   [ ] Attached, Document ID: _____ [X] Not Applicable

7. Supplemental Requirements Comment:

Additional Supplemental Requirements for Title V Air Operation Permit Applications

8. List of Proposed Insignificant Activities:
   [ ] Attached, Document ID: _____ [X] Not Applicable

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

10. Alternative Methods of Operation:
    [ ] Attached, Document ID: _____ [X] Not Applicable

11. Alternative Modes of Operation (Emissions Trading):
    [ ] Attached, Document ID: _____ [X] Not Applicable

12. Identification of Additional Applicable Requirements:
    [ ] Attached, Document ID: _____ [X] Not Applicable

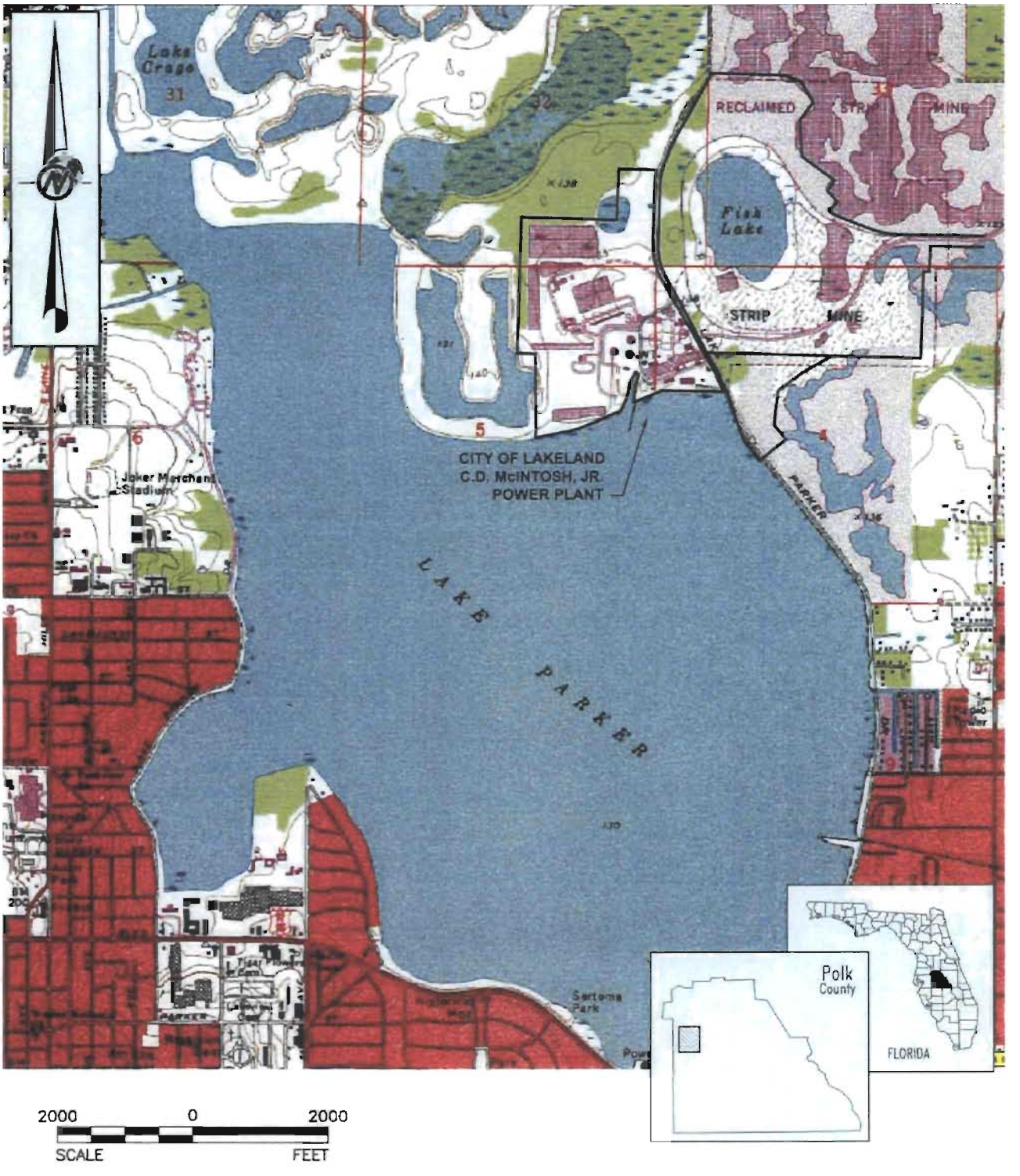
13. Risk Management Plan Verification:
    [X] Plan previously submitted to Chemical Emergency Preparedness and Prevention Office (CEPPO). Verification of submittal attached (Document ID: **MC-FI-C13**) or previously submitted to DEP (Date and DEP Office: December 27, 2001)
    [ ] Plan to be submitted to CEPPO (Date required: _____)
    [ ] Not Applicable

14. Compliance Report and Plan:
    [X] Attached, Document ID: **MC-FI-C14** [ ] Not Applicable

15. Compliance Certification (Hard-copy Required):
    [X] Attached, Document ID: **MC-FI-C15** [ ] Not Applicable

ATTACHMENT MC-FI-C1

AREA MAP SHOWING FACILITY LOCATION



REFERENCES

1.) USGS TOPOGRAPHIC MAP, 7.5 MIN. QUADRANGLE MAP SERIES: LAKELAND QUADRANGLE, POLK COUNTY, FLORIDA.

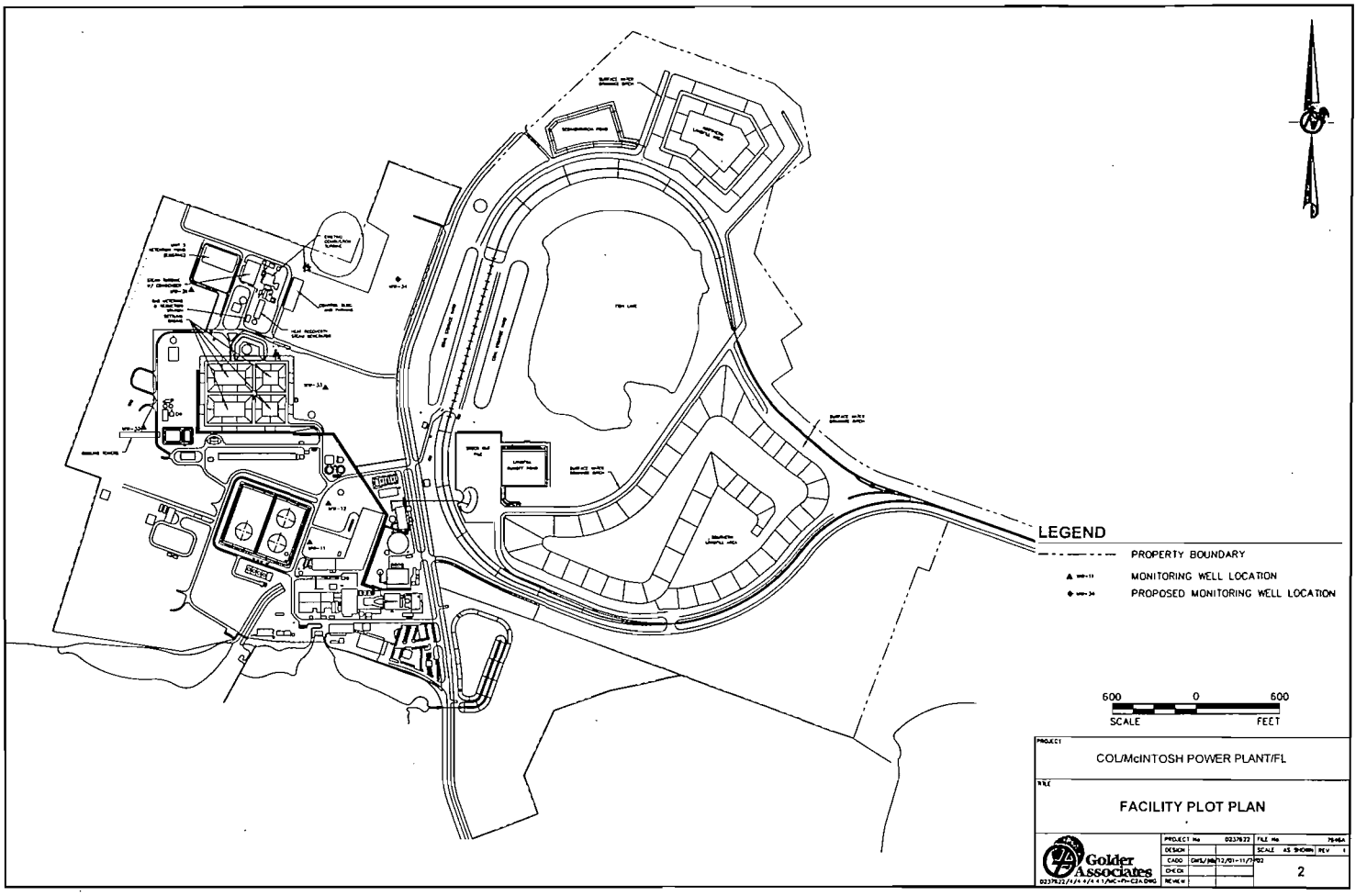
Attachment MC-FI-C1
Area Map Showing Facility Location

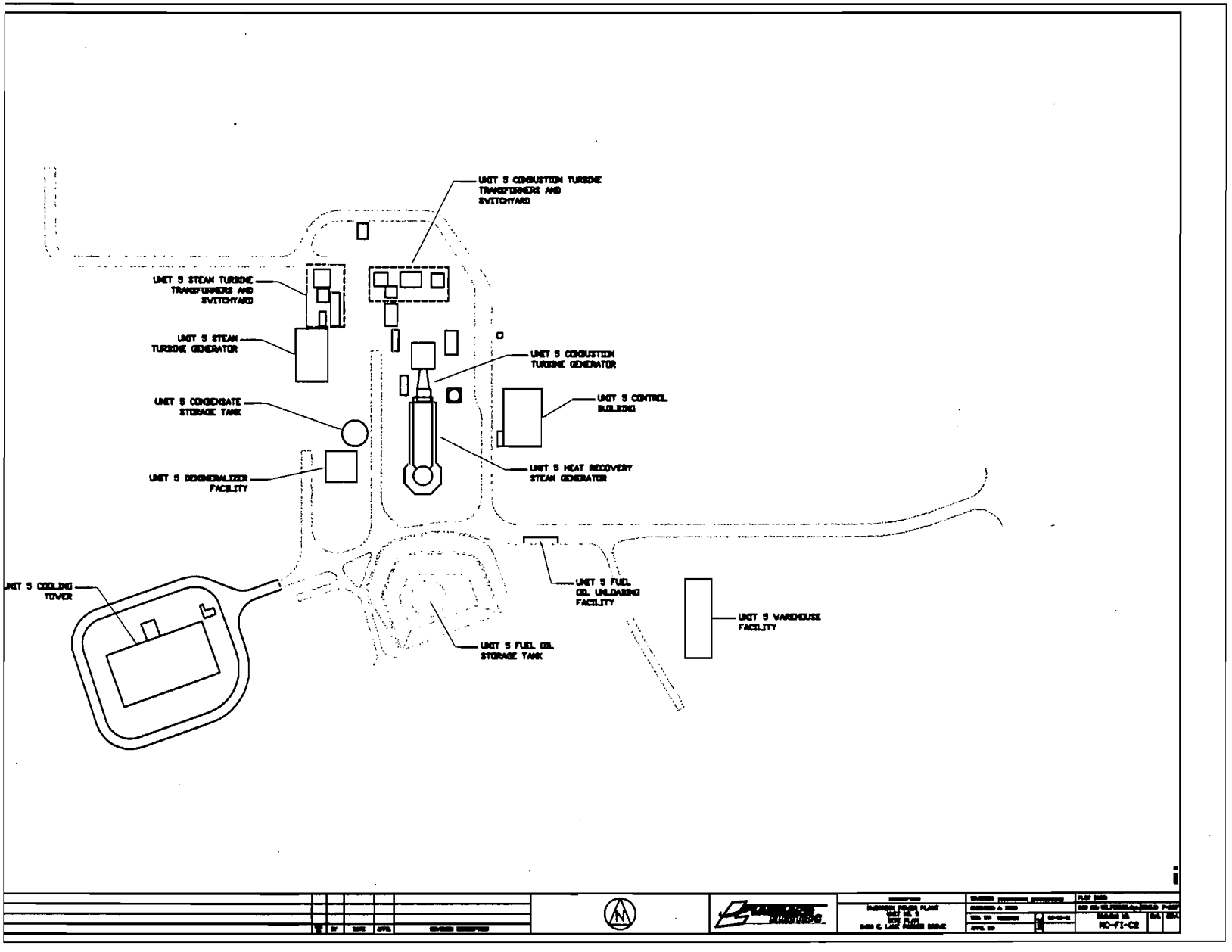
Source: Golder Associates Inc., 2002

Golder Associates

ATTACHMENT MC-FI-C2

FACILITY PLOT PLAN


LEGEND
PROPERTY BOUNDARY
MONITORING WELL LOCATION
PROPOSED MONITORING WELL LOCATION
600 0 600
SCALE FEET
PROJECT
COL/McINTOSH POWER PLANT/FL
TITLE
FACILITY PLOT PLAN
Golder Associates
PROJECT No 0237822
FILE No 75484
DESIGN
SCALE AS SHOWN
REV 1
CADD
CHECK
REVIEW
2


UNIT 5 COMBUSTION TURBINE TRANSFORMERS AND SWITCHYARD
UNIT 5 STEAM TURBINE TRANSFORMERS AND SWITCHYARD
UNIT 5 STEAM TURBINE GENERATOR
UNIT 5 COMBUSTION TURBINE GENERATOR
UNIT 5 CONDENSATE STORAGE TANK
UNIT 5 CONTROL BUILDING
UNIT 5 DEMINERALIZER FACILITY
UNIT 5 HEAT RECOVERY STEAM GENERATOR
UNIT 5 COOLING TOWER
UNIT 5 FUEL OIL UNLOADING FACILITY
UNIT 5 WAREHOUSE FACILITY
UNIT 5 FUEL OIL STORAGE TANK

ATTACHMENT MC-FI-C13

RISK MANAGEMENT PLAN VERIFICATION

Facility Name: McIntosh Power Plant/Northside WWTP
EPA ID: 1000 0009 4738

EPA United States Environmental Protection Agency

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460
OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE

Ed Colter
City of Lakeland
3400 East Lake Parker Drive
Lakeland, FL 33805-0513

December 27, 2001

EPA Facility ID#: 1000 0009 4738
Postmark Date: 12/20/2001
Anniversary Date: 12/20/2006

NOTIFICATION LETTER: COMPLETE RMP

The U.S. Environmental Protection Agency (EPA) received your Risk Management Plan (RMP) dated with the above postmark date. **This letter notifies you that your RMP is "complete" according to EPA's completion check.** The completion check is a program implemented by EPA to determine whether a submitted RMP includes the minimum amount of information every RMP must provide. The completion check does not assess whether a submitted RMP should have provided additional information or whether the information it provides is accurate or appropriate. In other words, it does not indicate that the RMP meets the requirements of 40 CFR Part 68.

Please note the anniversary date indicated above. Your RMP must be revised and updated by this date or earlier as required by 40 CFR §68.190. Please also note your EPA Facility ID number as identified at the top of this letter; all future Risk Management Plan submissions, corrections and other correspondence must include this number.

Your RMP (excluding the Offsite Consequence Analysis data) can be viewed on RMP*Info™, a national database on the Internet at http://www.epa.gov/enviro.

If you have any questions, please call one of the following numbers:

(1) For RMP rule interpretation questions, call the EPCRA Hotline at (800) 424-9346 or (703) 412-9810 (in the D.C. Metro area).

(2) For RMP*Submit installation and software questions, or information on the status of your RMP, contact the RMP Reporting Center at (703) 816-4434, or write to the:

RMP Reporting Center
P.O. Box 3346
Merrifield, VA 22116-3346

(3) For more information on the Risk Management Program, you can contact your Implementing Agency. Your Implementing Agency is **Florida Department of Community Affairs, 2555 Shumard Oak Boulevard, Tallahassee, FL, 32399, Phone: 850-413-9970.**

Thank you for your cooperation in this matter.

Sincerely,

RMP Reporting Center

Enclosure:
Risk Management Plan (if submitted on paper)

ATTACHMENT MC-FI-C14

COMPLIANCE REPORT AND PLAN

ATTACHMENT MC-FI-C14

COMPLIANCE REPORT AND PLAN

On the date specified in Attachment MC-FI-C15, the facility and emission units identified in this application are in compliance with the Applicable Regulations identified in this application form. Compliance with the conditions set forth in this operation permit will be certified on an annual basis by the submittal of the Statement of Compliance – Title V Source DEP Form No. 62-213.900(7). This report will be submitted by March 1 of each year for the prior calendar year. Compliance with the allowable emission limiting standards for oil firing shall be determined within 720 unit operating hours on oil as indicated by the EPA Region IV letter from R. Douglas Nealy dated February 14, 2001 (see attached letter). Compliance with the installation of the oxidation catalyst as required by Condition 17 of PSD-FL-245 will be demonstrated by a properly signed and sealed certification.

Permittee will submit a properly signed and sealed certification from the permittee's Professional Engineer stating that 1) the construction of the facility was completed in accordance with the AC permit and 2) the facility's emission units have been tested and compliance with the terms and conditions contained within the AC permit has been properly demonstrated within 45 days after completion of all of the initial performance tests.

[Rules 62-212.400(7)(b), 62-213.440(2), and 62-213.420(1)(a)5, F.A.C.]

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

FEB 14 2001

4APT-ARB

Mr. C.H. Fancy, P.E.
Chief
Bureau of Air Regulation
Department of Environmental Protection
Division of Air Resource Management
Mail Station 5500
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

SUBJ: Initial Performance Test Extension Request Submitted by Lakeland Electric for McIntosh Power Plant Unit No. 5

Dear Mr. Fancy:

The purpose of this letter is to provide you with a written determination regarding the referenced request that was sent to U.S. Environmental Protection Agency (EPA) Region 4 and to you in an October 23, 2000, letter from the City of Lakeland. Unit No. 5 is a 250 megawatt combustion turbine which is subject to 40 C.F.R Part 60, Subpart GG (Standards of Performance for Stationary Gas Turbines). Lakeland requested an extension of the deadline for completing testing under New Source Performance Standards (NSPS) because it has experienced several operating problems that are preventing it from firing the turbine with fuel oil at the present time.

Because of these operating problems, an extension of the deadline for testing would be acceptable to Region 4, and based upon the information provided by Lakeland, an appropriate duration for the extension would be 720 unit operating hours after Unit No. 5 resumes firing fuel oil. Details regarding the specific operating problems experienced by Lakeland and the basis for our determination are provided in the remainder of this letter.

Under the provisions of 40 C.F.R. §60.8(a), an initial performance test must be conducted on facilities subject to NSPS no later than 60 days after reaching maximum capacity or180 days after startup, whichever comes first. Based upon these provisions and the April 14, 1999, startup date for Unit No. 5, the deadline for completing an initial performance test on the turbine would have been October 11, 1999. Because the turbine had to be shut down for extensive repairs on July 30, 1999, and was not scheduled to resume operation prior to the deadline for testing, Lakeland requested an extension of this deadline. This request was made in a letter dated September 16, 1999, and in an October 18, 1999, letter to the Florida Department of Environmental Protection we approved this request and granted an extension of 60 days

following the restart of the unit to complete the performance test. Although Lakeland successfully completed an initial performance test while firing natural gas on March 2, 2000, the City has not been able to sustain firing on fuel oil long enough to conduct an initial test while burning this fuel. Therefore, the company's October 23, 2000, letter asked for approval of an additional extension that would give it up to 90 days following the restart of the turbine to complete an initial performance test during fuel oil firing.

Included with Lakeland's request for an extension of the deadline for testing was an October 19, 2000, Siemens Westinghouse, Incorporated letter which provided details about the problems that have prevented Unit No. 5 from achieving sustained operation on fuel oil. According to this letter, problems with igniters, fuel injectors, other mechanical components, and the generator have all contributed to the company's inability to achieve sustained operation on fuel oil. Due to this combination of problems, the maximum firing rate achieved during shake down testing on the unit while firing fuel oil was 25 percent of capacity, and the unit operated on oil for a total of only about 13 hours during this testing. Since the amount of time needed to correct all of the operating problems encountered by Lakeland will prevent it from completing an initial performance test under the terms of the extension we granted in October 1999, the City has requested an additional 90-day extension following the completion of repairs and the restart of the unit on fuel oil.

Since the City has been able to fire Unit No. 5 with fuel oil for such a small amount of time so far, extending the deadline for completing an initial performance test during oil firing is acceptable to Region 4. Because the operation on oil up to this point has been so limited, it is possible that Lakeland may encounter additional operating problems when the unit resumes operation. Because this factor makes it difficult to predict the number of days it will take to successfully bring the unit back on line and prepare it for testing, granting an extension based upon hours of operation will be a better approach than granting one based upon calendar days in Lakeland's case. Another advantage of basing the extension on operating hours, instead of operating days, is that it will reduce the likelihood that the City will need to submit any further requests for a testing extension on Unit No. 5

Based upon extensions that we have approved for other facilities that have not been able to operate on the deadline for testing, giving Lakeland up to 720 operating hours following the restart of Unit No. 5 on oil to complete an initial performance would be reasonable. The majority of the extensions we have granted in the past has given owners and operators 30 calendar days following the restart of an affected facility to complete testing. If the restart of Unit No. 5 on oil is relatively trouble free, extending the testing deadline by 720 operating hours will ensure that testing is completed within roughly the same number of calendar days following the restart as other facilities for which we have granted extensions in the past. In the event that any unexpected problems are encountered following the restart of Unit No. 5, extending the deadline beyond 30 calendar days would be acceptable since expediting the completion of the testing will not be a high priority if the unit is running only intermittently while any new problems are being resolved.

If you have any questions about the issues addressed in this letter, please contact Mr. David McNeal of the EPA Region 4 staff at 404/562-9102.

Sincerely,

Paul Stagner

R. Douglas Neeley, Chief
Air and Radiation Technology Branch
Air, Pesticides and Toxics
Management Division

cc: Mr. Martin Costello, FL DEP

Ms. Farzie Shelton
City of Lakeland
Department of Electric
501 East Lemon Street
Lakeland, Florida 33801-5050

ATTACHMENT MC-FI-C15

COMPLIANCE CERTIFICATION

ATTACHMENT MC-FI-C15

COMPLIANCE CERTIFICATION

The compliance report for this facility will be submitted by March 1 of each year for the prior calendar year. The compliance statement is as follows:

> I, the undersigned, am the responsible official as defined in Chapter 62-210.200, F.A.C., of the Title V source for which this report is being submitted. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made and data contained in this report are true, accurate, and complete.

Timothy C Bates

Timothy Bates
Director of Energy Suppy

11/26/02
Date

III. EMISSIONS UNIT INFORMATION

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

A. GENERAL EMISSIONS UNIT INFORMATION
(All Emissions Units)

Emissions Unit Description and Status

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

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

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

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

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

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

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

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

McIntosh Unit 5 – Combined Cycle Configuration

4. Emissions Unit Identification Number: [ ] No ID [ ] ID Unknown
ID: **028**

5. Emissions Unit Status Code:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
A	**JANUARY 2002**	**49**	[X]

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

This emission unit is a Westinghouse 501G combustion turbine currently operating in combined cycle with a HRSG and 120 MW steam electric turbine. The unit will be fired primarily with natural gas and distillate fuel oil as backup fuel. The diesel fuel may contain the additive Soltron as recommended by the manufacturer. See Attachment MC-EU1-A9.

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

Dry Low NO_X combustion – Natural gas firing

Water Injection – Oil firing

Selective Catalytic Reduction – Natural Gas Firing

Oxidation Catalyst (Attachment MC-FI-C14)

2. Control Device or Method Code(s): **25, 28, 65, 39**

Emissions Unit Details

1. Package Unit:
   Manufacturer: **Westinghouse** Model Number: **501G**
2. Generator Nameplate Rating: **369** MW
3. Incinerator Information:
   Dwell Temperature: °F
   Dwell Time: seconds
   Incinerator Afterburner Temperature: °F

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

Emissions Unit Operating Capacity and Schedule

1. Maximum Heat Input Rate:			**2,407**	mmBtu/hr
2. Maximum Incineration Rate:	lb/hr			tons/day
3. Maximum Process or Throughput Rate:				
4. Maximum Production Rate:				
5. Requested Maximum Operating Schedule:				
	24	hours/day	**7**	days/week
	52	weeks/year	**8,760**	hours/year

6. Operating Capacity/Schedule Comment (limit to 200 characters):

Maximum heat input for natural gas firing (LHV) at baseload; ISO conditions; maximum for oil firing (LHV) is 2,236 mmBtu/hr at baseload; ISO conditions. Heat input is a function of compressor inlet temperature.

C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

List of Applicable Regulations

See Attachment MC-EU1-D	

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

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram? **N/A**	2. Emission Point Type Code: **1**	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): **Exhausts through a single stack.**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: **V**	6. Stack Height: **300** feet	7. Exit Diameter: **20** feet
8. Exit Temperature: **187** °F	9. Actual Volumetric Flow Rate: **1,271,428** acfm	10. Water Vapor: **12.44** %
11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates: Zone: **17** East (km): **408.79** North (km): **3106.66**		
14. Emission Point Comment (limit to 200 characters): **Stack parameters for ISO turbine inlet operating condition firing natural gas at baseload; for oil 188°F, 1,291,502 ACFM and 12.05% water vapor at baseload; ISO conditions.**		

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

Segment Description and Rate: Segment 1 of 2

1. Segment Description (Process/Fuel Type) (limit to 500 characters): **Distillate (No. 2) Fuel Oil**		
2. Source Classification Code (SCC): **2-01-001-01**	3. SCC Units: **1,000 gallons**	
4. Maximum Hourly Rate: **17.0**	5. Maximum Annual Rate: **4,251**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **0.05**	8. Maximum % Ash:	9. Million Btu per SCC Unit: **132**
10. Segment Comment (limit to 200 characters): **mmBtu/SCC = 131.5 (rounded to 132). BASIS: Max. Hourly = 2,236 mmBtu/hr / 131.5 mmBtu/ 1,000 gal / 1,000 gal; Annual permit limited to 559 x 10^9 Btu (LHV) per year. Max hourly; function of turbine inlet temp. The diesel fuel may contain the additive Soltron as recommended by the manufacturer. See Attachment MC-EU1-E10, MSDS for Soltron.**		

Segment Description and Rate: Segment 2 of 2

1. Segment Description (Process/Fuel Type) (limit to 500 characters): **Natural Gas**		
2. Source Classification Code (SCC): **2-01-002-01**	3. SCC Units: **Million Cubic Feet**	
4. Maximum Hourly Rate: **2.53**	5. Maximum Annual Rate: **16,462**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: **950**
10. Segment Comment (limit to 200 characters): **Max. based on 59°F; 950 Btu/CF LHV. Annual permit limited to 15.639 x 10^{12} Btu (LHV) per year. Max. hourly a function of turbine inlet temperature. See Permit No. PSD-FL-245 (1050004-004-AC) Condition III.13.**		

F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM			NS
SO_2			EL
NO_X	25, 28	65	EL
CO	39(Pending)		NS
VOC	39(Pending)		NS
PM_{10}			NS

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **139.6** lb/hour **49** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **PSD-FL-245; Siemens Westinghouse**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **(8,510 hours gas x 8.8 lb/hour + 250 hours oil x 92.8 lb/hour)/2,000 lb/ton = 49.0 tons/year**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on oil firing, 50% load, 30°F; Tons/yr based on 8,510 hrs/yr gas firing and 250 hrs/yr oil firing; 59°F conditions, baseload.**	

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **10% opacity**	4. Equivalent Allowable Emissions: **139.6** lb/hour **11.6** tons/year
5. Method of Compliance (limit to 60 characters): **Annual VE test; EPA Method 9**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **PSD-FL-245 (1050004-004-AC)** **Oil firing; annual based on 250 hrs/yr at ISO conditions.**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **139.6** lb/hour **49** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **PSD-FL-245; Siemens Westinghouse**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters):	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on oil firing, 50% load, 30°F; Tons/yr based on 8,510 hrs/yr gas firing and 250 hrs/yr oil firing; 59°F conditions, baseload.**	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **10% opacity**	4. Equivalent Allowable Emissions: **9.1** lb/hour **38.5** tons/year
5. Method of Compliance (limit to 60 characters): **VE Test; EPA Method 9**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **PSD-FL-245 (1050004-004-AC)** **Gas firing - 30°F, 100% load; annual based on 59°F; 100% load, 8,760 hrs/yr.**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **SO_2**	2. Total Percent Efficiency of Control:

3. Potential Emissions: **127** lb/hour **38.4** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **PSD-FL-245**	7. Emissions Method Code: **2**

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

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

Lb/hr and TPY based on PSD-FL-245 (1050004-004-AC).

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **0.05% Sulfur Oil**	4. Equivalent Allowable Emissions: **127** lb/hour **15.9** tons/year

5. Method of Compliance (limit to 60 characters):

Fuel Sampling

6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters):

PSD-FL-245 (1050004-004-AC)

Oil firing.

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **SO_2**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **127** lb/hour **38.4** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **PSD-FL-245**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters):	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr and TPY based on PSD-FL-245 (1050004-004-AC).**	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **8 lb/hour**	4. Equivalent Allowable Emissions: **8** lb/hour **35.0** tons/year
5. Method of Compliance (limit to 60 characters): **Fuel Sampling**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **PSD-FL-245 (1050004-004-AC)** **Gas firing.**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **NO_X**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **148** lb/hour **321** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **PSD-FL-245**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters):	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on oil firing baseload; Tons/yr based on 8,510 hrs/yr gas firing and 250 hrs/yr oil firing.**	

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **15 ppmvd@15% O_2**	4. Equivalent Allowable Emissions: **148** lb/hour **18.5** tons/year
5. Method of Compliance (limit to 60 characters): **3-Hour Block Average (corrected to 15% Oxygen)**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **PSD-FL-245 (1050004-004-AC)** **Oil firing baseload; annual based on 250 hrs/yr. 200 lb/hr 24-hour Block Average, authorized for Startup, Shutdown or fuel change if Fuel oil is fired.**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **NO_X**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **148** lb/hour **321** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **PSD-FL-245**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters):	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on oil firing; Tons/yr based on 8,510 hrs/yr gas firing and 250 hrs/yr oil firing.**	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **7.5 ppmvd@15% O_2**	4. Equivalent Allowable Emissions: **71.1** lb/hour **311.4** tons/year
5. Method of Compliance (limit to 60 characters): **CEM 3-Hour Block Average and Annual RATA EPA Method 7E**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **PSD-FL-245 (1050004-004-AC)** **Gas firing; annual based on 8,760 hr/yr. 100 lb/hour, 24-hour Block Average, authorized for Startup, Shutdown when firing natural gas.**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **CO**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **38.6** lb/hour **41** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **PSD-FL-245**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters):	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on oil firing; Tons/yr based on 8,510 hrs/yr gas firing and 250 hrs/yr oil firing.**	

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **Oxidation Catalyst (8/1/03)**	4. Equivalent Allowable Emissions: **38.6** lb/hour **4.8** tons/year
5. Method of Compliance (limit to 60 characters): **None**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **PSD-FL-245 (1050004-004-AC) Oil firing, annual based on 250 hrs/yr. 90% Reduction @ Base Load, Oxidation Catalyst. See Attachment MC-FI-C14**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **CO**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **38.6** lb/hour **41** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **PSD-FL-245**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters):	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on oil firing base load; Tons/yr based on 8,510 hrs/yr gas firing and 250 hrs/yr oil firing.**	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **Oxidation Catalyst (8/1/03)**	4. Equivalent Allowable Emissions: **8.5** lb/hour **37.2** tons/year
5. Method of Compliance (limit to 60 characters): **Annual test for 2ppmvd criteria**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **PSD-FL-245 (1050004-004-AC), Gas firing,; annual based on 8,760 hr/yr. 90% Reduction @ Base Load, Oxidation Catalyst. See Attachment MC-FI-C14**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **SO_2**	2. Total Percent Efficiency of Control:

3. Potential Emissions: **127** lb/hour **38.4** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **PSD-FL-245**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters):	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr and TPY based on PSD-FL-245 (1050004-004-AC).**	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **0.05% Sulfur Oil**	4. Equivalent Allowable Emissions: **127** lb/hour **15.9** tons/year
5. Method of Compliance (limit to 60 characters): **Fuel Sampling**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **PSD-FL-245 (1050004-004-AC)** **Oil firing.**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM_{10}**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **139.6** lb/hour **49** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **PSD-FL-245; Siemens Westinghouse**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **(8,510 hours gas x 8.8 lb/hr + 250 hours oil x 92.8 lb/hour) / 2,000 lb/ton = 49.0 Tons/Year.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on oil firing, 50% load, 30°F; tons/year based on 8,510 hrs/yr gas firing and 250 hrs/yr oil firing; 59°F conditions.**	

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **10% opacity**	4. Equivalent Allowable Emissions: **139.6** lb/hour **11.6** tons/year
5. Method of Compliance (limit to 60 characters): **Annual VE test; EPA Method 9**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **PSD-FL-245 (1050004-004-AC)** **Oil firing; annual based on 250 hrs/yr at ISO conditions.**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM_{10}**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **139.6** lb/hour **49** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **PSD-FL-245; Siemens Westinghouse**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters):	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on oil firing, 50% load, 30°F; tons/year based on 8,510 hrs/yr gas firing and 250 hrs/yr oil firing; 59°F conditions.**	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **10% opacity**	4. Equivalent Allowable Emissions: **9.1** lb/hour **38.5** tons/year
5. Method of Compliance (limit to 60 characters): **VE Test, EPA Method 9**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **PSD-FL-245 (1050004-004-AC)** **Gas firing - 30°F, 100% load; annual based on 59°F; 100% load, 8,760 hrs/yr.**	

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

Visible Emissions Limitation: Visible Emissions Limitation 1 of 2

1. Visible Emissions Subtype: **VE20**	2. Basis for Allowable Opacity: [X] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: **10** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Annual VE Test EPA Method 9**	
5. Visible Emissions Comment (limit to 200 characters):	

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

Continuous Monitoring System: Continuous Monitor 1 of 2

1. Parameter Code: **EM**	2. Pollutant(s): **NO_X**
3. CMS Requirement:	[X] Rule [ ] Other
4. Monitor Information: Manufacturer: **Siemens** Model Number: **300-CLD** Serial Number: **28J04015**	
5. Installation Date: **Relocation to new stack December 2001**	6. Performance Specification Test Date: February 27, 2002
7. Continuous Monitor Comment (limit to 200 characters): **NO_X CEM proposed to meet requirements of 40 CFR Part 75.**	

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

Visible Emissions Limitation: Visible Emissions Limitation 2 of 2

1. Visible Emissions Subtype: **VE99**	2. Basis for Allowable Opacity: [X] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: **100** % Maximum Period of Excess Opacity Allowed: **6** min/hour	
4. Method of Compliance: **None**	
5. Visible Emissions Comment (limit to 200 characters): **FDEP Rule 62-210.700(1), which allows 2 hours (120 minutes) per 24 hours for start up, shutdown and malfunction. See Attachment MC-EU1-J6.**	

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

Continuous Monitoring System: Continuous Monitor 2 of 2

1. Parameter Code: **EM**	2. Pollutant(s): **NO_X**
3. CMS Requirement:	[X] Rule [ ] Other
4. Monitor Information: Manufacturer: **Siemens** Model Number: **Oxymat 6E** Serial Number: **N1K80365**	
5. Installation Date: **December 2001**	6. Performance Specification Test Date: February 27, 2002
7. Continuous Monitor Comment (limit to 200 characters): **Monitor is an O_2 analyzer for NO_x emissions determination.**	

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

Supplemental Requirements

1. Process Flow Diagram
   [X] Attached, Document ID: MC-EU1-J1 [ ] Not Applicable [ ] Waiver Requested

2. Fuel Analysis or Specification
   [X] Attached, Document ID: MC-EU1-J2 [ ] Not Applicable [ ] Waiver Requested

3. Detailed Description of Control Equipment
   [X] Attached, Document ID: MC-EU1-J3 [ ] Not Applicable [ ] Waiver Requested

4. Description of Stack Sampling Facilities
   [X] Attached, Document ID: MC-EU1-J4 [ ] Not Applicable [ ] Waiver Requested

5. Compliance Test Report
   [X] Attached, Document ID: MC-EU1-J5
   [ ] Previously submitted, Date: _____
   [ ] Not Applicable

6. Procedures for Startup and Shutdown
   [X] Attached, Document ID: MC-EU1-J3[ ] Not Applicable [ ] Waiver Requested

7. Operation and Maintenance Plan
   [X] Attached, Document ID: MC-EU1-J3[ ] Not Applicable [ ] Waiver Requested

8. Supplemental Information for Construction Permit Application
   [ ] Attached, Document ID: _____ [X] Not Applicable

9. Other Information Required by Rule or Statute
   [ ] Attached, Document ID: _____ [X] Not Applicable

10. Supplemental Requirements Comment:

Additional Supplemental Requirements for Title V Air Operation Permit Applications

11. Alternative Methods of Operation
[ ] Attached, Document ID:_____ [X] Not Applicable

12. Alternative Modes of Operation (Emissions Trading)
[ ] Attached, Document ID:_____ [X] Not Applicable

13. Identification of Additional Applicable Requirements
[X] Attached, Document ID: **MC-EU1-J13** [ ] Not Applicable

14. Compliance Assurance Monitoring Plan
[ ] Attached, Document ID:_____ [X] Not Applicable **See Attachment MC-EU1-J14**

15. Acid Rain Part Application (Hard-copy Required)

[X] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
Attached, Document ID: **MC-EU1-J15**

[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
Attached, Document ID:_____

[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
Attached, Document ID:_____

[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
Attached, Document ID:_____

[ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
Attached, Document ID:_____

[ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
Attached, Document ID:_____

[ ] Not Applicable

ATTACHMENT MC-EU1-A9

EMISSIONS UNIT COMMENT

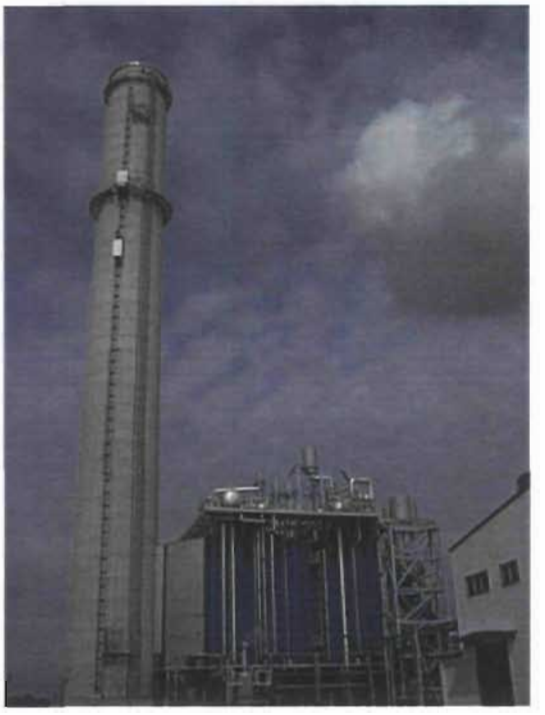


Photo 1. Unit 5 HRSG and Stack – View Toward West

Photo 2. Unit 5 HRSG and Stack – View Toward Northeast

Attachment MC-EU1-A9. Emissions Unit Comment
C.D. McIntosh, Jr. Power Plant Photos

Source: Golder, 2002.

Golder Associates

ATTACHMENT MC-EU1-D

LIST OF APPLICABLE REGULATIONS

ATTACHMENT MC-EU1-D

APPLICABLE REQUIREMENTS LISTING

EMISSION UNIT ID: EU28

FDEP Rules:

Air Pollution Control-General Provisions:

62-204.800(7)(b)37. (State Only)	NSPS Subpart GG
62-204.800(7)(c) (State Only)	NSPS authority
62-204.800(7)(d)(State Only)	NSPS General Provisions
62-204.800(12) (State Only)	Acid Rain Program
62-204.800(13) (State Only)	Allowances
62-204.800(14) (State Only)	Acid Rain Program Monitoring
62-204.800(16) (State Only)	Excess Emissions (Potentially applicable over term of permit)

Stationary Sources-General:

62-210.650	Circumvention; EUs with control device
62-210.700(1)	Excess Emissions;
62-210.700(4)	Excess Emissions; poor maintenance
62-210.700(6)	Excess Emissions; notification

Acid Rain:

62-214.300	All Acid Rain Units (Applicability)
62-214.320	All Acid Rain Units (Application Shield)
62-214.330(1)(a)	Compliance Options (if 214.430)
62-214.340	Exemptions (retired units)
62-214.350(2);(3);(5);(6)	All Acid Rain Units (Certification)
62-214.370	All Acid Rain Units (Revisions; correction; potentially applicable if a need arises)
62-214.430	All Acid Rain Units (Compliance Options-if required)

Stationary Sources-Emission Standards:

62-296.320(4)(b)(State Only)	CTs/Diesel Units

Stationary Sources-Emission Monitoring (where stack test is required):

62-297.310(1)	All Units (Test Runs-Mass Emission)
62-297.310(2)	All Units (Operating Rate)
62-297.310(3)	All Units (Calculation of Emission)
62-297.310(4)	All Units (Applicable Test Procedures)
62-297.310(5)	All Units (Determination of Process Variables)
62-297.310(6)(a)	All Units (Permanent Test Facilities-general)
62-297.310(6)(c)	All Units (Sampling Ports)
62-297.310(6)(d)	All Units (Work Platforms)
62-297.310(6)(e)	All Units (Access)
62-297.310(6)(f)	All Units (Electrical Power)
62-297.310(6)(g)	All Units (Equipment Support)

62-297.310(7)(a)1.	Applies mainly to CTs/Diesels
62-297.310(7)(a)3.	Permit Renewal Test Required
62-297.310(7)(a)4.	Annual Test
62-297.310(7)(a)5.	PM exemption if <400 hrs/yr
62-297.310(7)(a)8.	VE Compliance Test if > 400 hrs/yr
62-297.310(7)(a)9.	FDEP Notification - 15 days
62-297.310(7)(c)	Waiver of Compliance Tests (Fuel Sampling)
62-297.310(8)	Test Reports

Federal Rules:

NSPS Subpart GG:

40 CFR 60.332(a)(1)	NO_x for Electric Utility CTs
40 CFR 60.332(a)(3)	NO_x for Electric Utility CTs
40 CFR 60.333	SO_2 limits
40 CFR 60.334	Monitoring of Operations (Custom Monitoring for Gas)
40 CFR 60.335	Test Methods

NSPS General Requirements:

40 CFR 60.7(a)(1)	Notification of Construction
40 CFR 60.7(a)(3)	Notification of Actual Start-Up
40 CFR 60.7(a)(4)	Notification and Recordkeeping (Physical/Operational Cycle)
40 CFR 60.7(a)(5)	Notification of CEM Demonstration
40 CFR 60.7(b)	Recordkeeping (startup/shutdown/malfunction)
40 CFR 60.7(c)	Notification and Recordkeeping (startup/shutdown/malfunction)
40 CFR 60.7(d)	Notification and Recordkeeping (startup/shutdown/malfunction)
40 CFR 60.7(f)	Recordkeeping (maintain records-2 yrs)
40 CFR 60.8(a)	Performance Test Requirements
40 CFR 60.8(b)	Performance Test Requirements
40 CFR 60.8(c)	Performance Tests (representative conditions)
40 CFR 60.8(d)	Performance Test Notification
40 CFR 60.8(e)	Provide Stack Sampling Facilities
40 CFR 60.8(f)	Test Runs
40 CFR 60.11(a)	Compliance (ref. S. 60.8 or Subpart; other than opacity)
40 CFR 60.11(b)	Compliance (opacity determined EPA Method 9)
40 CFR 60.11(c)	Compliance (opacity; excludes startup/shutdown/malfunction)
40 CFR 60.11(d)	Compliance (maintain air pollution control equip.)
40 CFR 60.11(e)(2)	Compliance (opacity; ref. S. 60.8)
40 CFR 60.12	Circumvention
40 CFR 60.13(a)	Monitoring (Appendix B; Appendix F)
40 CFR 60.13(d)(1)	Monitoring (CEMS; span, drift, etc.)
40 CFR 60.13(e)	Monitoring (frequency of operation)
40 CFR 60.13(f)	Monitoring (frequency of operation)

Acid Rain-Permits:

40 CFR 72.9(a)	Permit Requirements
40 CFR 72.9(b)	Monitoring Requirements
40 CFR 72.9(c)(1)	SO_2 Allowances-hold allowances
40 CFR 72.9(c)(2)	SO_2 Allowances-violation

40 CFR 72.9(c)(3)(iv)	SO_2 Allowances-Phase II Units
40 CFR 72.9(c)(4)	SO_2 Allowances-allowances held in ATS
40 CFR 72.9(c)(5)	SO_2 Allowances-no deduction for 72.9(c)(1)(i)
40 CFR 72.9(e)	Excess Emission Requirements
40 CFR 72.9(f)	Recordkeeping and Reporting
40 CFR 72.9(g)	Liability
40 CFR 72.20(a)	Designated Representative; required
40 CFR 72.20(b)	Designated Representative; legally binding
40 CFR 72.20(c)	Designated Representative; certification requirements
40 CFR 72.21	Submissions
40 CFR 72.22	Alternate Designated Representative
40 CFR 72.23	Changing representatives; owners
40 CFR 72.24	Certificate of representation
40 CFR 72.30(a)	Requirements to Apply
40 CFR 72.30(b)(2)	Requirements to Apply (Phase II-Complete)
40 CFR 72.30(c)	Requirements to Apply (reapply before expiration)
40 CFR 72.30(d)	Requirements to Apply (submittal requirements)
40 CFR 72.31	Information Requirements; Acid Rain Applications
40 CFR 72.32	Permit Application Shield
40 CFR 72.33(b)	Dispatch System ID;unit/system ID
40 CFR 72.33(c)	Dispatch System ID;ID requirements
40 CFR 72.33(d)	Dispatch System ID;ID change
40 CFR 72.40(a)	General; compliance plan
40 CFR 72.40(b)	General; multi-unit compliance options
40 CFR 72.40(d)	General; termination of compliance options
40 CFR 72.51	Permit Shield
40 CFR 72.90	Annual Compliance Certification
Allowances:	
40 CFR 73.33(a),(c)	Authorized account representative
40 CFR 73.35(c)(1)	Compliance: ID of allowances by serial number
Monitoring Part 75:	
40 CFR 75.4	Compliance Dates;
40 CFR 75.5	Prohibitions
40 CFR 75.10(a)(1)	Primary Measurement; SO_2;
40 CFR 75.10(a)(2)	Primary Measurement; NO_x;
40 CFR 75.10(a)(3)(iii)	Primary Measurement; CO_2; O_2 monitor
40 CFR 75.10(b)	Primary Measurement; Performance Requirements
40 CFR 75.10(c)	Primary Measurement; Heat Input; Appendix F
40 CFR 75.10(f)	Primary Measurement; Minimum Measurement
40 CFR 75.10(g)	Primary Measurement; Minimum Recording
40 CFR 75.11(d)	SO_2 Monitoring; Gas- and Oil-fired units
40 CFR 75.11(e)	SO_2 Monitoring; Gaseous firing
40 CFR 75.12(a)	NO_x Monitoring; Coal; Non-peaking oil/gas units
40 CFR 75.12(c)	NO_x Monitoring; Determination of NO_x emission rate; Appendix F
40 CFR 75.13(b)	CO_2 Monitoring; Appendix G
40 CFR 75.13(c)	CO_2 Monitoring; Appendix F

40 CFR 75.14(c)	Opacity Monitoring; Gas units; exemption
40 CFR 75.20(a)	Initial Certification Approval Process; Loss of Certification
40 CFR 75.20(b)	Recertification Procedures (if recertification necessary)
40 CFR 75.20(c)	Certification Procedures (if recertification necessary)
40 CFR 75.21(a)	QA/QC; CEMS; Appendix B (Suspended 7/17/95-12/31/96)
40 CFR 75.21(c)	QA/QC; Calibration Gases
40 CFR 75.21(d)	QA/QC; Notification of RATA
40 CFR 75.21(e)	QA/QC; Audits
40 CFR 75.22	Reference Methods
40 CFR 75.24	Out-of-Control Periods; CEMS
40 CFR 75.30(a)(3)	General Missing Data Procedures; NO_x
40 CFR 75.30(a)(4)	General Missing Data Procedures; CO_2
40 CFR 75.30(d)	General Missing Data Procedures; SO_2
40 CFR 75.31	Initial Missing Data Procedures (new/re-certified CMS)
40 CFR 75.32	Monitoring Data Availability for Missing Data
40 CFR 75.33	Standard Missing Data Procedures
40 CFR 75.36	Missing Data for Heat Input
40 CFR 75.53	Monitoring Plan; revisions
40 CFR 75.57(a)	Recordkeeping Requirements for Affected Sources
40 CFR 75.57(b)	Operating Parameter Record Provisions
40 CFR 75.57(d)	NO_x Emission Record Provisions
40 CFR 75.57(e)	CO_2 Emission Record Provisions
40 CFR 75.57(h)	Missing Data Records
40 CFR 75.58(c)	Specific SO_2 Emission Record Provisions
40 CFR 75.58(e)	Specific SO_2 Emission Record Provisions
40 CFR 75.59	Certification; QA/QC Provisions
40 CFR 75.60	Reporting Requirements-General
40 CFR 75.61	Reporting Requirements-Notification cert/recertification
40 CFR 75.62	Reporting Requirements-Monitoring Plan
40 CFR 75.63	Reporting Requirements-Certification/Recertification
40 CFR 75.64(a)	Reporting Requirements-Quarterly reports; submission
40 CFR 75.64(b)	Reporting Requirements-Quarterly reports; DR statement
40 CFR 75.64(c)	Rep. Req.; Quarterly reports; Compliance Certification
40 CFR 75.64(d)	Rep. Req.; Quarterly reports; Electronic format
40 CFR 75.64(f)	Method of Submission
40 CFR 75.64(g)	Submission Requirements
40 CFR 75.66	Petitions to the Administrator (if required)
Appendix A	Specifications and Test Procedures
Appendix B	QA/QC Procedures
Appendix C.	Missing Data Estimation Procedures
Appendix D	Optional SO_2; Oil-/gas-fired units
Appendix F	Conversion Procedures

Acid Rain Program-Excess Emissions:

40 CFR 77.3	Offset Plans
40 CFR 77.5(b)	Deductions of Allowances
40 CFR 77.6	Excess Emissions Penalties (SO_2)

ATTACHMENT MC-EU1-E10

NO. 2 FUEL OIL SEGMENT COMMENT

This attachment contains the MSDS sheet for a fuel additive used on the fuel oil for the emission unit. This additive is an EPA approved fuel enzyme that is used to prevent breakdown of the fuel by bacteria and to improve the combustion process there-by reducing the amount of CO generated. The fuel additive will be used at a rate of 1 gallon per 4,000 gallons of fuel oil. This product has been approved for use by Siemens Westinghouse Power Corporation.

Soltron Safety Data Sheet
Date Prepared: 3/1/00

SOLTRON™ MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material Identity

Product Name: ***Soltron™***
General or Generic ID: LOW ODOR BASED SOLVENT

Company:
SOLPOWER CORPORATION
Suite 102
7309 East Stetson Dr.
Scottsdale, Arizona 85251

Emergency Telephone Number
INFOTRAC (1-800-535-5053)
24 hours everyday

Regulatory Information Number:
(1-480-947-6366)

2. COMPOSITION INFORMATION ON INGREDIENTS

Ingredients (s)	CAS Number	% (by weight)
Aliphatic Hydrocarbon	64742-96-7	>99.5
Proprietary Organic Compounds		< 0.5

3. HAZARDS IDENTIFCATION

Potential Health Effects

Eye Can cause eye irritation. Symptoms include stinging, tearing, redness and swelling of eyes.

Skin May cause mild skin irritation. Prolonged or repeated contact may dry the skin. Symptoms may include redness, burning, drying and cracking, and skin burns.

Swallowing Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful. This material can get into the lungs during swallowing or vomiting. This results in lung inflammation and other lung injury.

Inhalation Breathing of vapor mist is possible. Breathing small amounts of this material during normal handling is not likely to cause harmful effects. Breathing large amounts may be harmful.

Symptoms Of Skin Exposure

Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include: stomach or intestinal upset (nausea, vomiting, diarrhea) irritation (nose, throat, airways), central nervous symptom depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness), and death.

Target Organ Effects No data.

Developmental Information No data.

Cancer Information No data.

Other Health Effects No data.

Primary Route (s) of Entry Inhalation, Skin contact

4. FIRST AID MEASURES

Eyes If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate medical attention.

Skin Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention. Launder clothing before reuse.

Swallowing Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with head down. Contact a physician, medical facility or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

Inhalation If symptoms develop, move individual away from exposure and into fresh air. If symptoms persist, seek medical attention. If breathing is difficult, administer oxygen. Keep person warm and quiet; seek immediate medical attention.

Note to Physicians This material is an aspiration hazard. Potential danger from aspiration must be weighed against possible oral toxicity (see section 3 - Swallowing) when deciding whether to induce vomiting. Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: skin, lung (for example asthma-like conditions).

5. FIRE FIGHTING MEASURES

Flash Point °F, T.C.C – 150 (65.5°C)

Explosive Limit (For component) Lower 0.9% Upper .0%

Auto ignition Temperature No data.

Hazardous Products of Combustion May form: carbon dioxide and carbon monoxide, various hydrocarbons.

Fire and Explosion Hazards Vapors are heavier than air and may travel along the ground or are moved by ventilation and ignited by heat, pilot lights, other flames and ignitions sources at locations distant from material handing point. Never use welding or cutting torch on or near drum (even empty) because product (even just residue) can ignite explosively.

Extinguishing Media Regular foam, water fog, carbon dioxide, dry chemical

Fire Fighting Instructions Wear a self-contained breathing apparatus with a full-face piece operated in the positive pressure demand mode with appropriate turnout gear and chemical resistant personal protective equipment. Refer to the personal protective equipment section of this MSDS.

NFPA Rating Health - 0, Flammability - 1, Reactivity - 0.

6. ACCIDENTAL RELASE MEASURES

Small Spill Absorb liquid on vermiculite, floor absorbent, or the absorbent material and transfer to hood.

Large Spill Eliminate all ignition sources (flares, flames including pilot lights, electrical sparks). Persons not wearing protective equipment should be excluded from area of spill until clean up has been completed. Stop spill at source. Prevent from entering drains, sewers, streams, or other bodies of water. Prevent from spreading. If runoff occurs, notify authorities as required. Pump or vacuum transfer-spilled product to clean containers for recovery. Absorb unrecoverable product. Transfer contaminated absorbent soil and other materials to container for disposal.

7. HANDLING AND STORAGE

Handling Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapors, liquid and/or solids), all hazard precautions given in the data sheet must be observed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye protection	Chemical splash goggles and in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. (Consult your safety representative.)
Skin Protection	Wear resistant gloves such as: nitrile rubber. To prevent repeated or prolonged skin contact, wear impervious clothing and boots.
Respiratory Protections	If workplace exposure limit(s) of product or any component is exceeded (see exposure guidelines) a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators. (Negative pressure type) under specified conditions (see your industrial hygienist). Engineering or administrative controls should be implemented to reduce exposure.
Engineering Controls	Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(s)
Exposure Guidelines	ALIPHATIC HYDROCARBON (64742-96-7) No exposure limits established.

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point(For component)	350.0°F (176.6°C) @ 760 mmHg
Vapor Pressure	(For component) .010 mmHg @ 100.00°F
Specific Vapor Density	5.900 @ AIR=1
Specific Gravity	.804 @ 60.00°F
Liquid Density	6.700 lbs/gal @ 60.00°F .804 kg/l @ 16.00°C
Percent Volatiles	100.000%

Percent Volatile Organic Compounds	100.000%, 804.000 g/l, 6.700 lbs/gal
Evaporation Rate	200.00
Appearance	No data.
State	LIQUID.
Physical Form	NEAT.
Color	CLEAR & COLORLESS
Odor	LOW MILD ODOR
PH	No Data.

10. STABILITY AND REACTIVITY

Hazardous Polymerization	Product will not undergo hazardous polymerization.
Hazardous Decompositions	May form: carbon dioxide and carbon monoxide, various hydrocarbons.
Chemical Stability	Stable.
Incompatibility	Avoid contact with: strong oxidizing agents

11. TOXICOLOGICAL INFORMATION

No Data.

12. ECOLOGICAL INFORMATION

No Data

13. DISPOSAL CONSIDERATION

Waste Management Information — Dispose of in accordance with all applicable local, state and federal regulations.

14. TRASPORT INFORMATION

DOT INFORMATION – 49 CFR 172.101

DOT Description: LOW ODOR BASE ALIPHATIC HYDROCARBON, COMBUSTABLE LIQUID, UN1223 (for Air Shipment), N1268 (for Ground Shipment), III.

Container/Mode: 7 fl. oz., 32 fl. oz, 1 Gallon, 5 Gallon Pail, 55 Gallon Drum

NOS Component: None.

RQ (Reporting Quantity) – 49 CFR 172.101 Not applicable.

15. REGULATORY INFORMATION

US Federal Regulations

TSCA (Toxic Substance Control Act) Status
TSCA (UNITED STATES) The international ingredients of the product are listed.
CERCLA RQ – 40 CFR 302.4
None
SARA 302 Components – 40 CFR 355 Appendix A
None
Section 311/312 Hazard Class – 40 CFR 370.2
Immediate (X) Delayed ( ) Fire (X) Reactive ( ) Sudden Release of Pressure ( )
SARA 313 Components – 40 CFR 372.65
None

International Regulations

Inventory Status
DSL (CANADA) The intentional ingredients of this product are listed.
EINECS (EUROPE) The intentional ingredients of this product are listed.

State and Local Regulations

California Proposition 65
The following statement is made in order to comply with the California Safe Drinking Water and Toxic Enforcement Act of 1966: The product contains the following substance(s) known to the state of California to cause cancer.

BENZENE

The following statement is made in order to comply with the California Safe Drinking Water and Toxic Enforcement Act of 1966: The product contains the following substance(s) known to the state of California to cause reproductive harm.

TOLUENE

16. OTHER INFORMATION

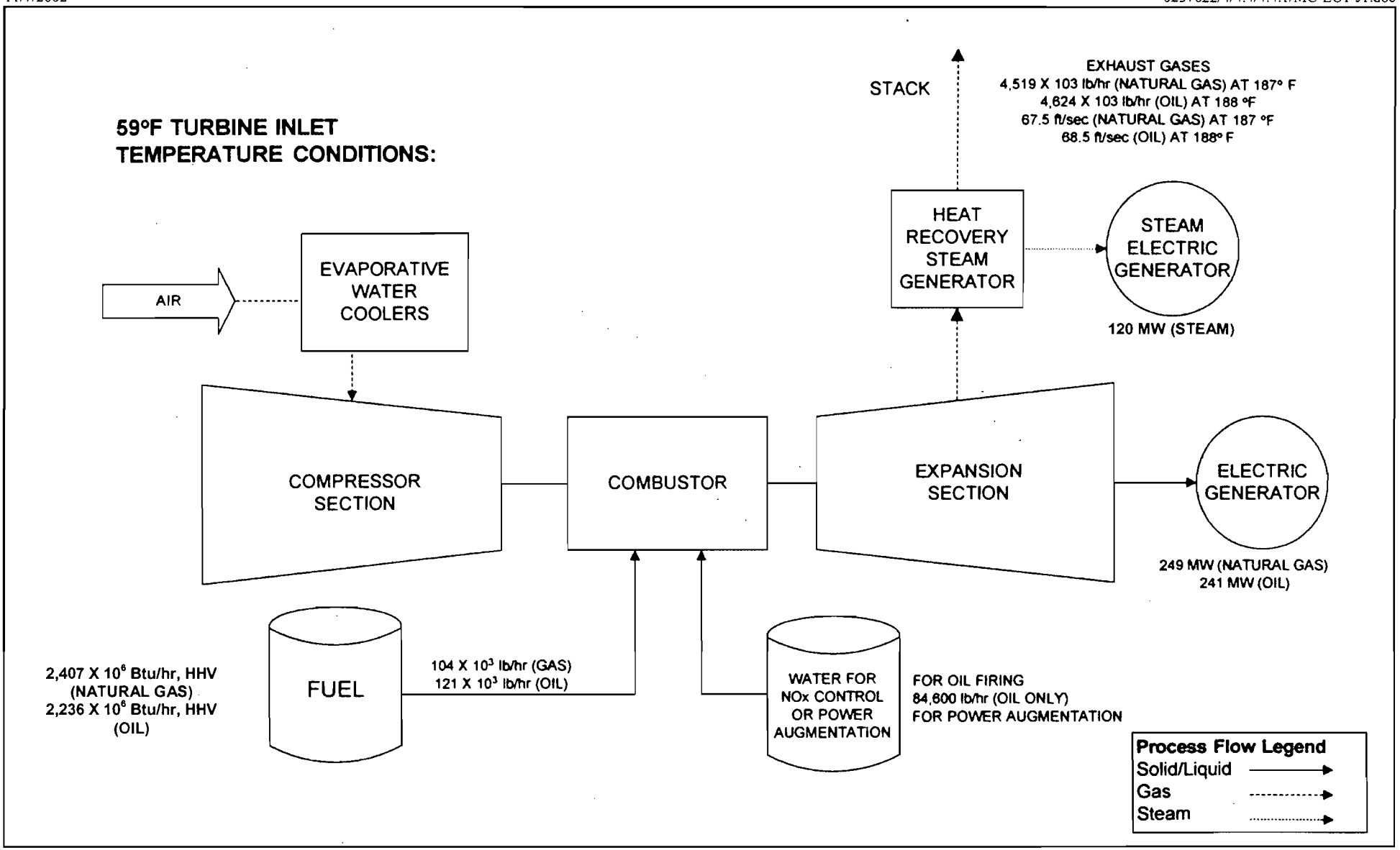
The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advanced of need that the information is current, applicable, and suitable to their circumstances.

17. OTHER INFORMATION

This Material Safety Data was prepared by Solpower Corporation in accordance with 29 CFR 1910.1200. All information, recommendations and suggestions appearing herein concerning this product are based upon tests and data believed to reliable, however it is the users responsibility to determine the safety, toxicity and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantee expressed or implied is made Solpower Corporation as to the effects of such use, the results to be obtained or the safety and toxicity of the product nor does Solpower Corporation assume any liability arising out of use by other of the product referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

ATTACHMENT MC-EU1-J1

PROCESS FLOW DIAGRAM



Attachment MC-EU1-J1
Simplified Flow Diagram of McIntosh Unit 5
City of Lakeland

Source: Golder, 2002.

Golder Associates

ATTACHMENT MC-EU1-J2

FUEL ANALYSIS
NO. 2 FUEL OIL

September 24, 1999

CITY OF LAKELAND
3030 E. Lake Parker Dr.
Lakeland, FL 33805
Attn: Steven Parrish

Sample identification by
City of Lakeland

Kind of sample
reported to us #5 Diesel

Sample ID: 570-99

Sample taken at Unit #5 Diesel Tank

Sample taken by City of Lakeland

Date sampled September 20, 1999

Date received September 21, 1999

Analysis Report No. 71-102976 Page 2 of 2

DISTILLATION

% RECOVERY	Degrees Farenheit	
	403	Initial Boiling Point
5	445	
10	469	
15	---	
20	491	
30	511	
40	525	
50	539	
60	553	
70	568	
80	586	
90	616	
95	637	
END POINT	657	
RECOVERY	97.5	
RESIDUE	1.7	
LOSS	0.8	

METHOD
Distillation: ASTM D 86

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

South Holland Laboratory

MEMBER ACIL

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

P-445
Original Watermarked For Your Protection

TERMS AND CONDITIONS ON REVERSE

September 24, 1999

CITY OF LAKELAND
3030 E. Lake Parker Dr.
Lakeland, FL 33805
Attn: Steven Parrish

Sample identification by
City of Lakeland

Kind of sample
reported to us #5 Diesel

Sample ID: 570-99

Sample taken at Unit #5 Diesel Tank

Sample taken by City of Lakeland

Date sampled September 20, 1999

Date received September 21, 1999

Analysis Report No. 71-102976

	As Received
GRAVITY	
Specific at 60/60°F	0.9449
Lb/gallon at 60°F	7.036
°API	36.0
HEATING VALUE	
Btu/lb	19,701
Btu/gal at 60°F	138,616
ASH, % Wt.	<.0010
SULFUR, % Wt.	0.04
BOTTOM SEDIMENT AND WATER, % Wt	0.025
FLASH PT. °F P-Marterns Closed Cup	196
POUR PT. °C	-15
VISCOSITY 100°F cSt	3.445
VISCOSITY 121°F cSt	2.687
CETANE INDEX	51.8
CETANE INDEX	54.0

METHODS
Gravity: ASTM D 287; Heating Value: ASTM D 240; Sulfur: ASTM D 1552; Ash: ASTM D 482
Bottom Sediment & Water: ASTM D 1796; Viscosity: ASTM D 445; Flash Point: ASTM D 92;
Pour Point: ASTM D 97; Cetane Index: ASTM D 976; Cetane Index: ASTM D 4737

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

South Holland Laboratory

MEMBER ACIL

REPORT OF LABORATORY ANALYSIS

LAB NO. ML 8826 SAMPLE MARKED: STK 411 after "Aurora"
SAMPLE DATE: 08-27-99 REPORT DATE: 08-30-99
LOCATION: Port Manatee Client: Coastal Refining & Marketing
SAMPLE SUBMITTED BY: Saybolt
SAMPLE DESCRIPTION : LOW SULFUR DIESEL

TEST	METHOD	RESULT
API GRAVITY AT 60 F.	D1298	36.0
SPECIFIC GRAVITY	D1298	0.8448
FLASH POINT, F. PMCC	D93	188
SEDIMENT & WATER, VOL.%	D2709	0
VISCOSITY AT 100 F., cSt	D445	3.49
VISCOSITY AT 122 F., cSt	D445	2.74
S.U.S. VISCOSITY AT 100 F.	D445	37.6
POUR POINT, F.	D97	+5
SULFUR, WT.%	D4294	0.035
ASH, WT.%	D482	<0.001
B.T.U./GAL. HHV	D240	137342
NITROGEN, PPM	D4629	------
CETANE INDEX, CALCULATED	D976	51
DISTILLATION, IBP	D86	400
10%RECOVERED	D86	465
50%RECOVERED	D86	538
90%RECOVERED	D86	614
FINAL BOILING POINT	D86	656
RECOVERY	D86	98.0
RESIDUE	D86	1.0
LOSS	D86	1.0
TRACE METALS	AA	------
SODIUM, PPM		------
POTASSIUM, PPM		------
SILICON, PPM		------
VANADIUM, PPM		------

BY: Marie Calhoon
MARIE F. CALHOON, CHEMIST

ATTACHMENT MC-EU1-J2

FUEL ANALYSIS
NATURAL GAS

FGT

Last Updated 4/18/02 6:55

Station Name	Total Sulfur Previous Day Avg ppm 04/16/02	Total Sulfur Previous Day Avg Grains/hcf 04/16/02
Perry 36" Stream #1	3.1	0.195
Perry 30" Stream #2	3.3	0.205
Perry 24" Stream #3	3.4	0.211
Brooker 24" Stream	4.4	0.276

Florida Gas makes no warranty or representation whatsoever as to the accuracy of the
This information is provided on a best efforts basis and is an estimate.
The information is not used for billing purposes.
Florida Gas is not responsible for any reliance on this information by any party.

Stream History

Gas Day	Index	Perry 36" Stream #1 15SA36PSUL.A Avg ppm	Perry 36" Stream #1 Avg Grains/hcf	Perry 30" Stream #2 15SA30PSUL.A Avg ppm	Perry 30" Stream #2 Avg Grains/h
04/15/02	33	2.412	0.151	2.901	0.181
04/14/02	32	2.761	0.173	1.717	0.107
04/13/02	31	2.492	0.156	1.684	0.105
04/12/02	30	2.169	0.136	1.635	0.102
04/11/02	29	2.319	0.145	1.524	0.095
04/10/02	28	2.431	0.152	1.617	0.101
04/09/02	27	2.464	0.154	2.259	0.141
04/08/02	26	1.910	0.119	1.744	0.109
04/07/02	25	1.428	0.089	1.650	0.103
04/06/02	24	1.480	0.093	1.693	0.106
04/05/02	23	1.918	0.120	1.790	0.112
04/04/02	22	1.663	0.104	1.622	0.101
04/03/02	21	2.973	0.186	2.116	0.132
04/02/02	20	2.080	0.130	0.937	0.059
04/01/02	19	1.750	0.109	1.171	0.073
03/31/02	18	1.297	0.081	1.428	0.089
03/30/02	17	1.293	0.081	2.036	0.127
03/29/02	16	1.610	0.101	1.569	0.098
03/28/02	15	1.718	0.107	2.174	0.136
03/27/02	14	2.166	0.135	2.227	0.139
03/26/02	13	2.962	0.185	1.924	0.120
03/25/02	12	3.112	0.194	2.031	0.127
03/24/02	11	2.527	0.158	2.191	0.137
03/23/02	10	2.147	0.134	2.496	0.156
03/22/02	9	2.205	0.138	2.119	0.132
03/21/02	8	2.214	0.138	1.862	0.116
03/20/02	7	2.404	0.150	1.607	0.100
03/19/02	6	3.120	0.195	1.899	0.119
03/18/02	5	2.792	0.174	2.056	0.128
03/17/02	4	2.436	0.152	2.136	0.134
03/16/02	3	2.307	0.144	2.096	0.131
03/15/02	2	2.069	0.129	1.797	0.112
03/14/02	1	1.634	0.102	2.531	0.158

BTU	Date	CO2	N2	Grav	Methane	Ethane	Propane	Ibutane	Nbutane	IPentan	NPentan	C6	C7	H2	Helium	Oxygen
1029	04-18-2002	0.93	0.28	0.582	96.26	1.956	0.339	0.087	0.068	0.027	0.016	0.036	0	0	0	0
1029	04-17-2002	0.869	0.295	0.582	96.293	1.957	0.342	0.088	0.07	0.028	0.017	0.042	0	0	0	0
1034	04-16-2002	0.922	0.29	0.586	95.788	2.236	0.455	0.119	0.093	0.034	0.019	0.044	0	0	0	0
1029	04-15-2002	0.923	0.291	0.582	96.206	1.976	0.357	0.092	0.073	0.028	0.016	0.037	0	0	0	0
1028	04-14-2002	0.911	0.291	0.581	96.318	1.921	0.329	0.085	0.067	0.026	0.016	0.036	0	0	0	0
1027	04-13-2002	0.916	0.287	0.581	96.366	1.926	0.299	0.076	0.06	0.023	0.014	0.032	0	0	0	0
1027	04-12-2002	0.929	0.296	0.581	96.31	1.948	0.304	0.077	0.061	0.025	0.015	0.036	0	0	0	0
1028	04-11-2002	0.933	0.302	0.582	96.216	1.98	0.337	0.084	0.066	0.027	0.016	0.039	0	0	0	0
1031	04-10-2002	0.908	0.307	0.583	96.054	2.116	0.359	0.091	0.071	0.03	0.019	0.045	0	0	0	0
1029	04-09-2002	0.86	0.304	0.581	96.273	1.997	0.331	0.083	0.064	0.028	0.017	0.042	0	0	0	0
1028	04-08-2002	0.858	0.306	0.58	96.425	1.874	0.317	0.082	0.063	0.025	0.015	0.036	0	0	0	0
1033	04-07-2002	0.894	0.311	0.584	95.964	2.132	0.413	0.104	0.084	0.033	0.019	0.045	0	0	0	0
1031	04-06-2002	0.912	0.327	0.584	95.902	2.26	0.358	0.084	0.066	0.029	0.018	0.043	0	0	0	0
1038	04-05-2002	1.007	0.298	0.59	95.207	2.616	0.531	0.133	0.102	0.039	0.022	0.046	0	0	0	0
1038	04-04-2002	1	0.285	0.589	95.298	2.56	0.515	0.134	0.102	0.039	0.022	0.046	0	0	0	0
1043	04-03-2002	1.002	0.279	0.592	95.012	2.651	0.625	0.166	0.129	0.049	0.027	0.061	0	0	0	0
1047	04-02-2002	0.949	0.286	0.594	94.907	2.649	0.693	0.181	0.156	0.06	0.037	0.082	0	0	0	0
1045	04-01-2002	0.904	0.284	0.592	95.097	2.57	0.652	0.168	0.146	0.058	0.037	0.083	0	0	0	0
1046	03-31-2002	0.921	0.278	0.593	95.063	2.584	0.659	0.171	0.15	0.058	0.036	0.081	0	0	0	0
1045	03-30-2002	0.925	0.289	0.592	95.092	2.552	0.655	0.167	0.147	0.057	0.036	0.081	0	0	0	0
1047	03-29-2002	0.969	0.285	0.594	94.87	2.655	0.698	0.181	0.159	0.06	0.037	0.085	0	0	0	0
1048	03-28-2002	0.929	0.28	0.594	94.91	2.641	0.704	0.182	0.163	0.062	0.039	0.088	0	0	0	0
1048	03-27-2002	0.949	0.281	0.595	94.789	2.713	0.73	0.191	0.164	0.061	0.037	0.085	0	0	0	0
1044	03-26-2002	0.933	0.295	0.592	95.075	2.583	0.643	0.166	0.142	0.054	0.032	0.076	0	0	0	0
1044	03-25-2002	0.922	0.295	0.592	95.131	2.539	0.642	0.167	0.142	0.054	0.032	0.077	0	0	0	0
1042	03-24-2002	0.909	0.288	0.59	95.324	2.463	0.59	0.155	0.128	0.048	0.028	0.068	0	0	0	0
1038	03-23-2002	0.889	0.285	0.588	95.555	2.388	0.523	0.135	0.105	0.041	0.023	0.055	0	0	0	0
1040	03-22-2002	0.839	0.285	0.588	95.574	2.38	0.543	0.142	0.111	0.043	0.025	0.058	0	0	0	0
1042	03-21-2002	0.864	0.281	0.59	95.309	2.524	0.606	0.159	0.124	0.048	0.027	0.06	0	0	0	0
1040	03-20-2002	0.869	0.285	0.588	95.462	2.487	0.53	0.135	0.105	0.043	0.026	0.057	0	0	0	0
1033	03-19-2002	0.919	0.287	0.584	95.757	2.448	0.353	0.083	0.064	0.029	0.019	0.04	0	0	0	0
1032	03-18-2002	0.91	0.282	0.584	95.835	2.4	0.337	0.082	0.065	0.03	0.019	0.041	0	0	0	0
1032	03-17-2002	0.867	0.287	0.583	95.962	2.336	0.324	0.075	0.061	0.028	0.019	0.042	0	0	0	0
1037	03-15-2002	0.899	0.309	0.587	95.55	2.46	0.464	0.115	0.09	0.037	0.022	0.052	0	0	0	0
1041	03-14-2002	0.905	0.311	0.59	95.274	2.546	0.575	0.149	0.115	0.044	0.024	0.057	0	0	0	0
1033	03-13-2002	0.91	0.305	0.584	95.804	2.354	0.369	0.093	0.072	0.031	0.018	0.045	0	0	0	0

TU	Date	CO2	N2	Grav	Methane	Ethane	Propane	Ibutane	Nbutane	IPentan	NPentan	C6	C7	H2	Helium	Oxygen
1031	03-12-2002	0.946	0.339	0.584	95.763	2.441	0.302	0.071	0.055	0.025	0.016	0.042	0	0	0	0
1030	03-11-2002	0.897	0.323	0.583	95.961	2.303	0.306	0.071	0.056	0.025	0.016	0.042	0	0	0	0
1030	03-10-2002	0.965	0.302	0.584	95.866	2.34	0.307	0.075	0.059	0.026	0.016	0.042	0	0	0	0
1029	03-09-2002	0.918	0.295	0.582	96.125	2.195	0.27	0.069	0.055	0.024	0.014	0.037	0	0	0	0
1029	03-08-2002	0.873	0.287	0.581	96.181	2.18	0.279	0.07	0.056	0.024	0.014	0.036	0	0	0	0
1028	03-07-2002	0.88	0.303	0.581	96.275	2.061	0.277	0.068	0.057	0.025	0.015	0.038	0	0	0	0
1027	03-06-2002	0.781	0.31	0.579	96.625	1.816	0.264	0.065	0.054	0.026	0.017	0.042	0	0	0	0
1026	03-05-2002	0.745	0.321	0.578	96.681	1.842	0.227	0.054	0.046	0.024	0.016	0.044	0	0	0	0
1028	03-04-2002	0.791	0.339	0.58	96.45	1.927	0.28	0.064	0.054	0.029	0.02	0.047	0	0	0	0
1028	03-03-2002	0.882	0.289	0.581	96.329	2.004	0.284	0.068	0.056	0.027	0.018	0.043	0	0	0	0
1028	03-02-2002	0.916	0.28	0.581	96.152	2.211	0.259	0.058	0.048	0.024	0.015	0.037	0	0	0	0
1028	03-01-2002	0.931	0.276	0.581	96.113	2.285	0.229	0.053	0.044	0.021	0.014	0.035	0	0	0	0
1028	02-28-2002	0.942	0.28	0.582	96.043	2.363	0.213	0.049	0.041	0.02	0.013	0.036	0	0	0	0
1030	02-27-2002	0.935	0.284	0.583	95.955	2.369	0.265	0.061	0.052	0.024	0.016	0.039	0	0	0	0
1029	02-26-2002	0.945	0.283	0.583	95.904	2.422	0.27	0.057	0.048	0.022	0.015	0.033	0	0	0	0
1029	02-25-2002	0.911	0.304	0.582	95.917	2.441	0.26	0.051	0.044	0.021	0.015	0.034	0	0	0	0
1029	02-24-2002	0.97	0.299	0.583	95.803	2.498	0.267	0.053	0.044	0.021	0.014	0.032	0	0	0	0
1029	02-23-2002	1.011	0.297	0.584	95.728	2.518	0.272	0.057	0.047	0.022	0.014	0.035	0	0	0	0
1033	02-22-2002	0.996	0.279	0.586	95.616	2.497	0.367	0.085	0.069	0.03	0.018	0.044	0	0	0	0
1032	02-21-2002	1.005	0.273	0.585	95.682	2.495	0.321	0.075	0.061	0.028	0.018	0.044	0	0	0	0
1032	02-20-2002	1.03	0.269	0.585	95.616	2.568	0.302	0.07	0.057	0.027	0.017	0.044	0	0	0	0
1032	02-19-2002	1.062	0.28	0.586	95.4	2.742	0.306	0.07	0.057	0.027	0.017	0.039	0	0	0	0
1034	02-18-2002	1.02	0.314	0.587	95.307	2.793	0.345	0.071	0.059	0.029	0.019	0.043	0	0	0	0
1035	02-17-2002	1.002	0.308	0.588	95.281	2.761	0.389	0.087	0.071	0.033	0.022	0.047	0	0	0	0
1036	02-16-2002	0.985	0.3	0.588	95.271	2.759	0.413	0.095	0.077	0.034	0.022	0.045	0	0	0	0
1035	02-15-2002	1	0.271	0.587	95.441	2.622	0.398	0.094	0.075	0.033	0.021	0.045	0	0	0	0
1033	02-14-2002	0.932	0.299	0.585	95.675	2.515	0.346	0.079	0.064	0.029	0.019	0.041	0	0	0	0
1034	02-13-2002	0.909	0.332	0.585	95.644	2.49	0.364	0.089	0.072	0.033	0.022	0.045	0	0	0	0
1033	02-12-2002	0.946	0.301	0.585	95.664	2.449	0.374	0.094	0.076	0.033	0.02	0.043	0	0	0	0
1035	02-11-2002	0.928	0.298	0.586	95.646	2.445	0.399	0.098	0.081	0.035	0.022	0.048	0	0	0	0
1033	02-10-2002	0.926	0.274	0.585	95.796	2.377	0.36	0.091	0.075	0.033	0.021	0.048	0	0	0	0
1033	02-09-2002	0.947	0.276	0.585	95.756	2.411	0.352	0.088	0.072	0.032	0.02	0.046	0	0	0	0
1035	02-08-2002	0.897	0.277	0.585	95.75	2.413	0.384	0.094	0.077	0.035	0.022	0.05	0	0	0	0
1036	02-07-2002	0.856	0.284	0.585	95.798	2.348	0.403	0.102	0.086	0.039	0.026	0.058	0	0	0	0
1035	02-06-2002	0.879	0.273	0.585	95.727	2.433	0.404	0.096	0.079	0.035	0.023	0.05	0	0	0	0
1039	02-05-2002	0.9	0.272	0.588	95.44	2.556	0.488	0.118	0.1	0.041	0.027	0.057	0	0	0	0

BTU	Date	CO2	N2	Grav	Methane	Ethane	Propane	Ibutane	Nbutane	IPentan	NPentan	C6	C7	H2	Helium	Oxygen
1042	02-04-2002	0.882	0.276	0.59	95.239	2.638	0.561	0.138	0.119	0.048	0.03	0.068	0	0	0	0
1039	02-03-2002	0.866	0.272	0.588	95.462	2.578	0.489	0.115	0.094	0.04	0.025	0.058	0	0	0	0
1040	02-02-2002	0.886	0.276	0.588	95.492	2.446	0.522	0.133	0.108	0.044	0.027	0.066	0	0	0	0
1040	02-01-2002	0.889	0.293	0.588	95.456	2.464	0.523	0.13	0.109	0.044	0.026	0.065	0	0	0	0
1038	01-31-2002	0.914	0.299	0.588	95.515	2.42	0.494	0.123	0.103	0.042	0.026	0.064	0	0	0	0
1033	01-30-2002	0.908	0.305	0.585	95.854	2.286	0.373	0.09	0.076	0.034	0.021	0.054	0	0	0	0
1035	01-29-2002	0.944	0.304	0.587	95.603	2.404	0.43	0.106	0.089	0.037	0.022	0.057	0	0	0	0
1036	01-28-2002	0.936	0.283	0.587	95.594	2.435	0.441	0.109	0.09	0.036	0.021	0.055	0	0	0	0
1040	01-27-2002	0.915	0.285	0.589	95.422	2.466	0.529	0.135	0.111	0.044	0.026	0.066	0	0	0	0
1044	01-26-2002	0.928	0.29	0.592	95.042	2.648	0.64	0.163	0.133	0.051	0.029	0.074	0	0	0	0
1044	01-25-2002	0.964	0.296	0.592	95.023	2.633	0.631	0.164	0.132	0.052	0.029	0.075	0	0	0	0
1043	01-24-2002	0.999	0.291	0.592	94.965	2.679	0.628	0.164	0.131	0.049	0.027	0.067	0	0	0	0
1039	01-23-2002	1.021	0.299	0.59	95.157	2.615	0.536	0.139	0.11	0.042	0.023	0.058	0	0	0	0
1035	01-22-2002	1.013	0.308	0.588	95.4	2.575	0.416	0.104	0.083	0.033	0.019	0.05	0	0	0	0
1037	01-21-2002	0.95	0.324	0.588	95.422	2.523	0.453	0.116	0.093	0.039	0.023	0.058	0	0	0	0
1036	01-20-2002	0.961	0.297	0.587	95.507	2.471	0.446	0.114	0.092	0.037	0.021	0.054	0	0	0	0
1036	01-19-2002	0.932	0.294	0.586	95.604	2.432	0.432	0.11	0.09	0.036	0.021	0.051	0	0	0	0
1034	01-18-2002	0.938	0.327	0.586	95.652	2.38	0.409	0.102	0.086	0.035	0.02	0.05	0	0	0	0

ATTACHMENT MC-EU1-J3

DETAILED DESCRIPTION OF CONTROL EQUIPMENT

LAKELAND

Operation and Maintenance Manual

Selective Catalytic Reduction System (SCR)

Purchase Order No. 12533

Peerless Mfg. Co.
2819 Walnut Hill Lane
Dallas, TX 75229

Shop Order 70157

Table of Contents

SECTION 1 - INTRODUCTION

The Selective Catalytic Reduction (SCR) System described in this manual is designed to reduce oxides of Nitrogen (NO_x) from turbine exhaust gases.

The NO_x reduction system is commonly termed a selective catalytic reduction system that requires ammonia as a reducing agent. The system provided uses liquid anhydrous ammonia that is passed through a set of heaters to be vaporized. Upon vaporization, the gaseous ammonia is injected into a dilution air line upstream of a static mixer. This ammonia and dilution air mixture is piped to the distribution header and injected directly into the exhaust gas. As the treated exhaust gas flows over the SCR catalyst bed, the NO_x is reduced to nitrogen (N_2) gas and water vapor. The SCR System is described in detail in this manual.

COMPONENT AND PROCESS DESCRIPTION

I. AMMONIA SUPPLY

A. Commercial grade anhydrous ammonia (99.5% or higher in purity with a maximum water content of 0.5%) is required for this system. The ammonia storage and supply system is furnished by others. The ammonia flow control unit (AFCU) skid consists of:

1. Ammonia line that includes: pressure regulator, flow control valve, and automated shutoff valve
2. Dilution air line that includes: one (1) primary dilution air blower, one (1) secondary air blower
3. Instrument air line with pressure regulator
4. Junction box with ammonia selector switch
5. Vaporizer package that includes two (2) 80 kW heaters

B. Anhydrous ammonia is supplied to the AFCU skid at 50 PSIG minimum, and is regulated down to 5 PSIG by the flow control valve for measurement and control.

II. DILUTION AIR SUPPLY

A blower is used as the primary source of supply for the dilution air. The blower is designed to provide 1300 SCFM of air at a static pressure of 42" W.C.

III. PROCESS GAS DISTRIBUTION

Process gas, a combination of dilution air and anhydrous ammonia, is fed from the AFCU skid to vertical distribution headers on each side of the HRSG. At that point, the process gas is directly injected into the exhaust gas through a series of AIG (ammonia injection grid) lances that run the entire length of the duct.

PRE-START-UP CHECK LIST

DISCLAIMER

Peerless has thoroughly tested and quality-inspected the supplied products prior to shipment to the Customer or End-User. When shipped, this equipment was mechanically, functionally, and operationally safe. Electrical construction and selection of electrical and mechanical materials were conducted according to current guidelines established by the National Electrical Code (NEC), International Electrical Code (IEC), Underwriters Laboratory, Inc. (UL), or the American Society of Mechanical Engineers (ASME).

Peerless explicitly recommends that the equipment constituting this product be installed, operated, and serviced only by trained and qualified personnel who are thoroughly familiar with the operation and features of the product.

IMPORTANT NOTE: ELECTRICAL INSTALLATION, SELECTION OF REQUIRED ELECTRICAL HARDWARE, ELECTRICAL SAFETY CERTIFICATION, AND SERVICE AND REPAIR OF THE ELECTRICAL PORTIONS OF THIS EQUIPMENT SHOULD ONLY BE PERFORMED BY QUALIFIED ELECTRICAL PERSONNEL.

I. INSTALLATION CHECKS

A. After installation of the SCR system, check the erection work against the Piping and Instrument Diagram and assembly drawings (see Section 2, Project Drawing/Data Sheets) to ensure proper equipment installation.

B. Check and clean the inside of the exhaust gas duct and reactor to confirm that all foreign matter such as electrodes, welding slag, and debris or combustible materials that may have been left during erection work is removed.

C. It is recommended by Peerless that the reactor be brought up to operating temperature, and cooled before the catalyst bed is installed. This will ensure that any remaining debris will be swept away and/or burned, as well as protect the catalyst during first start-up.

D.** Confirm that the ammonia supply line, dilution air line, instrument air supply line, and other utility pipe lines have been completely cleaned by air, Nitrogen, or steam purging. This is important to avoid the malfunction of valves and measuring instruments due to rust, dirt, welding slag, or other debris commonly found in newly constructed or repaired pipes and equipment.

E.** Confirm that there is no leakage.

F. Confirm that all manways and openings are closed and sealed tightly.

G. Confirm that all valves are operable and in the correct position. (Example: drain valves and bypass valves should be closed; supply valves should be open.) Check valves should be verified for proper direction.

**** Extreme caution should be used when performing these tasks.**

PRE-START-UP CHECK LIST (continued)

I. **INSTALLATION CHECKS** (continued)

H. Check ammonia and instrument air lines to confirm sufficient quantities and pressures are available to satisfy system demands.

I. Confirm that any blind flanges that may have been installed for pressure-proof test on the pipe line have been removed, and the piping has been properly re-connected .

II. **POWER SOURCE AND INSTRUMENTATION**

A. Confirm that the functionality of the control valves has been tested, and operation over the full travel is possible.

B. Confirm that all instruments and control loops have been installed, tested, and checked.

C. Check the rotation of the dilution air blowers.

D. Verify the electrical power supply.

E. Check all electrical terminals in the junction box by inspecting and verifying that all field, grounding, and shield connections are tight. Confirm that the cover is closed and sealed tightly.

F. Refer to **Section 18** of this manual for details on wiring up to the heater power panel on the ammonia vaporizer package located on the AFCU skid.

START-UP PROCEDURE

This Section describes the recommended procedure for start-up of the SCR System. (See the Start-Up Table on page 8 for start-up procedures that are required after the system is commissioned initially.)

All operators are required to read and fully understand this Manual before operating the SCR System and its related equipment.

I. INITIAL START-UP

A. Verify that the instrument air pressure to the AFCU skid is 80 PSIG minimum (-20°F dew point).

B. Confirm that there is no condensate build-up in the lines between the dilution air blowers and the exhaust duct, or in the instrument air line.

C. Verify that the ammonia pressure regulator (PCV-200) is set to 50 PSIG, while the instrument air pressure regulator is set to 20 PSIG.

D. Manually open the gate valves on the instrument air line.

E. Turn on the disconnect switches on the motor starters (provided by others). "Bump" one of the motors to verify correct rotation as indicated on the motor fan shroud. If rotation is not correct, switch two (2) of the three (3) legs of the power supply.

F. Confirm that air is flowing through the AFCU by observing the local pressure gauge at the blower outlet (PI-300). The dilution air flow rate should be above 39,000 SCFH.

G. Monitor the reactor inlet gas temperature until it reaches the required minimum temperature for ammonia injection (Refer to catalyst manufacturer's data sheets).

H. Confirm that the ammonia selector ("kill") switch located on the junction box is set to the "ON" position.

I. Manually open the ball valves at the AFCU skid inlet, vaporizer inlets and outlets, and the ball valve downstream of the ammonia pressure regulator (PCV-200).

J. Manually apply the minimum output signal (4 mA) to the NH_3 flow control valve (FCV-200) and verify the control valve is fully CLOSED and the NH_3 transmitter (FT-200) is reading zero flow. Adjust the output signal in increments of 25 percent (25%) (4mA). Verify the control valve is operating correctly, and the flow transmitter is giving a variable reading.

START-UP PROCEDURE (continued)

II. OPERATIONAL START-UP

A. Verify that process valves are open, and bypass valves are closed on the AFCU.

B. Confirm there is no condensate build-up in the lines between the dilution air blower and the exhaust duct.

C. Start the primary dilution air blower (BL-157A).

D. Confirm that air is flowing through the ammonia flow control unit by observing the local pressure gauge at the blower outlet (PI-300). The dilution air flow rate should be above 39,000 SCFH.

E. Monitor the reactor inlet gas temperature until it reaches the required minimum temperature for ammonia injection (Refer to catalyst manufacturer's data sheets).

F. The CEM monitoring system (provided by others) should be commissioned and operating.

G. When the start-up conditions have been satisfied, open the manual ammonia shutoff valve located at the ammonia inlet on the AFCU. With the ammonia control in MANUAL, bring the NO_x level to the required set point.

OPERATIONAL START-UP SUMMARY TABLE

STEP 1
Start the flue gas analyzer, and confirm that calibration has already been completed. **(Start analyzer before the SCR System is to be put into operation.)**

STEP 2
Confirm the exhaust gas source start-up.

STEP 3
Start the dilution air blower.

STEP 4
Monitor the exhaust temperature increase at the SCR reactor outlet.

STEP 5
Confirm that the manual NH_3 shutoff valve is OPEN.

STEP 6
OPEN the automatic NH_3 shutoff valve.

STEP 7
Set the SCR outlet NO_X set point.

ON-LINE SYSTEM AUDITS

I. SYSTEM CHECK TO BE MADE DURING EACH SHIFT

A. Check the following at least once per every shift to ensure they are within normal operating conditions:

-anhydrous ammonia flow rate
-anhydrous ammonia supply pressure
-dilution air flow rate
-dilution air pressure
-catalyst inlet temperature
-SCR differential pressure
-ammonia slip

B. An inspection should be made by the operator at least once per shift to observe the following:

1. Check differential pressure indicators on manifold to ensure equal flow through all branches.

2. Check for any fluid leaks in pipe runs.

SHUTDOWN PROCEDURES

I. SHUTDOWN PROCEDURES

A. Immediately close the manual valves located at the inlet of the ammonia line.

B. Turn the ammonia selector switch, located on the junction box, to the "OFF" position.

C. Close the automatic ammonia trip valve (ABV-200) on the ammonia line.

D. Continue to run the blower to purge the ammonia from the system, and to prevent the collection of flue gas condensate. The purge must continue for a MINIMUM of twenty (20) minutes.

E. Maintenance, if required, can be done once the unit has cooled and the blower is turned OFF.

II. EMERGENCY SHUTDOWN PROCEDURES

The emergency shutdown procedure of the SCR System stops the ammonia supply by automatically closing the ammonia shutoff valve when:

A. Abnormally low flue gas temperatures are received at the reactor inlet.

B. Abnormally high flue gas temperatures are received at the reactor inlet.

C. High ammonia to air ratio (>12%).

D. Gas turbine is not running.

E. Failure of secondary blower to activate upon loss of low dilution air supply (<39,000 SCFH).

F. Ammonia selector ("kill") switch is set to the "OFF" position.

When an emergency shutdown occurs, confirm the ammonia shutoff valves are fully closed. Then, proceed with the following steps:

1. If there is a quick return to normal operation, continue operation of the SCR System, including the blower.

2. If a quick return to normal operation is impossible, continue dilution air flow for about twenty (20) minutes to purge the system. Stop the primary blower.

SHUTDOWN TABLE

NORMAL SHUTDOWN PROCEDURE FOR SCR SYSTEMS (NORMAL CONDITIONS)

STEP 1
Manually CLOSE the valves at the inlet of the ammonia line.

STEP 2
Set the ammonia selector switch to the "OFF" position.

STEP 3
CLOSE the automatic NH_3 trip valve.

STEP 4
Continue to supply dilution air to purge the ammonia/air line, and to prevent condensation of flue gas in the interconnecting piping.

STEP 5
STOP the blower once the remaining process gas has been flushed from the system

STEP 6
Maintenance work can be done, if required.

STEP 7
STAND BY FOR START-UP

MAINTENANCE AND TROUBLESHOOTING

I. SYSTEM MAINTENANCE

SCHEDULED MAINTENANCE:

COMPONENT	MAINTENANCE FREQUENCY
TRANSMITTERS	DAILY - Visual inspection for external housing damage.
GAUGES	DAILY - Visual inspection for external damage, i.e., broken gauge glass or bent pointer; recalibrate annually.
CONTROL VALVE	DAILY - Visual inspection for external mechanical damage; recalibrate annually.
STRAINERS	Remove and clean bi-annually.
EQUIPMENT CALIBRATION CHECKS	For detailed calibration and maintenance procedures, see the specific instrument manufacturer's section of this Manual.

II. FAN MAINTENANCE AND TROUBLESHOOTING

A. MAINTENANCE:

Refer to the Cincinnati Fan manual (See Section 7)

SYSTEM WARRANTY PERFORMANCE

CUSTOMER: Nooter/Eriksen

PROJECT: LAKELAND

REFERENCE: Peerless Sales Order 70157

SUBJECT: Selective Catalytic Reduction System for the Reduction of Nitrogen Oxides (NOx)

PERFORMANCE

All hardware is under warranty for eighteen (18) months from the date of shipment or twelve (12) months from the date of initial start-up, whichever occurs first. The extent of the warranty includes replacement of defective components, and is limited to material only. Except during start-up or shutdown, warranty is invalidated if the specified operating conditions are not met.

NOTE: Cincinnati Fans are to be balanced upon installation, and documented for future reference. Otherwise, the warranty on the fans is void.

Peerless is not responsible for any damage due to operation above or below temperatures or pressures other than design conditions, nor any damage clearly resulting from mis-operation or improper maintenance of the unit.

STANDARD ABBREVIATIONS

ACFH	Actual Cubic Feet per Hour
ACFM	Actual Cubic Feet per Minute
CEMS	Continuous Emissions Monitoring System
CFH	Cubic Feet per Hour
CO	Chemical formula for carbon monoxide
°F	Degrees Fahrenheit
°R	Degrees Rankine
FCV	Flow control valve
INCHES W.C.	Inches Water Column; used to indicate pressure
ISA	Instrument Society of America
ISO	Isometric
mA	milli-Amp; one thousandth of an ampere
NH_3	Chemical formula for ammonia
NO_X	Chemical formula for nitrogen oxides
O_2	Chemical formula for oxygen
PID Algorithm	Proportional-Integral-Derivative algorithm
P&ID	Piping and Instrument Diagram
ppmvd	Parts Per Million by Volume, Dry
PSIA	Pounds per Square Inch, Absolute
PSIG	Pounds per Square Inch, gauge
SCFH	Standard Cubic Feet per Hour
SCFM	Standard Cubic Feet per Minute

RECOMMENDED SPARE PARTS LIST

SPECIF. #	DESCRIPTION	MANUFACTURER	PART NUMBER
S-620-01	Differential Pressure Transmitter	Rosemount	3051CD2A52A1AS5
S-620-03	Pressure Transmitter	Rosemount	3051TG2A2B21AS5
S-630-01	Manometer	Meriam	10AA25WM-0-10"W.C.
S-641-01	Pressure Gauges	Ashcroft	45-1188-SS-04L-0/60"W.C.
S-641-02	Pressure Gauges	Ashcroft	45-1188-SS-04L-0/40"W.C.
S-641-03	Pressure Gauges	Ashcroft	45-1279-SS-04L-0/60PSIG
S-642-01	Pressure Switch	SOR	12B3-KK614-N4-C2A-WV
S-655-01	Solenoid Valve	ASCO	EF8320G202
---	Blower Filter Elements	Solberg	377P-800F
---	Differential Pressure Indicator	Orange Research	1831DG1C4.5B-0-30"W.C.

NOTE: ONLY A PURCHASE OF $1,000.00 OR MORE WILL BE ACCEPTED

SCR Catalyst Operations and Maintenance Manual

CORMETECH, INC.
STANDARD OPERATING PROCEDURE

DOCUMENT APPROVAL

Name **Date**

Title

Change History

Sponsor: Alan Crowle
Review Team: Alan Crowle, Nancy Stephenson, Deb Sunick, Ken Pojman

ISSUE No.	DATE	AFFECTED PAGES
1.0	3/18/98	All; first complete and approved version.
1.1	6/2/98	PCR #98-212; changed wording on pages 28 & 29 for clarification.
1.2	9/8/98	PCR #98-302;deleted Site Specific/Project Specifications
1.3	2/12/99	PCR #99-080; changed all references to old appendix 2 updated references to new appendix 2.
1.4	3/9/99	PCR #99-127; Changed name of sop due to customer inquiries.
1.5	5/13/99	PCR #99-213; addition to page 27.
1.6	5/28/99	PCR #99-278; minor changes throughout SOP.
1.7	8/16/99	PCR #99-431; updated table on page 8.
1.8	2/28/00	PCR #00-072; revised table on page 8.
1.9	6/12/00	PCR #00-143; updated tables on pages 8 and 32.
2.0	7/20/00	PCR #00-481; Bi-annual review, changes to pages 2 & 32..

Contents

Scope

This operating manual covers the basic procedures for the Cormetech customer for safety, handling, and operation of Cormetech® SCR Catalysts.

For further clarification, please direct inquiries to CORMETECH. Extensive contact information is contained appendix 2.

SCR Overview

SCR System General Description

The process of selective catalytic reduction (SCR) of combustion flue gases reduces nitrogen oxides (NOx) into molecular nitrogen (N_2) and water (H_2O). NOx breaks down when it reacts with a reducing agent, usually ammonia (NH_3), in the presence of a catalyst. The NH_3 is mixed thoroughly with the flue gas prior to the catalyst. The mixing assures even distribution of the temperature and reaction components. The catalyst, by providing active reaction sites, allows the reaction to occur at temperatures between 300° - 1,050°F. The NH_3 diffuses into the catalyst pore structure and is adsorbed onto an active catalyst site. The NOx then reacts with the adsorbed NH_3, completing the reaction. The reaction depends primarily on available active sites (a function of geometric surface area, pore volume, and concentration of active catalyst component), flue gas temperature, and reagent concentration. A well-balanced process will maintain appropriate output levels of residual NOx and NH_3.

Cormetech® catalysts are extruded ceramic structures composed of inorganic oxides. These extruded catalysts are homogeneous, in that, the entire element is composed of a uniform distribution of catalytic material. Usually, the catalysts are assembled into steel modules that are arranged in the SCR reactor to efficiently contact the flue gases during system operation

SCR Chemistry

The most significant reactions that reduce NO and NO_2 with NH_3 are the following:

1) $4NO + O_2 + 4NH_3 \rightarrow 4N_2 + 6H_2O$
2) $NO + NO_2 + 2NH_3 \rightarrow 2N_2 + 3H_2O$
3) $6NO + 4NH_3 \rightarrow 5N_2 + 6H_2O$

The first reaction is the predominant reaction. It shows that one mole of ammonia is consumed for each mole of NO removed . However, in an actual system, slightly more ammonia is injected than necessary for the desired NO removal, to account for imperfect mixing. The excess ammonia which passes through the catalyst bed non-reacted is called ammonia slip.

Some consequential reactions may also take place under certain operating conditions. Specifically:

4) $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$
5) $2SO_2 + O_2 \rightarrow 2SO_3$
6) $2NH_3 + SO_3 + H_2O \rightarrow (NH_4)_2SO_4$
7) $NH_3 + SO_3 + H_2O \rightarrow (NH_4)HSO_4$

Reaction number (4), ammonia oxidation, is not significant at normal operating temperatures below 800°F. As the flue gas temperature increases, the NH_3 oxidizes more readily, increasing the concentration of NO and decreasing the available NH_3 for the SCR process.

Reaction number (5) is not important with low sulfur fuels or natural gas, but if CO oxidation catalysts are in the flow stream, the SO_2 concentration may increase anyway. The sulfur in the fuel generates SO_2 and SO_3 (SO_x) during combustion. The presence of SO_3 in the flue gas can lead to the formation of ammonium sulfate and ammonium bisulfate as shown in reaction equations (6) and (7) respectively. Once formed, these substances may deposit on the catalyst and other system equipment, reducing the system performance. If minor deposition occurs, this reaction may be reversible and system performance subsequently recovered by operating the system at elevated temperatures. In the event of the occurrence of sulfate deposits, immediately contact CORMETECH for proper operating guidelines and corrective action. See Appendix 2 for detailed contact information.

When operated as designed, the SCR process has limited impact on the boiler or process operations. The process is capable of reducing NOx without creating additional pollutants. It performs reliably and achieves high NOx reduction under varying loads. Furthermore, a well operating SCR system has very limited impact on operation of downstream equipment.

SCR Catalyst

SCR performance is dependent on the catalyst properties. Cormetech® catalyst is a titanium-tungsten based material that is highly reactive to NOx. Cormetech® catalyst is an extruded ceramic honeycomb structure with high geometric surface area per unit volume. The high void fraction will minimize pressure losses. The Cormetech® catalyst formulation is tailored for use in each specific SCR system application. Cormetech® catalyst is also selective by reducing NOx, while restricting the oxidation of NH_3 to NO or SO_2 to SO_3. It is tolerant of flue gas contaminants, including ash particles.

Catalyst Degradation Mechanisms

Cormetech® catalyst is designed to resist degradation. However, over time the catalyst performance potential may decline, because of a reduction in available active sites, or a masking of the pores which prevents access to the active sites. The following table shows some of the mechanisms which reduce performance potential.

	Degradation Source	*Mechanism*	*Method of Measurement*
Thermal	Temperature >750°F (except High Temperature Catalyst)	reduce available catalytic surface area by thermal sintering of ceramic material	BET Surface Area, XRD
Poisons	Fine particulate	reduce available surface area by masking surface and preventing diffusion into pore structure	SEM-EDX, surface
	Ammonia-sulfur compounds	plug pores and prevent diffusion of reactants	Ion Chromatography, surface
	Alkaline metals	Ion exchange with active sites Family includes Sodium, Potassium, Cesium, Lithium, Francium, Rubidium	ICP, surface
	Alkaline earth metals,	typically in the form of sulfates, bond with acid sites reducing the ability of catalyst to adsorb NH_3 Family includes Sodium, Calcium, Magnesium, Barium, Strontium, Phosphorous	ICP, surface
	Halogens	may react with and volatilize active metal sites	Ion Chromatography, surface

(Table continued)

	Degradation Source	*Mechanism*	*Method of Measurement*
	Heavy and Base Metals	**diffuse into catalyst and covers active sites preventing further reactions; may deposit onto the catalyst surface and promote oxidation of NH3 to NOx** **Family includes Arsenic, Antimony, Chrome, Copper, Lead, Mercury, Nickel, Tin, Zinc, Vanadium**	**ICPMS, surface**
		Platinum, Rhodium, Palladium	**ICPMS, surface**
	Silicas, Siloxanes	**silica compounds or polymers aggressively attach to catalyst surface, masking active sites**	**ICPMS, surface**
Liquid Contact	**Water, liquid ammonia reagent, cleaning solution**	**Liquids act as carriers of poisons and catalytic performance may decrease.** **Liquids flash off during rapid thermal change, cracking the ceramic material and reducing physical integrity** **Resilient sealing materials break down and may dislodge over time, allowing flue gas bypass within a catalyst module encasement**	**By Inspection**

Methods may be combined or replaced, as appropriate, for suitability.
ICP=Inductively Coupled Plasma
ICPMS=Inductively Coupled Plasma Mass Spectroscopy
XRD=X-Ray Diffraction

Personnel Safety

PROTECTION WHILE HANDLING CATALYSTS

Personal Protective Precautions

Personal protective precautions are required when catalyst dust is present. The routine handling of assembled catalyst modules should not generate dust. However, handlers should take the following personal protective precautions if dust is present, or if they will be directly handling catalyst elements, for instance, when taking a catalyst sample from a sample module.

1. **In areas of poor ventilation, wear a respirator. Cormetech recommends, at a minimum, a 3M 8710 Dust/Mist Respirator or suitable alternative.**
2. **Wear safety glasses, gloves, and protective outer clothing when handling the catalyst to avoid direct contact with skin.**
3. **Wash face and hands, and rinse mouth (gargle) after handling the catalyst. If a dust mask has been worn, it is not necessary to rinse mouth.**

Use proper lifting techniques to prevent back injuries while lifting or moving the catalyst elements.

First Aid Measures

Always refer to the MSDS in the Appendix 1

1. **In the event of eye irritation, flush eye(s) thoroughly with water for at least 15 minutes. Seek medical attention.**
2. **In the event of skin irritation, wash the dust from the skin with soap and water. If a rash develops, seek medical attention.**
3. **In the event of dust inhalation, remove the affected person from exposure. Seek medical attention.**
4. **In the event of dust ingestion, seek medical attention.**

PROTECTION WHILE HANDLING MODULES

Routine handling and installation of assembled catalyst modules does not require a dust mask, but It is recommended, to wear gloves and protective eyewear.

The primary danger from handling modules is due to the heavy weight. Always wear appropriate foot and hand protection while moving modules. Care should be taken in the area of crane and hoist operations.

Handling of Individual Catalyst Elements

Normally, only Cormetech personnel would handle individual catalyst elements (not assembled in a steel frame), except, potentially, during catalyst sampling or emergency replacement. If individual elements must be handled, please use the following procedures. Always contact Cormetech prior to handling individual catalyst elements. See Appendix 2 for detailed contact information.

Receiving Catalyst Elements

Catalyst elements will be received in special shipping containers that are reusable for return shipment. The catalyst element should be inspected upon receipt for damage. Any problems with the received catalyst elements should be reported to Cormetech. See Appendix 2 for detailed contact information.

Storing Catalyst Elements

1. **Keep individual catalyst elements in their original shipping container until ready for installation or testing.**
2. **If catalyst elements are removed from modules in the field, carefully wrap the catalyst elements in waterproof materials to prevent exposure to moisture, oil or solvents. Stack them horizontally, facing in the same direction, with cushioning material (cardboard sheet or foam pads) placed between the elements. The protective material should be placed under and on the side of each catalyst element. To further prevent exposure to water, stack the wrapped catalyst elements on pallets, not directly on the floor or ground.**
3. **Catalyst elements are to be stored in dry areas and protected from rough contact that may break the catalysts.**

Handling and Lifting Catalyst Elements

1. **The individual catalyst elements are ceramic material. They must be handled with care to prevent chipping and cracking caused by impact or mechanical shock.**
2. **To reduce potential chipping and cracking or poisoning, the catalyst elements should not come into direct contact with other hard materials, i.e., steel. Keep other equipment away from the catalyst. Do not lean other material or equipment on the catalyst or its storage pallet.**
3. **Follow personal protective measure as described above.**

Catalyst Element Replacement Procedure

1. **Determine the location in the SCR reactor of the catalyst module with the test sample elements by reviewing the installation drawing.**
2. **Determine which catalyst sample you wish to remove. If you are not sure which sample to remove contact Cormetech for guidance. See Appendix 2 for detailed contact information.**
3. **Determine how many pieces of catalyst are inside the sample container (tray). NOTE: Some sample trays contain multiple pieces or layers of catalysts that could drop from the sample tray, if not handled carefully.**
4. **Follow appropriate safety precautions identified in the earlier section on safety.**
5. **Provide safe access into the reactor chamber and provide safe access to the area of the catalyst module containing the removable test sample elements. Safe access may include scaffolding, walking planks, or personnel harnesses, depending on reactor design and test sample location.**
6. **Carefully pull the test sample holding device(tray) out of the catalyst module with the test sample. Pay special attention to multiple catalyst elements in the sample tray.**
7. **Remove the test sample from the tray and set the catalyst aside.**
8. **With a dark marker, mark on each removed sample, an arrow that indicates the flow direction of the flue gas. The flow direction is used in the analysis of performance at the test laboratory.**
9. **Insert the new (replacement) test sample in to the sample tray. Assure a tight fit to prevent leaks around the catalyst. Fiber packing material is provided with replacement test samples.**
10. **Replace the sample tray back into the catalyst module.**
11. **Remove the collected test sample from the reactor and prepare it for return shipment.**
12. **Clean the reactor of any materials that may have accumulated during the procedure.**

Shipping Catalyst Elements

Individual catalyst elements need to be shipped in special containers to prevent damage. A catalyst element can usually be returned to Cormetech in the container in which the original catalyst was shipped.

The Catalysts should be wrapped in bubble wrap, placed in a cardboard box or cardboard packing, then sealed in a well packed and secured wooden crate. See Appendix 2 for appropriate shipping contact information.

Handling of Catalyst Modules

Normally, Cormetech provides the catalyst pre-assembled into steel frames. Assembled catalyst modules consist of catalyst elements stacked together, with ceramic fiber packing between the elements within the steel frames.

Receiving Catalyst Modules

Catalyst modules will be received by special transportation arrangements. The trucks carrying the modules are schedule to arrive as designated by the customer. The modules should be inspected upon receipt for damage as noted by holes in the protective shipping material, broken or bent parts, etc. Any problems with the received catalyst elements or modules should be reported to Cormetech. See Appendix 2 for detailed contact information. All damage should be photographed to show the extent or cause of the problem.

Unloading From the Truck

The module should not be dropped, bumped or shocked in any manner.

Each module must be unloaded individually. An appropriately sized stationary crane or a mobile crane or forktruck (with at least 150% of the lifting capacity of the module weight) should be used. The weight of an individual module can be found on the specific project drawing.

For lifting from the top, the module's lifting lugs or a Cormetech supplied lifting tool should be used. Proper lifting techniques must be followed including sling angles (> 45°) and appropriately sized shackles.

For lifting from the bottom, the forktruck's fork spacing must assure that the module will not tilt and that the lift points are at the structurally correct point. Forktruck movement should be slow and steady.

See the section on handling and lifting modules for additional procedures.

Un-crating Modules

If the modules arrive in wooden crates, the following procedures apply:

1. **Unload the crated modules onto a flat, dry surface. Typically, a forktruck will be required to relocate the module in the wooden crate. It is a good idea to store the modules in the wooden crates for extra security, if they are not to be installed shortly.**
2. **Remove the steel banding from around the crate.**
3. **Carefully remove the crate's top panel, front panel, then the two side panels, and finally the back panel. Use caution with the demolition tools to assure no rough contact with the module inside the crate.**
4. **Unwrap the module from its packing material.**
5. **Handle and store the module as specified below.**

Storing Catalyst Modules

To minimize the handling and movement of the modules, consideration should given to storing the modules in numbered sequence order that will facilitate loading into the SCR reactor. Each module is uniquely numbered and has a specified location in the reactor.

Store catalyst modules inside a building to avoid contact with rain and/or sea water, heavy humidity, and other moisture, oil, and solvents. Moisture may either transport poisons onto the catalyst surface and cause deactivation, or may cause the catalyst to crack upon drying.

Set the catalyst modules down, on 4 x 4 timbers or other support structure, with a minimum of 3-1/2 inches clearance from the floor or ground.

Cover the catalyst modules with a waterproof canvas tarp or plastic sheet to prevent exposure to moisture and dust.

To prevent accidental catalyst module damage, do not perform any work in or near the catalyst module storage area.

Measures should be taken to keep the stored catalyst modules exposure to from alkali metals (e.g., potassium, sodium), earth metals (e.g., calcium, magnesium), and other substances (e.g., halogen). These substances cause deterioration of the catalyst activity.

If the catalyst modules are stored near production and/or storage facilities of chemical and petroleum plants, they should not be left in a reducing atmosphere and should not be in contact with volatile organic gases. These conditions may cause deterioration of the catalyst activity.

Handling and Lifting Catalyst Modules

See the above section on Unloading From the Truck for addition procedures.

Care must be taken during handling to avoid mechanical shock to the catalyst modules.

When lifting the catalyst module, lifting cables or straps must be properly secured to the lifting lugs on the top of the catalyst module frame. Sling angles must be greater than 45°. If unable to maintain the proper sling angle, then a lifting tool or spreader bar is required.

When lifting the catalyst module, take care not to bring the module in contact with other modules or any other hard surface.

When lifting the catalyst module, lift slowly and take care not to drop or cause sudden movement of the module. Lifting speed should be $\leq$ 40 ft/min. Lowering speed should be $\leq$ 25 ft/min.

Always use proper crane and hoist procedures when lifting the modules.

Crating Catalyst Modules for Overseas Transport

If the modules are to be shipped overseas, special packaging requirements exist.

The catalyst modules are first shrink-wrapped in plastic with a desiccant inside the wrap to absorb excess moisture. Crates are constructed out of wood, each side lined with waterproof paper. Each crate is banded with 1-1/4" steel band and stenciled for easy identification.

The crates are loaded into the sea container starting in the nose of the container and to one side, then alternating sides for balance. The crates are blocked to the floor with 2x4s. The crates should be braced at the tops to prevent tilting during transport. At the rear of the sea container, the crates are secured by 4x4 and 2x4 lumber.

Shipping Catalyst Modules

Contact Cormetech prior to shipping modules. See Appendix 2 for detailed contact information.

Specify air ride trailers, with each module individually secured on the trailer floor. Loading arrangement must be well-balanced.

When loading the catalyst modules onto the truck bed, place the modules such that the catalyst openings are horizontal and the element cell openings are perpendicular to the truck's direction of travel, unless crated for overseas transport. If crated for overseas shipment, either direction of crate orientation is acceptable.

Firmly secure the catalyst modules to the truck bed. Cargo straps may be used. Chains are not permitted. Block and tackle should not come into contact with the modules, as they might damage the catalyst.

Cover the catalyst modules completely with waterproof, durable tarp to prevent water contact. Tie down securely. Assure that wind blown tarps will not damage the catalyst.

Provide directions to the truck driver to:

- **Where practical and possible, select flat roadways.**
- **Avoid sudden starts and stops.**
- **Avoid sharp turns.**
- **Do not exceed legal maximum speed.**
- **Maintain tire air pressure and quality to DOT standards.**
- **Recheck strapping for tightness periodically each traveling day.**

SCR Reactor Loading and Un-loading

General Information

Prior to installing catalyst modules, measures should be taken to ensure that the SCR reactor, intake ducts, and flue gas generating facilities are thoroughly cleaned to remove construction dust, iron rust, oil, waste steel, waste cloth, waste sealing material, and other impurities.

Cormetech recommends operating the unit prior to catalyst installation for the following reasons:

a. **to ensure impurities have been removed from the system.**
b. **to complete coarse adjustment of burners or combustors to avoid possible catalyst plugging, rapid deterioration, or fires which may be caused by soot and products of incomplete combustion associated with burner adjustment.**
c. **to prevent mechanical shock to the catalyst by flying debris during fan operation.**

The modules are assigned specific locations in the SCR reactor. Pay special attention to load them in the correct order. This is especially important for the SAMPLE MODULE, which contains removable catalyst elements that are evaluated on a regular basis. Any deviations from the loading order must be reported to Cormetech. See Appendix 2 for detailed contact information.

Specific crew assignments and responsibilities need to be assigned prior to the start of the installation. Assure that everyone understands the total installation process. Provide an adequate crew to complete the installation efficiently.

Precautions need to be taken inside the reactor to provide safe walking surfaces. Scaffolding, lifts, and platforms are all suitable depending on the specific site requirements. Walking on the open sides of the modules is not acceptable.

SCR reactors are often classified as confined spaces by OSHA. Assure that all appropriate precautions are taken.

Staging the Catalyst Modules

The modules should be staged to expedite the installation. The modules are loaded in a specific order for each SCR reactor. Each module has an assigned number that corresponds to the installation drawing. Each module, prior to installation into the reactor, should have all packing material removed. Check for any miscellaneous material.

Inspection of the Catalyst Modules

A quick inspection of the module should be made to check for broken catalysts, loose packing, bent module frames, etc. prior to installation. Any unusual situations should be noted with respect to the module number. Report any deviations to Cormetech. See Appendix 2 for detailed contact information.

Installation of the Catalyst Modules

Each site has unique installation requirements, but the basic principles apply everywhere:

TOP LOADING REACTOR:

Using the appropriate handling procedures listed previously, a crane or hoist will lower the module into the reactor top opening until completely seated in place. Caution is necessary to maintain steady movement, with minimized bumping, acceleration, and deceleration. Check for proper alignment. Each module may need to be sealed prior to the loading of the next module. See the next section about module sealing.

SIDE LOADING REACTOR:

Using an appropriate conveyor or extended hoist, move the modules inside the reactor. Use conveyors, internal hoists, and chainfalls to maneuver the catalyst modules to their assigned position. Lower carefully into the designated position. Check for proper alignment. See the next section about module sealing.

Module Sealing

1. **Specific installations may require the addition of ceramic fiber sealing material between the module frame and the SCR reactor housing to prevent leaks. Refer to the module drawings and the reactor drawings for details. In any case, inspect each module seat to assure that there are no leaks.**
2. **Some module installations require the module to be moved into place against a sealing frame in the reactor after being placed into the reactor. The module may require sealing material placed between the module frame and the reactor frame. The sealing material may be supplied mounted to the modules or supplied separately for installation at the site. The modules are moved by jacking screws, small hydraulic jacks or other suitable means.**
3. **Some reactors require that sealing material be placed on the corresponding module mating surface prior to placement of the next module.**
4. **In some cases, a sealing system is installed after the modules are in place in the reactor. The final sealing may be like a cap that fits over the top of the module frames. The cap may just be set, fastened or welded in place.**

Field Welding on the Catalyst Modules

Catalyst modules typically do not require field welding. However, certain installations may use field welding to secure modules to each other or to provide adequate sealing. In the event that field welding will be performed on or near the catalyst modules, take precautions to protect the catalyst. Cover the catalyst face completely with a fireproof blanket to prevent welding by-products from contacting the catalyst. Welding slag, welding sparks, and welding gases could harm the catalyst. If practical, use a fan to direct smoke away from the catalyst.

If welding is necessary, Cormetech must be notified prior to commencement of work. See Appendix 2 for detailed contact information.

SCR Operation and Maintenance

Initial Start-Up

Refer to the system operating manuals for overall procedures for SCR operations.

1. **Use normal start-up and shutdown procedures as specified in your system suppliers SCR Operating Manual. Recommended heat-up rate is no more than 110°F (60°C) per minute.**
2. **There should be no water in the SCR system other than the moisture in the ambient air or flue gas.**
3. **The flue gas temperature distribution must meet the criteria in the technical specification.**
4. **Balance the distribution of flue gas flow across the catalyst bed to meet technical specification.**
5. **Ammonia injection can start only after the catalyst bed temperature has been elevated above the minimum operating temperature to prevent sulfate and nitrate compound deposits on the catalyst surface. The temperature should be measured by a downstream thermocouple to assure that all catalyst is above the minimum temperature. The minimum operating temperature is listed in the technical specification.**
6. **The SCR process must come to equilibrium before stable performance can be measured. Adjustments to the SCR process should be made after equilibrium has been reached. Equilibrium time for the SCR chemical reactions can vary due to system design. Systems operating below 400°F may require 3 hours to stabilize and systems operating above 600°F may require only 30 minutes.**

Operation

Refer to the system operating manuals for overall procedures for SCR operations.

1. **Unless stated otherwise, the operating temperature should not exceed 750°F (400°C). Exposure above this temperature risks permanent loss of catalyst activity.**
2. **Ammonia injection must be terminated if the reactor temperature drops below the minimum operational temperature specified in the Technical Specification to prevent sulfate and nitrate compound deposits on the catalyst surface. The temperature should be measured by a downstream thermocouple to assure that all catalyst is above the minimum temperature.**
3. **In the event of a tube leak upstream of the catalyst, care should be taken to prevent the entry of water or the generation of water droplets on catalyst surface. Water on the catalyst may decrease the catalyst performance.**
4. **The ammonia (NH_3) and flue gas NOx must be mixed and distributed to the concentration criteria in the technical specification for the NH_3/NOx ratio.**
5. **When soot blowers are available, proper measures should be taken to clean the catalyst bed whenever dust is deposited. A typical soot blower cycle in dust-laden environment is once per work shift and prior to shutdown of the SCR reactor.**
6. **Additional materials injected into the gas stream can have a negative impact on the catalyst. Examples for a gas turbine application are compressor cleaning fluid and lubrication oil. Water or water based cleaners should be used. The analysis of all substances not originally specified in the flue gas (including quantities and frequency) should be sent to Cormetech to check for compatibility with the catalyst. See Appendix 2 for detailed contact information.**
7. **Process parameters should be monitored during SCR operations. As a minimum, the pressure drop across the catalyst, the NH_3 injection rate and NH_3 slip should be monitored daily. Trend analysis of this and other data is very helpful in operational control of the SCR process.**
8. **The design of the catalyst is compatible with the fuels specified in the Technical Specification. The catalyst may not perform as designed if any other fuel compositions are used. Contact Cormetech for impact on catalyst performance if any other fuel is used. See Appendix 2 for detailed contact information.**

Shut Down and Maintenance

Refer to the system operating manuals for overall procedures for SCR operations. Use the normal procedures for shutdown of the SCR system.

1. **Where soot blowers are available, catalyst must be cleaned immediately prior to shut down. Where soot blowers are not available, as in gas/distillate systems, the catalyst elements should be thoroughly cleaned at annual shutdowns, using a vacuum to remove all accumulated dust, loose insulation, or iron rust scale.**
2. **Where possible, purge the catalyst bed with outside air, replacing the flue gas, to prevent condensation of moisture on the catalyst surface. This procedure is particularly important when treating gases containing SOx and HCl.**
3. **Shut off the ammonia injection prior to the flue gas and the reactor cooling below the minimum operating temperature indicated the Technical Specification. The temperature should be measured by an upstream thermocouple to assure that all catalyst is above the minimum temperature during the cool down cycle.**
4. **Measures should be taken to prevent exposure of the catalyst to boiler wash water, rainwater, or other moisture. Never wash the catalyst with water.**
5. **During outages, the catalyst should be inspected for erosion and plugging.**
6. **All debris, such as dust, iron rust, oil, and other impurities, should be cleaned from the catalyst as well as the reactor housing with a vacuum cleaner. Vacuuming should be done with care not to damage the catalyst face. Keep the vacuum nozzle 1/4 to 1/2 inches from the catalyst face. For plugged sections of catalyst that can not be cleared with a vacuum cleaner, use pressurized air in conjunction with a vacuum cleaner. Blow air from the downstream side of the catalyst to the upstream side, directed into the vacuum cleaner, if possible.**

Pressurized Air Specifications:

Maximum pressure	**100psi**
Air Quality	**water and oil free**
Nozzle velocity	**100 ft/sec**
Minimum nozzle clearance to catalyst	**20 inches minimum**

Note: Compressed air must be used with caution to prevent erosion of the catalyst from excessive pressure and velocity.

7. Steam cleaning can be used as an alternate to pressurized air blowing.

CAUTION: Do not use a vacuum cleaner in conjunction with steam cleaning.

Steam Specifications: Same as pressurized air above, except as listed.

Steam Quality	>50°F superheat (quality 100%)
Duration at one location	60 sec

8. If there is a continuing increase in NH_3 consumption rate with no decrease in outlet NOx level, there could be a catalyst or system problem. Contact Cormetech for guidance in the investigation. See Appendix 2 for detailed contact information.
9. When an SCR by-pass is used, see your system manual for appropriate procedures.

Maldistribution Criteria

The SCR catalyst is designed to achieve a desired performance based on prescribed inlet conditions. In operation, these parameters will vary both spatially and temporally. The catalyst is designed to account for a specified amount of variation, which is defined in the technical specification under the maldistribution criteria. These criteria reflect the boundaries for variations in temperature, flow rate, and NH_3/NOx molar (or volumetric) ratio, which will deliver adequate SCR system performance.

Typically, allowable variation in temperature is expressed as a mean temperature and ± tolerance. The allowable variation in flow rate and NH_3/NOx molar ratio is expressed in %RMS. The %RMS can be calculated as follows:

- Measure the following parameters at the inlet to the catalyst: flow, NOx, and NH_3. Use EPA methods to determine appropriate sample grid or traverse.
- Calculate % RMS.

$$\%\ \text{RMS} = \left(\sqrt{\frac{\sum_{j=1}^{H} (x_j - \bar{x})^2}{(H-1)}} \div \bar{x} \right) \times 100$$

where:

x_j = Measured value (Flow rate or NH_3 ratio at specific point j)

H = Total number of sample points

$\bar{x}$ = Average value

Annual Catalyst Sampling

Annual catalyst evaluation provides valuable information on the performance potential of the system and the condition of the catalyst. The test results assure the owner that the catalyst is performing as expected. In the event of unusually high deactivation rates, an investigation can determine the cause and prevent premature replacement. The information can also be used to estimate catalyst life to assist in an efficient catalyst replacement strategy.

Prior to retrieving a sample, contact Cormetech for the associated cost. See Appendix 2 for detailed contact information. Cormetech can either be contracted to retrieve the sample or will send a catalyst replacement element and retrieval kit. The kit will include instructions on handling and safety and all materials necessary to remove and replace the sample element. After replacement, the removed sample element should be returned to Cormetech in the same shipping container that the replacement sample was sent.

See the earlier section on handling catalyst elements for the procedure for removing and replacing the test sample catalyst.

Specific testing procedures need to be arranged with Cormetech to assure that all appropriate test are completed. Upon receipt of the sample, Cormetech will measure deactivation and send a summary report of the results to the owner.

Management of Spent SCR Catalyst

Introduction to catalyst recycling

The owner of spent SCR catalyst may dispose of it by recycling the catalysts or transferring it to an appropriate landfill. The established recycling procedure processes the spent catalyst material, along with other compatible feedstock for resale into industrial applications. Cormetech can arrange the recycling service for the owner at the time needed, and will assist in helping to arrange alternatives of disposal in the event the used catalyst cannot be recycled. The catalyst produced by Cormetech is a stable, homogeneous ceramic made primarily of titanium dioxide and tungsten trioxide, with vanadium pentoxide as a common minor constituent. The recycling process utilizes all of the catalyst mass and does not create by-products. The availability and conditions for this procedure are based on current regulations and the condition of the spent catalyst; any change in regulations concerning this product may necessitate alternative methods of spent catalyst management.

Procedure

1. **Extract one or more sample blocks of spent catalyst from the sampler module installed in the catalyst bed. The sample should be verified to have been in place for the entire operating period of the bed. Refer to the owner's records from routine catalyst performance audits to verify the total exposure time. See procedures in earlier sections of this manual for catalyst handling methods.**
2. **Wrap the catalyst sample entirely in plastic to avoid water contact. Wrap in bubble wrap and ship in a tight fitting container of adequate structure to prevent damage. See procedures in earlier sections of this manual for preparation of catalyst for shipping. Ship the sample via traceable means to Cormetech. See Appendix 2 for contact information.**
3. **Cormetech will conduct environmental test panels on the sample spent catalyst similar to the Toxic Characteristic Leaching Procedure and the Total Metals Procedure to characterize the catalyst material for recycle.**
4. **Cormetech will provide tests results from samples of spent catalysts to the recycler on behalf of the catalyst owner, and request that the catalyst recycler(s) accept the spent catalysts.**
5. **Upon acceptance and release from the recycler, Cormetech will advise the owner of the arrangements for shipment of the SCR catalyst modules to the recycler. See the earlier procedures for the methods for shipment of catalyst modules.**
6. **The catalyst materials will be processed by the recycler and upon completion, the owner will receive a Certificate of Recycle directly from the recycler. The certificate is the recycler's statement for the owner's assurance that proper procedures were followed and that ownership of the supplied materials has been transferred to the recycler.**

Note: Steel encasement modules that contain the catalyst may also be recycled at a steel mill, local to the recycler.

Appendix

Section 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	SCR Systems NOx Catalyst	**For Additional Product Information:**	(919) 620-3000
Chemical Family:	Ceramic	**In Emergency:**	(919) 620-3000
Manufacturer:	Cormetech, Inc.	**Approved by:**	Reda Iskandar
Address:	5000 International Drive Durham, NC 27712		

Section 2: COMPOSITION/INFORMATION ON INGREDIENTS

FOR EXPOSURE LIMITS SEE SECTION 8
FOR OTHER TOXICOLOGICAL INFORMATION SEE SECTION 12

			Exposure Limit		Sec 12 INFO	
CAS #	COMPONENT NAME	%	YES	NO	YES	NO
13463-67-7	Titantium dioxide	< 85	X			X
1314-35-8	Tungsten trioxide	< 10	X			X
not applicable	Ceramic fiber	< 10		X	X	
14808-60-7	Silicon dioxide	< 5	X		X	
1314-62-1	Vanadium pentoxide	< 5	X		X	

Section 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

This is a non-combustible, non-reactive solid material. It is supplied in the form of ceramic honeycombs. Use methods suitable to fight surrounding fire. Exposure to ceramic dusts may be irritating to eyes, nose, and throat. At very high levels the ceramic dust may have an effect on the lungs. The metallic elements contained in the ceramic may be biologically available if ingested or inhaled.

Potential Effects of Acute Exposure:

Eye:	Ceramic dust or powder may irritate eye tissue. Rubbing may cause abrasion of cornea.
Skin Contact:	Ceramic dust or powder may irritate the skin. Mechanical rubbing may increase skin irritation.
Skin Absorption:	No components are known to be available for absorption through the skin.
Ingestion:	May cause temporary irritation of throat, stomach, and gastrointestinal tract.
Inhalation:	Dust from this product may cause irritation of the nose, throat, and respiratory tract. When inhaled in very large amounts, damage to the lung can occur.

Potential Effects of Chronic Exposure:

Long term exposure to vanadium pentoxide dusts or fumes may cause lung damage, damage to the blood-forming elements, and central nervous system effects. IARC has classified the ceramic fibers used in this product as category 2B carcinogens (sufficient evidence of carcinogencity in animals but insufficient evidence in humans).

Effective Date: 11/92 Supersedes: 09/89

Section 4: FIRST AID MEASURES

Eyes:	Eye injuries from ceramic particles should be treated by a physician immediately.
Skin:	Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.
Inhalation:	Move person to non-contaminated air. Call a physician if symptoms persist.
Ingestion:	No need for first aid is anticipated if material is swallowed.
Notes to Physician:	None.

Section 5: FIRE-FIGHTING MEASURES

General:	This material will not burn.
Flashpoint:	Not applicable.
Flammability Limits:	Not applicable.
Autoignition Temperature:	Not applicable.
Means of Extinction:	As for the surrounding fire.
Hazardous Combustion Products:	Material forms irritating and toxic gaseous metallic oxides at high temperatures.
Fire-Fighting Instructions:	Wear full protective clothing; including helmet, self-contained positive pressure of pressure demand breathing apparatus, protective clothing and face mask.

Section 6: ACCIDENTAL SPILL/RELEASE MATERIALS

General:	Avoid creating dust.
Large/Small Spill:	Collect spill using a vacuum cleaner with a HEPA filter. Place in a closed container.
Waste Disposal:	Regulations vary. Consult local authorities before disposal.

Section 7: HANDLING AND STORAGE

General Handling Precautions:	Avoid inhalation of dust. Avoid contact with skin and eyes. Wash thoroughly after handling.
Storage Requirements:	Store in a dry area.

ffective Date: 11/92 Supersedes: 09/89

Section 8: EXPOSURE CONTROL/PERSONAL PROTECTION

Ventilation:	If material is ground or cut use appropriate local exhaust ventilation to keep exposures below the regulated limits.

Exposure Limits:

	OSHA		ACGIH		Other	
Chemical Name	TWA	STEL	TWA	STEL	TWA	STEL
Titanium dioxide	10 mg/m_3		10 mg/m^3			
Tungsten trioxide	5 mg/m^3	10 mg/m^3	5 mg/m^3	10 mg/m^3		
Silicon dioxide	0.1 mg/m^3		0.1 mg/m^3			
Vanadium pentoxide	0.05 mg/m^3		0.05 mg/m^3		ceiling = 0.55 mg/m^3 (NIOSH)	
Ceramic fiber					1 $fiber/cm^3$ (supplier TWA)	
Particulates (not otherwise regulated)	OSHA: total dust: 15 mg/m^3 respirable fraction: 5 mg/m^3					

Personal Protective Equipment:

Eye Protection:	Wear safety glasses with side shields.
Skin Protection:	Wear leather or other appropriate work gloves, if necessary for type of operation.
Protective Clothing:	Overalls.
Respiratory Protection:	If airborne fiber concentrations are not known, as minimum protection use half-face air-purifying respirator with HEPA filter cartridges (e.g., 3M 6000 Series).

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid	**Softening Point:**	> 1,800°C
Odor and Appearance:	Odorless, brown ceramic honeycomb	**pH:**	not applicable
Specific Gravity:	4.26 gm/cm^3 (density)	**Solubility (in water):**	not applicable
Boiling Point:	not applicable	**Freezing Point:**	not applicable
Vapor Pressure:	not applicable	**Evaporation Rate:**	not applicable
Percent Volatile:	not applicable	**Viscosity:**	not applicable
Vapor Density:	not applicable		

Section 10: STABILITY AND REACTIVITY

Stability:	Stable
Conditions to Avoid:	None Known
Hazardous Polymerization:	Will not occur
Incompatibility:	None known

Section 11: TRANSPORT INFORMATION

This product is not regulated as a hazardous material by the United States (DOT) or Canadian (TDG) transportation regulations.

Section 12: TOXICOLOGICAL INFORMATION

Eye Effects:	Dusts may cause mechanical irritation. Symptoms can include irritation, redness, scratching of the cornea, and tearing. Vanadium pentoxide dusts cause a sensation of burning and irritation of eyes and signs of conjunctivitis.
Skin Effects:	Dust may cause irritation. Solid material may cause cuts and abrasions.
Acute Oral:	No adverse health effects are known for product. Ingestion may cause transient irritation of throat, stomach, and gastrointestinal tract.
Acute Inhalation:	Mechanical irritation from inhalation of product may cause coughing, soreness of throat and nose, and sneezing. Very high exposures may cause difficulty breathing, congestion, tightness of chest and hemorrhage. A green discoloration of the tongue may result from acute exposure to vanadium pentoxide dusts.
Chronic Effects:	This product contains ceramic fibers which have been found to be carcinogenic to humans (Group 2B) according to IARC. For further information, see IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, 43, 1988, pp 39-41, 152. For components of product: Silicon dust seems to have little adverse effects on lungs and does not appear to produce significant organic disease or toxic effects when exposures are kept under reasonable control. Exposure to vanadium pentoxide for only a few days may cause rhinitis, dryness of the throat, hoarseness, bronchitis with coughing and wheezing, dyspnea and pneumonitis. Chronic effects include lung damage, damage to the blood elements, and central nervous system effects.

Section 13: REGULATORY INFORMATION

TSCA Status:	All components are listed on the TSCA inventory.
CERCLA/SARA:	This product does not contain any ingredients which are subject to the reporting requirements of Section 313 of SARA and its associated regulations.
RCRA:	This product contains a component identified as hazardous under 40 CFR 261.24. You must test your waste using methods described in 40 CFR Part 261 to determine if it meets these or other applicable definitions of hazardous waste. Waste must be handled in accordance with all applicable regulations. Purchaser is advised to review regulations referenced for applicability as determined by purchaser's use of product.

Section 14: OTHER INFORMATION

Revision information: New November 1992.

CORMETECH

Cormetech Contact Information

Cormetech Inc.	**Main Office**	**919.620.3000**	**sales@cormetech.com**
Cormetech, Inc.	**FAX**	**919.620.3001**	
Manager, Sales, Contracts and Services	**Nancy Stephenson**	**919.620.3018**	**stephensonnd@cormetech.com**
Manager, Engineering Services	**Houston Outing**	**919.620.3064**	**outinghe@cormetech.com**
Laboratory Services	**Deb Sunick**	**919.620.3041**	**sunickdl@cormetech.com**
Manager, Quality Control	**Alan Crowle**	**919.620.3060**	**crowleal@cormetech.com**

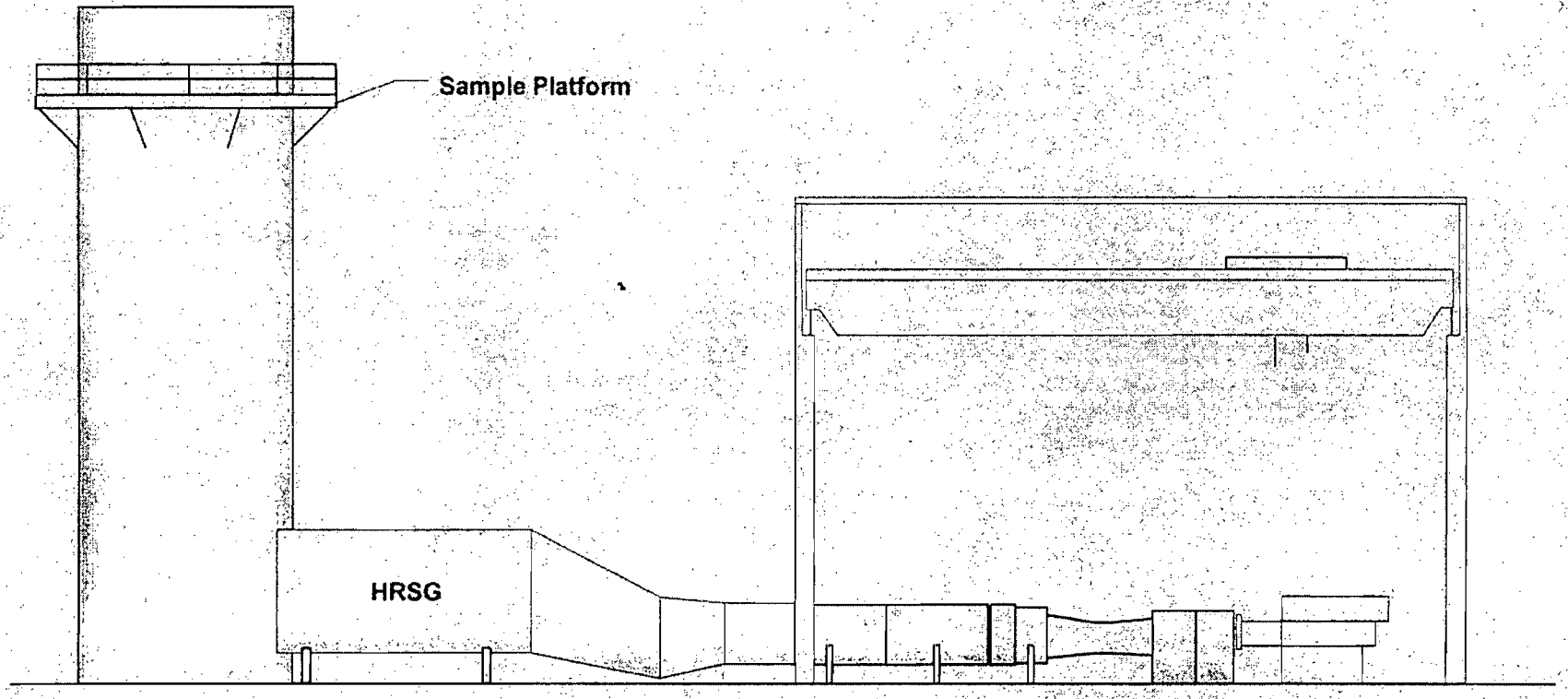
Shipping Address	**Cormetech Inc.** **5000 International Drive** **Durham, NC 27712**

LAST PAGE

ATTACHMENT MC-EU1-J4

DESCRIPTION OF STACK SAMPLING FACILITIES

CATALYST
AIR MANAGEMENT, INC.



GENERAL ARRANGEMENT

TITLE: CITY OF LAKELAND - C.D. McINTOSH POWER PLANT		
DESCRIPTION: GENERAL ARRANGEMENT - UNIT 5		DATE: 3/02/02
SCALE: None	DRAWN BY: MT TAYLOR	REVISED:

ATTACHMENT MC-EU1-J5

COMPLIANCE TEST REPORT

ATTACHMENT MC-EU1-J5

COMPLIANCE TEST REPORT

Compliance with the allowable emission limiting standards shall be determined within 60 days after achieving the maximum production rate, but not later than 180 days of initial operation of the unit, and annually thereafter as indicated in the air construction permit.

Permittee will submit a properly signed and sealed certification from the permittee's Professional Engineer stating that 1) the construction of the emissions unit was completed in accordance with the AC permit and 2) the emissions unit has been tested and compliance with the terms and conditions contained within the AC permit has been properly demonstrated within 45 days after completion of all of the initial performance tests.

[Rules 62-212.400(7)(b), 62-213.440(2), and 62-213.420(1)(a)5, F.A.C.]

CATALYST
AIR MANAGEMENT, INC

CITY OF LAKELAND
C.D. McINTOSH POWER PLANT
UNIT 5

EMISSIONS TEST REPORT

CATALYST AIR MANAGEMENT, INC.
REPORT NUMBER 138-049

JUNE 10, 2002

Prepared for
City of Lakeland
C.D. McIntosh Power Plant
3030 East Lake Parker Drive
Lakeland, FL 33805

PROJECT FACT SHEET

NAME OF SOURCE OWNER:	City of Lakeland
SOURCE IDENTIFICATION:	C.D. McIntosh Unit 5 Facility ID No. 1050004 E.U. ID No. 028
LOCATION OF SOURCE:	3030 East Lake Parker Drive Lakeland, FL
TYPE OF OPERATION:	Combustion Turbine Generating Unit
TYPES OF TESTS PERFORMED:	Oxygen/Carbon Dioxide-EPA Method 3A Carbon Monoxide-EPA Method 10 Nitrogen Oxide-EPA Method 20 VOC-EPA Method 25A
SOURCE ANALYZERS:	Siemans 300-CLD NOx – 28J04015 Siemans Oxymat 6E O_2 – N1K80365
TEST COMPANY:	Catalyst Air Management, Inc. 2505 Byington-Solway Road Knoxville, TN 37931
SITE SUPERVISOR:	Mike Taylor - Principal
TEST PERSONNEL:	Josh Nicely - Lead Technician
REPORT PREPARATION:	Mike Taylor - Principal
TEST DATES:	May 3-6, 2002
OWNERS REPRESENTATIVE:	John Guiseppi Andrew Nguyen
TEST OBSERVER:	Bob Soich - FDEP

1.0 Introduction

Catalyst Air management, Inc. (Catalyst) was contracted by the City of Lakeland to perform the performance test for initial compliance during combined cycle operation at C.D. McIntosh, Unit 5.

The sampling program was conducted May 3 through 6, 2002. The testing was performed by Messers. Mike Taylor and Josh Nicely of Catalyst, with the assistance of personnel assigned by Lakeland. Mr. John Guiseppi of Lakeland coordinated plant operation during the testing.

2.0 Summary of Test Results

A summary of test results developed by this source sampling program are presented in Table 1. The summary tables are presented as follows:

3.0 Results of Testing

The results from the compliance test are tabulated in Appendix. They indicate that the emissions are in compliance with standards ofTitle V Permit Number 1050004-009-AV.

TABLE 1
Emissions Summary
Base Load

Parameter	ppm @ 15% O_2	Permitted ppm	Actual lb/mmBtu
NOx	7.2	7.5	0.026
CO	1.0	25.0	0.002
VOC	0.1	4.0	0.001

TABLE 2
Emissions Summary
Power Augmentation

Parameter	ppm @ 15% O_2	Permitted ppm	Actual lb/mmBtu
NOx	7.0	7.5	0.026
CO	2.0	25.0	0.005
VOC	0.3	4.0	0.001

TABLE 3
Emissions Summary
90% Load

Parameter	ppm @ 15% O_2	Permitted ppm	Actual lb/mmBtu
NOx	7.0	7.5	0.026
CO	1.7	25.0	0.004
VOC	0.1	4.0	0.000

TABLE 4
Emissions Summary
80% Load

Parameter	ppm @ 15% O_2	Permitted ppm	Actual lb/mmBtu
NOx	6.8	7.5	0.025
CO	2.6	25.0	0.006
VOC	0.2	4.0	0.001

TABLE 5
Emissions Summary
70% Load

Parameter	ppm @ 15% O_2	Permitted ppm	Actual lb/mmBtu
NOx	6.8	7.5	0.025
CO	22.6	25.0	0.051
VOC	0.1	4.0	0.001

4.0 Description Of Combustion Units

McIntosh Unit 5 is a Westinghouse 501G combustion turbine (CT) with a heat recovery steam generator (HRSG). The CT can be fired with natural gas and No.2 distillate fuel oil. NOx emissions are controlled by low NOx combustion and selective catalytic reduction (SCR).

The maximum heat input of the unit is 2407 MMBtu/hr based on the lower heating value (MMBtu/hr, LHV) while firing natural gas and 2236 MMBtu/hr, LHV while firing fuel oil. The rated combined capacity of the CT/HRSG is approximately 350 MW gross.

The Unit 5 stack height is approximately 300 feet. The testing location is located on the stack approximately 160 ft above the inlet duct. Four test ports facilitate the sampling. A schematic of the stack sampling location is included.

5.0 Description of CEMS

The Unit 5 CEMS is an extraction system that measures NOx and O_2 concentrations at the sampling location. The CEMS analyzers include a Siemans Model 300-CLD NOx analyzer and a Siemans Model Oxymat 6E O_2 analyzer. The recording and reporting requirements are performed by a computerized data acquisition and handing system (DAHS).

Unit 5 CEMS

(1) Siemans NOx – 300-CLD - Serial No. 28J04015
(1) Siemans O_2 – Oxymat 6E - Serial No. N1K80365

The data acquisition and handling system utilizes a Fc factor based on the fuel (8710 or 9190 scf/mmBtu) to calculate NOx emissions in lbs/mmBtu. The SO_2 and CO_2 emissions are calculated and reported in accordance with procedures in 40 CFR Part 75, Appendices D and G.

TABLE 6
Test Summary
Gas - EPA Method 3A, 10, 20, 25A

Run #	Date	Start Time	End Time	Load	NOx ppm	NOx @15% ppm	NOx lb/mmBtu	CO ppm	CO @15% ppm	CO lbs/mmBtu	VOC ppm	VOC @15% ppm	VOC lbs/mmBtu	O2 %
1	5/3/02	0:48	2:34	70%	8.3	7.0	0.026	27.4	23.1	0.052	0.2	0.1	0.001	13.9
2	5/3/02	2:54	3:54	70%	7.9	6.7	0.025	25.7	21.7	0.049	0.2	0.1	0.000	13.9
3	5/3/02	4:01	5:01	70%	7.8	6.6	0.024	27.4	23.1	0.052	0.2	0.2	0.001	13.9
1	5/3/02	5:30	6:30	80%	8.4	6.6	0.024	3.4	2.7	0.006	0.2	0.2	0.001	13.4
2	5/3/02	6:39	7:39	80%	8.7	7.0	0.026	3.1	2.5	0.006	0.2	0.2	0.001	13.6
3	5/3/02	7:48	8:48	80%	8.6	6.9	0.025	3.1	2.5	0.006	0.2	0.2	0.001	13.5
1	5/5/02	18:30	19:30	90%	8.5	6.8	0.025	2.1	1.7	0.004	0.1	0.1	0.000	13.5
2	5/5/02	19:40	20:40	90%	9.1	7.2	0.026	2.0	1.6	0.004	0.1	0.1	0.000	13.4
3	5/5/02	20:50	21:50	90%	8.9	7.1	0.026	2.3	1.8	0.004	0.1	0.1	0.000	13.5
1	5/3/02	15:30	16:30	Base	9.4	7.3	0.027	1.6	1.2	0.003	0.2	0.2	0.001	13.3
2	5/6/02	7:41	8:41	Base	9.4	7.1	0.026	1.1	0.8	0.002	0.1	0.1	0.000	13.1
3	5/6/02	8:50	9:50	Base	9.5	7.2	0.026	1.3	1.0	0.002	0.1	0.1	0.000	13.1
1	5/6/02	12:10	13:10	Power Aug	8.8	6.7	0.025	3.5	2.6	0.006	0.3	0.2	0.001	13.1
2	5/6/02	13:15	14:15	Power Aug	9.2	7.1	0.026	2.5	1.9	0.004	0.4	0.3	0.001	13.3
3	5/6/02	14:25	15:25	Power Aug	10.2	7.3	0.027	2.2	1.6	0.004	0.4	0.3	0.001	12.7

VISIBLE EMISSION OBSERVATION FORM

No. 1/2

COMPANY NAME: CITY OF LAKELAND

STREET ADDRESS: 3030 E. LAKE PARKER DR

UNIT-5 COMBUSTION TURBINE

CITY: LAKELAND | STATE: FL | ZIP: 33805

PHONE (KEY CONTACT): 863 834 6600 | SOURCE ID NUMBER: 1050004 EUID 028

PROCESS EQUIPMENT: U5 COMBUSTION TURBINE | OPERATING MODE: BASE LOAD

CONTROL EQUIPMENT: SCR NONE | OPERATING MODE: ~~IN SERVICE~~

DESCRIBE EMISSION POINT: STACK EXIT - TALL CONCRETE STACK

HEIGHT ABOVE GROUND LEVEL: ≈ 300' | HEIGHT RELATIVE TO OBSERVER: Start ~300' End ~300'

DISTANCE FROM OBSERVER: Start ≈1100' End ≈1100 | DIRECTION FROM OBSERVER: Start W End W

DESCRIBE EMISSIONS: Start CT EXHAUST End CT EXHAUST

EMISSION COLOR: Start CLEAR End CLEAR | IF WATER DROPLET PLUME: Attached ☐ NONE Detached ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: Start STACK EXIT End STACK EXIT

DESCRIBE PLUME BACKGROUND: Start SKY & CLOUDS End SKY & CLOUDS

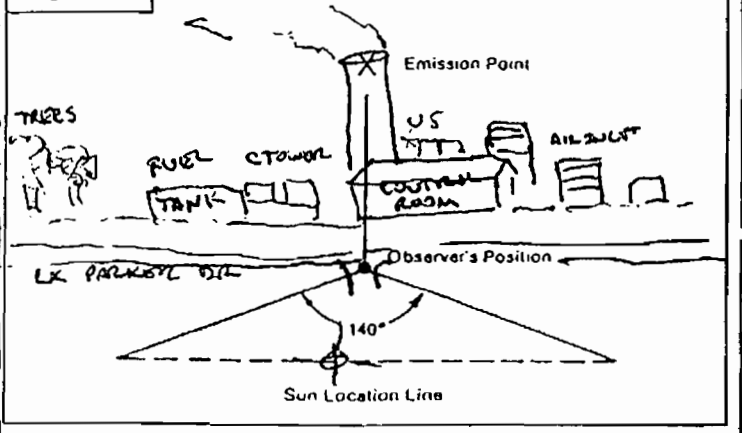
BACKGROUND COLOR: Start LT BLUE End LT BLUE | SKY CONDITIONS: Start SCATTERED End SCATTERED

WIND SPEED: Start 0-2 End 0-2 | WIND DIRECTION (FROM): Start NNE End NNE

AMBIENT TEMP: Start 79.0 End 82.0 | WET BULB TEMP: 75.1 | RH, percent: 83.5%

SOURCE LAYOUT SKETCH — Draw North Arrow

Stack with Plume
Sun
Wind



ADDITIONAL INFORMATION

INCLINE = 15.2° HIGH SET ANG ≈ 0

OBSERVATION DATE	START TIME	END TIME
	07:41	0810

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27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

OBSERVER'S NAME (PRINT): JOHN GUISEPPI

OBSERVER'S SIGNATURE: [signature] | DATE: 6 MAY 02

ORGANIZATION: CITY OF LAKELAND

CERTIFIED BY: EASTERN TECHNICAL ASSOCIATION | DATE: 14 FEB 02

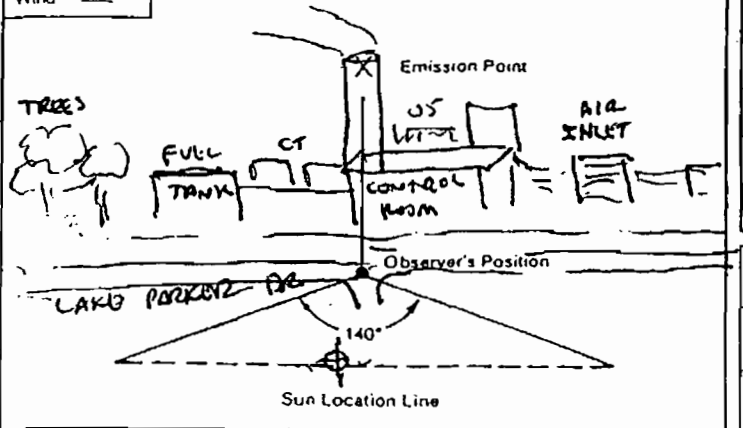
CONTINUED ON VEO FORM NUMBER: 2/4

VISIBLE EMISSION OBSERVATION FORM CONTINUED No. 2/2

COMPANY NAME	CITY OF LAKELAND
STREET ADDRESS	3030 E. LAKE PARKER DR
	UNIT-5 COMBUSTION TURBINE
CITY	LAKELAND
STATE	FL.
ZIP	33805
PHONE (KEY CONTACT)	863 834 6600
SOURCE ID NUMBER	1050004 EUID 028
PROCESS EQUIPMENT	US COMBUSTION TURBINE
OPERATING MODE	BASE LOAD
CONTROL EQUIPMENT	SCR NONE
OPERATING MODE	~~IN SERVICE~~
DESCRIBE EMISSION POINT	STACK EXIT - TALL CONCRETE STACK
HEIGHT ABOVE GROUND LEVEL	≈ 300'
HEIGHT RELATIVE TO OBSERVER	Start ≈300' End ≈300'
DISTANCE FROM OBSERVER	Start ≈1100' End ≈1100'
DIRECTION FROM OBSERVER	Start W End W
DESCRIBE EMISSIONS	Start CT EXHAUST End CT EXHAUST
EMISSION COLOR	Start CLEAR End CLEAR
IF WATER DROPLET PLUME	Attached ☐ NONE Detached ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	Start STACK EXIT End STACK EXIT
DESCRIBE PLUME BACKGROUND	Start SKY ; CLOUDS End SKY ; CLOUDS
BACKGROUND COLOR	Start LT BLUE End LT BLUE
SKY CONDITIONS	Start SCATTERED End SCATTERED
WIND SPEED	Start 0-2 End 1-3
WIND DIRECTION	Start NNE End NNE
AMBIENT TEMP	Start 82.0 End 83.9
WET BULB TEMP	77.5
RH, percent	76.1

SOURCE LAYOUT SKETCH — Draw North Arrow

Stack with Plume
Sun
Wind



OBSERVATION DATE	START TIME	END TIME
6 MAY 2002	0811	0840

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30	0	0	0	0	

OBSERVER'S NAME (PRINT)	JOHN GUISEPPI
OBSERVER'S SIGNATURE	
DATE	6 MAY 2002
ORGANIZATION	CITY OF LAKELAND
CERTIFIED BY	EASTERN TECHNICAL ASSOCIATION
DATE	14 ~~FEB~~ MAY 2002 JPG
CONTINUED ON VEO FORM NUMBER	

ADDITIONAL INFORMATION

INCLINE = 15.2° HIGH SET ANG = 0

VISIBLE EMISSION OBSERVATION FORM

No. 1/2

COMPANY NAME: CITY OF LAKELAND		
STREET ADDRESS: 3030 E. LAKE PARKER DR		
UNIT-5 COMBUSTION TURBINE		
CITY: LAKELAND	STATE: FL	ZIP: 33805
PHONE (KEY CONTACT): 863 834 6600	SOURCE ID NUMBER: 1050004 EUID 028	
PROCESS EQUIPMENT: U5 COMBUSTION TURBINE	OPERATING MODE: POWER AUG	
CONTROL EQUIPMENT: NONE	OPERATING MODE: N/A	

DESCRIBE EMISSION POINT: STACK EXIT - TALL CONCRETE STACK

HEIGHT ABOVE GROUND LEVEL: ≈300'	HEIGHT RELATIVE TO OBSERVER: Start ≈300' End ≈300'
DISTANCE FROM OBSERVER: Start ≈1000' End ≈1000'	DIRECTION FROM OBSERVER: Start EAST End EAST

DESCRIBE EMISSIONS: Start CT EXHAUST End CT EXHAUST

EMISSION COLOR: Start CLEAR End CLEAR	IF WATER DROPLET PLUME: Attached ☐ NONE Detached ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: Start STACK EXIT End STACK EXIT

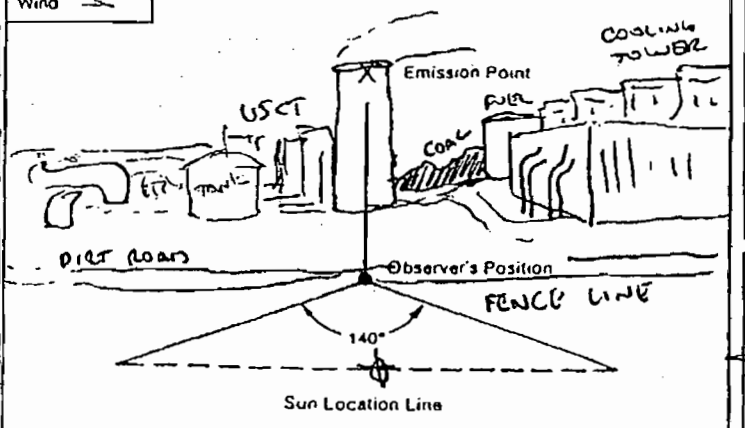
DESCRIBE PLUME BACKGROUND: Start SKY & CLOUDS End SKY & CLOUDS

BACKGROUND COLOR: Start BLU & WHT	End BLU & WHT	SKY CONDITIONS: Start SCATTERED	End SCATTERED
WIND SPEED: Start 3-5	End 3-5	WIND DIRECTION (FROM): Start N	End N
AMBIENT TEMP: Start 95.8	End 92.3	WET BULB TEMP: 78.0	RH, percent: 44.4%

SOURCE LAYOUT SKETCH

Stack with Plume
Sun
Wind

Draw North Arrow



ADDITIONAL INFORMATION: POWER AUGMENTATION IN SERVICE

INCLINE = 17.5° HIGH STACK ≈ 0

OBSERVATION DATE	START TIME	END TIME
6 MAY 2002	13:01	13:30

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29	0	0	0	0	
30	0	0	0	0	

OBSERVER'S NAME (PRINT): JOHN GIUSEPPI	
OBSERVER'S SIGNATURE	DATE: 6 MAY 2002
ORGANIZATION: CITY OF LAKELAND	
CERTIFIED BY: EASTERN TECHNICAL ASSOCIATION	DATE: 14 FEB 02

CONTINUED ON VEO FORM NUMBER: 2/2

VISIBLE EMISSION OBSERVATION FORM

No: 2/2

COMPANY NAME: CITY OF LAKELAND

STREET ADDRESS: 3030 E. LAKE PARKER DR

UNIT-5 COMBUSTION TURBINE

CITY: LAKELAND | STATE: FL | ZIP: 33805

PHONE (KEY CONTACT): 863 834 6600 | SOURCE ID NUMBER: 1050004 EMIS 028

PROCESS EQUIPMENT: US COMBUSTION TURBINE | OPERATING MODE: POWER AUG

CONTROL EQUIPMENT: NONE | OPERATING MODE: N/A

DESCRIBE EMISSION POINT: STACK EXIT - TALL CONCRETE STACK

HEIGHT ABOVE GROUND LEVEL: ≈ 300' | HEIGHT RELATIVE TO OBSERVER: Start ≈300' End ≈300'

DISTANCE FROM OBSERVER: Start ≈1000' End ≈1000' | DIRECTION FROM OBSERVER: Start EAST End EAST

DESCRIBE EMISSIONS: Start CT EXHAUST End CT EXHAUST

EMISSION COLOR: Start CLEAR End CLEAR | IF WATER DROPLET PLUME: Attached ☐ NONE Detached ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: Start STACK EXIT End STACK EXIT

DESCRIBE PLUME BACKGROUND: Start SKY & CLOUDS End SKY & CLOUDS

BACKGROUND COLOR: Start BLU & WHT End BLU & WHT | SKY CONDITIONS: Start SCATTERED End SCATTERED

WIND SPEED: Start 3-5 End 3-5 | WIND DIRECTION (FROM): Start N End N

AMBIENT TEMP: Start 92.3 End 90.9 | WET BULB TEMP: 78.2 | RH, percent: 44.7

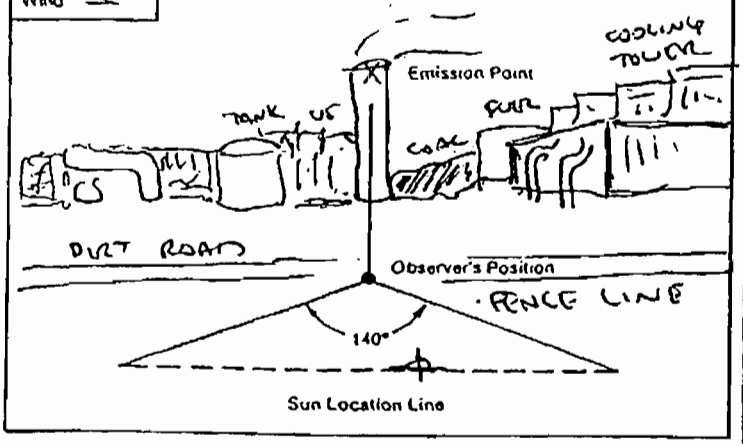
SOURCE LAYOUT SKETCH

Draw North Arrow

Stack with Plume

Sun

Wind



ADDITIONAL INFORMATION: POWER AUGMENTATION IN SERVICE

INCLINE ≈ 17.5 HIGH SEA ANG = 0

OBSERVATION DATE	START TIME	END TIME
6 MAY 2002	13:31	14:30

SEC / MIN	0	15	30	45	COMMENTS
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30	0	0	0	0	

OBSERVER'S NAME (PRINT): JOHN GUISEPPI

OBSERVER'S SIGNATURE | DATE: 6 MAY 2002

ORGANIZATION: CITY OF LAKELAND

CERTIFIED BY: EASTERN TECHNICAL ASSOCIATES | DATE: 14 FEB 02

CONTINUED ON VEO FORM NUMBER

ATTACHMENT MC-EU1-J13

IDENTIFICATION OF ADDITIONAL APPLICABLE REQUIREMENTS

Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

October 8, 2002

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Keith Hulbert
General Manager
Lakeland Utilities
501 East Lemon Street
Lakeland, Fl 33801-5079

Re: DEP File No. PSD-FL-245, PA 74-06
Lakeland McIntosh Unit No. 5

Dear Mr. Hulbert:

The Department reviewed your request to modify the PSD Permit relative to start-up emissions. The Department has additionally reviewed the May 24, 2002 summary provided by Ms. Farzie Shelton and Mr. Timothy Bachand concerning actual emissions data during Unit 5 start-up periods. As a result of this review, the Department has concluded that a permit modification may be granted. Accordingly, this request is acceptable as indicated herein.

Permit PSD-FL-245 is hereby modified as follows:

17. The permittee shall install ~~design the stationary gas turbine, ducting, possible future heat recovery steam generator, and stack(s) to accommodate installation of~~ SCR equipment and/~~or~~ install an oxidation catalyst. The oxidation catalyst shall be designed for a minimum 90% destruction efficiency at base load ~~in the event that the ULN technology fails to achieve the NOX limits given in Specific Condition No. 20 and 21 or the carbon monoxide (CO) limits given in Specific Condition 22 are not met.~~ [Rule 62-4.070, F.A.C.]

22. ~~Carbon Monoxide (CO) emissions: Prior to May 1, 2002, the concentration of CO (@15% O2 in the exhaust gas when firing natural gas shall not exceed 25 ppmvd when firing natural gas and 90 ppmvd when firing fuel oil as measured by EPA Method 10. CO emissions (at ISO conditions) shall not exceed 145 lb/hr (gas) and 539 lb/hr (oil). [Rule 62-212.400, F.A.C.]~~

    Prior to August 1, 2003 CO emissions shall be minimized through the use of best operating practices and properly tuned combustors.

    After July 31, 2003 ~~May 1, 2002~~, the concentration of CO in the exhaust gas shall be additionally controlled by the use of an oxidation catalyst with a minimum of 90% CO removal efficiency (based upon design at base load). The CO emissions shall be tested annually at full load and shall not exceed 2 ppmvd when firing natural gas as measured by EPA Method 10. The oxidation catalyst shall be maintained according to manufacturers recommendations, however in the event that CO emissions exceed 2 ppmvd (as demonstrated by annual testing above) the permittee shall implement a remedy and re-test within 90 days of operation. Should the re-test result in CO emissions exceeding 2 ppmvd the remedy shall be to completely replace the oxidation catalyst. ~~when firing natural gas shall not exceed 25 ppmvd when firing natural gas and 90 ppmvd when firing fuel oil as measured by EPA Method 10. CO emissions (at ISO conditions) shall not exceed 106 lb/hr (gas) and 386 lb/hr (oil).~~ [Rule 62-212.400, F.A.C.]

25. ~~Volatile Organic Compounds (VOC) Emissions: The concentration of VOC in the exhaust gas when firing natural gas shall not exceed 4 ppmvd when firing natural gas and 10 ppmvd when firing fuel oil as assured~~

~~by EPA Methods 18, and/or 25 A. VOC emissions (at ISO conditions) shall not exceed 10 lb/hr (gas) and 25 lb/hr (oil). [Rule 62-212.400, F.A.C.]~~

Prior to August 1, 2003 VOC emissions shall be minimized through the use of best operating practices and properly tuned combustors.

After July 31, 2003 VOC emissions shall be additionally controlled through the use of an oxidation catalyst. CO emissions shall be employed as a surrogate for VOC emissions and no further annual testing will be required.

26. Excess emissions resulting from startup, shutdown, malfunction or fuel switching shall be permitted provided that best operational practices are adhered to and the duration of excess emissions shall be minimized. Excess emissions occurrences shall in no case exceed four hours in any 24-hour period for cold startup or two hours in any 24-hour period for other reasons unless specifically authorized by DEP for longer duration.

During any calendar day in which a start-up, shutdown, or fuel change occurs, the following alternative NO_X limit applies:

100 lb/hr on the basis of a 24-hour average

200 lb/hr on the basis of a 24-hour average if fuel oil is fired during a start-up or shut-down within the 24-hour period

20. The following table is a summary of the BACT determination and is followed by the applicable specific conditions. Values for NO_X are corrected to 15% O_2. Values for CO are corrected to 15% O_2. [Rule 62-212.400, F.A.C.]

Operational Mode	NO_X (ppm)	CO (ppm)	VOC (ppm)	PM/Visibility (% Opacity)	*Technology and Comments*
~~Simple Cycle~~	~~25 - NG (basis) 237 lb/hr (24-hr avg) 42 - FO (3-hr avg)~~	~~25 - NG or 10 - Ox Cat 90 - FO~~	~~4 - NG 10 - FO~~	~~10~~	~~DLN on gas, WI on oil. Applies until 05/1/2002. Clean fuels, good combustion~~
~~Simple Cycle~~	~~9 - NG (basis) 85 lb/hr (24-hr avg) 42 - FO (3-hr avg)~~	~~25 - NG or 10 - Ox Cat 90 - FO~~	~~4 - NG 10 - FO~~	~~10~~	~~ULN on gas, WI on oil. Applies after 05/1/2002 Clean fuels, good combustion~~
~~Simple Cycle~~	~~9 - NG (3-hr avg) 15 - FO (3-hr avg)~~	~~25 - NG or 10 - Ox Cat 90 - FO~~	~~4 - NG 10 - FO~~	~~10~~	~~Hot SCR. Applies not later than 05/1/2002 if 9 ppm NO_X not achievable by ULN. Clean fuels, good combustion.~~
Combined Cycle	7.5 - NG (3 hr avg) 15 - FO (3-hr avg)	~~25 - NG or 10 - Ox Cat 90 - FO~~ Oxidation Catalyst (annual test 2 ppm criteria at full load firing natural gas.)	~~4 - NG 10 - FO~~ Oxidation Catalyst	10	Conventional SCR with Oxidation Catalyst, ~~unless simple cycle limits are achieved on or before 05/01/2002.~~ Clean fuels, good combustion

No other changes to the permit are authorized by this action.

A copy of this letter shall be filed with the referenced permit and shall become part of the permit. This permit modification is issued pursuant to Chapter 403, Florida Statutes. Any party to this order (permit modification) has the right to seek judicial review of it under Section 120.68, F.S., 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, Mail Station 35, 3900 Commonwealth Boulevard, 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 after this Notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

Sincerely,

Howard L. Rhodes, Director
Division of Air Resources
Management

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this ~~Intent to Issue~~ PSD Permit Modification (~~including the Public Notice of Intent to Issue PSD Permit Modification and the Draft permit~~) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 10/8/02 to the person(s) listed:

Mr. Keith Hulbert, Lakeland Utilities *
Ms. Farzie Shelton, Lakeland Utilities
Mr. Gregg Worley, EPA
Mr. John Bunyak, NPS
Mr. Bill Thomas, SWD
Mr. Buck Oven, DEP
Mr. Joe King, Polk County

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Victoria Gibson (Clerk) October 8, 2002 (Date)

Lakeland Electric
C. D. McIntosh, Jr. Power Plant
Facility ID No.: 1050004
Polk County

Title V Air Operation Permit Revision
FINAL Title V Permit Revision No.: 1050004-011-AV

Permitting Authority:
State of Florida
Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation
Title V Section

Mail Station #5505
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Telephone: 850/488-1344
Fax: 850/922-6979

Compliance Authority:
Department of Environmental Protection
Southwest District Office
3804 Coconut Palm Drive
Tampa, Florida 33619-8218
Telephone: 813/744-6100
Fax: 813/744-6084

Section III. Emissions Unit(s) and Conditions.

Subsection F. This section addresses the following emissions unit.

E.U. ID No.	Brief Description
-028	McIntosh Unit 5 – 250 MW Simple Cycle Stationary Combustion Turbine

McIntosh Unit 5 is a Westinghouse 501G combustion turbine operating in a simple cycle, once through steam generator. The turbine is fired with natural gas or a maximum 0.05 percent, by weight, sulfur content No. 2 or superior grade of distillate fuel oil. Emissions are initially controlled using Dry Low NO_X combustion when firing natural gas; water injection when firing distillate fuel oil; use of inherently clean fuels; and, good combustion practices. Ultimately the combustors will be replaced and nitrogen oxides emissions will be reduced by the use of either Ultra Low NO_X burners or the addition of a selective catalytic reduction (SCR) system. Conditions are included for possible future conversion to a 350 megawatt combined cycle installation including a heat recovery steam generator provided there are no increases in emissions associated with the conversion.

{Permitting note(s): The emissions unit is regulated under Acid Rain, Phase II; NSPS - 40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines, adopted and incorporated by reference in Rule 62-204.800(7), F.A.C.; Rule 62-212.400(5), F.A.C., Prevention of Significant Deterioration (PSD); Rule 62-212.400(6), F.A.C., Best Available Control Technology (BACT) Determination, dated July 10, 1998. The simple cycle combustion turbine began operation in March, 2000.}

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

Essential Potential to Emit (PTE) Parameters

F.1. Permitted Capacity. The maximum heat input rates, based on the lower heating value (LHV) of each fuel to Unit 5 at ambient conditions of 59°F temperature, 60% relative humidity, 100% load, and 14.7 psi pressure shall not exceed 2,407 million Btu per hour when firing natural gas, nor 2,236 million Btu per hour when firing No. 2 or superior grade of distillate fuel oil. These maximum heat input rates will vary depending upon ambient conditions and the combustion turbine characteristics. Manufacturer's curves approved by the Department, attached in appendix W501G McIntosh #5, Lakeland FL – Maximum Heat Input as a Function of Compressor Inlet Temperature (1/5/01), for the heat input correction to other temperatures may be utilized to establish heat input rates over a range of temperatures for compliance determination. Monitoring required under condition **F.24.** shall satisfy periodic monitoring requirements for heat input.
[Rules 62-4.160(2), 62-210.200(PTE) and 62-213.440(1)(b)1.b., F.A.C.; and, PSD-FL-245C]

F.2. Emissions Unit Operating Rate Limitation After Testing. See specific condition **F.40.**
[Rule 62-297.310(2), F.A.C.]

F.3. Methods of Operation. Fuels. Only pipeline natural gas or a maximum 0.05 percent, by weight, sulfur content No. 2 or superior grade of distillate fuel oil shall be fired in this unit.
[Rules 62-212.400, 62-212.410, and 62-213.410, F.A.C.; and, PSD-FL-245]

F.4. Hours of Operation. This emissions unit may operate continuously, i.e., 8,760 hours/year.
[Rule 62-210.200(PTE), F.A.C.; and, PSD-FL-245]

F.5. Fuel Usage as Heat Input.
(a) Natural Gas. Fuel usage as heat input shall not exceed 15.639×10^{12} Btu (LHV) per year (rolled monthly) until the unit achieves the NO_X emission limits (other than the initial limits) given in specific conditions **F.12.** through **F.15.** Thereafter, only the hourly heat input limits given in specific condition **F.1.** apply.
(b) Fuel Oil. Fuel usage as heat input shall not exceed 599×10^{9} Btu (LHV) per year (rolled monthly).
[PSD-FL-245]

Control Technology

F.6. Westinghouse Dry Low NO_X (DLN) combustors shall be installed on the stationary combustion turbine to control nitrogen oxides emissions while firing natural gas.
[PSD-FL-245]

F.7. The DLN combustors shall be replaced with Westinghouse Ultra Low NO_X (ULN) combustors to accomplish further NO_X control in order to achieve the emission limits specified in specific conditions **F.11.** through **F.15.** A high temperature selective catalytic reduction (Hot SCR) system or a low temperature SCR system shall be installed and in operation (together with DLN or ULN combustors) not later than May 1, 2002, if the emission limits specified in specific conditions **F.11.** through **F.15.** are not achievable by ULN combustors by this date.
[PSD-FL-245]

F.8. The permittee shall design the stationary gas turbine, ducting, possible future heat recovery steam generator, and stack(s) to accommodate installation of SCR equipment and/or oxidation catalyst in the event that the ULN technology fails to achieve the NO_X limits given in specific conditions **F.11.** through **F.15.** or the carbon monoxide (CO) limits given in specific conditions **F.16.** and **F.17.** are not met.
[PSD-FL-245]

F.9. A water injection system shall be installed for use when firing No. 2 or superior grade distillate fuel oil for control of NO_X emissions.
[PSD-FL-245]

F.10. The permittee shall provide manufacturer's emissions performance verses load diagrams for the DLN and ULN systems prior to their installation. DLN and ULN systems shall each be tuned upon initial operation to optimize emissions reductions and shall be maintained to minimize NO_X emissions and CO emissions. Operation of the DLN and ULN systems in the diffusion firing mode shall be minimized when firing natural gas.
[PSD-FL-245]

Emission Limitations and Standards

{Permitting note: Table 1-1, Summary of Air Pollutant Standards and Terms, summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.}

F.11. The following table is a summary of the BACT determination and is followed by the applicable specific conditions **F.12.** through **F.20.** Values for NO_X are corrected to 15% O_2. Values for CO are corrected to 15% O_2 only until May 1, 2002.

Operational Mode	NO_X (ppm)	CO (ppm)	VOC (ppm)	PM/Visibility (% Opacity)	Technology and Comments
Simple Cycle	25 - NG (basis) 262 lb/hr (24-hr avg) 42 - FO (3 hr avg)	25 - NG or 10 - Ox Cat 90 - FO	4 - NG 10 - FO	10	DLN on gas, WI on oil. Applies until 05/1/2002 . Clean fuels, good combustion.
Simple Cycle	9 - NG (basis) 85 lb/hr (24-hr avg) 42 - FO (3 hr avg)	25 - NG or 10 - Ox Cat 90 - FO	4 - NG 10 - FO	10	ULN on gas, WI on oil. Applies after 05/1/2002. Clean fuels, good combustion.
Simple Cycle	9 - NG (3 hr avg) 15 - FO (3-hr avg)	25 - NG or 10 - Ox Cat 90 - FO	4 - NG 10 - FO	10	Hot SCR. Applies not later than 05/1/2002 if 9 ppm NO_X not achievable by ULN. Clean fuels, good combustion.
Combined Cycle	7.5 - NG (3 hr avg) 15 - FO (3-hr avg)	25 - NG or 10 - Ox Cat 90 - FO	4 - NG 10 - FO	10	Conventional SCR unless simple cycle limits are achieved on or before 05/01/2002. Clean fuels, good combustion.

[PSD-FL-245C]

F.12. Nitrogen Oxides. Until May 1, 2002, the concentration of NO_X in the exhaust gas shall not exceed 262 pounds per hour (at ISO conditions) on a 24-hour block average (basis 25 ppm @ 15% O_2, full load) when firing natural gas and 42 ppmvd at 15% O_2 when firing fuel oil on the basis of a 3-hour average, as measured by the continuous emission monitoring system (CEMS). In addition, NO_X emissions calculated as NO_2 (at ISO conditions) shall exceed neither 25 ppm @ 15% O_2 nor 262 pounds per hour (when firing natural gas) and shall exceed neither 42 ppm @ 15% O_2 nor 431 pounds per hour (when firing fuel oil) to be demonstrated by stack tests.
[PSD-FL-245C]

F.13. Nitrogen Oxides. No later than May 1, 2002, the concentration of NO_X in the exhaust gas shall not exceed 85 pounds per hour (at ISO conditions) on a 24-hour block average (basis 9 ppm @ 15% O_2) when firing natural gas and 42 ppmvd at 15% O_2 when firing fuel oil on the basis of a 3-hour average, as measured by the CEMS. In addition, NO_X emissions calculated as NO_2 (at ISO conditions) shall exceed neither 9 ppm @ 15% O_2 nor 85 pounds per hour (when firing natural gas) and shall not exceed 42 ppm @ 15% O_2 or 431 pounds per hour (when firing fuel oil) to be demonstrated by stack tests.
[PSD-FL-245C]

F.14. Nitrogen Oxides. If hot SCR is installed, achievable short-term NO_X concentrations in the exhaust gas shall be demonstrated at baseload during the first compliance test following installation not to exceed 9 ppmvd at 15% O_2 when firing natural gas. NO_X emissions shall not exceed 9 ppmvd at 15% O_2 when firing natural gas and 15 ppmvd at 15% O_2 when firing fuel oil on the basis of a 3-hour average, as measured by the CEMS. In addition, NO_X emissions calculated as NO_2 (at ISO conditions) shall not exceed 85 pounds per hour (when firing natural gas) and 148 pounds per hour (when firing fuel oil) to be demonstrated by stack tests.
[PSD-FL-245]

F.15. Nitrogen Oxides. If conventional SCR is installed in conjunction with the conversion to combined cycle operation, achievable short-term NO_X concentrations in the exhaust gas shall be demonstrated at baseload during the first compliance test following installation not to exceed 7.5 ppmvd at 15% O_2 when firing natural gas. If conventional SCR catalyst is installed, NO_X emissions shall not exceed 7.5 ppmvd at 15% O_2 when firing natural gas and 15 ppmvd at 15% O_2 when firing fuel oil on the basis of a 3-hour average, as measured by the CEMS. In addition, NO_X emissions calculated as NO_2 (at ISO conditions) shall not exceed 71.1 pounds per hour (when firing natural gas) and 148 pounds per hour (when firing fuel oil) to be demonstrated by stack tests.
[PSD-FL-245]

F.16. Carbon Monoxide. Prior to May 1, 2002, the concentration of CO (@ 15% O_2) in the exhaust gas when firing natural gas shall not exceed 25 ppmvd and 90 ppmvd when firing fuel oil as measured by EPA Method 10. CO emissions (at ISO conditions) shall not exceed 161 pounds per hour (when firing natural gas) and 568 pounds per hour (when firing fuel oil).
[PSD-FL-245C]

F.17. Carbon Monoxide. After May 1, 2002, the concentration of CO in the exhaust gas when firing natural gas shall not exceed 25 ppmvd and 90 ppmvd when firing fuel oil as measured by EPA Method 10. CO emissions (at ISO conditions) shall not exceed 106 pounds per hour (when firing natural gas) and 386 pounds per hour (when firing fuel oil).
[PSD-FL-245]

F.18. Sulfur Dioxide. SO_2 emissions (at ISO conditions) shall not exceed 8 pounds per hour when firing pipeline natural gas and 127 pounds per hour when firing maximum 0.05 percent, by weight, sulfur content No. 2 or superior grade distillate fuel oil, as measured by applicable compliance methods (see specific conditions **F.36.**). Emissions of SO_2 shall not exceed 38.4 tons per year.
[PSD-FL-245C and Applicant Request to Escape PSD Review]

F.19. Visible Emissions. Visible emissions shall not exceed 10 percent opacity.
[PSD-FL-245]

F.20. Volatile Organic Compounds. The concentration of VOC in the exhaust gas when firing natural gas shall not exceed 4 ppmvd and 10 ppmvd when firing fuel oil as measured by EPA Method(s) 18 and/or 25A. VOC emissions (at ISO conditions) shall exceed 11 pounds per hour (when firing natural gas) and 25 pounds per hour (when firing fuel oil).
[PSD-FL-245C]

Excess Emissions

{Permitting note: The Excess Emissions Rule at Rule 62-210.700, F.A.C., cannot vary any requirement of a NSPS, NESHAP, or Acid Rain program provision.}

F.21. Excess emissions from this emissions unit resulting from startup, shutdown, malfunction or fuel switching shall be permitted provided that best operational practices to minimize emissions are adhered to and the duration of excess emissions shall be minimized. Excess emissions occurrences shall in no case exceed four hours in any 24 hour period for cold startup or two hours in any 24 hour period for other reasons unless specifically authorized by the Department for longer duration
[Rule 62-210.700(1), F.A.C.; and, PSD-FL-245]

F.22. Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonably be prevented during startup, shutdown or malfunction shall be prohibited.
[Rule 62-210.700(4), F.A.C.]

Monitoring of Operations

F.23. At all times, including periods of startup, shutdown and malfunction, owners and operators shall, to the extent practicable, maintain and operate any affected facility including associated pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source.
[40 CFR 60.11(d)]

F.24. The owner or operator of any stationary gas turbine subject to the provisions of 40 CFR 60, Subpart GG and using water injection to control NO_X emissions shall operate a continuous monitoring system to monitor and record the fuel consumption and the ratio of water to fuel being fired in the turbine. This system shall be accurate to within $\pm$5.0 percent and shall be approved by the Administrator.
[40 CFR 60.334(a)]

F.25. The owner or operator of any stationary gas turbine subject to the provisions of 40 CFR 60, Subpart GG shall monitor sulfur content and nitrogen content of the fuel being fired in the turbine. The frequency of determination of these values shall be as follows:
(1) If the turbine is supplied its fuel from a bulk storage tank, the values shall be determined on each occasion that fuel is transferred to the storage tank from any other source.
(2) If the turbine is supplied its fuel without intermediate bulk storage the values shall be determined and recorded daily. Owners, operators or fuel vendors may develop custom schedules for determination of the values based on the design and operation of the affected facility and the characteristics of the fuel supply. These custom schedules shall be substantiated with data and must be approved by the Administrator before they can be used to comply with 40 CFR 60.334(b).
[40 CFR 60.334(b)(1) & (2)]

F.26. Fuel Oil Monitoring Schedule. The following monitoring schedule for No. 2 or superior grade fuel oil shall be followed: For all bulk shipments of No. 2 or superior grade fuel oil received at the C. D. McIntosh, Jr. Power Plant, an analysis which reports the sulfur content and the nitrogen content of the fuel shall be provided by the vendor. The analysis shall also specify the methods by which the analysis was conducted and shall comply with the requirements of 40 CFR 60.335(d). See specific condition **F.36.**
[PSD-FL-245]

F.27. Natural Gas Monitoring Schedule. The following custom monitoring schedule for natural gas is approved (pending EPA concurrence) in lieu of the daily sampling requirements of 40 CFR 60.334(b)(2):

- Monitoring of natural gas nitrogen content shall not be required.
- Analysis of the sulfur content of natural gas shall be conducted using one of the EPA-approved ASTM reference methods in specific condition **F.36.** for the measurement of sulfur in gaseous fuels, or an approved alternate method. Once Unit 5 becomes operational, monitoring of the sulfur content of the natural gas shall be conducted twice monthly for six months. If this monitoring shows little variability in the fuel sulfur content, and indicates consistent compliance with 40 CFR 60.333, then fuel sulfur monitoring shall be conducted once per quarter for six quarters and after that, semiannually.
- Should any sulfur analysis indicate noncompliance with 40 CFR 60.333, the City shall notify DEP of such excess emissions and the custom fuel monitoring schedule shall be reexamined. The sulfur content of the natural gas will be monitored weekly during the interim period while the monitoring schedule is reexamined.
- The City shall notify DEP of any change in natural gas supply for reexamination of this monitoring schedule. A substantial change in natural gas quality (i.e., sulfur content variation of greater than one grain per 100 cubic feet of natural gas) shall be considered as a change in the natural gas supply. Sulfur content of the natural gas will be monitored weekly by the natural gas supplier during the interim period when this monitoring schedule is being reexamined.
- Records of sampling analyses and natural gas supply pertinent to this monitoring schedule shall be retained by the City for a period of five years, and shall be made available for inspection by the appropriate regulatory personnel.
- The City may obtain the sulfur content of the natural gas from the fuel supplier (Florida Gas Transmission) provided the test methods listed in specific condition **F.36.** are used.

[PSD-FL-245]

F.28. Determination of Process Variables.

(a) Required Equipment. The owner or operator of an emissions unit for which compliance tests are required shall install, operate, and maintain equipment or instruments necessary to determine process variables, such as process weight input or heat input, when such data are needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.

(b) Accuracy of Equipment. Equipment or instruments used to directly or indirectly determine process variables, including devices such as belt scales, weight hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value.

[Rule 62-297.310(5), F.A.C.]

Test Methods and Procedures

{Permitting note: Table 2-1, Summary of Compliance Requirements, summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.}

F.29. To compute the nitrogen oxides emissions, the owner or operator shall use analytical methods and procedures that are accurate to within 5 percent and are approved by the Department to determine the nitrogen content of the fuel being fired.
[40 CFR 60.335(a)]

F.30. During performance tests to determine compliance, measured NO_X emissions at 15 percent oxygen will be adjusted to ISO ambient atmospheric conditions by the following correction factor:

$$NO_X = [NO_X \text{ obs}] [(P_{ref})^{0.5} / P_{obs}] \ e^{19} [H_{obs} - 0.00633] \ [288^{\circ} K / T_{amb}] 1.53$$

where:
NO_X = Emissions of NO_X at 15 percent oxygen and ISO standard ambient conditions.
NO_X obs = Measured NO_X emission at 15 percent oxygen, ppmv.
P_{ref} = Reference combustor inlet absolute pressure at 101.3 kilopascals ambient pressure.
P_{obs} = Measured combustor inlet absolute pressure at test ambient pressure.
e = Transcendental constant (2.718)
H_{obs} = Specific humidity of ambient air at test.
T_{amb} = Temperature of ambient air at test.
[40 CFR 60.335(c)(1)]

F.31. When determining compliance with 40 CFR 60.332, Subpart GG - Standards of Performance for Stationary Gas Turbines, the monitoring device of 60.334(a) shall be used to determine the fuel consumption and the water-to-fuel ratio necessary to comply with the permitted NO_X standard at 30, 50, 75, and 100 percent of peak load or at four points in the normal operating range of the gas turbine, including the minimum point in the range and peak load. All loads shall be corrected to ISO conditions using the appropriate equations supplied by the manufacturer.
[40 CFR 60.335(c)(2)]

F.32. The owner or operator shall determine compliance with the nitrogen oxides and sulfur dioxide standards in 40 CFR 60.332 as follows:
c. U.S. EPA Method 20 (40 CFR 60, Appendix A) shall be used to determine the nitrogen oxides, sulfur dioxide, and oxygen concentrations. The span values shall be 300 ppm of nitrogen oxide and 21 percent oxygen. The NO_X emissions shall be determined at each of the load conditions specified in 40 CFR 60.335(c)(2).
[40 CFR 60.335(c)(3)]

F.33. Compliance with the allowable emission limiting standards shall be determined within 60 days after achieving the maximum production rate, for each fuel, at which this unit will be operated, but not later than 180 days after initial operation of the unit for that fuel, and annually thereafter as indicated in this permit, by using the reference methods as described in the latest edition of 40 CFR 60, Appendix A, and adopted by reference in Chapter 62-204.800, F.A.C. Emission limit compliance dates shall conform to the timetable specified in specific condition **F.11.**
[PSD-FL-245]

F.34. Compliance Testing. Initial (I) performance tests shall be performed on Unit 5 while firing natural gas as well as while firing fuel oil. Initial tests shall also be conducted after any modifications (and shakedown period not to exceed 100 days after restarting the combustion turbine) of air pollution control equipment, including installation of Ultra Low NO_X burners, Hot SCR, or conventional SCR. Annual (A) compliance tests shall be performed during every federal fiscal year (October 1 – September 30) pursuant to Rule 62-297.310(7), F.A.C., on Unit 5, as indicated. The following reference methods shall be used. No other test methods may be used for compliance testing unless prior DEP approval is received in writing.

- EPA Reference Method 9, "Visual Determination of the Opacity of Emissions from Stationary Sources" (I,A).
- EPA Reference Method 10, "Determination of Carbon Monoxide Emissions from Stationary Sources" (I,A).
- EPA Reference Method 20, "Determination of Oxides of Nitrogen, Sulfur Dioxide and Diluent Emissions from Stationary Gas Turbines." Initial test only for compliance with 40 CFR 60, Subpart GG and (I,A) short-term NO_X BACT limits (Method 7E or RATA test data may be used to demonstrate compliance for the annual test requirement).
- EPA Reference Method(s) 18 and/or 25A, "Determination of Volatile Organic Concentrations." Initial test only.

[PSD-FL-245]

F.35. Continuous compliance with the NO_X emission limits: Continuous compliance with the NO_X emission limits shall be demonstrated with the CEM system based on the applicable averaging time of 24-hr block average (DLN or ULN technology) or a 3-hr average (if SCR is used). Based on CEMS data, a separate compliance determination is conducted at the end of each operating day (or 3-hr period when applicable) and a new average emission rate is calculated from the arithmetic average of all valid hourly emission rates from the previous operating day (or 3-hr period when applicable). Valid hourly emission rates shall not included periods of startup (including fuel switching), shutdown, or malfunction as defined in Rule 62-210.200, F.A.C., where emissions exceed the applicable NO_X standard. These excess emissions periods shall be reported as required in specific condition **F.59.** A valid hourly emission rate shall be calculated for each hour in which at least two NO_X concentrations are obtained at least 15 minutes apart.
[PSD-FL-245]

F.36. Compliance with the SO_2 and PM/PM_{10} emission limits: Not withstanding the requirements of Rule 62-297.340, F.A.C., the use of pipeline natural gas and maximum 0.05 percent sulfur (by weight) No. 2 or superior grade distillate fuel oil, is the method for determining compliance for SO_2 and PM/PM_{10}. For the purposes of demonstrating compliance with the 40 CFR 60.333 SO_2 standard and the 0.05% S limit, fuel oil analysis using ASTM D2880-71 or D4294 (or latest version) for the sulfur content of liquid fuels and D1072-80, D3031-81, D4084-82 or D3246-81 (or latest version) for sulfur content of gaseous fuel shall be utilized in accordance with the EPA-approved custom fuel monitoring schedule. The applicant is responsible for ensuring that the procedures above are used for determination of fuel sulfur content. Analysis may be performed by the owner or operator, a service contractor retained by the owner or operator, the fuel vendor, or any other qualified agency pursuant to 40 CFR 60.335(e).
[PSD-FL-245]

F.37. Compliance with CO emission limit: An initial test for CO shall be conducted concurrently with the initial NO_X test, as required. The initial NO_X and CO test results shall be the average of three valid one-hour runs. Annual compliance testing for CO may be conducted concurrent with the annual RATA testing for NO_X required pursuant to 40 CFR 75 (required for gas only).
[PSD-FL-245]

F.38. Compliance with the VOC emission limit: An initial test is required to demonstrate compliance with the BACT VOC emission limit. Thereafter, the CO emission limit will be employed as a surrogate and no annual testing is required.
[PSD-FL-245]

F.39. To meet the requirements of 40 CFR 60.334(b), the owner or operator shall use the methods specified in 40 CFR 60.335(a) and (d) to determine the nitrogen and sulfur contents of the fuel being burned. The analysis may be performed by the owner or operator, a service contractor retained by the owner or operator, the fuel vendor, or any other qualified agency. See specific conditions **F.25.** through **F.27.**
[40 CFR 60.335(e)]

F.40. Operating Rate During Testing. Testing of emissions shall be conducted with the emissions unit operating at permitted capacity. Permitted capacity is defined as 95-100 percent of the maximum heat input rate allowed by the permit, corrected for the average ambient air temperature during the test (with 100 percent represented by a curve depicting heat input verses ambient temperature). If it is impracticable to test at permitted capacity, an emissions unit may be tested at less than permitted capacity. In this case, subsequent emissions unit operation is limited by adjusting the entire heat input verses ambient temperature curve downward by an increment equal to the difference between the maximum permitted heat input (corrected for ambient temperature) and 105 percent of the value reached during the test until a new test is conducted. Once the emissions unit is so limited, operation at higher 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), F.A.C.; and, PSD-FL-245]

F.41. Required Number of Test Runs. For mass emission limitations, a compliance test shall consist of three complete and separate determinations of the total air pollutant emission rate through the test section of the stack or duct and three complete and separate determinations of any applicable process variables corresponding to the three distinct time periods during which the stack emission rate was measured provided, however, that three complete and separate determinations shall not be required if the process variables are not subject to variation during a compliance test, or if three determinations are not necessary in order to calculate the unit's emission rate. The three required test runs shall be completed within one consecutive five day period. In the event that a sample is lost or one of the three runs must be discontinued because of circumstances beyond the control of the owner or operator, and a valid third run cannot be obtained within the five day period allowed for the test, the Secretary or his or her designee may accept the results of the two complete runs as proof of compliance, provided that the arithmetic mean of the results of the two complete runs is at least 20 percent below the allowable emission limiting standards.
[Rule 62-297.310(1), F.A.C.]

F.42. Calculation of Emission Rate. The indicated emission rate or concentration shall be the arithmetic average of the emission rate or concentration determined by each of the three separate test runs unless otherwise specified in a particular test method or applicable rule.
[Rule 62-297.310(3), F.A.C.]

F.43. Applicable Test Procedures.

(a) Required Sampling Time.

1. Unless otherwise specified in the applicable rule, the required sampling time for each test run shall be no less than one hour and no greater than four hours, and the sampling time at each sampling point shall be of equal intervals of at least two minutes.

2. Opacity Compliance Tests. When either EPA Method 9 or DEP Method 9 is specified as the applicable opacity test method, the required minimum period of observation for a compliance test shall be sixty (60) minutes for emissions units which emit or have the potential to emit 100 tons per year or more of particulate matter, and thirty (30) minutes for emissions units which have potential emissions less than 100 tons per year of particulate matter and are not subject to a multiple-valued opacity standard. The opacity test observation period shall include the period during which the highest opacity emissions can reasonably be expected to occur. Exceptions to these requirements are as follows:

c. The minimum observation period for opacity tests conducted by employees or agents of the Department to verify the day-to-day continuing compliance of a unit or activity with an applicable opacity standard shall be twelve minutes.

(b) Minimum Sample Volume. Unless otherwise specified in the applicable rule, the minimum sample volume per run shall be 25 dry standard cubic feet.

(c) Required Flow Rate Range. For EPA Method 5 particulate sampling, acid mist/sulfur dioxide, and fluoride sampling which uses Greenburg Smith type impingers, the sampling nozzle and sampling time shall be selected such that the average sampling rate will be between 0.5 and 1.0 actual cubic feet per minute, and the required minimum sampling volume will be obtained.

(d) Calibration of Sampling Equipment. Calibration of the sampling train equipment shall be conducted in accordance with the schedule shown in Table 297.310-1, attached to this permit.
(e) Allowed Modification to EPA Method 5. When EPA Method 5 is required, the following modification is allowed: the heated filter may be separated from the impingers by a flexible tube.
[Rule 62-297.310(4), F.A.C.]

F.44. The permittee shall comply with the requirements contained in APPENDIX SS-1, Stack Sampling Facilities, attached to this permit.
[Rule 62-297.310(6), F.A.C.]

F.45. Frequency of Compliance Tests. The following provisions apply only to those emissions units that are subject to an emissions limiting standard for which compliance testing is required.
(a) General Compliance Testing.

3. The owner or operator of an emissions unit that is subject to any emission limiting standard shall conduct a compliance test that demonstrates compliance with the applicable emission limiting standard prior to obtaining a renewed operation permit. Emissions units that are required to conduct an annual compliance test may submit the most recent annual compliance test to satisfy the requirements of this provision. In renewing an air operation permit pursuant to Rule 62-210.300(2)(a)3.b., c., or d., F.A.C., the Department shall not require submission of emission compliance test results for any emissions unit that, during the year prior to renewal:

a Did not operate; or

b. In the case of a fuel burning emissions unit, burned liquid and/or solid fuel for a total of no more than 400 hours.

4. During each federal fiscal year (October 1 -- September 30), unless otherwise specified by rule, order, or permit, the owner or operator of each emissions unit shall have a formal compliance test conducted for:

a. Visible emissions, if there is an applicable standard;

b. Each of the following pollutants, if there is an applicable standard, and if the emissions unit emits or has the potential to emit: 5 tons per year or more of lead or lead compounds measured as elemental lead; 30 tons per year or more of acrylonitrile; or 100 tons per year or more of any other regulated air pollutant; and

c. Each NESHAP pollutant, if there is an applicable emission standard.

5. An annual compliance test for particulate matter emissions shall not be required for any fuel burning emissions unit that, in a federal fiscal year, does not burn liquid and/or solid fuel, other than during startup, for a total of more than 400 hours.

8. Any combustion turbine that does not operate for more than 400 hours per year shall term of its air operation permit.

9. The owner or operator shall notify the Department's Southwest District office, at least 15 days prior to the date on which each formal compliance test is to begin, of the date, time, and place of each such test, and the test contact person who will be responsible for coordinating and having such test conducted for the owner or operator.

(b) Special Compliance Tests. When the Department's Southwest District office, 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 a Department rule or in a permit issued pursuant to those rules is being violated, it may require the owner or operator of the emissions unit to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions unit and to provide a report on the results of said tests to the Department.
(c) Waiver of Compliance Test Requirements. If the owner or operator of an emissions unit that is subject to a compliance test requirement demonstrates to the Department, pursuant to the procedure established in Rule 62-297.620, F.A.C., that the compliance of the emissions unit with an applicable weight emission limiting standard can be adequately determined by means other than the designated test procedure, such as specifying a surrogate standard of no visible emissions for particulate matter sources equipped with a bag house or specifying a fuel analysis for sulfur dioxide emissions, the Department shall waive the compliance test requirements for such emissions units and order that the alternate means of determining compliance be used, provided, however, the provisions of Rule 62-297.310(7)(b), F.A.C., shall apply.
[Rule 62-297.310(7), F.A.C.; and, SIP approved]

Continuous Monitoring Requirements

F.46. Continuous Monitoring System. The permittee shall install, calibrate, maintain, and operate a continuous emission monitor in the stack to measure and record the nitrogen oxides emissions from Unit 5. Periods when NO_X emissions (ppmvd @ 15% oxygen) are above the BACT standards, listed in specific conditions **F.11.** through **F.15.**, shall be reported to the DEP Southwest District office pursuant to Rule 62-4.160(8), F.A.C. Following the format of 40 CFR 60.7, periods of startup, shutdown, malfunction and fuel switching shall be monitored, recorded and reported as excess emissions when emission levels exceed the BACT standards listed in specific conditions **F.11.** through **F.15.**
[PSD-FL-245 and 40 CFR 60.7]

F.47. CEMS in lieu of Water to Fuel Ratio. Subject to EPA approval, the NO_X CEMS shall be used in lieu of the water/fuel monitoring system for reporting excess emissions in accordance with 40 CFR 60.334(c)(1) specified in specific condition **F.55.** Subject to EPA approval, calibration of the water/fuel monitoring device required in 40 CFR 60.335(c)(2) and specified in specific condition **F.31.** will be replaced by the 40 CFR 75 certification tests of the NO_X CEMS. Upon request from DEP, the CEMS emissions rates for NO_X on Unit 5 shall be corrected to ISO conditions to demonstrate compliance with the NO_X standard established in 40 CFR 60.332.
[PSD-FL-245]

F.48. When NO_X monitoring data is not available, substitution for missing data shall be handled as required by Title IV (40 CFR 75) to calculate any specified average time.
[PSD-FL-245]

F.49. A performance evaluation of the CEMS shall be conducted during any required performance test or within 30 days thereafter in accordance with the applicable performance specifications of 40 CFR 60, Appendix B and at other times as required by the Administrator.
[40 CFR 60.13(c)]

F.50. The zero (or low-level value between 0 and 20 percent of span value) and span (50 to 100 percent of span value) calibration drifts shall be checked at least once daily in accordance with a written procedure. The zero and span shall, at a minimum, be adjusted whenever the 24-hour zero drift or 24-hour span drift exceeds two times the limits of the applicable performance specifications of 40 CFR 60, Appendix B. The system must allow the amount of excess zero and span drift measured at the 24-hour interval checks to be recorded and quantified.
[40 CFR 60.13(d)(1)]

F.51. Except for system breakdowns, repairs, calibration checks, and zero and span adjustments required under 40 CFR 60.13(d)(1), all continuous monitoring systems shall be in continuous operation and shall meet the minimum frequency of operation as follows:
(2) All continuous monitoring systems for measuring emissions, except opacity, shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.
[40 CFR 60.13(e)]

F.52. All continuous monitoring systems or monitoring devices shall be installed such that representative measurements of emissions or process parameters form the affected facility are obtained.
[40 CFR 60.13(f)]

F.53. For continuous monitoring systems other than opacity, 1-hour averages shall be computed from four or more data points equally spaced over each 1-hour period. Data recorded during periods of continuous monitoring system breakdown, repairs, calibration checks, and zero and span adjustments shall not be included in the data averages computed under this paragraph. An arithmetic or integrated average of all data may be used. The data may be recorded in reduced or non-reduced form (e.g. ppm pollutant and percent O_2 or ng/J of pollutant). All excess emissions shall be converted into units of the standard using the applicable conversion procedures specified in the subparts. After conversion into units of the standard, the data may be rounded to the same number of significant digits as used in the applicable subparts to specify the emission limit. (e.g. rounded to the nearest 1 percent opacity).
[40 CFR 60.13(h)]

F.54. Continuous Monitoring System. The monitoring devices shall comply with the certification and quality assurance, and any other applicable requirements of Rule 62-297.520, F.A.C., 40 CFR 60.13, including certification of each device in accordance with 40 CFR 60, Appendix B, Performance Specifications and 40 CFR 60.7(a)(5) or 40 CFR 75. Quality assurance procedures must conform to all applicable sections of 40 CFR 60, Appendix F or 40 CFR 75.
[PSD-FL-245]

Record Keeping and Reporting Requirements

F.55. For the purpose of reports required under 40 CFR 60.7(c), periods of excess emissions that shall be reported are defined as follows:

a. Nitrogen oxides. Any one-hour period during which the average water-to-fuel ratio, as measured by the continuous monitoring system, falls below the water-to-fuel ratio determined to demonstrate compliance with the permitted nitrogen oxide standard by the initial performance test required in 40 CFR 60.8 or any period during which the fuel-bound nitrogen of the fuel is greater than the maximum nitrogen content allowed by the fuel-bound nitrogen allowance used during the initial performance test. Each report shall include the average water-to-fuel ratio, average fuel consumption, ambient conditions, gas turbine load, and nitrogen content of the fuel during the period of excess emissions, and the graphs or figures developed under 40 CFR 60.335(a).
[Rule 62-296.800, F.A.C.; and, 40 CFR 60.334(c)(1)]

F.56. The owner or operator required to install a continuous monitoring system (CMS) or monitoring device shall submit an excess emissions and monitoring systems performance report (excess emissions are defined in applicable subparts) and/or a summary report form [see 40 CFR 60.7(d)] to the Administrator semiannually, except when: more frequent reporting is specifically required by an applicable subpart; or, the CMS data are to be used directly for compliance determination, in which case quarterly reports shall be submitted; or, the Administrator, on a case-by-case basis, determines that more frequent reporting is necessary to accurately assess the compliance status of the source. All reports shall be postmarked by the 30th day following the end of each calendar half (or quarter, as appropriate). Written reports of excess emissions shall include the following information:

(1) The magnitude of excess emissions computed in accordance with 40 CFR 60.13(h), any conversion factor(s) used, and the date and time of commencement and completion of each time period of excess emissions. The process operating time during the reporting period.

(2) Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the affected facility. The nature and cause of any malfunction (if known), the corrective action taken or preventative measures adopted.

(3) The date and time identifying each period during which the continuous monitoring system was inoperative except for zero and span checks and the nature of the system repairs or adjustments.

(4) When no excess emissions have occurred or the continuous monitoring system(s) have not been inoperative, repaired, or adjusted, such information shall be stated in the report.

Quarterly excess emission reports, in accordance with 40 CFR 60.7(a)(7)(c), shall be submitted to the DEP's Southwest District office.
[40 CFR 60.7(c)(1), (2), (3), & (4); and, PSD-FL-245]

F.57. The summary report form shall contain the information and be in the format shown in Figure 1 (attached) unless otherwise specified by the Administrator. One summary report form shall be submitted for each pollutant monitored at each affected facility.

(1) If the total duration of excess emissions for the reporting period is less than 1 percent of the total operating time for the reporting period and CMS downtime for the reporting period is less than 5 percent of the total operating time for the reporting period, only the summary report form shall be submitted and the excess emission report described in 40 CFR 60.7(c) need not be submitted unless requested by the Administrator.

(2) If the total duration of excess emissions for the reporting period is 1 percent or greater of the total operating time for the reporting period or the total CMS downtime for the reporting period is 5 percent or greater of the total operating time for the reporting period, the summary report form and the excess emission report described in 40 CFR 60.7(c) shall both be submitted.

[40 CFR 60.7(d)(1) & (2)]

F.58. (1) Notwithstanding the frequency of reporting requirements specified in 40 CFR 60.7(c), an owner or operator who is required by an applicable subpart to submit excess emissions and monitoring systems performance reports (and summary reports) on a quarterly (or more frequent) basis may reduce the frequency of reporting for that standard to semiannual if the following conditions are met:

(i) For 1 full year (e.g., 4 quarterly or 12 monthly reporting periods) the affected facility's excess emissions and monitoring systems reports submitted to comply with a standard under this part continually demonstrate that the facility is in compliance with the applicable standard;

(ii) The owner or operator continues to comply with all recordkeeping and monitoring requirements specified in 40 CFR 60, Subpart A, and the applicable standard; and

(iii) The Administrator does not object to a reduced frequency of reporting for the affected facility, as provided in 40 CFR 60.7(e)(2).

(2) The frequency of reporting of excess emissions and monitoring systems performance (and summary) reports may be reduced only after the owner or operator notifies the Administrator in writing of his or her intention to make such a change and the Administrator does not object to the intended change. In deciding whether to approve a reduced frequency of reporting, the Administrator may review information concerning the source's entire previous performance history during the required recordkeeping period prior to the intended change, including performance test results, monitoring data, and evaluations of an owner or operator's conformance with operation and maintenance requirements. Such information may be used by the Administrator to make a judgment about the source's potential for noncompliance in the future. If the Administrator disapproves the owner or operator's request to reduce the frequency of reporting, the Administrator will notify the owner or operator in writing within 45 days after receiving notice of the owner or operator's intention. The notification from the Administrator to the owner or operator will specify the grounds on which the disapproval is based. In the absence of a notice of disapproval within 45 days, approval is automatically granted.

(3) As soon as monitoring data indicate that the affected facility is not in compliance with any emission limitation or operating parameter specified in the applicable standard, the frequency of reporting shall revert to the frequency specified in the applicable standard, and the owner or operator shall submit an excess emissions and monitoring systems performance report (and summary report, if required) at the next appropriate reporting period following the noncomplying event. After demonstrating compliance with the applicable standard for another full year, the owner or operator may again request approval from the Administrator to reduce the frequency of reporting for that standard as provided for in 40 CFR 60.7(e)(1) and (e)(2).
[40 CFR 60.7(e)(1)]

F.59. Malfunction Reporting. In the case of excess emissions resulting from malfunctions, each owner or operator shall notify the Department's Southwest District office within one (1) working day of: the nature, extent, and duration of the excess emissions; and, the actions taken to correct the problem. A full written report on the malfunctions shall be submitted in a quarterly report, if requested by the Department.
[Rule 62-210.700(6), F.A.C.; and, PSD-FL-245]

F.60. All recorded data shall be maintained on file by the Source for a period of five years.
[Rule 62-213.440, F.A.C.]

F.61. Test Reports.
(a) The owner or operator of an emissions unit for which a compliance test is required shall file a report with the Department's Southwest District office on the results of each such test.
(b) The required test report shall be filed with the Department's Southwest District office as soon as practical but no later than 45 days after the last sampling run of each test is completed.
(c) The test report shall provide sufficient detail on the emissions unit tested and the test procedures used to allow the Department's Southwest District office to determine if the test was properly conducted and the test results properly computed. As a minimum, the test report, other than for an EPA or DEP Method 9 test, shall provide the following information:

1. The type, location, and designation of the emissions unit tested.
2. The facility at which the emissions unit is located.
3. The owner or operator of the emissions unit.
4. The normal type and amount of fuels used and materials processed, and the types and amounts of fuels used and material processed during each test run.
5. The means, raw data and computations used to determine the amount of fuels used and materials processed, if necessary to determine compliance with an applicable emission limiting standard.
6. The type of air pollution control devices installed on the emissions unit, their general condition, their normal operating parameters (pressure drops, total operating current and GPM scrubber water), and their operating parameters during each test run.
7. A sketch of the duct within 8 stack diameters upstream and 2 stack diameters downstream of the sampling ports, including the distance to any upstream and downstream bends or other flow disturbances.

8. The date, starting time and duration of each sampling run.
9. The test procedures used, including any alternative procedures authorized pursuant to Rule 62-297.620, F.A.C. Where optional procedures are authorized in this chapter, indicate which option was used.
10. The number of points sampled and configuration and location of the sampling plane.
11. For each sampling point for each run, the dry gas meter reading, velocity head, pressure drop across the stack, temperatures, average meter temperatures and sample time per point.
12. The type, manufacturer and configuration of the sampling equipment used.
13. Data related to the required calibration of the test equipment.
14. Data on the identification, processing and weights of all filters used.
15. Data on the types and amounts of any chemical solutions used.
16. Data on the amount of pollutant collected from each sampling probe, the filters, and the impingers, are reported separately for the compliance test.
17. The names of individuals who furnished the process variable data, conducted the test, analyzed the samples and prepared the report.
18. All measured and calculated data required to be determined by each applicable test procedure for each run.
19. The detailed calculations for one run that relate the collected data to the calculated emission rate.
20. The applicable emission standard, and the resulting maximum allowable emission rate for the emissions unit, plus the test result in the same form and unit of measure.
21. A certification that, to the knowledge of the owner or his authorized agent, all data submitted are true and correct. When a compliance test is conducted for the Department's Southwest District office or its agent, the person who conducts the test shall provide the certification with respect to the test procedures used. The owner or his authorized agent shall certify that all data required and provided to the person conducting the test are true and correct to his knowledge.

[Rules 62-213.440 and 62-297.310(8), F.A.C.]

Miscellaneous Requirements.

F.62. Definitions. For the purposes of Rule 62-204.800(7), F.A.C., the definitions contained in the various provisions of 40 CFR 60, shall apply except that the term "Administrator" when used in 40 CFR 60, shall mean the Secretary or the Secretary's designee.
[40 CFR 60.2; and, Rule 62-204.800(7)(a), F.A.C.]

F.63. Circumvention. No owner or operator subject to the provisions of 40 CFR 60 shall build, erect, install, or use any article, machine, equipment or process, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous diluents to achieve compliance with an opacity standard or with a standard which is based on the concentration of a pollutant in the gases discharged to the atmosphere.
[40 CFR 60.12]

F.64. Operating Procedures: Operating procedures shall include good operating practices and proper training of all operators and supervisors. The good operating practices shall meet the guidelines and procedures as established by the equipment manufacturers. All operators (including supervisors) of air pollution control devices shall be properly trained in plant specific equipment.
[PSD-FL-245]

ATTACHMENT MC-EU1-J14

COMPLIANCE ASSURANCE MONITORING PLAN

ATTACHMENT MC-EU1-J14

COMPLIANCE ASSURANCE MONITORING PLAN

The control devices for the CT are dry low NO_x combustors, water injection, and selective catalytic reduction, all for NO_x control. Continuous Emission Monitors (CEMS) monitor NO_x, therefore the Compliance Assurance Monitoring Plan need not be submitted.

ATTACHMENT MC-EU1-J15

ACID RAIN PART APPLICATION
PHASE II PERMIT APPLICATION

Phase II Permit Application

For more information, see instructions and refer to 40 CFR 72.30 and 72.31 and Chapter 62-214, F.A.C.

This submission is: New ☒ ☐ Revised

STEP 1
Identify the source by plant name, State, and ORIS code from NADB

C. D. McIntosh, Jr.	FL	676
Plant Name	State	ORIS Code

STEP 2 Enter the boiler ID# from NADB for each affected unit and indicate whether a repowering plan is being submitted for the unit by entering "yes" or "no" at column c. For new units, enter the requested information in columns d and e.

a	Compliance Plan		d	e
Boiler ID#	b: Unit will hold allowances in accordance with 40 CFR 72.9(c)(1)	c: Repowering Plan	New Units: Commence Operation Date	New Units: Monitor Certification Deadline
5	Yes	No	1/1/99	3/1/99
	Yes			
	Yes			
	Yes			
	Yes			
	Yes			
	Yes			
	Yes			
	Yes			
	Yes			
	Yes			

STEP 3
Check the box if the response in column c of Step 2 is "Yes" for any unit

☐ For each unit that will be repowered, the Repowering Extension Plan form is included and the Repowering Technology Petition form has been submitted or will be submitted by June 1, 1997.

source and all documents that demonstrate the truth of the statements in the certificate of representation, in accordance with Rule 62-214.350, F.A.C.; provided that the certificate and documents shall be retained on site at the source beyond such 5-year period until such documents are superseded because of the submission of a new

Plant Name (from Step 1)

Recordkeeping and Reporting Requirements (cont)

certificate of representation changing the designated representative;
(ii) All emissions monitoring information, in accordance with 40 CFR part 75;
(iii) Copies of all reports, compliance certifications, and other submissions and all records made or required under the Acid Rain Program; and,
(iv) Copies of all documents used to complete an Acid Rain part application and any other submission under the Acid Rain Program or to demonstrate compliance with the requirements of the Acid Rain Program.

(2) The designated representative of an Acid Rain source and each Acid Rain unit at the source shall submit the reports and compliance certifications required under the Acid Rain Program, including those under 40 CFR part 72 subpart I and 40 CFR part 75.

Liability.

(1) Any person who knowingly violates any requirement or prohibition of the Acid Rain Program, a complete Acid Rain part application, an Acid Rain part, or a written exemption under 40 CFR 72.7 or 72.8, including any requirement for the payment of any penalty owed to the United States, shall be subject to enforcement pursuant to section 113(c) of the Act.
(2) Any person who knowingly makes a false, material statement in any record, submission, or report under the Acid Rain Program shall be subject to criminal enforcement pursuant to section 113(c) of the Act and 18 U.S.C. 1001.
(3) No permit revision shall excuse any violation of the requirements of the Acid Rain Program that occurs prior to the date that the revision takes effect.
(4) Each Acid Rain source and each Acid Rain unit shall meet the requirements of the Acid Rain Program.
(5) Any provision of the Acid Rain Program that applies to an Acid Rain source (including a provision applicable to the designated representative of an Acid Rain source) shall also apply to the owners and operators of such source and of the Acid Rain units at the source.
(6) Any provision of the Acid Rain Program that applies to an Acid Rain unit (including a provision applicable to the designated representative of an Acid Rain unit) shall also apply to the owners and operators of such unit. Except as provided under 40 CFR 72.44 (Phase II repowering extension plans), and except with regard to the requirements applicable to units with a common stack under 40 CFR part 75 (including 40 CFR 75.16, 75.17, and 75.18), the owners and operators and the designated representative of one Acid Rain unit shall not be liable for any violation by any other Acid Rain unit of which they are not owners or operators or the designated representative and that is located at a source of which they are not owners or operators or the designated representative.
(7) Each violation of a provision of 40 CFR parts 72, 73, 75, 77, and 78 by an Acid Rain source or Acid Rain unit, or by an owner or operator or designated representative of such source or unit, shall be a separate violation of the Act.

Effect on Other Authorities. No provision of the Acid Rain Program, an Acid Rain part application, an Acid Rain part, or a written exemption under 40 CFR 72.7 or 72.8 shall be construed as:

(1) Except as expressly provided in title IV of the Act, exempting or excluding the owners and operators and, to the extent applicable, the designated representative of an Acid Rain source or Acid Rain unit from compliance with any other provision of the Act, including the provisions of title I of the Act relating to applicable National Ambient Air Quality Standards or State Implementation Plans;
(2) Limiting the number of allowances a unit can hold; *provided*, that the number of allowances held by the unit shall not affect the source's obligation to comply with any other provisions of the Act;
(3) Requiring a change of any kind in any State law regulating electric utility rates and charges, affecting any State law regarding such State regulation, or limiting such State regulation, including any prudence review requirements under such State law;
(4) Modifying the Federal Power Act or affecting the authority of the Federal Energy Regulatory Commission under the Federal Power Act; or,
(5) Interfering with or impairing any program for competitive bidding for power supply in a State in which such program is established.

Certification

I am authorized to make this submission on behalf of the owners and operators of the Acid Rain source or Acid Rain units for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

Name

Timothy C. Bates, Power Production Manager

Signature	Date
Timothy C Bates	3/9/98

"EP 5 (optional)
r the source AIRS
FINDS Identification

AIRS
FINDS

III. EMISSIONS UNIT INFORMATION

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

A. GENERAL EMISSIONS UNIT INFORMATION
(All Emissions Units)

Emissions Unit Description and Status

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

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

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

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

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

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

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

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

Mechanical Draft Cooling Tower

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

5. Emissions Unit Status Code:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
A	**JANUARY 2002**	**49**	[ ]

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

The mechanical draft cooling tower will reuse water with a maximum total dissolved solids content of up to 5,000 ppm when concentrated. A small portion of the water will be emitted as drift which will form particulate matter. The facility will have an insignificant increase in PM. See Attachment MC-EU2-A9.

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

   Mist Eliminator

2. Control Device or Method Code(s): **14**

Emissions Unit Details

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

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

Emissions Unit Operating Capacity and Schedule

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

C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

List of Applicable Regulations

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

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type) (limit to 500 characters): **Circulating Water Rate**		
2. Source Classification Code (SCC):	3. SCC Units: **1,000 gallons**	
4. Maximum Hourly Rate: **7,500**	5. Maximum Annual Rate: **65,700,000**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment (limit to 200 characters):		

Segment Description and Rate: Segment _____ of _____

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

F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM	014		NS
PM_{10}	014		NS

ATTACHMENT MC-EU2-A9

GENERAL EMISSIONS UNIT INFORMATION

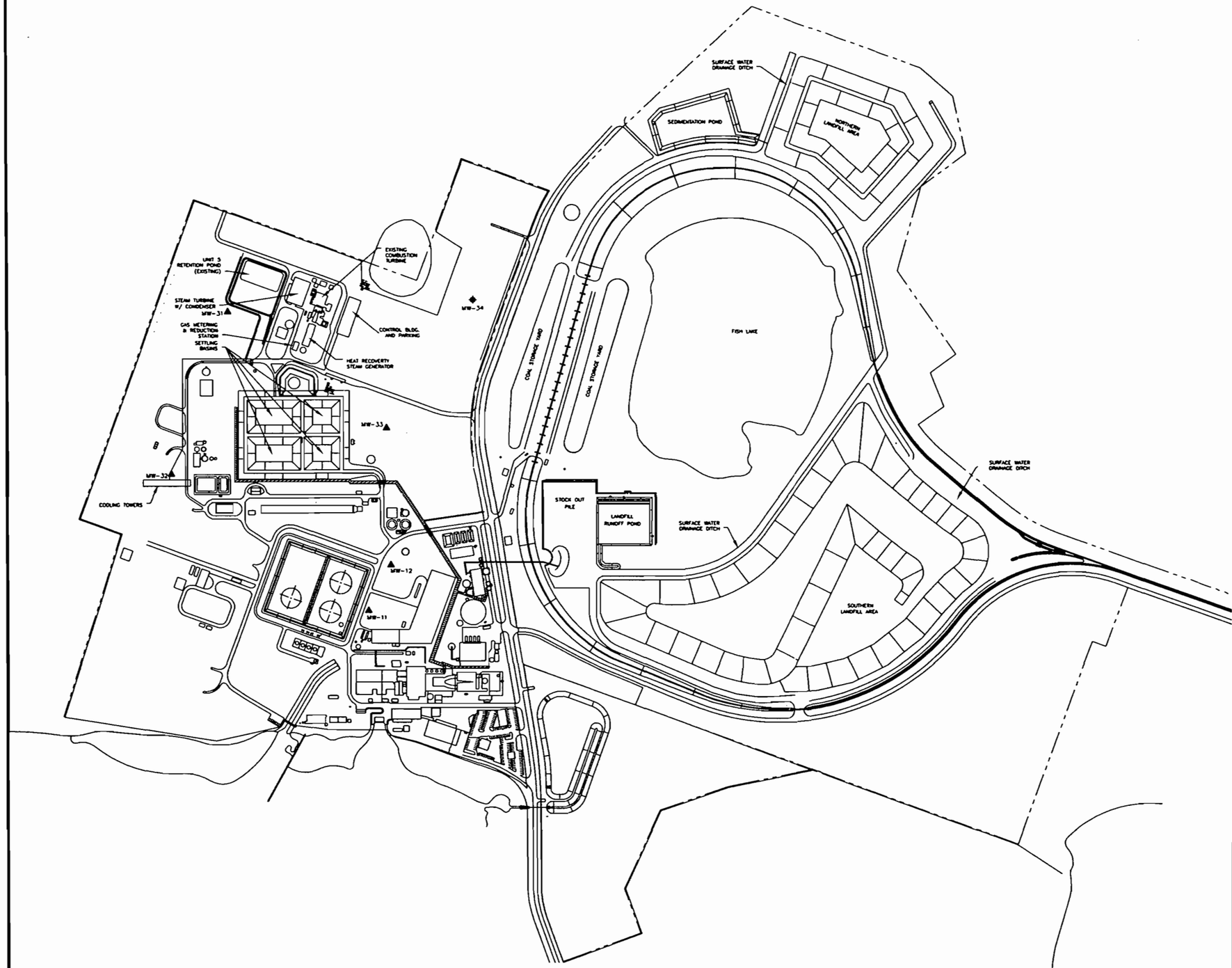
Photo 1. Distant View - Cooling Towers

Photo 2. Close View - Cooling Towers

Attachment MC-EU2-A9. Emissions Unit Comment
C.D. McIntosh, Jr. Power Plant Photos

Source: Golder, 2002.

Golder Associates



LEGEND

- PROPERTY BOUNDARY
- ▲ MW-11 MONITORING WELL LOCATION
- ◆ MW-34 PROPOSED MONITORING WELL LOCATION

600 0 600

SCALE FEET

PROJECT

COL/McINTOSH POWER PLANT/FL

TITLE

FACILITY PLOT PLAN

Golder Associates

0237622/4/4.4/4.4.1/MC-F1-C2A.DWG

PROJECT No.	0237622		FILE No.	7646A
DESIGN			SCALE AS SHOWN	REV. 1
CADD	GMS/MK	12/01-11/7/02		
CHECK				2
REVIEW				