Department of Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

February 23, 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Farzie Shelton,
Environmental Coordinator
Lakeland Electric and Water
501 East Lemon Street
Lakeland, Florida 33801-5050

Re DRAFT Permit Amendment No. AC53-190437, PSD-FL-166B
File No. 1050003-005-AC
Charles Larsen Memorial Power Plant Unit 8-Combined Cycle Gas Turbine

Dear Ms. Shelton:

Enclosed is one copy of the Draft Air Construction Permit And Amendment for the Charles Larsen Memorial Power Plant located on the south side of Lake Parker on US Highway 92 in Polk County. The Department's Intent to Issue Air Construction Permit And Amendment and the "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT AND AMENDMENT" are also included.

The "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT AND AMENDMENT" must be published within 30 (thirty) days of receipt of this letter. Proof of publication, i.e., newspaper affidavit, must be provided to the Department's Bureau of Air Regulation office within 7 (seven) days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit amendment.

Please submit any written comments you wish to have considered concerning the Department's proposed action to A. A. Linero, P.E., Administrator, New Source Review Section at the above letterhead address. If you have any other questions, please contact Mr. Martin Costello or Mr. Linero at 850/488-1344.

Sincerely,

C. H. Fancy, P.E.
Chief
Bureau of Air Regulation

CHF/mc

Enclosures

Memorandum

Florida Department of
Environmental Protection

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write *"Return Receipt Requested"* on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Ms. Darzie Shelton, EC
Lakeland Electric & Water
501 E. Lemon St.
Lakeland, Fl
33801-5050

4a. Article Number P 265 659 300

4b. Service Type
☐ Registered ☒ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery 2-26-98

5. Received By: *(Print Name)*

8. Addressee's Address *(Only if requested and fee is paid)*

6. Signature: *(Addressee or Agent)*
X Bonnie Shelton

PS Form **3811**, December 1994 Domestic Return Receipt

Is your RETURN ADDRESS completed on the reverse side?

Thank you for using Return Receipt Service.

SD-FI-1560

P 265 659 300

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail *(See reverse)*

Sent to DARZIE Shelton	
Street & Number Lakeland Electric H2O	
Post Office, State, & ZIP Code Lakeland FL	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date SD-FI-WWB	2-24-98

PS Form **3800**, April 1995

In the Matter of an
Application for Permit and Amendment by:

Lakeland Electric and Water
501 East Lemon Street
Lakeland, Florida 33801-5050/

Permit No. AC53-190437 / PSD-FL-166B
Charles Larsen Memorial Power Plant
Polk County

INTENT TO ISSUE AIR CONSTRUCTION PERMIT AND AMENDMENT

The Department of Environmental Protection (Department) gives notice of its intent to re-issue an air construction permit and to issue a amendment (copy of DRAFT Permit and Amendment attached) for the proposed project, as detailed in the application specified above, for the reasons stated below.

The applicant, Lakeland Electric and Water, applied on March 20, 1997, to the Department for an amendment of the above referenced permit for Charles Larsen Memorial Power Plant Unit 8 located on the south side of Lake Parker on US Highway 92 in Lakeland, Polk County. Because the original construction permit expired in 1993, this action re-issues the expired permit and makes the changes indicated in the draft permit.

The Department has permitting jurisdiction under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Chapters 62-4, 62-210, and 62-212. The above actions are not exempt from permitting procedures. The Department has determined that an air construction permit and amendment is required to authorize the following changes: deletion of permit requirements for mercury and lead for this combustion turbine which is only authorized to fire natural gas and low sulfur fuel oil, clarification that beryllium emissions are minimized by firing clean fuels, replacement of the fuel oil usage limit with a curve of fuel oil usage (gals/hr) vs compressor inlet temperature, clarification of the type of changes at the facility that would require the company to notify the Department and apply for a modification, and removal of the tpy limits for CO and H_2SO_4. This amendment also adds the short term limit for CO (25 ppm) that was established in the BACT but inadvertently left out of the original PSD permit. Also an annual test is specified in the amended permit as required in 62-297.310 since Unit 8 is major for CO.

The Charles Larsen Memorial Power Plant contains a 120 MW combined cycle combustion turbine which fires mainly natural gas. Nitrogen oxides emissions are controlled by water injection.

The Department intends to re-issue this air construction permit and amendment based on the belief that reasonable assurances have been provided to indicate that operation of these emission units will not adversely impact air quality, and the emission units will comply with all appropriate provisions of Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297, F.A.C.

Pursuant to Section 403.815, F.S., and Rule 62-103.150, F.A.C., you (the applicant) are required to publish at your own expense the enclosed "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT AND AMENDMENT". The notice shall be published one time only within 30 (thirty) days in the legal advertisement section of a newspaper of general circulation in the area affected. For the purpose of these rules, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. Where there is more than one newspaper of general circulation in the county, the newspaper used must be one with significant circulation in the area that may be affected by the permit. If you are uncertain that a newspaper meets these requirements, please contact the Department at the address or telephone number listed below. The applicant shall provide proof of publication to the Department's Bureau of Air Regulation, at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, Florida 32399-2400 (Telephone: 850/488-1344; Fax 850/ 922-6979) within 7 (seven) days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit and amendment pursuant to Rule 62-103.150 (6), F.A.C.

The Department will issue the FINAL permit and amendment, in accordance with the conditions of the enclosed DRAFT permit and amendment unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept written comments concerning the proposed DRAFT permit and amendment issuance action for a period of 30 (thirty) days from the date of publication of "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT AND AMENDMENT." Written comments should be provided to the Department's Bureau of Air Regulation, 2600 Blair Stone Road, Mail Station #5505, Tallahassee, Florida 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in this DRAFT Permit and Amendment, the Department shall issue a Revised DRAFT Permit and Amendment and require, if applicable, another Public Notice.

The Department will issue the permit and amendment with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57 F.S. before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative hearing in accordance with Sections 120.569 and 120.57 F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000, telephone: 850/488-9730, fax: 850/487-4938. Petitions must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. A petitioner must mail a copy of the petition to the applicant at the address indicated above, at the time of filing. The failure of any person to file a petition (or a request for mediation, as discussed below) within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-5.207 of the Florida Administrative Code.

A petition must contain the following information: (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Permit File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by petitioner, if any; (e) A statement of the facts that the petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement identifying the rules or statutes that the petitioner contends require reversal or modification of the Department's action or proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wants the Department to take with respect to the action or proposed action addressed in this notice of intent.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice of intent. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

In addition to the above, a person subject to regulation has a right to apply for a variance from or waiver of the requirements of particular rules, on certain conditions, under Section 120.542 F.S. The relief provided by this state statute applies only to state rules, not statutes, and not to any federal regulatory requirements. Applying for a variance or waiver does not substitute or extend the time for filing a petition for an administrative hearing or exercising any other right that a person may have in relation to the action proposed in this notice of intent.

The application for a variance or waiver is made by filing a petition with the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000. The petition must specify the following information: (a) The name, address, and telephone number of the petitioner; (b) The

name, address, and telephone number of the attorney or qualified representative of the petitioner, if any; (c) Each rule or portion of a rule from which a variance or waiver is requested; (d) The citation to the statute underlying (implemented by) the rule identified in (c) above; (e) The type of action requested; (f) The specific facts that would justify a variance or waiver for the petitioner; (g) The reason why the variance or waiver would serve the purposes of the underlying statute (implemented by the rule); and (h) A statement whether the variance or waiver is permanent or temporary and, if temporary, a statement of the dates showing the duration of the variance or waiver requested.

The Department will grant a variance or waiver when the petition demonstrates both that the application of the rule would create a substantial hardship or violate principles of fairness, as each of those terms is defined in Section 120.542(2) F.S., and that the purpose of the underlying statute will be or has been achieved by other means by the petitioner.

Persons subject to regulation pursuant to any federally delegated or approved air program should be aware that Florida is specifically not authorized to issue variances or waivers from any requirements of any such federally delegated or approved program. The requirements of the program remain fully enforceable by the Administrator of the EPA and by any person under the Clean Air Act unless and until the Administrator separately approves any variance or waiver in accordance with the procedures of the federal program.

Executed in Tallahassee, Florida.

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this INTENT TO ISSUE AIR CONSTRUCTION PERMIT AND AMENDMENT (including the PUBLIC NOTICE, and DRAFT permit and amendment) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 2-24-98 to the person(s) listed:

Ms. Farzie Shelton, Lakeland Electric and Water *
Mr.Kennard Kosky, Golder Associates
Mr. Brian Beals EPA
Mr. John Bunyak, NPS
Mr. Bill Thomas, SWD

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

(Clerk) 2-24-98 (Date)

NOTICE TO BE PUBLISHED IN THE NEWSPAPER

PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT AND AMENDMENT

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DRAFT Permit and Amendment No. AC53-190437 / PSD-FL-166B
Charles Larsen Memorial Power Plant
Polk County

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit and amendment to Lakeland Electric and Water for the Charles Larsen Memorial Power Plant Unit 8-Combined Cycle Gas Turbine located on the south side of Lake Parker on US Highway 92 in Lakeland, Polk County. A Best Available Control Technology (BACT) determination was not required pursuant to Rule 62-212.400, F.A.C. and 40 CFR 52.21, Prevention of Significant Deterioration (PSD). The applicant's name and address are: Lakeland Electric and Water, 501 East Lemon Street, city, Florida, 33801-5050.

This action re-issues and modifies the construction permit for Larsen Unit 8 which expired in 1993. The attached amendment grants the following changes to the permit: deletion of permit requirements for mercury and lead for this combustion turbine which is only authorized to fire natural gas and low sulfur fuel oil, clarification that Beryllium emissions are minimized by firing clean fuels, replacement of the fuel oil usage limit with a curve of fuel oil usage (gals/hr) vs compressor inlet temperature, clarification of the type of changes at the facility that would require the company to notify the Department and apply for a modification, and removal of the ton per year (tpy) limits for CO and H_2SO_4. This amendment also adds the short term limit for CO (25 ppm) that was established in the BACT but inadvertently left out of the original PSD permit. Also an annual test is specified in the amended permit as required in Rule 62-297.310 F.A.C. since Unit 8 is major for CO.

The Department will issue the FINAL Permit and Amendment, in accordance with the conditions of the DRAFT Permit and Amendment unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept written comments and requests for public meetings concerning the proposed DRAFT Permit and Amendment issuance action for a period of 30 (thirty) days from the date of publication of this Notice. Written comments and requests for public meetings should be provided to the Department's Bureau of Air Regulation, 2600 Blair Stone Road, Mail Station #5505, Tallahassee, Florida 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in this DRAFT Permit and Amendment, the Department shall issue a Revised DRAFT Permit and Amendment and require, if applicable, another Public Notice.

The Department will issue FINAL Permit and Amendment with the conditions of the DRAFT Permit and Amendment unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57 F.S. or a party requests mediation as an alternative remedy under Section 120.573 before the deadline for filing a petition. Choosing mediation will not adversely affect the right to a hearing if mediation does not result in a settlement. The procedures for petitioning for a hearing are set forth below, followed by the procedures for requesting mediation.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative hearing in accordance with Sections 120.569 and 120.57 F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000, telephone: 850/488-9370, fax: 850/487-4938. Petitions must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. A petitioner must mail a copy of the petition to the applicant at the address indicated above, at the time of filing. The failure of any person to file a petition (or a request for mediation, as discussed below) within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-5.207 of the Florida Administrative Code.

A petition must contain the following information: (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Permit File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by petitioner, if any; (e) A statement of the facts that the petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement identifying the rules or statutes that the petitioner contends require reversal or modification of the Department's action or proposed action; and (g) A statement of the relief sought by the petitioner, stating

precisely the action that the petitioner wants the Department to take with respect to the Department's action or proposed action addressed in this notice of intent.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice of intent. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

A complete project file is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Department of Environmental Protection
Bureau of Air Regulation
111 S. Magnolia Drive, Suite 4
Tallahassee, Florida, 32301
Telephone: 850/488-1344
Fax: 850/922-6979

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

The complete project file includes the Draft Permit and Amendment, the application, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Administrator, New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-1344, for additional information.

TECHNICAL EVALUATION

AND

PRELIMINARY DETERMINATION

Lakeland Electric and Water Utilities

Charles Larsen Memorial Power Plant, Unit 8
120 Megawatt Combustion Turbine and
Heat Recovery Steam Generator
Polk County

Permit No. PSD-FL-166B / AC53-190437
(Revised)

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

February 23, 1998

Amendment Request and Analysis:

The Department received a request from the applicant, the City of Lakeland, for changes to Permit No. PSD-FL-166B \ AC53-190437. Several of the requested changes are approved in the attached draft letter which amends and reissues the construction permit. This action removes the annual cap for CO emissions. This action also removes limits for lead, mercury, beryllium, and sulfuric acid mist since these pollutants are controlled by restricting fuels to natural gas or low sulfur diesel oil. This action also allows the use of a curve to determine fuel oil usage limits. Specific Condition 6 is changed to replace the hourly fuel oil usage limit (8,190 gph) with the curve of fuel oil usage versus compressor inlet temperature provided by the applicant.

The applicant withdrew a request to use EPA Method 5B for nonsulfuric acid particulate matter.

The following explains the reasons why some of the requested permit changes are not approved.

30 Day Rolling Average:

Larsen Unit 8 consists of a GE combustion turbine with an unfired heat recovery steam generator. Nitrogen oxides (NOx) are controlled in the combustion turbine using water injection. The current compliance method for NOx is an annual stack test. Unit 8 has a dilution extractive continuous monitoring system which measures NOx concentrations on a wet basis. The applicant originally requested a 24 hour averaging time for the NOx standard which would be demonstrated using a continuous emission monitoring system (CEMS). The applicant later requested a 30 day rolling average citing a 1994 statute change which requires certain acid rain units to use a 30 day rolling average. The Department determined that Section 403.0872(13)(b) of the Florida Statutes narrowly applies to units subject to 62-296.405 F.A.C. except that other averaging times shall apply for these units if specifically provided in 40 CFR parts 60 or 76. The statute does not authorize relaxation of BACT standards. The applicant argued in a letter dated May 13, 1997 that 62-296.405 F.A.C. is applicable to Larsen Unit 8 since this combined cycle unit repowered an existing boiler which was subject to this rule. The Department has determined that the combined cycle unit is not subject to 62-296.405 F.A.C. since the heat recovery steam generator is unfired (no duct burner).

The applicant was asked for an analysis which would provide the Department reasonable assurance that the existing BACT standard for NOx (25 ppmvd @ 15 % O_2 on a dry basis determined by Method 20) would not be less stringent than the proposed BACT standard (25 ppmvd @ 15% O_2 compliance by CEM based on a 30 day rolling average on a wet basis). The applicant failed to provide reasonable assurance that the stringency of the BACT standard would be preserved with the longer averaging time. The proposed BACT standard is on a wet basis due to the type of monitoring system used for Unit 8. Pollutant concentrations measured on a wet basis are lower than the same emissions measured on a dry basis since the water dilutes the concentration. The Department's analysis of monitoring data (including periods of startup, shutdown, and malfunction) indicated that the NOx standard should be reduced for the longer averaging time. The Department also noted differences in startup emissions as some startups had excursions which exceeded 25 ppm NOx while

many other startups were accomplished without exceeding the standard. The applicant may be able to improve the startup procedure to reduce excess emissions.

The Larsen Facility is located about 30 miles east of downtown Tampa and less than 30 miles from the Hillsborough county line which delineates the Tampa Bay Maintenance Area. Due to recent exceedances of the ambient air standard for ozone in Tampa, the Department recently conducted two public workshops on emission reduction strategies for NOx and VOC. Ozone episodes are generally a result of ozone precursor emissions (NOx and VOC) over a daily or a few days time which react in the atmosphere with the aid of sunlight. Uncontrolled emissions from Larsen Unit 8, a 120 MW combined cycle unit, may be approximately 150 ppm versus the controlled rate of 25 ppm.

The City petitioned to EPA in the past for an alternative ISO correction equation because they claimed they were injecting too much water for NOx control. If the BACT standard were to be based on a 30 day average and 25 ppmw, the result would likely be less water injected for NOx control.

The current construction permit specifies a NOx BACT limit of 25 ppmvd @ 15% O_2 and compliance demonstration by Method 20. This BACT standard limits the peak NOx emissions to 25 ppm on a short term basis. The unit currently has a CEMS for NOx as required by 40 CFR 75. This system records hourly averages of NOx emission rates. Extension of the averaging time to a 30 day rolling average affords the opportunity to operate the unit in excess of 25 ppm for hours, days or even weeks as long as low emission rate operation is sufficient to average below the standard on a 30 day rolling average. This constitutes a potential short term relaxation of the original BACT for NOx. Since the stringency of the original BACT must be preserved, the new emission limit must be reduced to a level which equates to the original limit which is based on a 1 hour average and on a dry basis. Although the applicant submitted data which includes all operating periods, the applicant has not requested inclusion of startup/shut down, and malfunction in the 30 day rolling averages periods.

Particulate Matter Emission Limits:

The applicant requested clarification that the particulate matter emission limits should be based on a 3 hour block average. The applicant explained that this clarification was needed in anticipation of the implementation of EPA's Any Credible Evidence Rule in Florida. This rule provides that data from methods other than the compliance test methods specified in the permit or applicable rules can be used for enforcement purposes. No additional language will be added to the PSD permit since the averaging time is implicit to the test methods (Method 5 or 17) and the required test length specified in Rule 62-297.310. Note that 62-297.310(1) F.A.C. allows compliance to be determined from two runs under certain circumstances.

CO BACT Standard:

Table 1 of the permit does not show the BACT limit of 25 ppmvd but instead shows a tpy CO limit for each fuel. A review of the file showed that the Preliminary Determination and Technical Evaluation and draft BACT Determination dated March 15, 1991 incorrectly concluded that PSD was

not triggered for CO. The draft permit in this Intent Package contained only tpy values for CO. The Final Determination contained a BACT for CO (25 ppm) for each fuel but Table 1 was not adjusted to incorporate these applicable limits. Specific Condition 12 of the permit waives VOC testing provided that the CO emission standards are demonstrated. The applicant is now requesting that the tpy values in Table 1 be removed. This request is granted although the BACT limit of 25 ppm CO and an annual test requirement pursuant to 62-297.310(7)(a)4 F.A.C. is added to the permit to correct the oversight when the original permit was issued.

Averaging Time for Heat Input Limits:

The applicant requested a 30 day rolling average for the heat input limits in Specific Condition 6. The heat input limitation is implied in the units for this standard which is MMBtu/hr. The Department has not used averages longer than one hour for heat input limits on other combustion turbines. Heat input must be calculated on an hourly basis since compliance testing is based on three 1 hour runs while the combustion turbine is operated at capacity (the maximum permitted heat input). The averaging time for heat input limits will not be extended from the current one hour basis.

Based on the foregoing technical evaluation of the application and additional information submitted by the applicant, the Department has made a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations provided the Department's Best Available Control Technology Determination is implemented and certain conditions are met. The amended permit conditions are listed in the attached draft letter.

Permit Engineer: Martin Costello, P.E.

Reviewed and Approved by Clair Fancy, P.E.
Chief, Bureau of Air Regulation

Department of Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

PERMITTEE:

Lakeland Electric and Water
501 East Lemon Street
Lakeland, Florida 33801-5050

Permit No.	AC53-190437
PSD No.	PSD-FL-166B
File No.	1050003-015-AC
Expires	December 31, 1998
Facility	Charles Larsen Memorial Plant
Unit No.	Combined Cycle Combustion Turbine, Unit 8

Authorized Representative:
Ms. Farzie Shelton
Environmental Coordinator

DRAFT

LOCATED AT:

Charles Larsen Memorial Plant
Standard Industrial Classification Code (SIC): 4911
Polk County, Florida

Directions: Located on the south side of Lake Parker on US Highway 92 in Lakeland, Polk County

STATEMENT OF BASIS:

This construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and the Florida Administrative Code (F.A.C.) Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297. The above named permittee is authorized to modify the facility in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department of Environmental Protection (Department).

Attached Appendices and Tables made a part of this permit:

Original construction permit	AC53-190437 / PSD-FL-166 issued 7/25/91
Modification	Dated 12/18/95, added a custom fuel monitoring schedule, clarified ISO correction, and adjusted SO_2 and H_2SO_4 limits
Table 1	Revised Emission Limits

Howard L. Rhodes, Director
Division of Air Resources Management

DRAFT

SPECIFIC CONDITIONS:

I This permit supersedes permit AC53-190437 / PSD-FL-166 dated July 25, 1991, as changed by amendment dated December 18, 1995.

II The provisions of permit AC53-190437 / PSD-FL-166 are incorporated into this permit except for the following changes:

Specific Condition #1:

Table 1 referenced in this condition shall be replaced with the attached Table 1 (revised December 18, 1995 and February 23, 1998). This new table does not contain emission limits for Mercury, Lead, or Beryllium. CO and sulfuric acid mist emission limits have also been changed. The tons per year (tpy) limits for CO have been replaced with the BACT limits of 25 ppm for each fuel.

Specific Condition #2:

This condition is replaced with the following:

2. Emissions of mercury shall be limited by firing only natural gas or No. 2 fuel oil.

Specific Condition #6:

From:

6. The permitted materials and utilization rates for the combined cycle gas turbine shall not exceed the values as follows:
   Maximum No. 2 fuel oil consumption shall not exceed either of the following limitations: 9190 gal/hr; 23,914,800 gals/yr.
   Maximum annual firing using No. 2 fuel oil shall not exceed 1/3 of the annual capacity factor.
   Maximum sulfur (S) content in the No. 2 fuel oil shall not exceed 0.20 percent by weight.
   Maximum heat input shall not exceed 1055 MMBtu/hr (gas) or 1040 MMBtu/hr No. 2 fuel (oil).

TO:

6. The permitted materials and utilization rates for the combined cycle gas turbine shall not exceed the values as follows:

   Maximum No. 2 fuel oil consumption shall not exceed either of the following limitations: the values in the attached Oil Input VS Compressor Inlet Temperature curve and 23,914,800 gals/yr.
   Maximum annual firing using No. 2 fuel oil shall not exceed 1/3 of the annual capacity factor.
   Maximum sulfur (S) content in the No. 2 fuel oil shall not exceed 0.20 percent by weight.
   Maximum heat input shall not exceed 1055 MMBtu/hr (gas) or 1040 MMBtu/hr No. 2 fuel (oil).

Specific Condition #7: **DRAFT**

From:

7. Any change in the method of operation, equipment or operating hours shall be submitted to the DER's Bureau of Air Regulation and Southwest District Offices.

TO:

7. The owner or operator shall submit to the Permitting Authority(s), for review any changes in, or modifications to: the method of operation; process or pollution control equipment; increased equipment capacities; or any change which would result in an increase in potential or actual emissions. Depending on the size and scope of the modification, it may be necessary to submit an application for, and obtain, an air construction permit prior to making the desired change. *Routine maintenance of equipment will not constitute a modification of this permit.* [Rule 62-4.030, 62-210.300 and 62-4.070(3), F.A.C.]

Specific Condition #19:

FROM:

This source shall comply with all applicable provisions of Chapter 403, Florida Statutes and Chapters 17-2 and 17-4, Florida Administrative Code.

TO:

This source shall comply with all applicable provisions of Chapter 403, Florida Statutes, and Chapters 62-4, 62-210, 62-212, 62-213, 62-214, 62-296, and 62-297, Florida Administrative Code. 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.

DRAFT

TABLE 1
ALLOWABLE EMISSION LIMITS
Combined Cycle Combustion Turbine
(Revised 12/18/95 and 2/23/98)

	Standards		Gas Turbine and HRSG [a]		
Pollutant	Gas Firing	No. 2 Fuel Oil Firing	Tons Per Year Gas	Tons Per Year Oil	Basis
NO_x	25 PPM at 15% oxygen on a dry basis	42 ppmv at 15 percent oxygen on a dry basis	425	244	BACT
SO_2	Natural gas a fuel	0.20 percent S by weight	8.6	307	BACT
PM/PM_{10}	0.006 lb/MMBtu	0.025 lb/MMBtu	22	22	BACT
VOC	-	-	9	6.7	BACT
CO	25 ppmv at 15 percent oxygen on a dry basis	25 ppmv at 15 percent oxygen on a dry basis			BACT
Sulfuric Acid Mist	Natural gas as fuel	Low sulfur content oil			BACT

(a) Emissions rates based on 100 percent capacity factor for natural gas and 1/3 capacity factor for oil firing.

Current Permit

Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

PERMITTEE:
City of Lakeland
501 E. Lemon Street
Lakeland, Florida 32961

Permit Number: AC 53-190437
Expiration Date: March 30, 1993
County: Polk
Latitude/Longitude: 28°02'56"N
81°55'25"W
Project: 120 MW Combined Cycle
Gas Turbine

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the construction of a 120 MW combined cycle gas turbine to be located at the City of Lakeland-Charles Larsen Power Plant in Lakeland, Florida. The turbine will fire natural gas as the primary fuel and have limited hours firing No. 2 fuel oil. The turbine is a GE PG7111 (EA) Frame 7 unit with water injection to reduce NOx emissions. Fuel flow rate for natural gas is 17,333 scfm @ ISO and 124.2 gal/min @ ISO for No. 2 fuel oil. The UTM coordinates are 409.185 km East and 3102.754 km North.

The source shall be constructed in accordance with the permit application, plans, documents, amendments and drawings; except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:

1. City of Lakeland-Charles Larsen Power Plant's letter dated April 3, 1991.
2. EPA Region IV letter dated April 4, 1991.
3. National Park Service's letter dated May 3, 1991.
4. City of Lakeland's letter dated May 15, 1991.

GENERAL CONDITIONS:

b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the dates analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

SPECIFIC CONDITIONS:

Emission Limits

1. The maximum allowable emissions from this facility shall not exceed the emission rates listed in Table 1.

2. Unless the Department has determined other concentrations are required to protect public health and safety, predicted acceptable ambient air concentrations (AAC) of the following pollutants shall not be exceeded:

SPECIFIC CONDITIONS:

Pollutant	Acceptable Ambient Concentrations ug/m^3 8-hrs	24-hrs	Annual
Beryllium	0.02	0.005	0.0004
Lead	1.5	0.36	0.09
Inorganic mercury compounds, all forms of vapor, as Hg	-	-	0.3

3. Visible emissions shall not exceed 10% opacity.

Operating Rates

4. This source is allowed to operate continuously (8760 hours per year).

5. This source is allowed to use natural gas as the primary fuel and No. 2 distillate oil as the secondary fuel (limited as shown in Specific Condition 6 below).

6. The permitted materials and utilization rates for the combined cycle gas turbine shall not exceed the values as follows:

- Maximum No. 2 fuel oil consumption shall not exceed either of the following limitations: 8,190 gals/hr; 23,914,800 gals/yr.
- Maximum annual firing using No. 2 fuel oil shall not exceed 1/3 of the annual capacity factor.
- Maximum sulfur (S) content in the No. 2 fuel oil shall not exceed 0.20 percent by weight.
- Maximum heat input shall not exceed 1055 MMBtu/hr (gas) or 1040 MMBtu/hr No. 2 fuel (oil).

7. Any change in the method of operation, equipment or operating hours shall be submitted to the DER's Bureau of Air Regulation and Southwest District offices.

8. Any other operating parameters established during compliance testing and/or inspection that will ensure the proper operation of this facility shall be included in the operating permit.

SPECIFIC CONDITIONS:

Compliance Determination

9. Initial (I) compliance tests shall be performed on each CT using both fuels. The stack test for each turbine shall be performed within 10 percent of the maximum heat rate input for the tested operating temperature. Annual (A) compliance tests shall be performed on each CT with the fuel(s) used for more than 400 hours in the preceding 12-month period. Tests shall be conducted using EPA reference methods in accordance with the November 2, 1989, version of 40 CFR 60 Appendix A:

a. 5 or 17 for PM (I, A, for oil only)

b. 10 for CO (I)

c. 9 for VE (I, A)

d. 20 for NO_x (I, A)

e. Trace elements of Beryllium (Be) shall be tested (I, for oil only) using EMTIC Interim Test Method. As an alternative, Method 104 may be used; or Be may be determined from fuel sample analysis using either Method 7090 or 7091, and sample extraction using Method 3040 as described in the EPA solid waste regulations SW 846.

f. Mercury (Hg) shall be tested using EPA Method 101 (40 CFR 61, Appendix B) (I, for oil only) or fuel sampling analysis using methods acceptable to the Department.

Other DER approved methods may be used for compliance testing after prior Departmental approval.

10. Method 5 or 17 must be used to determine the initial compliance status of this unit. Thereafter, the opacity emissions test may be used unless 10% opacity is exceeded.

11. Compliance with the SO_2 emission limit can also be determined by calculations based on fuel analysis using ASTM D2880-71 for the sulfur content of liquid.

12. Compliance with the total volatile organic compound emission limits will be assumed, provided the CO allowable emission rate is achieved; specific VOC compliance testing is not required.

clarified by 12/18/95 amendment

SPECIFIC CONDITIONS:

13. During the initial performance tests, to determine compliance with the NSPS ~~proposed~~ NO_x standard, measured NO_x emission at 15 percent oxygen will be adjusted to ISO ambient atmospheric conditions by the following correction factor:

$$NO_x = (NO_x \text{ obs}) \left(\frac{P_{ref}}{P_{obs}}\right)^{0.5} e^{19(H_{obs} - 0.00633)} \left(\frac{288°K}{T_{AMB}}\right)^{1.53}$$

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 (1 atmosphere) ambient pressure.

P_{obs} = Measured combustor inlet absolute pressure at test ambient pressure.

H_{obs} = Specific humidity of ambient air at test.

e = Transcendental constant (2.718).

T_{AMB} = Temperature of ambient air at test.

14. Test results will be the average of 3 valid runs. The Southwest District office will be notified at least 30 days in advance of the compliance test. The source shall operate between 90% and 100% of permitted capacity during the compliance test. Compliance test results shall be submitted to the Southwest District office no later than 45 days after completion.

15. Water injection shall be utilized for NOx control. The water to fuel ratio at which compliance is achieved shall be incorporated into the permit and shall be continuously monitored. In addition, the Permittee shall install a duct module suitable for future installation of SCR equipment.

16. To determine compliance with the capacity factor condition for oil firing, the Permittee shall maintain daily records of fuel usage. All records shall be maintained for a minimum of three years after the date of each record and shall be made available to representatives of the Department upon request.

SPECIFIC CONDITIONS:

17. Sulfur, nitrogen content and lower heating value of the fuel being fired in the gas turbine shall also be recorded per fuel oil shipment. These records shall also be kept by the company for at least three years and made available for regulatory agency's inspection.

18. Compliance with the acceptable ambient concentrations for Be, Lead, and Hg emissions shall be demonstrated based on calculations certified by a Professional Engineer registered in Florida, using actual operating conditions. Determination of the ambient concentrations for chemical compounds shall be determined by Department approved dispersion modeling. This compliance determination shall be made available upon request.

Rule Requirements

19. This source shall comply with all applicable provisions of Chapter 403, Florida Statutes and Chapters 17-2 and 17-4, Florida Administrative Code.

20. This source shall comply with all requirements of 40 CFR 60, Subpart GG and F.A.C. Rule 17-2.660(2)(a), Standards of Performance for Stationary Gas Turbines.

21. Issuance of this permit does not relieve the facility owner or operator from compliance with any applicable federal, state, or local permitting requirements and regulations (F.A.C. Rule 17-2.210(1)).

22. This source shall comply with F.A.C. Rule 17-2.700, Stationary Point Source Emission Test Procedures.

23. Pursuant to F.A.C. Rule 17-2.210(2), Air Operating Permits, the permittee is required to submit annual reports on the actual operating rates and emissions from this facility. These reports shall include, but are not limited to the following: sulfur, nitrogen content and lower heating value of the fuel being fired, fuel usage, hours of operation, air emissions limits, etc. Annual reports shall be sent to the Department's Southwest District office.

(oil only)

24. The permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the Bureau of Air Regulation prior to 60 days before the expiration of the permit (F.A.C. Rule 17-4.090).

PERMITTEE:
City of Lakeland

Permit Number: AC 53-190437
Expiration Date: March 30, 1993

SPECIFIC CONDITIONS:

25. An application for an operation permit must be submitted to the Southwest District office at least 90 days prior to the expiration date of this construction permit or within 45 days after completion of compliance testing, whichever occurs first. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rule 17-4.220).

Issued this 25th day
of July, 1991

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Carol M. Browner

Carol M. Browner, Secretary

* Custom fuel monitoring schedule was added in the 12/18/95 amendment

TABLE 1
ALLOWABLE EMISSION LIMITS
Combined Cycle Combustion Turbine

Pollutant	Standards: Gas Firing	Standards: No. 2 Fuel Oil Firing	Gas Turbine and HRSG[a] Tons Per Year: Gas	Gas Turbine and HRSG[a] Tons Per Year: Oil	Basis
NO_x	25 ppm at 15% oxygen on a dry basis	42 ppmv at 15 percent oxygen on a dry basis	425	244	BACT
SO_2	Natural gas as fuel	0.2 percent S by weight	2.6 → 8.6 per 12/18/95 Amendment	307	BACT
PM/PM_{10}	0.006 lb/MMBtu	0.025 lb/MMBtu	22	22	BACT
VOC	-	-	9	6.7	BACT
CO	-	-	232	79	BACT
Mercury (Hg)	-	3.0×10^{-6} lbs/MMBtu	—	.003	Est. by Appl.
Lead (Pb)	-	2.8×10^{-5} lbs/MMBtu	—	0.03	" "
Beryllium (be)	-	2.5×10^{-6} lbs/MMBtu	—	.003	BACT
Sulfuric Acid Mist	Natural gas as fuel	Low sulfur content oil	— → 0.8	3.2×10^{-3} → 9.13	BACT

(a) Emissions rates based on 100 percent capacity factor for natural gas and 1/3 capacity factor for oil firing.

Note: Changes per 12/18/95 Amendment

Best Available Control Technology (BACT) Determination
City of Lakeland-Charles Larsen Power Plant
Polk County

The applicant proposes to install a combustion turbine generator at their facility in Lakeland. The generator system will consist of a single nominal 80 megawatt (MW) combustion turbine, and a single heat recovery steam generator (HRSG) which will be used to repower an existing nominal 40 MW steam turbine.

The combustion turbine will be capable of both combined cycle and simple cycle operation. The applicant requested that the combustion turbine use either natural gas or distillate oil. The applicant has indicated the maximum annual tonnage of regulated air pollutants emitted from the facility based on 100 percent capacity and type of fuel fired at ISO conditions to be as follows:

Pollutant	Potential Emissions (tons/yr)		PSD Significant Emission Rate (tons/yr)
	Natural Gas	Fuel Oil	
NOx	425	732	40
SO_2	2.6	920	40
PM	22.0	66	25
PM_{10}	22.0	66	15
CO	232	237	100
VOC	9	20.0	40
H_2SO_4	0.8	27.4	7
Be	0.0	0.01	0.0004
Hg	0.0	0.01	0.1
Pb	0.0	0.12	0.6

Florida Administrative Code Rule 17-2.500(2)(f)(3) requires a BACT review for all regulated pollutants emitted in an amount equal to or greater than the significant emission rates listed in the previous table.

Date of Receipt of a BACT Application

December 17, 1990

BACT Determination Requested by the Applicant

Pollutant	Determination
NOx	25 ppmvd @ 15% O_2 (natural gas burning) 42 ppmvd @ 15% O_2 (diesel oil firing)
SO_2	Firing of natural gas or No. 2 fuel oil with a maximum sulfur content of 0.20%
PM and PM_{10}	Combustion control
H_2SO_4	Firing of No. 2 fuel oil with a maximum sulfur content of 0.20%.
Be	Firing of No. 2 fuel oil

BACT Determination Procedure

In accordance with Florida Administrative Code Chapter 17-2, Air Pollution, this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department, on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that in making the BACT determination the Department shall give consideration to:

(a) Any Environmental Protection Agency determination of Best Available Control Technology pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources) or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants).

(b) All scientific, engineering, and technical material and other information available to the Department.

(c) The emission limiting standards or BACT determinations of any other state.

(d) The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine for the emission source in question the most stringent control available for a similar or identical source or source category. If it is shown that this level of control is technically or economically infeasible for the source in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

The air pollutant emissions from combined cycle power plants can be grouped into categories based upon what control equipment and techniques are available to control emissions from these facilities. Using this approach, the emissions can be classified as follows:

- Combustion Products (Particulates and Heavy Metals). Controlled generally by good combustion of clean fuels.
- Products of Incomplete Combustion (CO, VOC, Toxic Organic Compounds). Control is largely achieved by proper combustion techniques.
- Acid Gases (SOx, NOx, HCl, Fl). Controlled generally by gaseous control devices.

Grouping the pollutants in this manner facilitates the BACT analysis because it enables the equipment available to control the type or group of pollutants emitted and the corresponding energy, economic, and environmental impacts to be examined on a common basis. Although all of the pollutants addressed in the BACT analysis may be subject to a specific emission limiting standard as a result of PSD review, the control of "nonregulated" air pollutants is considered in imposing a more stringent BACT limit on a "regulated" pollutant (i.e., particulates, sulfur dioxide, fluorides, sulfuric acid mist, etc,), if a reduction in "nonregulated" air pollutants can be directly attributed to the control device selected as BACT for the abatement of the "regulated" pollutants.

Combustion Products

The City of Lakeland's projected emissions of particulate matter, PM_{10}, and beryllium surpass the significant emission rates given in Florida Administrative Code Rule 17-2.500, Table 500-2 for No. 2 fuel oil firing only.

A PM/PM_{10} emissions limitation of .025 lb/MMBtu for No. 2 fuel oil firing is reasonable as BACT for the Lakeland facility.

In general, the BACT/LAER Clearinghouse does not contain specific emission limits for beryllium from turbines. BACT for these heavy metals is typically represented by the level of particulate control. As this is the case, the emission factor of .025 lb/MMbtu for particulate matter PM_{10} is judged to also represent BACT for beryllium.

Products of Incomplete Combustion

The emissions of carbon monoxide exceeds the significant level and therefore requires a BACT analysis.

At the proposed BACT NO_x emissions of 25/42 ppmvd (gas/oil) the turbine will be capable of maintaining CO emission rates of 25 ppmvd for either natural gas or No. 2 fuel oil. The applicant states that catalytic reduction could be installed at a levelized cost of 1.0 million/year to further reduce the CO emissions by 140 tons/year while burning natural gas (8760 hrs/yr). The incremental removal cost of using such control would be approximately $7340/ton of CO removed. This cost exceeds that which is consistent with BACT and is not economically justifiable.

Acid Gases

The emissions of sulfur dioxide, nitrogen oxides, and sulfuric acid mist, represent a significant proportion of the total emissions and need to be controlled if deemed appropriate. Sulfur dioxide emissions from combustion turbines are directly related to the sulfur content of the fuel being combusted.

The applicant has proposed the use of natural gas and No. 2 fuel oil with a maximum sulfur content of 0.20% to control sulfur dioxide emissions. A review of the latest edition (1990) of the BACT/LAER Clearinghouse indicates that sulfur dioxide emissions from combustion turbines have been controlled by limiting fuel oil sulfur content to a range of 0.1 to 0.3%, with the average for the facilities listed being approximately 0.24 percent. As this is the case, the applicant's proposal to use No. 2 fuel oil with a maximum sulfur content of 0.20% is judged to represent BACT.

The applicant has stated that BACT for nitrogen oxides will be met by using wet (water or steam) injection necessary to limit emissions to 42 ppmvd or 25 ppmvd at 15% oxygen when burning No. 2 fuel oil or natural gas, respectively.

A review of the EPA's BACT/LAER Clearinghouse indicates that the lowest NOx emission limit established to date for a combustion turbine is 4.5 ppmvd at 15% percent oxygen. This level of control was accomplished through the use of water injection and a selective catalytic reduction (SCR) system.

Selective catalytic reduction is a post-combustion method for control of NOx emissions. The SCR process combines vaporized ammonia with NOx in the presence of a catalyst to form nitrogen and water. The vaporized ammonia is injected into the exhaust gases prior to passage through the catalyst bed. The SCR process can achieve up to 90% reduction of NOx with a new catalyst. As the catalyst ages, the maximum NOx reduction will decrease to approximately 86 percent.

Given the applicant's proposed BACT level for nitrogen oxides control stated above, an evaluation can be made of the cost and associated benefit of using SCR as follows:

The applicant has indicated that the total levelized annual cost (operating plus amortized capital cost) to install SCR for natural gas firing at 100 percent capacity factor is $2,190,000. Taking into consideration the total levelized annual cost, a cost/benefit analysis of using SCR can now be developed.

Based on the information supplied by the applicant, it is estimated that the maximum annual NOx emissions with wet injection from the Lakeland facility will be 425 tons/year. Assuming that SCR would reduce the NOx emissions by an additional 80-85%, the SCR would control at least 340 tons of NOx annually for natural gas firing. When this reduction is taken into consideration with the total levelized annual cost of $2,190,000, the cost per ton of controlling NOx is $6,441. This calculated cost is higher than has previously been approved as BACT.

Since SCR has been determined to be BACT for several combined cycle facilities, the EPA has clearly stated that there must be unique circumstances to consider the rejection of such control on the basis of economics.

In a recent letter from EPA Region IV to the Department regarding the permitting of a combined cycle facility (Tropicana Products, Inc.), the following statement was made:

> "In order to reject a control option on the basis of economic considerations, the applicant must show why the costs associated with the control are significantly higher for this specific project than for other similar projects that have installed this control system or in general for controlling the pollutant."

A review of the combined cycle facilities in which SCR has been established as a BACT requirement indicates that the majority of these facilities are also intended to operate at high capacity factors. As this is the case, the proposed project is similar to other facilities in which SCR has been established as BACT, thereby supporting SCR as BACT for the proposed facility.

For fuel oil firing, the cost associated with controlling NOx emissions must take into account the potential operating problems that can occur with using SCR in the oil firing mode.

A concern associated with the use of SCR on combined cycle projects is the formation of ammonium bisulfate. For the SCR process, ammonium bisulfate can be formed due to the reaction of sulfur in the fuel and the ammonia injected. The ammonium bisulfate formed has a tendency to plug the tubes of the heat recovery steam generator leading to operational problems. As this is the case, SCR has been judged to be technically infeasible for oil firing in some previous BACT determinations.

The latest information available now indicates that SCR can be used for oil firing provided that adjustments are made in the ammonia to NOx injection ratio. For natural gas firing operation NOx emissions can be controlled with up to a 90 percent efficiency using a 1 to 1 or greater injection ratio. By lowering the injection ratio for oil firing, testing has indicated that NOx can be controlled with efficiencies ranging from 60 to 75 percent. When the injection ratio is lowered there is not a problem with ammonium bisulfate formation since essentially all of the ammonia is able to react with the nitrogen oxides present in the combustion gases.

Based on this strategy SCR has been both proposed and established as BACT for oil fired combined cycle facilities with NOx emission limits ranging from 11.7 to 25 ppmvd depending on the efficiency of control established.

Assuming that the lowered ammonia injection ratio strategy was used to control NOx emissions by 65%, the SCR would control 386 tons of NOx annually for oil/gas firing, assuming a maximum capacity factor of 33 percent on oil. When this reduction is taken into consideration with the total annual cost of $2,190,000, the cost per ton of controlling NOx is $5,674. This cost is lower than that determined for natural gas firing alone; however, it is still higher than what has been previously accepted as BACT.

Environmental Impact Analysis

The predominant environmental impacts associated with this proposal are related to the use of SCR for NOx control. The use of SCR results in emissions of ammonia, which may increase with increasing levels of NOx control. In addition, some catalysts may contain substances which are listed as hazardous waste, thereby creating an additional environmental burden. Although the use of SCR does have some environmental impacts, the disadvantages do not outweigh the benefit which would be provided by reducing nitrogen oxide emissions by 80 percent. The overwhelming benefit of NOx control by using SCR is substantiated by the fact that nearly one half of all BACT determinations have established SCR as the control measure for nitrogen oxides over the last five years.

In addition to the criteria pollutants, the impacts of toxic pollutants associated with the combustion of natural gas and No. 2 fuel oil have been evaluated. Beryllium for oil fired operation exceeds PSD significant levels. Other toxics are expected to be emitted in minimal amounts, with the total emissions combined to be less than 0.1 tons per year.

Although the emissions of the toxic pollutants could be controlled by particulate control devices such as a baghouse or scrubber, the amount of emission reductions would not warrant the added expense. As this is the case, the Department does not believe that the BACT determination would be affected by the emissions of the toxic pollutants associated with the firing of natural gas or No. 2 fuel oil.

Potentially Sensitive Concerns

With regard to controlling NOx emissions with SCR, the applicant has identified the following technical limitations:

1. SCR would reduce output of combustion turbines by one percent.

2. SCR could result in the release of unreacted quantities of ammonia to the atmosphere.

3. SCR would require handling of ammonia by plant operators. Since it is a hazardous material, there is a concern about safety and productivity of operators.

4. SCR results in contaminated catalyst from flue gas trace elements which could be considered hazardous. Safety of operators and disposal of spent catalyst is a concern.

BACT Determination by DER

NOx Control

A review of the permitting activities for combined cycle proposals across the nation indicates that SCR has been required and most recently proposed for installations with a variety of operating conditions (i.e., natural gas, fuel oil, capacity factors ranging from low to high). However, the cost and other concerns expressed by the applicant are valid.

The information that the applicant presented and Department calculations indicates that the incremental cost of controlling NOx ($6,441/ton) for natural gas is high compared to other BACT determinations which require SCR. However, the cost of controlling NOx emissions for oil firing ($4,600/ton) could be considered reasonable. Based on the information presented by the applicant and the studies conducted, the Department believes that the use of SCR for NOx control is not justifiable at this time as BACT. Therefore, the Department is willing to accept low NOx combustors with the firing of natural gas as the primary fuel. However, No. 2 distillate oil firing must be limited to 1/3 of the annual capacity factor. The applicant is also expected to design the facility to accomodate SCR should additional oil usage become necessary and SCR becomes a BACT requirement in the future.

SO_2 Control

For sulfur dioxide BACT is represented by firing natural gas or No. 2 fuel oil with an average sulfur content not to exceed 0.20 percent.

Other Emissions Control

The emission limitations for PM and PM_{10}, are based on previous BACT determinations for similar facilities, with the heavy metal beryllium being addressed through the particulate limitation and sulfuric acid mist being addressed through the sulfur dioxide limitation.

The emission limits for the City of Lakeland project are thereby established as follows:

Pollutant	Emission Limit Natural Gas Firing	No. 2 Fuel Oil Firing
NOx	25 ppmvd @ 15% O_2	42 ppmvd @ 15% O_2*
SO_2	Natural gas as fuel	Sulfur content not to exceed 0.20%
CO	25 ppmvd @ 15% O_2	25 ppmvd @ 15% O_2
PM & PM_{10}	0.006 lb/MMBtu	0.025 lb/MMBtu
Sulfuric Acid Mist	Emissions limited by natural gas and No. 2 fuel oil firing	
Beryllium	Emissions limited by natural gas and No. 2 fuel oil firing	

* No. 2 fuel oil usage limited to 1/3 of the total heat input on an annual basis.

Details of the Analysis May be Obtained by Contacting:

Preston Lewis, P.E., BACT Coordinator
Department of Environmental Regulation
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended by:

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

July 14, 1991
Date

Approved by:

Carol M. Browner, Secretary
Dept. of Environmental Regulation

July 26, 1991
Date

Memorandum

Florida Department of
Environmental Protection

TO: Clair Fancy

FROM: Marty Costello mc

DATE: February 23, 1998

SUBJECT: DRAFT Permit Amendment No. AC53-190437, PSD-FL-166B
Charles Larsen Memorial Power Plant Unit 8-Combined Cycle Gas Turbine

Attached is a DRAFT letter that re-issues/amends the construction permit (which expired in 1993) for a combined cycle gas turbine located in Polk County near Lakeland.

The attached amendment makes the following changes to the permit:

- Deletes limits for mercury, lead, beryllium, and H_2SO_4 for this combustion turbine which is only authorized to fire natural gas and low sulfur fuel oil.
- Replaces the fuel oil usage limit with a curve of fuel oil usage (gals/hr) vs compressor inlet temperature.
- Clarifies the type of changes at the facility that would require the company to notify the department and apply for a modification.
- Removes annual limits (tpy) for CO.

Although not requested by the applicant, this amendment also adds the short term limit and annual test requirement for CO (25 ppm) that was established in the BACT but inadvertently left out of the original PSD permit.

This amendment does not grant a 30 day rolling average for the NO_X standard as requested by the applicant. The applicant failed to provide the requested analysis demonstrating that the current BACT standard would not be relaxed by the use of the 30 day rolling average.

I recommend your approval and signature.

CF/mc

attachments