Department of
Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

July 9, 1999

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. R. Douglas Neeley, Chief
Air, Radiation Technology Branch
US EPA Region IV
61 Forsyth Street
Atlanta, GA 30303

Re: PSD Review and Custom Fuel Monitoring Schedule
Lake Worth Generating, LLC
PSD-FL-266

Dear Mr. Neeley:

Enclosed is a copy of the Department's draft permit to construct (the Department's Intent to Issue package was already mailed to Mr. Greg Worley) the Lake Worth Generating Project in Palm Beach County, Florida. It will be a natural gas-fired combined cycle facility with limited use of maximum 0.04 percent sulfur fuel oil. The project consists of a maximum 186 megawatt (MW) combustion turbine-electrical generator with a supplementary-fired heat recovery steam generator.

The project is not subject to the Florida's Power Plant Siting procedure because it will generate less than 74 MW of steam electricity.

Please send your written comments on or approval of the applicant's proposed custom fuel monitoring schedule. The plan is based on the letter dated January 16, 1996 from Region V to Dayton Power and Light. The Subpart GG limit on SO_2 emissions is 150 ppmvd @ 15% O_2 or a fuel sulfur limit of 0.8% sulfur. Neither of these limits could conceivably be violated by the use of pipeline quality natural gas which has a maximum SO_2 emission rate of 0.0006 lb/MMBtu (40 CFR 75 Appendix D Section 2.3.1.4). The sulfur content of pipeline quality natural gas in Florida has been estimated at a maximum of 0.003 % sulfur. Fuel oil will with a 0.04% sulfur content will be used. The requirements have been incorporated into the enclosed draft permit as Specific Conditions 31 and 32 and read as follows:

31. Alternate Monitoring Plan: Subject to EPA approval, the following alternate monitoring may be used to demonstrate compliance.

    (a) The NOX CEM data may be used in lieu of the monitoring system for water-to-fuel ratio and the reporting of excess emissions in accordance with 40 CFR 60.334(c)(1), Subpart GG. Subject to EPA approval, the calibration of the water-to-fuel ratio-monitoring device required in 40 CFR 60.335(c)(2) will be replaced by the 40 CFR 75 certification tests of the NOX CEMS.

    (b) The NOX CEM data shall be used in lieu of the requirement for reporting excess emissions in accordance with 40 CFR 60.334(c)(1), Subpart GG.

(c) A custom fuel monitoring schedule pursuant to 40 CFR 75 Appendix D for natural gas may be used in lieu of the daily sampling requirements of 40 CFR 60.334 (b)(2) provided the following requirements are met: the permittee shall apply for an Acid Rain permit within the deadlines specified in 40 CFR 72.30; the permittee shall submit a monitoring plan, certified by signature of the Authorized Representative, that commits to using a primary fuel of pipeline supplied natural gas containing no more than 1 grain of sulfur per 100 SCF of gas pursuant to 40 CFR 75.11(d)(2); each unit shall be monitored for SO2 emissions using methods consistent with the requirements of 40 CFR 75 and certified by the USEPA. This custom fuel-monitoring schedule will only be valid when pipeline natural gas is used as a primary fuel. If the primary fuel for these units is changed to a higher sulfur fuel, SO2 emissions must be accounted for as required pursuant to 40 CFR 75.11(d).

(d) Upon request from DEP, the CEMS emission rates for NOx on this unit shall be corrected to ISO conditions to demonstrate compliance with the NOx standard established in 40 CFR 60.332.

[40 CFR 60, Subparts Db and GG, Applicant Request]

32. Fuel Records: The permittee shall maintain on file a fuel purchase contract and typical analysis indicating the sulfur and nitrogen content of the natural gas being supplied. For all bulk shipments of low sulfur distillate oil received at this facility, the permittee shall obtain from the fuel vendor an analysis indicating the sulfur and nitrogen content. The analysis shall also specify the methods by which sulfur and nitrogen contents were determined and shall comply with the requirements of 40 CFR 60.335(d). [Rule 62-4.160(15), F.A.C.]

Also, please comment on Specific Condition 30 which allow the use of the acid rain NOx CEMS for demonstrating compliance as well as reporting excess emissions. Typically NOx emissions will be less than 9 ppmvd @15% O_2 (gas) which is less than one-tenth of the applicable Subpart GG limit based on the efficiency of the unit. A CEMS requirement is stricter and more accurate than any Subpart GG requirement for determining excess emissions.

The Department recommends your approval of the custom fuel monitoring schedules and these NO_X monitoring provisions. We also request your comments on the Intent to Issue. If you have any questions on these matters please contact Jeff Koerner at 850/894-7268.

Sincerely,

7/9

A. A. Linero, P.E., Administrator
New Source Review Section

AAL/jfk

Enclosures

Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

Golder Associates

July 8, 1999

9839537

Florida Department of Environmental Regulation
Bureau of Air Regulation
111 South Magnolia Drive, Suite 4
Tallahassee, Florida 32301

Attention: Mr. Jeffery F. Koerner, P.E.

RE: LAKE WORTH GENERATION (LWG) COMBINED CYCLE PROJECT
DEP FILE NO. 099-0569-001-AC
COMMENTS FROM NATIONAL PARK SERVICE

Dear Jeff:

This correspondence provides responses to the additional comments provided in the National Park Service (NPS) in a letter dated June 16, 1999 and received by the Department on June 21, 1999. The nature of the NPS comments center on the cost analysis provided in Best Available Control Technology (BACT) analysis for the LWG project. The NPS suggests that the proposed BACT was based on "economic unfeasibility" alone. As provided in the original permit application and in the additional provided with our May 3, 1999 correspondence, the proposed BACT for the LWG project (i.e., dry low-NO_x at 9 ppmvd at 15 percent O_2) was not base solely on economic unfeasibility. Clearly, the definition of BACT that must be considered is that specified in Rule 62-210.200(42) and must be made on a "case-by-case basis, taking into account energy, environmental and economic impacts". Indeed, the Environmental Protection Agency's (EPA's) "draft" Top-Down guidance specifically states that control technologies can be rejected as BACT if they are shown to be "in appropriate" as BACT, due to energy, environmental or economic impacts (see EPA Top-Down Guidance, Section IV.D, page 11 first partial paragraph). The BACT information provided for the LWG project, when taken together, demonstrated thai selective catalytic reduction was "in appropriate" for the project. The economic impacts (i.e., >$6,000 per ton of NOx removed), environmental impacts (e.g., the urban area that included close proximity of a school, I-95 and nursery school to an ammonia storage tank; see Figure 4-1 in the application), and energy impacts (e.g., lost of energy equivalent to annual usage for 700 residential customers) suggest that SCR is inappropriate as BACT.

Specific comments to the NPS economic analysis are summarized below:

SCR Capital Cost-The NPS analysis did not include the total direct capital cost of the SCR system as provided by the manufacturer. The total direct capital cost for the SCR system is $1,200,00 rather than the $480,000 used. The difference, $720,000 is the cost of the catalyst and should be included with the purchased equipment cost and used as the basis for capital

recovery. This oversight results in a lower cost effectiveness estimate by an amount of $540 per ton of NO_x removed. The catalyst cost provided by the vendor was however for a gas only project and does not account for oil firing. For a NO_x reduction when firing oil, the catalyst cost will increase by 30 percent. Thus the catalyst cost is $936,000 for an oil capable catalyst. In the analysis provided with the LWG application the catalyst cost is more appropriately included as a recurring capital cost with a capital recovery based on the guaranteed catalyst life, i.e., three years. This is a significant oversight and contrary to the any economic evaluation (EPA method or otherwise).

HRSG Modification-The cost estimate presented in the LWG evaluation was based on previous estimates for SCR catalyst and not both CO and SCR. As noted in the May 19, 1999 Golder Associates letter providing additional information on BACT, costs for any material upgrading due to oil firing was not included in the cost estimate.

Instrumentation Cost-The cost estimate for the LWG project was based on the EPA Cost Control Manual. As noted from the SCR vendor's budgetary estimate, monitors and instrumentation is not included in the budget quote. This includes any monitors for ammonia and instrumentation for interfacing the SCR system with the plant's digital control system (DCS).

Catalyst Life-It is acknowledged that the catalyst life is likely greater than the 3 years guaranteed by the vendor. However, it is also assumed in the analysis that the project operates at 100 percent capacity factor at a turbine inlet temperature of 59 °F for the entire three years. This operating assumption is equivalent to 60 to 70 percent capacity factors for 4 to 6 years and would more closely correspond to the actual operating experience of such projects. Given that LWG can only rely on a vendor's guarantee for catalyst life, which is prorated over either operation or catalyst delivery, and the conservative basis for emissions, using three years is appropriate.

PSM/RMP-It is undisputed that a risk management plan would be required for the storage requirements of either aqueous of anhydrous ammonia. Indeed, the application identified unique attributes of the site regarding toxic endpoints and potential impacts (see Page 4-9 in application). Golder Associates has prepared such plans for ammonia storage facilities and the cost estimate is appropriate, based on our experience for similar projects.

Contingency-The contingency reflects the uncertainty of the costs and is appropriate for any type of project planning. Contingencies can range from 3 to 25 percent. Golder Associates has assumed 10 percent, given the "budgetary" nature of the cost estimate and the uncertainties previously described.

Ammonia Cost-The cost for ammonia provided in the application was obtained from a local supplier for aqueous ammonia. A regional supplier has been subsequently contacted and the cost for aqueous ammonia delivered to the site is $308 per ton including transportation to the site (see attached estimate). The $ per ton of NO_x removed from the original BACT cost analysis would be lower by $988 per ton of NO_x removed using an ammonia cost of $308 per ton. The recalculated cost effectiveness is $7,130 per ton of NO_x removed.

MW Loss and Heat Rate Penalty-The basis for this cost factor is associated with two independent costs. Independent power produces are providing both capacity and energy with such projects. Payment for both, i.e., capacity any energy, are included in contracts with power marketers and utilities. Capacity payments are paid regardless of plant operation and depend upon the availability of the plant to supply the power. Energy costs are paid based on the cost to produce the power. Indeed, all the cogeneration projects developed in Florida in the early 1990's included these concepts. The MW Loss cost reflect the marginally reduced power output due SCR and reflect marginally lower capacity payments. The Heat Rate Penalty is the marginal increase in the cost of producing the energy.

Capacity Loss-This cost reflects lower capacity payments as a result of forced outage due solely to the SCR system. This cost is commonly included in cost evaluations for similar projects.

Fuel Escalation Cost-This is a very marginal cost that reflects increased future costs of fuel greater than general inflation. Such an estimate is appropriate for projected cost for natural gas and fuel oil.

Capital Recovery Factor-Golder Associates does not disagree with the NPS that a capital recovery factor of 7 percent is appropriate for general regulatory analyses. Moreover, the capital recovery factor cannot be confused with interest rate. However, for a specific project, the capital recovery factor must reflect project-specific conditions. Golder Associates believes that for private sector independent power projects, a higher capital recovery factor is generally appropriate based on the risk of these projects. The developer of the LWG project indicated that a CRF based on 10 percent is within their planning basis. It should be noted that the NPS used a CRF of 0.1098 versus the 0.1174 used in the LWG analysis, a relatively small difference.

Recurring Capital Cost-The recurring capital cost, as stated previously, is simply the cost of the catalyst and is part of the Total Capital Cost of the SCR system. Using the catalyst cost in this way is a more economically sophisticated way of handling a high percent capital cost item that has a lower economic life than the other portions of the system. The recurring capital cost is used to develop a true annualized cost based on its economic life and the capital recovery. As noted above, the NPS did not adhere to the EPA cost manual by removing the catalyst from the original capital cost estimate of the system (i.e., purchased equipment costs).

Annualized Cost for the LWG Project-When adjusted for the cost of ammonia, the estimated cost effectiveness for the LWG project is $7,130 per ton of NO_x removed. Even making many of the assumptions by the NPS, the lowest calculated cost effectiveness is $5,500 per ton of NO_x removed for the LWG project. This assumes a 7 percent capital recovery factor, 3 percent contingency on capital cost only, eliminating the cost for capacity loss, eliminating the fuel escalation cost, eliminating any contingency costs for any operating cost and assuming the catalyst life is 6 years. This also conservatively assumes a 100 percent capacity factor, which is highly unrealistic. At a 70 percent capacity factor, the cost effectiveness is $6,600 per ton of NO_x removed.

Comparison with Similar Projects-The cost effectiveness for the LWG Project is similar to the range provided for the New Smyrna Beach Power Project (NSBPP) of $6,500 to $7,366 per ton of NO_x removed and the Kissimmee Utility Authority Cane Island Project of greater than $5,500 per ton of NO_x removed. The NSBPP is also a gas only project and the KUA project is for a city-owned municipality with lower cost of capital. For both projects, the Department has supported dry-low NO_x combustion technology at 9 ppmvd corrected to 15 percent oxygen when firing natural gas. Moreover, the LWG project is situated on a site that clearly is unique for risks associated with handling ammonia. In addition, the LWG Project is a repowering project where the potential emissions from three currently permitted steam units would substantially eliminated. As described in Section 2.2 of the application, several thousand tons per year of potential emissions in PM, NO_x and SO_2 would be eliminated with the steam generators associated Unit S-1 and S-4. The use of SCR for the LWG Project is clearly "inappropriate" as BACT, when considering all the economic, environmental and energy impacts associated.

Please call if you have questions.

Sincerely,
GOLDER ASSOCIATES INC.

Kennard F. Kosky
Principal
Professional Engineer Registration No. 14996

SEAL

KFK/jkk

Enclosures

cc: Mr. Paul Doherty, LWG
Mr. Brian Chatlosh, LWG
Mr. Leonard Shapiro, Energy Resources Group, Inc.
Mr. Richard Zwolak, Golder Associates-Tampa

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Table B-3c. Capital Cost for Selective Catalytic Reduction for GE Frame 7FA in Combined Cycle Configuration - NPS Assumptions

Cost Component	Costs	Basis of Cost Component
Direct Capital Costs		
SCR Associated Equipment	$480,000	Vendor Based Estimate
Ammonia Storage Tank	$139,601	$35 per 1,000 lb mass flow developed from vendor quotes
HRSG Modification	$478,632	$120 per 1,000 lb mass flow developed from vendor quotes
Instrumentation	$48,000	10% of SCR Associated Equipment and RCC
Taxes	$84,960	6% of SCR Associated Equipment and Catalyst
Freight	$70,800	5% of SCR Associated Equipment
Total Direct Capital Costs (TDCC)	$1,301,993	
Direct Installation Costs		
Foundation and supports	$179,039	8% of TDCC and RCC;OAQPS Cost Control Manual
Handling & Erection	$313,319	14% of TDCC and RCC;OAQPS Cost Control Manual
Electrical	$89,520	4% of TDCC and RCC;OAQPS Cost Control Manual
Piping	$44,760	2% of TDCC and RCC;OAQPS Cost Control Manual
Insulation for ductwork	$22,380	1% of TDCC and RCC;OAQPS Cost Control Manual
Painting	$22,380	1% of TDCC and RCC;OAQPS Cost Control Manual
Site Preparation	$5,000	Engineering Estimate
Buildings	$15,000	Engineering Estimate
Total Direct Installation Costs (TDIC)	$691,398	
Recurring Capital Costs (RCC)	$936,000	Catalyst; Vendor Based Estimate-Gas Only Catalyst
Total Capital Costs (TCC)	$2,929,391	Sum of TDCC, TDIC and RCC
Indirect Costs		
Engineering	$223,799	10% of TDCC and RCC; OAQPS Cost Control Manual
PSM/RMP Plan	$75,000	Engineering Estimate
Construction and Field Expense	$111,900	5% of TDCC and RCC; OAQPS Cost Control Manual
Contractor Fees	$223,799	10% of TDCC and RCC; OAQPS Cost Control Manual
Start-up	$44,760	2% of TDCC and RCC; OAQPS Cost Control Manual
Performance Tests	$22,380	1% of TDCC and RCC; OAQPS Cost Control Manual
Contingencies	$67,140	3% of TDCC and RCC; OAQPS Cost Control Manual
Total Indirect Capital Cost (TInCC)	$768,778	
Total Direct, Indirect and Recurring Capital Costs (TDIRCC)	$3,698,169	Sum of TCC and TInCC

Table B-4b. Annualized Cost for Selective Catalytic Reduction for GE Frame 7FA in Combined Cycle Configuration

Cost Component	Costs	Basis of Cost Component	
Direct Annual Costs			
Operating Personnel	18,720	24 hours/week at $15/hr	
Supervision	2,808	15% of Operating Personnel;OAQPS Cost Control Manual	
Ammonia	119,491	$308 per ton NH_3 for Aqueous	
PSM/RMP Update	25,000	Engineering Estimate	
Inventory Cost	36,629	Capital Recovery (11.74%) for 1/3 catalyst	
Catalyst Disposal Cost	37,227	$28/1,000 lb/hr mass flow over 3 years; developed from vendor quotes	
Contingency	23,987	10% of Direct Annual Costs	
Total Direct Annual Costs (TDAC)	263,862		
Energy Costs			
Electrical	28,032	80kW/h @ $0.04/kWh times Capacity Factor	
MW Loss and Heat Rate Penalty	547,631	0.5% of MW output; EPA, 1993 (Page 6-20) and $3/mmBtu additional fuel costs	
Capacity Loss	65,753	3 days outage each 3 years; Capacity penalty of $240,000 per % per year.	
Fuel Escalation	17,270	Escalation of fuel over inflation; 3% of energy costs	
Contingency	65,869	10% of Energy Costs	
Total Energy Costs (TEC)	724,555		
Indirect Annual Costs			
Overhead	$84,612	60% of Operating/Supervision Labor and Ammonia	
Property Taxes	$41,176	1% of Total Capital Costs	
Insurance	$41,176	1% of Total Capital Costs	
Annualized Total Direct Capital	$373,515	11.74% Capital Recovery Factor of 10% over 20 years times sum of TDCC, TDIC and TInCC	
Annualized Total Direct Recurring	$376,366	40.21% Capital Recovery Factor of 10% over 3 years times RCC	
Total Indirect Annual Costs (TIAC)	$916,843		
Total Annualized Costs	$1,905,261	Sum of TDAC, TEC and TIAC	
Cost Effectiveness	$7,130	NO_x Reduction Only	100% Capacity Factor
	$19,612	Net Emission Reduction	

Table B-4c. Annualized Cost for Selective Catalytic Reduction for GE Frame 7FA in Combined Cycle Configuration-NPS Assumptions

Cost Component	Costs	Basis of Cost Component	
Direct Annual Costs			
Operating Personnel	18,720	24 hours/week at $15/hr	
Supervision	2,808	15% of Operating Personnel;OAQPS Cost Control Manual	
Ammonia	119,491	$308 per ton NH_3 for Aqueous	
PSM/RMP Update	25,000	Engineering Estimate	
Inventory Cost	34,258	Capital Recovery (10.98%) for 1/3 catalyst	
Catalyst Disposal Cost	37,227	$28/1,000 lb/hr mass flow over 3 years; developed from vendor quotes	
Contingency	0	0% of Direct Annual Costs	
Total Direct Annual Costs (TDAC)	237,504		
Energy Costs			
Electrical	28,032	80kW/h @ $0.04/kWh times Capacity Factor	
MW Loss and Heat Rate Penalty	547,631	0.5% of MW output; EPA, 1993 (Page 6-20) and $3/mmBtu additional fuel costs	
Capacity Loss	0	3 days outage each 3 years; Capacity penalty of $240,000 per % per year.	
Fuel Escalation	0	Escalation of fuel over inflation; 3% of energy costs	
Contingency	0	0% of Energy Costs	
Total Energy Costs (TEC)	575,663		
Indirect Annual Costs			
Overhead	$84,612	60% of Operating/Supervision Labor and Ammonia	
Property Taxes	$36,982	1% of Total Capital Costs	
Insurance	$36,982	1% of Total Capital Costs	
Annualized Total Direct Capital	$303,286	10.98% Capital Recovery Factor of 7% over 15 years times sum of TDCC, TDIC and TInCC	
Annualized Total Direct Recurring	$196,373	20.98% Capital Recovery Factor of 7% over 6 years times RCC	
Total Indirect Annual Costs (TIAC)	$658,234		
Total Annualized Costs	$1,471,401	Sum of TDAC, TEC and TIAC	
Cost Effectiveness	$5,506	NO_x Reduction Only	100% Capacity Factor
	$8,826	Net Emission Reduction	

Table B-4d. Annualized Cost for Selective Catalytic Reduction for GE Frame 7FA in Combined Cycle Configuration-NPS Assumptions

Cost Component	Costs	Basis of Cost Component	
Direct Annual Costs			
Operating Personnel	18,720	24 hours/week at $15/hr	
Supervision	2,808	15% of Operating Personnel;OAQPS Cost Control Manual	
Ammonia	83,644	$308 per ton NH_3 for Aqueous	
PSM/RMP Update	25,000	Engineering Estimate	
Inventory Cost	34,258	Capital Recovery (10.98%) for 1/3 catalyst	
Catalyst Disposal Cost	37,227	$28/1,000 lb/hr mass flow over 3 years; developed from vendor quotes	
Contingency	0	0% of Direct Annual Costs	
Total Direct Annual Costs (TDAC)	201,656		
Energy Costs			
Electrical	19,622	80kW/h @ $0.04/kWh times Capacity Factor	
MW Loss and Heat Rate Penalty	383,342	0.5% of MW output; EPA, 1993 (Page 6-20) and $3/mmBtu additional fuel costs	
Capacity Loss	0	3 days outage each 3 years; Capacity penalty of $240,000 per % per year.	
Fuel Escalation	0	Escalation of fuel over inflation; 3% of energy costs	
Contingency	0	0% of Energy Costs	
Total Energy Costs (TEC)	402,964		
Indirect Annual Costs			
Overhead	$63,103	60% of Operating/Supervision Labor and Ammonia	
Property Taxes	$36,982	1% of Total Capital Costs	
Insurance	$36,982	1% of Total Capital Costs	
Annualized Total Direct Capital	$303,286	10.98% Capital Recovery Factor of 7% over 15 years times sum of TDCC, TDIC and TInCC	
Annualized Total Direct Recurring	$196,373	20.98% Capital Recovery Factor of 7% over 6 years times RCC	
Total Indirect Annual Costs (TIAC)	$636,725		
Total Annualized Costs	$1,241,346	Sum of TDAC, TEC and TIAC	
Cost Effectiveness	$6,636	NO_x Reduction Only	70% Capacity Factor
	$10,637	Net Emission Reduction	

TANNER INDUSTRIES, INC.
735 DAVISVILLE ROAD, THIRD FLOOR
SOUTHAMPTON, PA 18966-3200
215-322-1238 FAX 215-322-7725
www.tannerind.com

June 30, 1999

Mr. Ken Cosky
GOLDER & ASSOCIATES
6241 NW 23rd Street
Suite 500
Gainesville, FL 32653

via facsimile: 352-336-6603

Dear Ken:

Per your request, we are pleased to supply the following budgetary quotation for truckloads of **28% Aqua Ammonia** for delivery to your facility in Lake Worth, FL.

Price: $285.00 per ton of contained anhydrous ammonia.
FOB: Apopka, FL
Freight: $1.16/CWT based on 45,000 pound minimum.
Terms: Net 30 days.
Price Protection: 30 days.

TANNER INDUSTRIES, INC., as a leader in the ammonia distribution industry is dedicated to supplying a quality product in a safe and efficient manner. We thank you for giving us a chance to quote on this business.

If we may be of any further service, please call.

Very truly yours,
TANNER INDUSTRIES, INC.

J. Thomas Lauria
Sales Manager

JTL/edc

cc: Roger Luczak
MRT/File

RECEIVED
JUL 12 1999
BUREAU OF AIR REGULATION

MEMORANDUM

TO: Cleve Holladay, Florida Department Of Environmental Protection — June 26, 1999

FR: Bob McCann, Golder Associates Inc. ccm 6/29/99

RE: DEP FILE NO. 099-0569-001-AC (PSD) PERMIT APPLICATION; LAKE WORTH GENERATION COMBINED CYCLE PROJECT; SULFUR DIOXIDE SIGNIFICANT IMPACT ANALYSIS — Project No. 983-9537

Based on our recent discussions, additional analyses were performed to address your comment regarding the project's maximum predicted 24-hour average sulfur dioxide (SO_2) concentrations relative to the EPA significant impact level of 5 ug/m^3. The following information presents the response prepared in Golder's letter of May 3, 1999, and provides additional information that shows the project's impacts will be well below the significant impact levels when SO_2 emissions reductions due to the shutdown of Unit No. 4 are included in the analysis. It should be noted that existing Unit No. 1 would also be shutdown but SO_2 emissions reductions for that unit were not included in the analysis.

Comment (from Florida DEP's letter dated April 9, 1999):

6. Modeled Ambient Impacts - Determining Compliance with PSD Class II Increments and AAQS:

   Table 6-7 of the application indicates a maximum predicted 24-hour SO_2 concentration of 5 ug/m^3 while burning oil during combined cycle operation. This is equal to the EPA significant impact level also identified in Table 6-7. **Please submit more detailed modeling or a valid justification as to why this isn't necessary.**

Response:

More detailed air dispersion modeling was performed to obtain the overall maximum 24-hour concentration for the project. As discussed in the Air Permit Application, initial air modeling of the project's emissions was performed using 720 grid receptors in a screening analysis. Detailed air modeling analyses were performed using a dense receptor grid in a refined analysis to produce the maximum 24-hour SO_2 concentration of 5 ug/m^3. These results are summarized in Table 1.

It should be noted that:

1. This concentration was predicted for the proposed combustion turbine firing fuel oil, a backup fuel, and operating at 50 percent load;
2. This concentration occurred for only one year (i.e., 1987) at only one receptor located 200 m to the west-southwest (240 degrees) from the proposed HRSG stack which is equivalent to:
   - One occurrence from a potential 1,826 24-hour average concentrations predicted at that receptor and
   - One occurrence in about 1,300,000 24-hour average concentrations predicted for the entire screening receptor grid;
3. For all other receptors for that year and at all receptors for other years, the maximum 24-hour SO_2 concentrations were predicted to be 15 percent or more lower than the 5 ug/m^3.

As a result, since the maximum concentrations did not exceed the significant impact level of 5 ug/m^3, was predicted to occur in a very limited area for only one 24-hour period in the five years considered in the analysis, and was based on oil-firing which will be limited to 1,000 hours per year, it was determined that more detailed modeling with other emission sources was not warranted.

As stated in the PSD permit application, there will be an expansion of the PSD increment due to the net reductions of potential pollutant emissions from the existing units. The air modeling results presented in the application did not account for pollutant emission reductions and, therefore, concentration reductions, from existing Units 1 and 4 that will be shutdown as part of this project. To account for these emission reductions, air modeling was performed for the project together with emission reductions due to Unit 4 alone. The two sources were modeled in the same run (the proposed combustion turbine with positive emissions, existing Unit 4 with negative emissions) using the same model and methods as described in the application. Pollutant concentrations were predicted in the area in which the project alone was predicted to have a 24-hour average SO_2 concentration equal to the significant impact level of 5 ug/m^3. Pollutant impacts were predicted for the combustion turbine operating at 50 percent load for ambient temperatures of 45 and 95 °F. A copy of the computer output files are attached. A summary of the model results is presented in Table 2.

As shown in Table 2, the project's impacts are predicted to be well below the significant impact level of 5 ug/m^3 for the 24-hour averaging period when SO_2 emissions reductions due to the shutdown of Unit No. 4 are included in the analysis.

Table 1. Significant Impact Analysis of 24-hour Average SO_2 Concentrations Predicted for the Project in Combined-Cycle Operation firing Fuel Oil
Proposed Project Alone, 50% Operating Load, Screening and Refined Analyses

Pollutant	Maximum Emission Rates (lb/hr) by Operating Load and Air Temperature 50% Load 45°F	50% Load 95°F	Averaging Time	Maximum Predicted Concentrations (ug/m^3) 50% Load 45°F		50% Load 95°F	
PSD APPLICATION							
Screening Analysis					% Significant Impact Level		% Significant Impact Level
Generic	79.37	79.37	24-hour				
(10 g/s)			1987	4.987	NA	5.202	NA
			1988	2.134	NA	3.053	NA
			1989	1.568	NA	1.631	NA
			1990	3.802	NA	3.968	NA
			1991	3.470	NA	4.462	NA
SO_2	64.2	58.0	24-hour				
			1987	4.03	81	3.80	76
			1988	1.73	35	2.23	45
			1989	1.27	25	1.19	24
			1990	3.08	62	2.90	58
			1991	2.81	56	3.26	65
Refined Analysis					% Significant Impact Level		% Significant Impact Level
Generic	79.37	79.37	24-hour				
(10 g/s)			1987	6.236	NA	6.535	NA
			1988	2.995	NA	4.024	NA
			1989	NM	NM	NM	NM
			1990	5.498	NA	5.775	NA
			1991	4.781	NA	6.562	NA
SO_2	64.2	58.0	24-hour				
			1987	5.04	101	4.78	96
			1988	2.42	48	2.94	59
			1989	NM	NM	NM	NM
			1990	4.45	89	4.22	84
			1991	3.87	77	4.80	96
ADDITIONAL RECEPTORS: 200, 400 M							
Screening Analysis					% Significant Impact Level		% Significant Impact Level
Generic	79.37	79.37	24-hour				
(10 g/s)			1987	6.236	NA	6.535	NA
			1988	2.698	NA	3.889	NA
			1989	1.682	NA	1.771	NA
			1990	4.872	NA	5.109	NA
			1991	4.339	NA	5.619	NA
SO_2	64.2	58.0	24-hour				
			1987	5.04	101	4.78	96
			1988	2.18	44	2.84	57
			1989	1.36	27	1.29	26
			1990	3.94	79	3.73	75
			1991	3.51	70	4.11	82
Refined Analysis					% Significant Impact Level		% Significant Impact Level
Generic	79.37	79.37	24-hour				
(10 g/s)			1987	6.236	NA	6.535	NA
			1988	NM	NM	NM	NM
			1989	NM	NM	NM	NM
			1990	5.498	NA	5.775	NA
			1991	NM	NM	6.562	NA
SO_2	64.2	58.0	24-hour				
			1987	5.04	101	4.78	96
			1988	NM	NM	NM	NM
			1989	NM	NM	NM	NM
			1990	4.45	89	4.22	84
			1991	NM	NM	4.80	100

Note: 24-hour average PSD Class II significant impact level for SO_2 concentration is 5 ug/m^3.
NA= not applicable; NM= not modeled.

(1) Concentrations are based on highest predicted concentrations using five years of meteorological for 1987 to 1991 of surface and upper air data from the National Weather Service station at the West Palm Beach International Airport.

Pollutant concentrations were based on a modeled or generic concentration predicted using a modeled emission rate of 79.37 lb/hr (10 g/s). Specific pollutant concentrations were estimated by multiplying the modeled concentration (at 10 g/s) by the ratio of the specific pollutant emission rate to the modeled emission rate of 10 g/s.

Table 2. Significant Impact Analysis of 24-hour Average SO_2 Concentrations Predicted for the Project in Combined-Cycle Operation Firing Fuel Oil Proposed Project, 50-Percent Operating Load, with Emission Reductions Due to Unit No. 4 Shutdown, Screening Analysis

Pollutant	Maximum Emission Rates (lb/hr) by Operating Load and Air Temperature		Averaging Time	Maximum Predicted Concentrations (ug/m^3)			
	50% Load			50% Load			
	45°F	95°F		45°F		95°F	
PSD APPLICATION							
Screening Analysis					% Significant		% Significant
SO_2	64.2	58.0	24-hour		Impact Level		Impact Level
			1987	0.0003	0.01	0.0003	0.01
			1988	0.0008	0.02	0.0007	0.01
			1989	0.0005	0.01	0.0005	0.01
			1990	0.0003	0.01	0.0003	0.01
			1991	0.0006	0.01	0.0006	0.01

Note: 24-hour average PSD Class II significant impact level for SO_2 concentration is 5 ug/m^3.

Concentrations are based on highest predicted concentrations using 5 years of meteorological for 1987 to 1991 of surface and upper air data from the National Weather Service Station at the West Palm Beach International Airport.

```
CO STARTING
CO TITLEONE 1987 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99
CO TITLETWO  HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset
CO MODELOPT DFAULT CONC   RURAL NOCMPL
CO AVERTIME  24
CO POLLUTID SO2
CO DCAYCOEF    .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING

** Source Location Cards:
**          SRCID SRCTYP        XS            YS            ZS
** MODELING ORIGIN IS PROPOSED HRSG STACK
**  CT BYPASS STACK LETTER CODE
** ------------------------
** Source Location Cards:
**          SRCID SRCTYP        XS       YS       ZS
**                              (m)      (m)      (m)
SO LOCATION  HRLD5045  POINT    0.0      0.0      0.0
SO LOCATION  HRLD5095  POINT    0.0      0.0      0.0
SO LOCATION  LWUNIT4   POINT    0.0      0.0      0.0
**
** Source Parameter Cards:
** POINT:   SRCID             QS      HS       TS        VS       DS
**                           (g/s)    (m)      (K)      (m/s)     (m)
SO SRCPARAM  HRLD5045        8.1     45.7     377.6     13.74     5.49
SO SRCPARAM  HRLD5095        7.3     45.7     377.6     13.33     5.49
SO SRCPARAM  LWUNIT4     -129.85     35.1     418.2      17.0     2.29

SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID HRLD5045    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5045    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5045    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDWID HRLD5045    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5045    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5045    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID HRLD5095    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5095    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5095    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDWID HRLD5095    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5095    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5095    25.67   25.00   23.56   21.41   18.61   15.24

SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92

SO EMISUNIT    .100000E+07 (GRAMS/SEC)          (MICROGRAMS/CUBIC-METER)
SO SRCGROUP HRLD5045 HRLD5045 LWUNIT4
SO SRCGROUP HRLD5095 HRLD5095 LWUNIT4
SO FINISHED

RE STARTING
RE GRIDPOLR POL STA
RE GRIDPOLR POL ORIG   0.0   0.0
RE GRIDPOLR POL DIST  100 200 300 400
RE GRIDPOLR POL GDIR    5  220.00  10.00
RE GRIDPOLR POL END
RE FINISHED
```

```
ME STARTING
ME INPUTFIL D:\MET\WPBPRL87.BIN        UNFORM
ME ANEMHGHT  33 FEET
ME SURFDATA  12844  1987            W_PALM_BCH
ME UAIRDATA  12844  1987            W_PALM_BCH
ME WINDCATS    1.54    3.09    5.14    8.23   10.80
ME FINISHED


OU STARTING
OU RECTABLE ALLAVE FIRST SECOND
OU FINISHED

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

  *** ISCST3 - VERSION 98356 ***     *** 1987 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99     ***
                                   ***  HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset           ***

**MODELOPTs: CONC                        RURAL  FLAT          DFAULT

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Simple Terrain Model is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses Regulatory DEFAULT Options:
          1. Final Plume Rise.
          2. Stack-tip Downwash.
          3. Buoyancy-induced Dispersion.
          4. Use Calms Processing Routine.
          5. Not Use Missing Data Processing Routine.
          6. Default Wind Profile Exponents.
          7. Default Vertical Potential Temperature Gradients.
          8. "Upper Bound" Values for Supersquat Buildings.
          9. No Exponential Decay for RURAL Mode

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR

**This Run Includes:     3 Source(s);      2 Source Group(s); and      20 Receptor(s)

**The Model Assumes A Pollutant Type of:  SO2

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                               m for Missing Hours
                                                               b for Both Calm and Missing Hours

**Misc. Inputs:  Anem. Hgt. (m) =    10.06 ;    Decay Coef. =   0.0000     ;    Rot. Angle =     0.0
                 Emission Units = (GRAMS/SEC)                              ;  Emission Rate Unit Factor =   0.1000
                 Output Units   = (MICROGRAMS/CUBIC-METER)

**Approximate Storage Requirements of Model =     1.2 MB of RAM.

**Input Runstream File:          SO2XOFF.I87
**Output Print File:             SO2XOFF.O87
  *** ISCST3 - VERSION 98356 ***    *** 1987 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99     ***
                                  ***  HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset           ***

**MODELOPTs: CONC                        RURAL  FLAT          DFAULT
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSIO SCALAR BY
HRLD5045	0	0.81000E+01	0.0	0.0	0.0	45.70	377.60	13.74	5.49	YES	
HRLD5095	0	0.73000E+01	0.0	0.0	0.0	45.70	377.60	13.33	5.49	YES	
LWUNIT4	0	-.12985E+03	0.0	0.0	0.0	35.10	418.20	17.00	2.29	YES	

*** ISCST3 - VERSION 98356 *** *** 1987 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

HRLD5045 HRLD5045, LWUNIT4 ,

HRLD5095 HRLD5095, LWUNIT4 ,

*** ISCST3 - VERSION 98356 *** *** 1987 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: HRLD5045

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	21.3,	18.6,	0	2	21.3,	21.4,	0	3	21.3,	23.6,	0	4	21.3,	25.0,	0	5	21.3,	25.7,	0	6
7	21.3,	24.7,	0	8	21.3,	23.1,	0	9	21.3,	20.7,	0	10	21.3,	23.1,	0	11	21.3,	24.7,	0	12
13	21.3,	25.7,	0	14	21.3,	25.0,	0	15	21.3,	23.6,	0	16	21.3,	21.4,	0	17	21.3,	18.6,	0	18
19	21.3,	18.6,	0	20	21.3,	21.4,	0	21	21.3,	23.6,	0	22	21.3,	25.0,	0	23	21.3,	25.7,	0	24
25	21.3,	24.7,	0	26	21.3,	23.1,	0	27	21.3,	20.7,	0	28	21.3,	23.1,	0	29	21.3,	24.7,	0	30
31	21.3,	25.7,	0	32	21.3,	25.0,	0	33	21.3,	23.6,	0	34	21.3,	21.4,	0	35	21.3,	18.6,	0	36

SOURCE ID: HRLD5095

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	21.3,	18.6,	0	2	21.3,	21.4,	0	3	21.3,	23.6,	0	4	21.3,	25.0,	0	5	21.3,	25.7,	0	6
7	21.3,	24.7,	0	8	21.3,	23.1,	0	9	21.3,	20.7,	0	10	21.3,	23.1,	0	11	21.3,	24.7,	0	12
13	21.3,	25.7,	0	14	21.3,	25.0,	0	15	21.3,	23.6,	0	16	21.3,	21.4,	0	17	21.3,	18.6,	0	18
19	21.3,	18.6,	0	20	21.3,	21.4,	0	21	21.3,	23.6,	0	22	21.3,	25.0,	0	23	21.3,	25.7,	0	24
25	21.3,	24.7,	0	26	21.3,	23.1,	0	27	21.3,	20.7,	0	28	21.3,	23.1,	0	29	21.3,	24.7,	0	30
31	21.3,	25.7,	0	32	21.3,	25.0,	0	33	21.3,	23.6,	0	34	21.3,	21.4,	0	35	21.3,	18.6,	0	36

SOURCE ID: LWUNIT4

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	24.4,	121.9,	0	2	24.4,	121.9,	0	3	24.4,	121.9,	0	4	24.4,	121.9,	0	5	24.4,	121.9,	0	6
7	24.4,	121.9,	0	8	24.4,	121.9,	0	9	24.4,	121.9,	0	10	24.4,	121.9,	0	11	24.4,	121.9,	0	12
13	24.4,	121.9,	0	14	24.4,	121.9,	0	15	24.4,	121.9,	0	16	24.4,	121.9,	0	17	24.4,	121.9,	0	18
19	24.4,	121.9,	0	20	24.4,	121.9,	0	21	24.4,	121.9,	0	22	24.4,	121.9,	0	23	24.4,	121.9,	0	24
25	24.4,	121.9,	0	26	24.4,	121.9,	0	27	24.4,	121.9,	0	28	24.4,	121.9,	0	29	24.4,	121.9,	0	30
31	24.4,	121.9,	0	32	24.4,	121.9,	0	33	24.4,	121.9,	0	34	24.4,	121.9,	0	35	24.4,	121.9,	0	36

*** ISCST3 - VERSION 98356 *** *** 1987 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

*** ORIGIN FOR POLAR NETWORK ***
X-ORIG = 0.00 ; Y-ORIG = 0.00 (METERS)

*** DISTANCE RANGES OF NETWORK ***
(METERS)

100.0, 200.0, 300.0, 400.0,

*** DIRECTION RADIALS OF NETWORK ***
(DEGREES)

220.0, 230.0, 240.0, 250.0, 260.0,

*** ISCST3 - VERSION 98356 *** *** 1987 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** ISCST3 - VERSION 98356 *** *** 1987 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: D:\MET\WPBPRL87.BIN
FORMAT: UNFORM
SURFACE STATION NO.: 12844 UPPER AIR STATION NO.: 12844
NAME: W_PALM_BCH NAME: W_PALM_BCH
YEAR: 1987 YEAR: 1987

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
87	1	1	1	351.0	7.20	293.7	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	2	8.0	8.75	294.3	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00

87	1	1	3	14.0	6.69	293.2	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	4	13.0	6.69	293.2	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	5	43.0	8.23	293.7	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	6	32.0	5.66	293.2	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	7	25.0	6.69	293.2	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	8	53.0	6.17	293.7	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	9	77.0	8.75	294.8	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	10	91.0	8.23	293.2	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	11	114.0	8.23	294.8	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	12	96.0	6.69	295.4	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	13	73.0	9.77	294.8	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	14	69.0	9.77	294.3	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	15	102.0	9.26	294.3	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	16	114.0	7.20	293.2	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	17	101.0	9.26	291.5	4	420.0	420.0	0.0000	0.0	0.0000	0	0.00
87	1	1	18	97.0	6.69	289.3	4	425.8	425.8	0.0000	0.0	0.0000	0	0.00
87	1	1	19	94.0	5.14	288.7	5	439.3	477.9	0.0000	0.0	0.0000	0	0.00
87	1	1	20	107.0	6.17	288.2	4	452.8	452.8	0.0000	0.0	0.0000	0	0.00
87	1	1	21	100.0	4.63	287.0	5	466.3	559.2	0.0000	0.0	0.0000	0	0.00
87	1	1	22	92.0	4.63	286.5	5	479.8	599.8	0.0000	0.0	0.0000	0	0.00
87	1	1	23	70.0	4.12	286.5	5	493.3	640.4	0.0000	0.0	0.0000	0	0.00
87	1	1	24	70.0	4.12	285.9	5	506.8	681.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

*** ISCST3 - VERSION 98356 *** *** 1987 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD504
INCLUDING SOURCE(S): HRLD5045, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	400.00
220.0	0.00000 (87021124)	0.00013 (87122724)	0.00029 (87051124)	0.00033 (87051124)
230.0	0.00000 (87031724)	0.00016 (87122724)	0.00010 (87090924)	0.00012 (87090924)
240.0	0.00000 (87050824)	0.00003 (87031724)	0.00007 (87031724)	0.00007 (87031724)
250.0	0.00000 (87080324)	0.00002 (87080324)	0.00011 (87080324)	0.00013 (87080324)
260.0	0.00000 (87080324)	0.00001 (87080324)	0.00019 (87030224)	0.00016 (87030224)

*** ISCST3 - VERSION 98356 *** *** 1987 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD509
INCLUDING SOURCE(S): HRLD5095, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	400.00
220.0	0.00000 (87021124)	0.00011 (87122724)	0.00026 (87051124)	0.00029 (87051124)
230.0	0.00000 (87031724)	0.00013 (87122724)	0.00009 (87090924)	0.00010 (87090924)
240.0	0.00000 (87050824)	0.00002 (87031724)	0.00006 (87031724)	0.00006 (87031724)
250.0	0.00000 (87080324)	0.00002 (87080324)	0.00009 (87080324)	0.00011 (87080324)
260.0	0.00000 (87080324)	0.00001 (87080324)	0.00016 (87030224)	0.00014 (87030224)

*** ISCST3 - VERSION 98356 *** *** 1987 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 2ND HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD504
INCLUDING SOURCE(S): HRLD5045, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION | DISTANCE (METERS)

(DEGREES)	100.00	200.00	300.00	400.00
220.0	0.00000 (87090924)	0.00003 (87021124)	0.00025 (87122724)	0.00017 (87122724)
230.0	0.00000 (87050824)	0.00003 (87031724)	0.00010 (87050824)	0.00011 (87050824)
240.0	0.00000 (87090524)	0.00002 (87050824)	0.00006 (87090524)	0.00005 (87090524)
250.0	0.00000 (87050824)	0.00000 (87090524)	0.00001 (87090124)	0.00002 (87080624)
260.0	0.00000 (0)	0.00000 (87030224)	0.00003 (87092224)	0.00004 (87092224)

*** ISCST3 - VERSION 98356 *** *** 1987 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 2ND HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD509
INCLUDING SOURCE(S): HRLD5095, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	400.00
220.0	0.00000 (87090924)	0.00003 (87021124)	0.00021 (87122724)	0.00015 (87122724)
230.0	0.00000 (87050824)	0.00003 (87031724)	0.00008 (87050824)	0.00010 (87050824)
240.0	0.00000 (87090524)	0.00001 (87050824)	0.00005 (87090524)	0.00005 (87090524)
250.0	0.00000 (87050824)	0.00000 (87090524)	0.00001 (87090124)	0.00001 (87080624)
260.0	0.00000 (0)	0.00000 (87030224)	0.00003 (87092224)	0.00003 (87092224)

*** ISCST3 - VERSION 98356 *** *** 1987 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

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

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)			OF T
HRLD5045	HIGH 1ST HIGH VALUE IS	0.00033	ON 87051124: AT (	-257.12,	-306.42,	0.00,	0.00)
	HIGH 2ND HIGH VALUE IS	0.00025	ON 87122724: AT (	-192.84,	-229.81,	0.00,	0.00)
HRLD5095	HIGH 1ST HIGH VALUE IS	0.00029	ON 87051124: AT (	-257.12,	-306.42,	0.00,	0.00)
	HIGH 2ND HIGH VALUE IS	0.00021	ON 87122724: AT (	-192.84,	-229.81,	0.00,	0.00)

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

*** ISCST3 - VERSION 98356 *** *** 1987 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

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

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

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 4 Informational Message(s)

A Total of 4 Calm Hours Identified

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

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

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

```
CO STARTING
CO TITLEONE 1988 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99
CO TITLETWO  HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset
CO MODELOPT DFAULT CONC   RURAL NOCMPL
CO AVERTIME  24
CO POLLUTID SO2
CO DCAYCOEF    .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING

** Source Location Cards:
**          SRCID SRCTYP        XS            YS            ZS
** MODELING ORIGIN IS PROPOSED HRSG STACK
**  CT BYPASS STACK LETTER CODE
** ------------------------
** Source Location Cards:
**          SRCID SRCTYP        XS       YS       ZS
**                              (m)      (m)      (m)
SO LOCATION  HRLD5045  POINT    0.0      0.0      0.0
SO LOCATION  HRLD5095  POINT    0.0      0.0      0.0
SO LOCATION  LWUNIT4   POINT    0.0      0.0      0.0
**
** Source Parameter Cards:
** POINT:   SRCID             QS       HS       TS        VS        DS
**                          (g/s)     (m)      (K)      (m/s)      (m)
SO SRCPARAM  HRLD5045        8.1     45.7     377.6     13.74      5.49
SO SRCPARAM  HRLD5095        7.3     45.7     377.6     13.33      5.49
SO SRCPARAM  LWUNIT4      -129.85    35.1     418.2      17.0      2.29

SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID HRLD5045    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5045    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5045    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDWID HRLD5045    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5045    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5045    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID HRLD5095    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5095    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5095    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDWID HRLD5095    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5095    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5095    25.67   25.00   23.56   21.41   18.61   15.24

SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92

SO EMISUNIT    .100000E+07 (GRAMS/SEC)          (MICROGRAMS/CUBIC-METER)
SO SRCGROUP HRLD5045 HRLD5045 LWUNIT4
SO SRCGROUP HRLD5095 HRLD5095 LWUNIT4
SO FINISHED

RE STARTING
RE GRIDPOLR POL STA
RE GRIDPOLR POL ORIG   0.0   0.0
RE GRIDPOLR POL DIST  100 200 300 400
RE GRIDPOLR POL GDIR    5  220.00  10.00
RE GRIDPOLR POL END
RE FINISHED
```

```
ME STARTING
ME INPUTFIL D:\MET\WPBPRL88.BIN        UNFORM
ME ANEMHGHT  33 FEET
ME SURFDATA  12844  1988            W_PALM_BCH
ME UAIRDATA  12844  1988            W_PALM_BCH
ME WINDCATS    1.54    3.09    5.14    8.23   10.80
ME FINISHED


OU STARTING
OU RECTABLE ALLAVE FIRST SECOND
OU FINISHED

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

  *** ISCST3 - VERSION 98356 ***     *** 1988 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99     ***
                                  ***  HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset           ***

**MODELOPTs: CONC                        RURAL  FLAT          DEFAULT

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Simple Terrain Model is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses Regulatory DEFAULT Options:
          1. Final Plume Rise.
          2. Stack-tip Downwash.
          3. Buoyancy-induced Dispersion.
          4. Use Calms Processing Routine.
          5. Not Use Missing Data Processing Routine.
          6. Default Wind Profile Exponents.
          7. Default Vertical Potential Temperature Gradients.
          8. "Upper Bound" Values for Supersquat Buildings.
          9. No Exponential Decay for RURAL Mode

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR

**This Run Includes:     3 Source(s);      2 Source Group(s); and      20 Receptor(s)

**The Model Assumes A Pollutant Type of:  SO2

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Anem. Hgt. (m) =    10.06 ;    Decay Coef. =   0.0000     ;    Rot. Angle =     0.0
                 Emission Units = (GRAMS/SEC)                              ;  Emission Rate Unit Factor =   0.1000
                 Output Units   = (MICROGRAMS/CUBIC-METER)

**Approximate Storage Requirements of Model =     1.2 MB of RAM.

**Input Runstream File:          SO2XOFF.I88
**Output Print File:             SO2XOFF.O88
  *** ISCST3 - VERSION 98356 ***    *** 1988 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99     ***
                                  ***  HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset           ***

**MODELOPTs: CONC                        RURAL  FLAT          DEFAULT
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSIO SCALAR BY
HRLD5045	0	0.81000E+01	0.0	0.0	0.0	45.70	377.60	13.74	5.49	YES	
HRLD5095	0	0.73000E+01	0.0	0.0	0.0	45.70	377.60	13.33	5.49	YES	
LWUNIT4	0	-.12985E+03	0.0	0.0	0.0	35.10	418.20	17.00	2.29	YES	

*** ISCST3 - VERSION 98356 *** *** 1988 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

HRLD5045 HRLD5045, LWUNIT4 ,

HRLD5095 HRLD5095, LWUNIT4 ,

*** ISCST3 - VERSION 98356 *** *** 1988 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: HRLD5045

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	21.3,	18.6,	0	2	21.3,	21.4,	0	3	21.3,	23.6,	0	4	21.3,	25.0,	0	5	21.3,	25.7,	0	6
7	21.3,	24.7,	0	8	21.3,	23.1,	0	9	21.3,	20.7,	0	10	21.3,	23.1,	0	11	21.3,	24.7,	0	12
13	21.3,	25.7,	0	14	21.3,	25.0,	0	15	21.3,	23.6,	0	16	21.3,	21.4,	0	17	21.3,	18.6,	0	18
19	21.3,	18.6,	0	20	21.3,	21.4,	0	21	21.3,	23.6,	0	22	21.3,	25.0,	0	23	21.3,	25.7,	0	24
25	21.3,	24.7,	0	26	21.3,	23.1,	0	27	21.3,	20.7,	0	28	21.3,	23.1,	0	29	21.3,	24.7,	0	30
31	21.3,	25.7,	0	32	21.3,	25.0,	0	33	21.3,	23.6,	0	34	21.3,	21.4,	0	35	21.3,	18.6,	0	36

SOURCE ID: HRLD5095

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	21.3,	18.6,	0	2	21.3,	21.4,	0	3	21.3,	23.6,	0	4	21.3,	25.0,	0	5	21.3,	25.7,	0	6
7	21.3,	24.7,	0	8	21.3,	23.1,	0	9	21.3,	20.7,	0	10	21.3,	23.1,	0	11	21.3,	24.7,	0	12
13	21.3,	25.7,	0	14	21.3,	25.0,	0	15	21.3,	23.6,	0	16	21.3,	21.4,	0	17	21.3,	18.6,	0	18
19	21.3,	18.6,	0	20	21.3,	21.4,	0	21	21.3,	23.6,	0	22	21.3,	25.0,	0	23	21.3,	25.7,	0	24
25	21.3,	24.7,	0	26	21.3,	23.1,	0	27	21.3,	20.7,	0	28	21.3,	23.1,	0	29	21.3,	24.7,	0	30
31	21.3,	25.7,	0	32	21.3,	25.0,	0	33	21.3,	23.6,	0	34	21.3,	21.4,	0	35	21.3,	18.6,	0	36

SOURCE ID: LWUNIT4

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	24.4,	121.9,	0	2	24.4,	121.9,	0	3	24.4,	121.9,	0	4	24.4,	121.9,	0	5	24.4,	121.9,	0	6
7	24.4,	121.9,	0	8	24.4,	121.9,	0	9	24.4,	121.9,	0	10	24.4,	121.9,	0	11	24.4,	121.9,	0	12
13	24.4,	121.9,	0	14	24.4,	121.9,	0	15	24.4,	121.9,	0	16	24.4,	121.9,	0	17	24.4,	121.9,	0	18
19	24.4,	121.9,	0	20	24.4,	121.9,	0	21	24.4,	121.9,	0	22	24.4,	121.9,	0	23	24.4,	121.9,	0	24
25	24.4,	121.9,	0	26	24.4,	121.9,	0	27	24.4,	121.9,	0	28	24.4,	121.9,	0	29	24.4,	121.9,	0	30
31	24.4,	121.9,	0	32	24.4,	121.9,	0	33	24.4,	121.9,	0	34	24.4,	121.9,	0	35	24.4,	121.9,	0	36

*** ISCST3 - VERSION 98356 *** *** 1988 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

*** ORIGIN FOR POLAR NETWORK ***
X-ORIG = 0.00 ; Y-ORIG = 0.00 (METERS)

*** DISTANCE RANGES OF NETWORK ***
(METERS)

100.0, 200.0, 300.0, 400.0,

*** DIRECTION RADIALS OF NETWORK ***
(DEGREES)

220.0, 230.0, 240.0, 250.0, 260.0,

*** ISCST3 - VERSION 98356 *** *** 1988 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** ISCST3 - VERSION 98356 *** *** 1988 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: D:\MET\WPBPRL88.BIN
FORMAT: UNFORM
SURFACE STATION NO.: 12844 UPPER AIR STATION NO.: 12844
NAME: W_PALM_BCH NAME: W_PALM_BCH
YEAR: 1988 YEAR: 1988

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
88	1	1	1	281.0	9.26	292.6	4	1864.6	1864.6	0.0000	0.0	0.0000	0	0.00
88	1	1	2	228.0	4.63	292.0	4	1829.4	1829.4	0.0000	0.0	0.0000	0	0.00

88	1	1	3	304.0	5.66	291.5	4	1794.2	1794.2	0.0000	0.0	0.0000	0	0.00
88	1	1	4	293.0	9.77	293.2	4	1759.0	1759.0	0.0000	0.0	0.0000	0	0.00
88	1	1	5	223.0	4.12	292.0	4	1723.8	1723.8	0.0000	0.0	0.0000	0	0.00
88	1	1	6	282.0	7.20	293.7	4	1688.6	1688.6	0.0000	0.0	0.0000	0	0.00
88	1	1	7	265.0	8.23	293.7	4	1653.4	1653.4	0.0000	0.0	0.0000	0	0.00
88	1	1	8	263.0	6.17	293.7	4	1618.2	1618.2	0.0000	0.0	0.0000	0	0.00
88	1	1	9	277.0	5.66	294.8	4	1583.0	1583.0	0.0000	0.0	0.0000	0	0.00
88	1	1	10	281.0	4.12	293.7	4	1547.8	1547.8	0.0000	0.0	0.0000	0	0.00
88	1	1	11	284.0	7.72	297.0	4	1512.6	1512.6	0.0000	0.0	0.0000	0	0.00
88	1	1	12	286.0	8.75	295.9	4	1477.4	1477.4	0.0000	0.0	0.0000	0	0.00
88	1	1	13	273.0	6.17	295.4	4	1442.2	1442.2	0.0000	0.0	0.0000	0	0.00
88	1	1	14	269.0	4.63	297.0	4	1407.0	1407.0	0.0000	0.0	0.0000	0	0.00
88	1	1	15	342.0	2.06	293.7	4	1407.0	1407.0	0.0000	0.0	0.0000	0	0.00
88	1	1	16	294.0	7.72	295.4	4	1407.0	1407.0	0.0000	0.0	0.0000	0	0.00
88	1	1	17	291.0	4.63	294.8	4	1407.0	1407.0	0.0000	0.0	0.0000	0	0.00
88	1	1	18	267.0	4.12	294.8	4	1386.3	1386.3	0.0000	0.0	0.0000	0	0.00
88	1	1	19	294.0	3.60	293.7	4	1337.7	1337.7	0.0000	0.0	0.0000	0	0.00
88	1	1	20	297.0	6.17	294.8	4	1289.0	1289.0	0.0000	0.0	0.0000	0	0.00
88	1	1	21	290.0	6.69	295.4	4	1240.4	1240.4	0.0000	0.0	0.0000	0	0.00
88	1	1	22	302.0	6.69	295.4	4	1191.8	1191.8	0.0000	0.0	0.0000	0	0.00
88	1	1	23	280.0	7.20	295.4	4	1143.2	1143.2	0.0000	0.0	0.0000	0	0.00
88	1	1	24	310.0	7.20	294.8	4	1094.6	1094.6	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

*** ISCST3 - VERSION 98356 *** *** 1988 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD504
INCLUDING SOURCE(S): HRLD5045, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	400.00
220.0	0.00000 (88013024)	0.00024 (88062224)	0.00063 (88062224)	0.00077 (88062224)
230.0	0.00000 (88071424)	0.00009 (88062224)	0.00021 (88062224)	0.00012 (88062224)
240.0	0.00000 (88072324)	0.00002 (88072324)	0.00012c(88081124)	0.00016c(88081124)
250.0	0.00000c(88081424)	0.00004c(88081424)	0.00007c(88081424)	0.00026 (88011324)
260.0	0.00000c(88081424)	0.00021c(88081424)	0.00051c(88081424)	0.00050c(88081424)

*** ISCST3 - VERSION 98356 *** *** 1988 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD509
INCLUDING SOURCE(S): HRLD5095, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	400.00
220.0	0.00000 (88013024)	0.00021 (88062224)	0.00055 (88062224)	0.00068 (88062224)
230.0	0.00000 (88071424)	0.00008 (88062224)	0.00017 (88062224)	0.00010 (88062224)
240.0	0.00000 (88072324)	0.00002 (88072324)	0.00009 (88072324)	0.00012 (88072324)
250.0	0.00000c(88081424)	0.00003c(88081424)	0.00006c(88081424)	0.00023 (88011324)
260.0	0.00000c(88081424)	0.00018c(88081424)	0.00045c(88081424)	0.00044c(88081424)

*** ISCST3 - VERSION 98356 *** *** 1988 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 2ND HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD504
INCLUDING SOURCE(S): HRLD5045, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION | DISTANCE (METERS)

(DEGREES)	100.00	200.00	300.00	400.00
220.0	0.00000 (88062224)	0.00002 (88072124)	0.00011 (88072124)	0.00021 (88062124)
230.0	0.00000 (88072324)	0.00002 (88071424)	0.00006 (88071424)	0.00006 (88071424)
240.0	0.00000 (88071424)	0.00000 (88043024)	0.00011 (88072324)	0.00014 (88072324)
250.0	0.00000 (88072324)	0.00001 (88070124)	0.00006 (88070124)	0.00005 (88070124)
260.0	0.00000 (88072324)	0.00002 (88072324)	0.00008 (88072324)	0.00019 (88011324)

*** ISCST3 - VERSION 98356 *** *** 1988 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 2ND HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD509
INCLUDING SOURCE(S): HRLD5095, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	400.00
220.0	0.00000 (88062224)	0.00002 (88072124)	0.00009 (88072124)	0.00017 (88062124)
230.0	0.00000 (88072324)	0.00001 (88071424)	0.00005 (88071424)	0.00005 (88071424)
240.0	0.00000 (88071424)	0.00000 (88043024)	0.00008c(88081124)	0.00011c(88081124)
250.0	0.00000 (88072324)	0.00001 (88070124)	0.00005 (88070124)	0.00004 (88070124)
260.0	0.00000 (88072324)	0.00002 (88072324)	0.00007 (88072324)	0.00016 (88011324)

*** ISCST3 - VERSION 98356 *** *** 1988 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

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

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF T
HRLD5045	HIGH 1ST HIGH VALUE IS	0.00077	ON 88062224: AT (	-257.12,	-306.42,	0.00,	0.00)	
	HIGH 2ND HIGH VALUE IS	0.00021	ON 88062124: AT (	-257.12,	-306.42,	0.00,	0.00)	
HRLD5095	HIGH 1ST HIGH VALUE IS	0.00068	ON 88062224: AT (	-257.12,	-306.42,	0.00,	0.00)	
	HIGH 2ND HIGH VALUE IS	0.00017	ON 88062124: AT (	-257.12,	-306.42,	0.00,	0.00)	

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

*** ISCST3 - VERSION 98356 *** *** 1988 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

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

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

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 113 Informational Message(s)

A Total of 113 Calm Hours Identified

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

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

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

****

```
CO STARTING
CO TITLEONE 1989 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99
CO TITLETWO  HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset
CO MODELOPT DFAULT CONC   RURAL NOCMPL
CO AVERTIME  24
CO POLLUTID SO2
CO DCAYCOEF    .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING

** Source Location Cards:
**          SRCID SRCTYP        XS            YS            ZS
** MODELING ORIGIN IS PROPOSED HRSG STACK
**  CT BYPASS STACK LETTER CODE
** ------------------------
** Source Location Cards:
**          SRCID SRCTYP        XS       YS       ZS
**                              (m)      (m)      (m)
SO LOCATION  HRLD5045  POINT    0.0      0.0      0.0
SO LOCATION  HRLD5095  POINT    0.0      0.0      0.0
SO LOCATION  LWUNIT4   POINT    0.0      0.0      0.0
**
** Source Parameter Cards:
** POINT:   SRCID             QS       HS       TS       VS       DS
**                          (g/s)      (m)      (K)     (m/s)      (m)
SO SRCPARAM  HRLD5045        8.1     45.7     377.6     13.74     5.49
SO SRCPARAM  HRLD5095        7.3     45.7     377.6     13.33     5.49
SO SRCPARAM  LWUNIT4     -129.85     35.1     418.2      17.0     2.29

SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID HRLD5045    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5045    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5045    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDWID HRLD5045    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5045    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5045    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID HRLD5095    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5095    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5095    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDWID HRLD5095    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5095    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5095    25.67   25.00   23.56   21.41   18.61   15.24

SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92

SO EMISUNIT    .100000E+07 (GRAMS/SEC)          (MICROGRAMS/CUBIC-METER)
SO SRCGROUP HRLD5045 HRLD5045 LWUNIT4
SO SRCGROUP HRLD5095 HRLD5095 LWUNIT4
SO FINISHED

RE STARTING
RE GRIDPOLR POL STA
RE GRIDPOLR POL ORIG   0.0   0.0
RE GRIDPOLR POL DIST  100 200 300 400
RE GRIDPOLR POL GDIR    5  220.00  10.00
RE GRIDPOLR POL END
RE FINISHED
```

```
ME STARTING
ME INPUTFIL D:\MET\WPBPRL89.BIN        UNFORM
ME ANEMHGHT  33 FEET
ME SURFDATA  12844  1989            W_PALM_BCH
ME UAIRDATA  12844  1989            W_PALM_BCH
ME WINDCATS    1.54    3.09    5.14    8.23   10.80
ME FINISHED


OU STARTING
OU RECTABLE ALLAVE FIRST SECOND
OU FINISHED

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

  *** ISCST3 - VERSION 98356 ***     *** 1989 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99     ***
                                   ***  HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset           ***

**MODELOPTs: CONC                        RURAL  FLAT          DFAULT

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Simple Terrain Model is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses Regulatory DEFAULT Options:
          1. Final Plume Rise.
          2. Stack-tip Downwash.
          3. Buoyancy-induced Dispersion.
          4. Use Calms Processing Routine.
          5. Not Use Missing Data Processing Routine.
          6. Default Wind Profile Exponents.
          7. Default Vertical Potential Temperature Gradients.
          8. "Upper Bound" Values for Supersquat Buildings.
          9. No Exponential Decay for RURAL Mode

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR

**This Run Includes:     3 Source(s);      2 Source Group(s); and      20 Receptor(s)

**The Model Assumes A Pollutant Type of:  SO2

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Anem. Hgt. (m) =    10.06 ;    Decay Coef. =   0.0000     ;    Rot. Angle =     0.0
                 Emission Units = (GRAMS/SEC)                              ;  Emission Rate Unit Factor =   0.1000
                 Output Units   = (MICROGRAMS/CUBIC-METER)

**Approximate Storage Requirements of Model =     1.2 MB of RAM.

**Input Runstream File:          SO2XOFF.I89
**Output Print File:             SO2XOFF.O89
  *** ISCST3 - VERSION 98356 ***    *** 1989 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99    ***
                                   ***  HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset           ***

**MODELOPTs: CONC                        RURAL  FLAT          DFAULT
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSIO SCALAR BY
HRLD5045	0	0.81000E+01	0.0	0.0	0.0	45.70	377.60	13.74	5.49	YES	
HRLD5095	0	0.73000E+01	0.0	0.0	0.0	45.70	377.60	13.33	5.49	YES	
LWUNIT4	0	-.12985E+03	0.0	0.0	0.0	35.10	418.20	17.00	2.29	YES	

*** ISCST3 - VERSION 98356 *** *** 1989 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
HRLD5045	HRLD5045, LWUNIT4 ,
HRLD5095	HRLD5095, LWUNIT4 ,

*** ISCST3 - VERSION 98356 *** *** 1989 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: HRLD5045

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	21.3,	18.6,	0	2	21.3,	21.4,	0	3	21.3,	23.6,	0	4	21.3,	25.0,	0	5	21.3,	25.7,	0	6
7	21.3,	24.7,	0	8	21.3,	23.1,	0	9	21.3,	20.7,	0	10	21.3,	23.1,	0	11	21.3,	24.7,	0	12
13	21.3,	25.7,	0	14	21.3,	25.0,	0	15	21.3,	23.6,	0	16	21.3,	21.4,	0	17	21.3,	18.6,	0	18
19	21.3,	18.6,	0	20	21.3,	21.4,	0	21	21.3,	23.6,	0	22	21.3,	25.0,	0	23	21.3,	25.7,	0	24
25	21.3,	24.7,	0	26	21.3,	23.1,	0	27	21.3,	20.7,	0	28	21.3,	23.1,	0	29	21.3,	24.7,	0	30
31	21.3,	25.7,	0	32	21.3,	25.0,	0	33	21.3,	23.6,	0	34	21.3,	21.4,	0	35	21.3,	18.6,	0	36

SOURCE ID: HRLD5095

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	21.3,	18.6,	0	2	21.3,	21.4,	0	3	21.3,	23.6,	0	4	21.3,	25.0,	0	5	21.3,	25.7,	0	6
7	21.3,	24.7,	0	8	21.3,	23.1,	0	9	21.3,	20.7,	0	10	21.3,	23.1,	0	11	21.3,	24.7,	0	12
13	21.3,	25.7,	0	14	21.3,	25.0,	0	15	21.3,	23.6,	0	16	21.3,	21.4,	0	17	21.3,	18.6,	0	18
19	21.3,	18.6,	0	20	21.3,	21.4,	0	21	21.3,	23.6,	0	22	21.3,	25.0,	0	23	21.3,	25.7,	0	24
25	21.3,	24.7,	0	26	21.3,	23.1,	0	27	21.3,	20.7,	0	28	21.3,	23.1,	0	29	21.3,	24.7,	0	30
31	21.3,	25.7,	0	32	21.3,	25.0,	0	33	21.3,	23.6,	0	34	21.3,	21.4,	0	35	21.3,	18.6,	0	36

SOURCE ID: LWUNIT4

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	24.4,	121.9,	0	2	24.4,	121.9,	0	3	24.4,	121.9,	0	4	24.4,	121.9,	0	5	24.4,	121.9,	0	6
7	24.4,	121.9,	0	8	24.4,	121.9,	0	9	24.4,	121.9,	0	10	24.4,	121.9,	0	11	24.4,	121.9,	0	12
13	24.4,	121.9,	0	14	24.4,	121.9,	0	15	24.4,	121.9,	0	16	24.4,	121.9,	0	17	24.4,	121.9,	0	18
19	24.4,	121.9,	0	20	24.4,	121.9,	0	21	24.4,	121.9,	0	22	24.4,	121.9,	0	23	24.4,	121.9,	0	24
25	24.4,	121.9,	0	26	24.4,	121.9,	0	27	24.4,	121.9,	0	28	24.4,	121.9,	0	29	24.4,	121.9,	0	30
31	24.4,	121.9,	0	32	24.4,	121.9,	0	33	24.4,	121.9,	0	34	24.4,	121.9,	0	35	24.4,	121.9,	0	36

*** ISCST3 - VERSION 98356 *** *** 1989 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

*** ORIGIN FOR POLAR NETWORK ***
X-ORIG = 0.00 ; Y-ORIG = 0.00 (METERS)

*** DISTANCE RANGES OF NETWORK ***
(METERS)

100.0, 200.0, 300.0, 400.0,

*** DIRECTION RADIALS OF NETWORK ***
(DEGREES)

220.0, 230.0, 240.0, 250.0, 260.0,

*** ISCST3 - VERSION 98356 *** *** 1989 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
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NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** ISCST3 - VERSION 98356 *** *** 1989 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: D:\MET\WPBPRL89.BIN
FORMAT: UNFORM
SURFACE STATION NO.: 12844 UPPER AIR STATION NO.: 12844
NAME: W_PALM_BCH NAME: W_PALM_BCH
YEAR: 1989 YEAR: 1989

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
89	1	1	1	81.0	1.00	291.5	7	1325.4	84.0	0.0000	0.0	0.0000	0	0.00
89	1	1	2	78.0	1.00	290.9	7	1335.1	84.0	0.0000	0.0	0.0000	0	0.00

89	1	1	3	84.0	1.00	290.9	7	1344.8	84.0	0.0000	0.0	0.0000	0	0.00
89	1	1	4	153.0	2.57	290.9	6	1354.6	84.0	0.0000	0.0	0.0000	0	0.00
89	1	1	5	163.0	2.57	290.9	6	1364.3	84.0	0.0000	0.0	0.0000	0	0.00
89	1	1	6	162.0	1.00	290.9	7	1374.1	84.0	0.0000	0.0	0.0000	0	0.00
89	1	1	7	165.0	1.54	290.9	7	1383.8	84.0	0.0000	0.0	0.0000	0	0.00
89	1	1	8	143.0	1.54	291.5	6	166.7	241.0	0.0000	0.0	0.0000	0	0.00
89	1	1	9	57.0	1.54	294.3	5	380.9	442.8	0.0000	0.0	0.0000	0	0.00
89	1	1	10	31.0	2.57	297.0	4	595.1	644.7	0.0000	0.0	0.0000	0	0.00
89	1	1	11	4.0	4.63	299.8	3	809.3	846.5	0.0000	0.0	0.0000	0	0.00
89	1	1	12	326.0	3.60	300.9	2	1023.6	1048.3	0.0000	0.0	0.0000	0	0.00
89	1	1	13	323.0	6.17	301.5	3	1237.8	1250.2	0.0000	0.0	0.0000	0	0.00
89	1	1	14	319.0	5.14	300.4	3	1452.0	1452.0	0.0000	0.0	0.0000	0	0.00
89	1	1	15	322.0	6.69	300.4	4	1452.0	1452.0	0.0000	0.0	0.0000	0	0.00
89	1	1	16	324.0	6.69	299.3	4	1452.0	1452.0	0.0000	0.0	0.0000	0	0.00
89	1	1	17	331.0	5.66	298.2	4	1452.0	1452.0	0.0000	0.0	0.0000	0	0.00
89	1	1	18	337.0	4.63	296.5	5	1454.8	1390.2	0.0000	0.0	0.0000	0	0.00
89	1	1	19	344.0	4.12	295.4	5	1461.4	1245.1	0.0000	0.0	0.0000	0	0.00
89	1	1	20	337.0	2.57	294.3	6	1468.0	1100.1	0.0000	0.0	0.0000	0	0.00
89	1	1	21	30.0	2.57	294.3	6	1474.6	955.1	0.0000	0.0	0.0000	0	0.00
89	1	1	22	142.0	2.06	293.7	6	1481.3	810.1	0.0000	0.0	0.0000	0	0.00
89	1	1	23	40.0	3.60	293.2	5	1487.9	665.0	0.0000	0.0	0.0000	0	0.00
89	1	1	24	20.0	4.12	293.2	5	1494.5	520.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.
*** ISCST3 - VERSION 98356 *** *** 1989 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD504
INCLUDING SOURCE(S): HRLD5045, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	400.00
220.0	0.00000c(89123024)	0.00021c(89090224)	0.00050c(89090224)	0.00053c(89090224)
230.0	0.00000 (89011824)	0.00017c(89090224)	0.00032c(89090224)	0.00033 (89090324)
240.0	0.00000 (89020624)	0.00002 (89061424)	0.00022 (89090324)	0.00027 (89090324)
250.0	0.00000 (89020624)	0.00003 (89020624)	0.00030 (89052324)	0.00035 (89052324)
260.0	0.00000 (89111524)	0.00003 (89011724)	0.00026 (89052324)	0.00029 (89052324)

*** ISCST3 - VERSION 98356 *** *** 1989 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD509
INCLUDING SOURCE(S): HRLD5095, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	400.00
220.0	0.00000c(89123024)	0.00018c(89090224)	0.00044c(89090224)	0.00046c(89090224)
230.0	0.00000 (89011824)	0.00013c(89090224)	0.00025 (89090324)	0.00029 (89090324)
240.0	0.00000 (89020624)	0.00002 (89061424)	0.00018 (89090324)	0.00023 (89090324)
250.0	0.00000 (89020624)	0.00003 (89020624)	0.00026 (89052324)	0.00030 (89052324)
260.0	0.00000 (89111524)	0.00002 (89011724)	0.00023 (89052324)	0.00025 (89052324)

*** ISCST3 - VERSION 98356 *** *** 1989 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 2ND HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD504
INCLUDING SOURCE(S): HRLD5045, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION | DISTANCE (METERS)

(DEGREES)	100.00	200.00	300.00	400.00
220.0	0.00000 (89011824)	0.00019c(89123024)	0.00035c(89081424)	0.00045c(89081424)
230.0	0.00000 (89032224)	0.00003 (89032224)	0.00029 (89090324)	0.00032c(89090224)
240.0	0.00000 (89061424)	0.00002 (89020624)	0.00009 (89061424)	0.00011 (89061424)
250.0	0.00000 (89111524)	0.00001 (89111524)	0.00011 (89020624)	0.00030 (89091824)
260.0	0.00000 (89020624)	0.00003 (89111524)	0.00011 (89111524)	0.00014 (89111524)

*** ISCST3 - VERSION 98356 *** *** 1989 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 2ND HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD509
INCLUDING SOURCE(S): HRLD5095, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	400.00
220.0	0.00000 (89011824)	0.00016c(89123024)	0.00031c(89081424)	0.00039c(89081424)
230.0	0.00000 (89032224)	0.00003 (89032224)	0.00024c(89090224)	0.00024c(89090224)
240.0	0.00000 (89061424)	0.00002 (89020624)	0.00008 (89061424)	0.00009 (89061424)
250.0	0.00000 (89111524)	0.00001 (89111524)	0.00009 (89020624)	0.00026 (89091824)
260.0	0.00000 (89020624)	0.00002 (89111524)	0.00009 (89111524)	0.00012 (89111524)

*** ISCST3 - VERSION 98356 *** *** 1989 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

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

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF T
HRLD5045	HIGH 1ST HIGH VALUE IS	0.00053c	ON 89090224: AT (	-257.12,	-306.42,	0.00,	0.00)	
	HIGH 2ND HIGH VALUE IS	0.00045c	ON 89081424: AT (	-257.12,	-306.42,	0.00,	0.00)	
HRLD5095	HIGH 1ST HIGH VALUE IS	0.00046c	ON 89090224: AT (	-257.12,	-306.42,	0.00,	0.00)	
	HIGH 2ND HIGH VALUE IS	0.00039c	ON 89081424: AT (	-257.12,	-306.42,	0.00,	0.00)	

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

*** ISCST3 - VERSION 98356 *** *** 1989 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

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

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

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 169 Informational Message(s)

A Total of 169 Calm Hours Identified

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

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

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

****

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CO STARTING
CO TITLEONE 1990 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99
CO TITLETWO  HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset
CO MODELOPT DFAULT CONC   RURAL NOCMPL
CO AVERTIME  24
CO POLLUTID SO2
CO DCAYCOEF    .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING

** Source Location Cards:
**          SRCID SRCTYP        XS            YS            ZS
** MODELING ORIGIN IS PROPOSED HRSG STACK
**  CT BYPASS STACK LETTER CODE
** ------------------------
** Source Location Cards:
**          SRCID SRCTYP        XS       YS       ZS
**                              (m)      (m)      (m)
SO LOCATION  HRLD5045  POINT    0.0      0.0      0.0
SO LOCATION  HRLD5095  POINT    0.0      0.0      0.0
SO LOCATION  LWUNIT4   POINT    0.0      0.0      0.0
**

** Source Parameter Cards:
** POINT:   SRCID             QS       HS        TS        VS        DS
**                          (g/s)     (m)       (K)      (m/s)      (m)
SO SRCPARAM  HRLD5045        8.1     45.7      377.6     13.74      5.49
SO SRCPARAM  HRLD5095        7.3     45.7      377.6     13.33      5.49
SO SRCPARAM  LWUNIT4     -129.85     35.1      418.2      17.0      2.29

SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID HRLD5045    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5045    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5045    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDWID HRLD5045    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5045    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5045    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID HRLD5095    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5095    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5095    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDWID HRLD5095    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5095    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5095    25.67   25.00   23.56   21.41   18.61   15.24

SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92

SO EMISUNIT    .100000E+07 (GRAMS/SEC)          (MICROGRAMS/CUBIC-METER)
SO SRCGROUP HRLD5045 HRLD5045 LWUNIT4
SO SRCGROUP HRLD5095 HRLD5095 LWUNIT4
SO FINISHED

RE STARTING
RE GRIDPOLR POL STA
RE GRIDPOLR POL ORIG   0.0   0.0
RE GRIDPOLR POL DIST  100 200 300 400
RE GRIDPOLR POL GDIR    5  220.00  10.00
RE GRIDPOLR POL END
RE FINISHED
```

```
ME STARTING
ME INPUTFIL D:\MET\WPBPRL90.BIN        UNFORM
ME ANEMHGHT  33 FEET
ME SURFDATA  12844  1990            W_PALM_BCH
ME UAIRDATA  12844  1990            W_PALM_BCH
ME WINDCATS    1.54    3.09    5.14    8.23   10.80
ME FINISHED


OU STARTING
OU RECTABLE ALLAVE FIRST SECOND
OU FINISHED

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

  *** ISCST3 - VERSION 98356 ***    *** 1990 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99    ***
                                 ***  HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset           ***

**MODELOPTs: CONC                        RURAL  FLAT          DFAULT

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Simple Terrain Model is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses Regulatory DEFAULT Options:
          1. Final Plume Rise.
          2. Stack-tip Downwash.
          3. Buoyancy-induced Dispersion.
          4. Use Calms Processing Routine.
          5. Not Use Missing Data Processing Routine.
          6. Default Wind Profile Exponents.
          7. Default Vertical Potential Temperature Gradients.
          8. "Upper Bound" Values for Supersquat Buildings.
          9. No Exponential Decay for RURAL Mode

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR

**This Run Includes:     3 Source(s);      2 Source Group(s); and      20 Receptor(s)

**The Model Assumes A Pollutant Type of:  SO2

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Anem. Hgt. (m) =    10.06 ;    Decay Coef. =   0.0000     ;    Rot. Angle =     0.0
                 Emission Units = (GRAMS/SEC)                              ;  Emission Rate Unit Factor =   0.1000
                 Output Units   = (MICROGRAMS/CUBIC-METER)

**Approximate Storage Requirements of Model =     1.2 MB of RAM.

**Input Runstream File:          SO2XOFF.I90
**Output Print File:             SO2XOFF.O90
  *** ISCST3 - VERSION 98356 ***    *** 1990 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99    ***
                                  ***  HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset           ***

**MODELOPTs: CONC                        RURAL  FLAT          DFAULT
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSIO SCALAR BY
HRLD5045	0	0.81000E+01	0.0	0.0	0.0	45.70	377.60	13.74	5.49	YES	
HRLD5095	0	0.73000E+01	0.0	0.0	0.0	45.70	377.60	13.33	5.49	YES	
LWUNIT4	0	-.12985E+03	0.0	0.0	0.0	35.10	418.20	17.00	2.29	YES	

**MODELOPTs: CONC RURAL FLAT DFAULT

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
HRLD5045	HRLD5045, LWUNIT4 ,
HRLD5095	HRLD5095, LWUNIT4 ,

*** ISCST3 - VERSION 98356 *** *** 1990 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: HRLD5045

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	21.3,	18.6,	0	2	21.3,	21.4,	0	3	21.3,	23.6,	0	4	21.3,	25.0,	0	5	21.3,	25.7,	0	6
7	21.3,	24.7,	0	8	21.3,	23.1,	0	9	21.3,	20.7,	0	10	21.3,	23.1,	0	11	21.3,	24.7,	0	12
13	21.3,	25.7,	0	14	21.3,	25.0,	0	15	21.3,	23.6,	0	16	21.3,	21.4,	0	17	21.3,	18.6,	0	18
19	21.3,	18.6,	0	20	21.3,	21.4,	0	21	21.3,	23.6,	0	22	21.3,	25.0,	0	23	21.3,	25.7,	0	24
25	21.3,	24.7,	0	26	21.3,	23.1,	0	27	21.3,	20.7,	0	28	21.3,	23.1,	0	29	21.3,	24.7,	0	30
31	21.3,	25.7,	0	32	21.3,	25.0,	0	33	21.3,	23.6,	0	34	21.3,	21.4,	0	35	21.3,	18.6,	0	36

SOURCE ID: HRLD5095

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	21.3,	18.6,	0	2	21.3,	21.4,	0	3	21.3,	23.6,	0	4	21.3,	25.0,	0	5	21.3,	25.7,	0	6
7	21.3,	24.7,	0	8	21.3,	23.1,	0	9	21.3,	20.7,	0	10	21.3,	23.1,	0	11	21.3,	24.7,	0	12
13	21.3,	25.7,	0	14	21.3,	25.0,	0	15	21.3,	23.6,	0	16	21.3,	21.4,	0	17	21.3,	18.6,	0	18
19	21.3,	18.6,	0	20	21.3,	21.4,	0	21	21.3,	23.6,	0	22	21.3,	25.0,	0	23	21.3,	25.7,	0	24
25	21.3,	24.7,	0	26	21.3,	23.1,	0	27	21.3,	20.7,	0	28	21.3,	23.1,	0	29	21.3,	24.7,	0	30
31	21.3,	25.7,	0	32	21.3,	25.0,	0	33	21.3,	23.6,	0	34	21.3,	21.4,	0	35	21.3,	18.6,	0	36

SOURCE ID: LWUNIT4

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	24.4,	121.9,	0	2	24.4,	121.9,	0	3	24.4,	121.9,	0	4	24.4,	121.9,	0	5	24.4,	121.9,	0	6
7	24.4,	121.9,	0	8	24.4,	121.9,	0	9	24.4,	121.9,	0	10	24.4,	121.9,	0	11	24.4,	121.9,	0	12
13	24.4,	121.9,	0	14	24.4,	121.9,	0	15	24.4,	121.9,	0	16	24.4,	121.9,	0	17	24.4,	121.9,	0	18
19	24.4,	121.9,	0	20	24.4,	121.9,	0	21	24.4,	121.9,	0	22	24.4,	121.9,	0	23	24.4,	121.9,	0	24
25	24.4,	121.9,	0	26	24.4,	121.9,	0	27	24.4,	121.9,	0	28	24.4,	121.9,	0	29	24.4,	121.9,	0	30
31	24.4,	121.9,	0	32	24.4,	121.9,	0	33	24.4,	121.9,	0	34	24.4,	121.9,	0	35	24.4,	121.9,	0	36

*** ISCST3 - VERSION 98356 *** *** 1990 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

*** ORIGIN FOR POLAR NETWORK ***
X-ORIG = 0.00 ; Y-ORIG = 0.00 (METERS)

*** DISTANCE RANGES OF NETWORK ***
(METERS)

100.0, 200.0, 300.0, 400.0,

*** DIRECTION RADIALS OF NETWORK ***
(DEGREES)

220.0, 230.0, 240.0, 250.0, 260.0,

*** ISCST3 - VERSION 98356 *** *** 1990 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** ISCST3 - VERSION 98356 *** *** 1990 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: D:\MET\WPBPRL90.BIN
FORMAT: UNFORM
SURFACE STATION NO.: 12844 UPPER AIR STATION NO.: 12844
NAME: W_PALM_BCH NAME: W_PALM_BCH
YEAR: 1990 YEAR: 1990

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
90	1	1	1	11.0	3.09	293.2	6	1390.0	520.0	0.0000	0.0	0.0000	0	0.00
90	1	1	2	358.0	3.60	293.2	5	1390.0	520.0	0.0000	0.0	0.0000	0	0.00

90	1	1	3	54.0	3.09	293.2	6	1390.0	520.0	0.0000	0.0	0.0000	0	0.00
90	1	1	4	343.0	3.09	292.6	6	1390.0	520.0	0.0000	0.0	0.0000	0	0.00
90	1	1	5	33.0	3.60	293.2	5	1390.0	520.0	0.0000	0.0	0.0000	0	0.00
90	1	1	6	32.0	3.60	292.6	5	1390.0	520.0	0.0000	0.0	0.0000	0	0.00
90	1	1	7	45.0	3.60	292.0	5	1390.0	520.0	0.0000	0.0	0.0000	0	0.00
90	1	1	8	33.0	3.60	292.6	4	159.6	619.9	0.0000	0.0	0.0000	0	0.00
90	1	1	9	27.0	4.63	295.9	3	364.6	748.2	0.0000	0.0	0.0000	0	0.00
90	1	1	10	51.0	6.17	297.6	4	569.7	876.6	0.0000	0.0	0.0000	0	0.00
90	1	1	11	64.0	8.23	299.8	4	774.8	1004.9	0.0000	0.0	0.0000	0	0.00
90	1	1	12	46.0	7.20	299.8	4	979.9	1133.3	0.0000	0.0	0.0000	0	0.00
90	1	1	13	83.0	7.20	301.5	4	1184.9	1261.6	0.0000	0.0	0.0000	0	0.00
90	1	1	14	79.0	6.69	300.9	4	1390.0	1390.0	0.0000	0.0	0.0000	0	0.00
90	1	1	15	132.0	6.17	299.8	4	1390.0	1390.0	0.0000	0.0	0.0000	0	0.00
90	1	1	16	144.0	8.75	299.3	4	1390.0	1390.0	0.0000	0.0	0.0000	0	0.00
90	1	1	17	181.0	10.29	294.3	4	1390.0	1390.0	0.0000	0.0	0.0000	0	0.00
90	1	1	18	187.0	9.26	292.0	4	1389.5	1389.5	0.0000	0.0	0.0000	0	0.00
90	1	1	19	184.0	9.26	291.5	4	1388.4	1388.4	0.0000	0.0	0.0000	0	0.00
90	1	1	20	197.0	7.72	291.5	4	1387.3	1387.3	0.0000	0.0	0.0000	0	0.00
90	1	1	21	190.0	6.69	292.0	4	1386.1	1386.1	0.0000	0.0	0.0000	0	0.00
90	1	1	22	202.0	8.23	292.0	4	1385.0	1385.0	0.0000	0.0	0.0000	0	0.00
90	1	1	23	210.0	5.66	292.0	4	1383.9	1383.9	0.0000	0.0	0.0000	0	0.00
90	1	1	24	200.0	7.72	292.0	4	1382.8	1382.8	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

*** ISCST3 - VERSION 98356 *** *** 1990 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD504
INCLUDING SOURCE(S): HRLD5045, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	400.00
220.0	0.00000 (0)	0.00000 (90062224)	0.00026 (90062224)	0.00028 (90062224)
230.0	0.00000c(90093024)	0.00000c(90093024)	0.00003 (90062224)	0.00002c(90052424)
240.0	0.00000c(90093024)	0.00002c(90093024)	0.00009c(90093024)	0.00030c(90052424)
250.0	0.00000c(90093024)	0.00002c(90093024)	0.00009c(90093024)	0.00026c(90101224)
260.0	0.00000c(90120424)	0.00003c(90120424)	0.00013c(90120424)	0.00019c(90071324)

*** ISCST3 - VERSION 98356 *** *** 1990 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD509
INCLUDING SOURCE(S): HRLD5095, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	400.00
220.0	0.00000 (0)	0.00000 (90062224)	0.00023 (90062224)	0.00025 (90062224)
230.0	0.00000c(90093024)	0.00000c(90093024)	0.00003 (90062224)	0.00002c(90052424)
240.0	0.00000c(90093024)	0.00002c(90093024)	0.00007c(90093024)	0.00026c(90052424)
250.0	0.00000c(90093024)	0.00002c(90093024)	0.00007c(90093024)	0.00023c(90101224)
260.0	0.00000c(90120424)	0.00003c(90120424)	0.00012c(90120424)	0.00017c(90071324)

*** ISCST3 - VERSION 98356 *** *** 1990 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 2ND HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD504
INCLUDING SOURCE(S): HRLD5045, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION | DISTANCE (METERS)

(DEGREES)	100.00	200.00	300.00	400.00
220.0	0.00000 (0)	0.00000c(90121624)	0.00004 (90091224)	0.00014 (90092824)
230.0	0.00000 (0)	0.00000 (90062224)	0.00002c(90070824)	0.00001 (90062224)
240.0	0.00000c(90120424)	0.00000c(90120424)	0.00002 (90013024)	0.00019c(90101224)
250.0	0.00000c(90120424)	0.00001c(90120424)	0.00004 (90013024)	0.00014c(90052424)
260.0	0.00000c(90093024)	0.00000c(90093024)	0.00005c(90070424)	0.00017c(90120424)

*** ISCST3 - VERSION 98356 *** *** 1990 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 2ND HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD509
INCLUDING SOURCE(S): HRLD5095, LMUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	400.00
220.0	0.00000 (0)	0.00000c(90121624)	0.00004 (90091224)	0.00013 (90092824)
230.0	0.00000 (0)	0.00000 (90062224)	0.00002c(90070824)	0.00001 (90062224)
240.0	0.00000c(90120424)	0.00000c(90120424)	0.00002 (90013024)	0.00016c(90101224)
250.0	0.00000c(90120424)	0.00001c(90120424)	0.00004 (90013024)	0.00012c(90052424)
260.0	0.00000c(90093024)	0.00000c(90093024)	0.00004c(90070424)	0.00014c(90120424)

*** ISCST3 - VERSION 98356 *** *** 1990 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

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

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF T
HRLD5045	HIGH 1ST HIGH VALUE IS	0.00030c	ON 90052424: AT (-346.41, -200.00, 0.00, 0.00)		
	HIGH 2ND HIGH VALUE IS	0.00019c	ON 90101224: AT (-346.41, -200.00, 0.00, 0.00)		
HRLD5095	HIGH 1ST HIGH VALUE IS	0.00026c	ON 90052424: AT (-346.41, -200.00, 0.00, 0.00)		
	HIGH 2ND HIGH VALUE IS	0.00016c	ON 90101224: AT (-346.41, -200.00, 0.00, 0.00)		

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

*** ISCST3 - VERSION 98356 *** *** 1990 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

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

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

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 325 Informational Message(s)

A Total of 325 Calm Hours Identified

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

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

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

****

```
CO STARTING
CO TITLEONE 1991 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99
CO TITLETWO  HRSG STACKS, FUEL OIL, 24-hour for SO2L- w/ Unit 4 offset
CO MODELOPT DFAULT CONC   RURAL NOCMPL
CO AVERTIME  24
CO POLLUTID SO2
CO DCAYCOEF    .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING

** Source Location Cards:
**          SRCID SRCTYP        XS            YS            ZS
** MODELING ORIGIN IS PROPOSED HRSG STACK
**  CT BYPASS STACK LETTER CODE
** ------------------------
** Source Location Cards:
**          SRCID SRCTYP        XS       YS       ZS
**                              (m)      (m)      (m)
SO LOCATION  HRLD5045  POINT    0.0      0.0      0.0
SO LOCATION  HRLD5095  POINT    0.0      0.0      0.0
SO LOCATION  LWUNIT4   POINT    0.0      0.0      0.0
**
** Source Parameter Cards:
** POINT:   SRCID             QS      HS       TS       VS       DS
**                          (g/s)    (m)      (K)     (m/s)     (m)
SO SRCPARAM  HRLD5045        8.1    45.7     377.6    13.74     5.49
SO SRCPARAM  HRLD5095        7.3    45.7     377.6    13.33     5.49
SO SRCPARAM  LWUNIT4    -129.85    35.1     418.2     17.0     2.29

SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5045    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID HRLD5045    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5045    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5045    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDWID HRLD5045    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5045    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5045    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT HRLD5095    21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID HRLD5095    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5095    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5095    25.67   25.00   23.56   21.41   18.61   15.24
SO BUILDWID HRLD5095    18.61   21.41   23.56   25.00   25.67   25.57
SO BUILDWID HRLD5095    24.69   23.06   20.73   23.06   24.69   25.57
SO BUILDWID HRLD5095    25.67   25.00   23.56   21.41   18.61   15.24

SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LWUNIT4   24.38   24.38   24.38   24.38   24.38   24.38
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92
SO BUILDWID LWUNIT4  121.92  121.92  121.92  121.92  121.92  121.92

SO EMISUNIT    .100000E+07 (GRAMS/SEC)          (MICROGRAMS/CUBIC-METER)
SO SRCGROUP HRLD5045 HRLD5045 LWUNIT4
SO SRCGROUP HRLD5095 HRLD5095 LWUNIT4
SO FINISHED

RE STARTING
RE GRIDPOLR POL STA
RE GRIDPOLR POL ORIG   0.0   0.0
RE GRIDPOLR POL DIST  100 200 300 400
RE GRIDPOLR POL GDIR    5  220.00  10.00
RE GRIDPOLR POL END
RE FINISHED
```

```
ME STARTING
ME INPUTFIL D:\MET\WPBPRL91.BIN        UNFORM
ME ANEMHGHT  33 FEET
ME SURFDATA  12844  1991             W_PALM_BCH
ME UAIRDATA  12844  1991             W_PALM_BCH
ME WINDCATS    1.54    3.09    5.14    8.23   10.80
ME FINISHED


OU STARTING
OU RECTABLE ALLAVE FIRST SECOND
OU FINISHED

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

  *** ISCST3 - VERSION 98356 ***    *** 1991 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99    ***
                                   ***  HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset          ***

**MODELOPTs: CONC                        RURAL  FLAT          DEFAULT

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Simple Terrain Model is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses Regulatory DEFAULT Options:
           1. Final Plume Rise.
           2. Stack-tip Downwash.
           3. Buoyancy-induced Dispersion.
           4. Use Calms Processing Routine.
           5. Not Use Missing Data Processing Routine.
           6. Default Wind Profile Exponents.
           7. Default Vertical Potential Temperature Gradients.
           8. "Upper Bound" Values for Supersquat Buildings.
           9. No Exponential Decay for RURAL Mode

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR

**This Run Includes:     3 Source(s);      2 Source Group(s); and      20 Receptor(s)

**The Model Assumes A Pollutant Type of:  SO2

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Anem. Hgt. (m) =    10.06 ;    Decay Coef. =   0.0000     ;    Rot. Angle =     0.0
                 Emission Units = (GRAMS/SEC)                              ;  Emission Rate Unit Factor =   0.1000
                 Output Units   = (MICROGRAMS/CUBIC-METER)

**Approximate Storage Requirements of Model =     1.2 MB of RAM.

**Input Runstream File:          SO2XOFF.I91
**Output Print File:             SO2XOFF.O91
  *** ISCST3 - VERSION 98356 ***    *** 1991 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99    ***
                                    ***  HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset          ***

**MODELOPTs: CONC                        RURAL  FLAT          DEFAULT
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSIO SCALAR BY
HRLD5045	0	0.81000E+01	0.0	0.0	0.0	45.70	377.60	13.74	5.49	YES	
HRLD5095	0	0.73000E+01	0.0	0.0	0.0	45.70	377.60	13.33	5.49	YES	
LWUNIT4	0	-.12985E+03	0.0	0.0	0.0	35.10	418.20	17.00	2.29	YES	

*** ISCST3 - VERSION 98356 *** *** 1991 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

HRLD5045 HRLD5045, LWUNIT4 ,

HRLD5095 HRLD5095, LWUNIT4 ,

*** ISCST3 - VERSION 98356 *** *** 1991 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: HRLD5045

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	21.3,	18.6,	0	2	21.3,	21.4,	0	3	21.3,	23.6,	0	4	21.3,	25.0,	0	5	21.3,	25.7,	0	6
7	21.3,	24.7,	0	8	21.3,	23.1,	0	9	21.3,	20.7,	0	10	21.3,	23.1,	0	11	21.3,	24.7,	0	12
13	21.3,	25.7,	0	14	21.3,	25.0,	0	15	21.3,	23.6,	0	16	21.3,	21.4,	0	17	21.3,	18.6,	0	18
19	21.3,	18.6,	0	20	21.3,	21.4,	0	21	21.3,	23.6,	0	22	21.3,	25.0,	0	23	21.3,	25.7,	0	24
25	21.3,	24.7,	0	26	21.3,	23.1,	0	27	21.3,	20.7,	0	28	21.3,	23.1,	0	29	21.3,	24.7,	0	30
31	21.3,	25.7,	0	32	21.3,	25.0,	0	33	21.3,	23.6,	0	34	21.3,	21.4,	0	35	21.3,	18.6,	0	36

SOURCE ID: HRLD5095

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	21.3,	18.6,	0	2	21.3,	21.4,	0	3	21.3,	23.6,	0	4	21.3,	25.0,	0	5	21.3,	25.7,	0	6
7	21.3,	24.7,	0	8	21.3,	23.1,	0	9	21.3,	20.7,	0	10	21.3,	23.1,	0	11	21.3,	24.7,	0	12
13	21.3,	25.7,	0	14	21.3,	25.0,	0	15	21.3,	23.6,	0	16	21.3,	21.4,	0	17	21.3,	18.6,	0	18
19	21.3,	18.6,	0	20	21.3,	21.4,	0	21	21.3,	23.6,	0	22	21.3,	25.0,	0	23	21.3,	25.7,	0	24
25	21.3,	24.7,	0	26	21.3,	23.1,	0	27	21.3,	20.7,	0	28	21.3,	23.1,	0	29	21.3,	24.7,	0	30
31	21.3,	25.7,	0	32	21.3,	25.0,	0	33	21.3,	23.6,	0	34	21.3,	21.4,	0	35	21.3,	18.6,	0	36

SOURCE ID: LWUNIT4

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV
1	24.4,	121.9,	0	2	24.4,	121.9,	0	3	24.4,	121.9,	0	4	24.4,	121.9,	0	5	24.4,	121.9,	0	6
7	24.4,	121.9,	0	8	24.4,	121.9,	0	9	24.4,	121.9,	0	10	24.4,	121.9,	0	11	24.4,	121.9,	0	12
13	24.4,	121.9,	0	14	24.4,	121.9,	0	15	24.4,	121.9,	0	16	24.4,	121.9,	0	17	24.4,	121.9,	0	18
19	24.4,	121.9,	0	20	24.4,	121.9,	0	21	24.4,	121.9,	0	22	24.4,	121.9,	0	23	24.4,	121.9,	0	24
25	24.4,	121.9,	0	26	24.4,	121.9,	0	27	24.4,	121.9,	0	28	24.4,	121.9,	0	29	24.4,	121.9,	0	30
31	24.4,	121.9,	0	32	24.4,	121.9,	0	33	24.4,	121.9,	0	34	24.4,	121.9,	0	35	24.4,	121.9,	0	36

*** ISCST3 - VERSION 98356 *** *** 1991 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

*** ORIGIN FOR POLAR NETWORK ***
X-ORIG = 0.00 ; Y-ORIG = 0.00 (METERS)

*** DISTANCE RANGES OF NETWORK ***
(METERS)

100.0, 200.0, 300.0, 400.0,

*** DIRECTION RADIALS OF NETWORK ***
(DEGREES)

220.0, 230.0, 240.0, 250.0, 260.0,

**MODELOPTs: CONC RURAL FLAT DFAULT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** ISCST3 - VERSION 98356 *** *** 1991 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: D:\MET\WPBPRL91.BIN
FORMAT: UNFORM
SURFACE STATION NO.: 12844 UPPER AIR STATION NO.: 12844
NAME: W_PALM_BCH NAME: W_PALM_BCH
YEAR: 1991 YEAR: 1991

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
91	1	1	1	271.0	3.60	293.7	5	1072.6	428.0	0.0000	0.0	0.0000	0	0.00
91	1	1	2	218.0	2.57	292.6	6	1068.6	428.0	0.0000	0.0	0.0000	0	0.00

91	1	1	3	254.0	4.12	293.7	5	1064.6	428.0	0.0000	0.0	0.0000	0	0.00
91	1	1	4	273.0	5.14	295.9	4	1060.7	1060.7	0.0000	0.0	0.0000	0	0.00
91	1	1	5	273.0	5.14	295.9	5	1056.7	428.0	0.0000	0.0	0.0000	0	0.00
91	1	1	6	252.0	4.63	295.4	5	1052.7	428.0	0.0000	0.0	0.0000	0	0.00
91	1	1	7	265.0	5.14	295.4	5	1048.8	428.0	0.0000	0.0	0.0000	0	0.00
91	1	1	8	283.0	3.60	295.9	4	117.2	496.1	0.0000	0.0	0.0000	0	0.00
91	1	1	9	277.0	5.14	297.6	4	267.8	583.6	0.0000	0.0	0.0000	0	0.00
91	1	1	10	271.0	6.17	298.2	4	418.5	671.0	0.0000	0.0	0.0000	0	0.00
91	1	1	11	284.0	6.69	298.2	4	569.1	758.5	0.0000	0.0	0.0000	0	0.00
91	1	1	12	276.0	8.75	298.7	4	719.7	846.0	0.0000	0.0	0.0000	0	0.00
91	1	1	13	293.0	7.72	298.7	4	870.4	933.5	0.0000	0.0	0.0000	0	0.00
91	1	1	14	299.0	9.77	299.8	4	1021.0	1021.0	0.0000	0.0	0.0000	0	0.00
91	1	1	15	302.0	6.17	299.3	4	1021.0	1021.0	0.0000	0.0	0.0000	0	0.00
91	1	1	16	314.0	7.20	299.3	4	1021.0	1021.0	0.0000	0.0	0.0000	0	0.00
91	1	1	17	321.0	5.14	297.6	4	1021.0	1021.0	0.0000	0.0	0.0000	0	0.00
91	1	1	18	307.0	4.12	296.5	5	1036.3	1027.6	0.0000	0.0	0.0000	0	0.00
91	1	1	19	304.0	3.09	295.9	6	1072.2	1043.2	0.0000	0.0	0.0000	0	0.00
91	1	1	20	297.0	4.12	295.9	5	1108.1	1058.8	0.0000	0.0	0.0000	0	0.00
91	1	1	21	300.0	5.14	295.9	5	1144.0	1074.3	0.0000	0.0	0.0000	0	0.00
91	1	1	22	312.0	3.60	295.9	5	1179.8	1089.9	0.0000	0.0	0.0000	0	0.00
91	1	1	23	320.0	2.57	294.8	6	1215.7	1105.4	0.0000	0.0	0.0000	0	0.00
91	1	1	24	330.0	3.60	294.8	5	1251.6	1121.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

*** ISCST3 - VERSION 98356 *** *** 1991 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD504
INCLUDING SOURCE(S): HRLD5045, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	400.00
220.0	0.00000c(91110124)	0.00018c(91051324)	0.00039c(91051324)	0.00063c(91051324)
230.0	0.00000c(91110124)	0.00003c(91082424)	0.00018 (91041724)	0.00016c(91123124)
240.0	0.00000c(91082424)	0.00000c(91082424)	0.00038 (91041724)	0.00050 (91041724)
250.0	0.00000c(91051624)	0.00001c(91051624)	0.00012 (91041724)	0.00008 (91041724)
260.0	0.00000 (0)	0.00002c(91051624)	0.00009c(91051624)	0.00011c(91051624)

*** ISCST3 - VERSION 98356 *** *** 1991 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD509
INCLUDING SOURCE(S): HRLD5095, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	400.00
220.0	0.00000c(91110124)	0.00015c(91051324)	0.00033c(91051324)	0.00055c(91051324)
230.0	0.00000 (91040524)	0.00002c(91082424)	0.00015 (91041724)	0.00014c(91123124)
240.0	0.00000c(91082424)	0.00000c(91082424)	0.00033 (91041724)	0.00044 (91041724)
250.0	0.00000c(91051624)	0.00001c(91051624)	0.00010 (91041724)	0.00007 (91041724)
260.0	0.00000 (0)	0.00002c(91051624)	0.00008c(91051624)	0.00010c(91051624)

*** ISCST3 - VERSION 98356 *** *** 1991 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DFAULT

*** THE 2ND HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD504
INCLUDING SOURCE(S): HRLD5045, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION | DISTANCE (METERS)

(DEGREES)	100.00	200.00	300.00	400.00
220.0	0.00000c(91070624)	0.00008c(91110124)	0.00013c(91110124)	0.00005c(91110124)
230.0	0.00000c(91082424)	0.00003c(91051324)	0.00012c(91082424)	0.00015 (91041724)
240.0	0.00000c(91051624)	0.00000 (91041724)	0.00003c(91123124)	0.00032c(91123124)
250.0	0.00000 (0)	0.00000 (91041724)	0.00004c(91051624)	0.00003c(91051624)
260.0	0.00000 (0)	0.00000 (91041724)	0.00001 (91041724)	0.00000c(91051524)

*** ISCST3 - VERSION 98356 *** *** 1991 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DEFAULT

*** THE 2ND HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: HRLD509
INCLUDING SOURCE(S): HRLD5095, LWUNIT4 ,

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

DIRECTION | DISTANCE (METERS)

(DEGREES)	100.00	200.00	300.00	400.00
220.0	0.00000c(91070624)	0.00007c(91110124)	0.00011c(91110124)	0.00005c(91110124)
230.0	0.00000c(91110124)	0.00002c(91051324)	0.00010c(91082424)	0.00013 (91041724)
240.0	0.00000c(91051624)	0.00000 (91041724)	0.00002c(91123124)	0.00028c(91123124)
250.0	0.00000 (0)	0.00000 (91041724)	0.00004c(91051624)	0.00002c(91051624)
260.0	0.00000 (0)	0.00000 (91041724)	0.00000 (91041724)	0.00000c(91051524)

*** ISCST3 - VERSION 98356 *** *** 1991 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DEFAULT

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

** CONC OF SO2 IN (MICROGRAMS/CUBIC-METER) **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)			OF T
HRLD5045	HIGH 1ST HIGH VALUE IS	0.00063c	ON 91051324: AT (	-257.12,	-306.42,	0.00,	0.00)
	HIGH 2ND HIGH VALUE IS	0.00032c	ON 91123124: AT (	-346.41,	-200.00,	0.00,	0.00)
HRLD5095	HIGH 1ST HIGH VALUE IS	0.00055c	ON 91051324: AT (	-257.12,	-306.42,	0.00,	0.00)
	HIGH 2ND HIGH VALUE IS	0.00028c	ON 91123124: AT (	-346.41,	-200.00,	0.00,	0.00)

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

*** ISCST3 - VERSION 98356 *** *** 1991 LAKE WORTH PROPOSED GE F7A (100, 200,300,400 M ONLY) 6/20/99 ***
*** HRSG STACKS, FUEL OIL, 24-hour for 50%L- w/ Unit 4 offset ***

**MODELOPTs: CONC RURAL FLAT DEFAULT

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

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

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 566 Informational Message(s)

A Total of 566 Calm Hours Identified

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

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

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

Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

Golder Associates

June 24, 1999

9839537-0100

Bureau of Air Regulation, New Source Review Section
Florida Department of Environmental Protection
2600 Blair Stone Road, Mail Station #5505
Tallahassee, Florida 32399-2400

Attention: Mr. Jeffery F. Koerner, P.E.

RE: DEP File No. 099-0569-001-AC (PSD) Permit Application
LWG Combined Cycle Project
Information Requested

Dear Jeff:

Presented herein is information you requested in your June 17, 1999 e-mail.

1. a. **Why is the duct burner necessary for this system?** The duct burner is needed to maximize the export steam to the City of Lake Worth's Unit No. 3 and Unit 4 to maximum electric generation from the system when the ambient temperatures and electric demands are highest.

   b. **What is the final design heat input for the duct burners?** The designed maximum heat input for the duct burner is 175 mmBtu/hr for 2,000 hours. This is equivalent to 350,000 mmBtu/year. Please note that this is actually less than the annual amount for Kissimmee Utility Authority Cane Island Project which is equivalent to 385,400 mmBtu/yr for the duct burner.

   c. **Does the duct burner need to be 200 mmBtu/hr?** No. At the time of the request for the duct firing system, 200 mmBtu/hr was the best design value available given the state of the design process.

   d. **Under what conditions will the duct burner be fired?** As ambient temperature increases, electric power and steam production from the system decreases. To compensate for this reduction in electric output and steam production, the duct burner system is used to recover that portion of the electric generation and steam production lost due to increased temperature.

e. **Is 2,000 hours per year necessary?** A 5-year meteorological data base, consisting of hourly values from West Palm Beach International Airport, have been analyzed to estimate the number of hours where temperatures exceed a heat index of 85 degrees F. This apparent temperature is where a "caution" heat index advisory is given; it also corresponds to increased air conditioning use and concomitant electric demand. The heat index is a function of air temperature and relative humidity and occurs at an ambient temperature of about 80 degrees F in southern Florida. During the 5-year period evaluated, there were 14,588 hours exceeding the criteria. This is an average of 2,918 hours per year. A maximum of 2,000 hours at 175 mmBtu/hr of duct firing is needed for the project to have the ability of providing additional power during these high demand periods.

f. **What are the CO, NO_x and VOC emission limits (including combustion turbine emissions) in terms of ppmvd @ 15% oxygen?** The volume concentrations of CO, NO_x and VOC have been calculated for 95 degrees F turbine inlet conditions since this has the lowest mass flow and volume flow and would correspond to a worst case (highest) concentration. The concentrations were determined based on a maximum duct firing of 175 mmbtu/hr and corresponded to 17.5 lb/hr for both CO and NO_x (i.e., based on 0.1 lb/mmbtu for the duct burner system as provided in the updated application) and 0.525 lb/hr for VOC (i.e., based on 0.003 lb/mmbtu). The concentrations were calculated based on correction provided in the application (i.e., ppmvd for CO, ppmvd @ 15% O_2 for NO_x and ppmw for VOC). The maximum concentrations are 17.5 ppmvd for CO, 10.7 ppmvd @ 15% O_2 for NO_x and 3.7 ppmw for VOC. Please note that the duct burner system would be regulated based on electric demand and not always operated at the maximum heat input. An annual limitation on heat input is requested 350,000 mmBtu/yr to allow the system to provide power during the peak demand periods which we have identified in 1.e. above. Under power augmentation, the only change will be in the CO concentration. Under the same turbine conditions described above, the worst case CO concentration would be 20.5 ppmvd. As discussed previously, LWG requests the ability to perform power augmentation provided that NO_x emission will remain at 9 ppmvd corrected to 15 percent O_2. The concentration of VOCs would remain under power augmentation.

2. a. **What is the maximum steam production for the HRSG?** The maximum steam production for the HRSG is about 720,000 lb/hr.

b. **What is the steam production required to produce 74 MW of steam generated power?** The steam capacity of the existing City of Lake Worth steam generating units (i.e., Units 1-4) is 795,100 lb/hr with a corresponding electric capacity of 74 MW. The LWG system will generate about 720,000 lb/hr, which is sufficient to supply steam to produce 74 MW from Units 3 and 4 under design conditions.

Please call or e-mail if you have further questions.

Sincerely,

GOLDER ASSOCIATES INC.

Kennard F. Kosky, P.E.
Principal

KFK/tla

cc: Paul Doherty, LWG
Brian Chatlosh, LWG
Leonard Shapiro, Energy Resources Group, Inc.
Richard Zwolak, Golder-Tampa

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United States Department of the Interior

NATIONAL PARK SERVICE
Air Resources Division
P.O. Box 25287
Denver, CO 80225

IN REPLY REFER TO:

June 16, 1999

N3615 (2350)

A.A. Linero, PE, Administrator
Florida Department of Environmental Protection
New Source Review Section
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Linero:

We have reviewed the additional information provided by Golder Associates for the Prevention of Significant Deterioration (PSD) permit application for the Lake Worth Generation, LLC facility (LWG) located in Palm Beach County, Florida. The facility is located approximately 104 kilometers north of Everglades National Park, a Class I air quality area administered by the National Park Service. In our April 15, 1999, letter to you we provided comments regarding the LWG PSD permit application and the Air Quality Related Values (AQRVs) and Best Available Control Technology (BACT) analyses. The Golder Associates' submittal addressed our comments regarding the AQRV analysis, however, we still have comments concerning the BACT analyses. Our comments on the BACT analysis are discussed in the enclosed Technical Review Document.

Thank you for involving us in the review of the LWG PSD permit application and sending the Golder Associates submittal to us for our review. Please do not hesitate to contact Mr. Dee Morse of my staff at (303) 969-2817 if you have any questions concerning our BACT comments.

Sincerely,

for John Bunyak
Chief, Policy, Planning and Permit Review Branch

Enclosure

CC: J. Koerner, BAR
Kosky, Golder Assoc.
SED
EPA

TECHNICAL REVIEW OF
BEST AVAILABLE CONTROL TECHNOLOGY
ADDITIONAL INFORMATION FOR
PREVENTION OF SIGNIFICANT DETERIORATION PERMIT APPLICATION
LAKE WORTH GENERATION, LLC FACILITY

by

Policy, Planning and Permit Review Branch
Air Resources Division, National Park Service

Background

Lake Worth Generation (LWG) proposes one GE Frame 7FA gas-fired combined cycle combustion turbine (CCT) with duct burner, heat recovery steam generator, and steam turbine, for a total output of 260 megawatts (MW).

LWG is proposing to meet a nitrogen oxides (NO_x) limit of 9 parts per million (ppm) using Dry Low-NOx (DLN) combustors. LWG continues to assert that the addition of Selective Catalytic Reduction (SCR) to further reduce NO_x emissions from a CCT equipped with DLN would create adverse ammonia emissions and excessive costs.

BACT Review

Although LWG supplied some additional justification for its economic analysis of applying SCR downstream of DLN to reduce NO_x emissions to 3.5 ppm, it has still not provided sufficient information to support its claim of economic unfeasibility. For that reason, National Park Service (NPS) has supplied its own cost analysis based upon the specific issues below (see Table 1 attached):

1. Justification (including vendor estimates) for the cost of "HRSG Modification" is based upon installation of both a CO catalyst and SCR. We have adjusted this cost downward by two-thirds to account for the removal of the CO catalyst and plenum.

2. Previous conversations with an SCR vendor have determined that the expensive monitoring system referenced to by LWG is not needed at the low level of NO_x removal efficiency proposed (61% by LWG versus 80+% for other SCR systems). If LWG needs to monitor emissions for compliance purposes, that would happen regardless of the presence of SCR and should not be charged as a cost of SCR.

3. As stated by the vendor, catalyst life expectancy is 5-7 years, with a three-year guarantee. We selected the mid-range value of five years for our analysis.

4. Because LWG did not provide the requested example of an actual price for a PSM/RMP and plan update for a similar facility, this cost was eliminated.

5. LWG cites "uncertainty" as justification for a 10% "Contingency" Indirect Cost as opposed to 3% used by OAQPS Cost Manual. Because SCR systems such as this are becoming relatively common, the need to allow for so much uncertainty is unjustified. We have not seen such great reliance upon "uncertainty" and inflated contingencies in any other permit application of this type.

6. LWG has not provided a quote from an ammonia supplier. Because LWG's ammonia costs are more than double those used by other Florida applicants, we used ammonia costs from the Lakeland McIntosh and FPC-Polk applications.

7. NPS supports LWG's proposal to maintain a one-year inventory of spare catalyst and requests that such a condition be included in LWG's permit. However, because we have assumed a longer catalyst lifetime, and because we are using the 7% interest rate recommended by EPA, our cost for this item is lower than calculated by LWG.

8. Although we have accepted LWG's justification, we would still prefer to see actual vendor quotes for catalyst disposal cost.

9. LWG's justification for addition of second and third 10% "Contingency" Direct Annual Cost and Energy Cost not found in the OAQPS Cost Manual is based upon "good engineering practice" (GEP). Because the Cost Manual is also based upon GEP, and because the amount of contingency cost built into LWG's estimates are so much higher than any other similar application, we disregarded these costs.

10. LWG's justification for inclusion of both the Heat Rate Penalty and "additional fuel costs" is still "double-counting." Even though these are two separate costs, they both attempt to quantify the same thing—the energy lost due to inclusion of SCR in the system. The Heat Rate Penalty quantifies the value of the energy lost to the SCR. The "additional fuel costs" is simply the cost of energy required to make up for the Heat Rate Penalty. Ideally, both calculation methods should yield the same result. We have chosen to use the conventional Heat Rate Penalty method used by the Environmental Protection Agency (EPA). We have not seen any other applicant attempt LWG's double-counting approach.

11. LWG has not shown us why "Capacity Loss" should be independent of, and in addition to, normal maintenance downtime, nor has LWG documented how they determined that this amount of extra downtime would occur outside of normal maintenance activities.

12. We do not understand why LWG should include a "Fuel Escalation" cost as part of its SCR cost analysis. Inflation is a fact of life in all enterprises and should not be an "add-on" cost charged to SCR.

13. While we agree with LWG that the "Capital Recovery Factor (CRF) is more than just simple interest rate," that does not invalidate the CRF used by EPA since the EPA CRF is also "more than just simple interest rate." The CRF is a key in determining the annual cost of the capital used to purchase, install, and operate emission control equipment over its life, and consists of two basic components, equipment life and interest rate. We agree with LWG's estimate of 10-year equipment life. The second component, interest rate, not only includes the rate at which a company would pay on a construction loan, but also considers the tax benefits derived by the company taking the loan. For this reason, and because of the overall decline in interest rates,

the 7% interest rate used by NPS is now recommended for regulatory analyses by OMB and EPA (rather than the "old" 10% rate). In fact, Ronald W. Spahr, Professor of Finance, University of Wyoming, explained at a workshop on power plant financing ("Workshop on the Wyoming Generation and HVDC Transmission Project," Denver, May 29, 1998) that the after-tax weighted average cost of capital used to calculate the CRF is not the same as the 10% interest rate that a company would pay on a construction loan. Instead, this rate must take into account the tax write-offs and other advantages gained in borrowing money. Professor Spahr recommended use of the same 7% interest rate in current calculations of the CRF. NPS will continue to use the 7% rate contained in the OAQPS Cost Manual.

14. LWG has made some questionable assumptions regarding the methods presented in the OAQPS Cost Manual. By accounting for the cost of catalyst replacement as a Recurring Capital Cost, LWG has deviated from the OAQPS methods in such a way as to improperly inflate the Total Capital Investment. The main problem appears when LWG adds the Recurring Capital Cost to the Total Direct Installation Cost to produce a "Total Capital Cost." LWG then proceeds to base its "Indirect Costs" upon this Total Capital Cost and cites the OAQPS Cost Manual as justification. That is clearly incorrect and results in a gross inflation of the Indirect Costs and Total Capital Investment. The Cost Manual bases Indirect Costs on the Purchased Equipment Cost (which LWG calls Total Direct Capital Costs), which does not include LWG's Total Direct Installation Costs and Recurring Capital Costs. The cost estimates prepared by NPS adhere to the EPA Control Cost Manual, while those prepared by LWG do not, despite LWG's assertions that they do.

NPS SCR Economic Analysis

Because of our concerns expressed above, and because the LWG cost estimates continue to be almost double those seen at other similar installations that have proposed to install SCR, NPS has provided its own SCR cost estimates which show that SCR could be installed and operated for less than $4,000 per ton of NO_x removed. Because this cost is typical to the industry, it should be accepted as economically feasible and SCR should be required as BACT.

BACT Context and Consistency

NPS has noted a wide disparity among states in their BACT determinations for gas turbines in general, and combine-cycle projects in particular. This disparity is illustrated in the attached Table 2. Of the 33 combined-cycle projects for which we have recent information, all but seven (including LWG) are proposing SCR; at least half of the units using DLN are adding SCR. (That proportion may be greater because we do not have information on many of the combustors equipped with SCR.) A fundamental principle of the BACT process is that similar projects should use similar controls, unless the applicant demonstrates that there exist "unusual circumstances" that weigh against application of the presumptive control technology. As EPA states in its New Source Review Workshop Manual:

> The determination that a control alternative to be inappropriate involves a demonstration that circumstances exist at the source which distinguish it from other sources where the control alternative may have been required previously, or that argue against the transfer of technology or application of new technology. Alternately, where a control technique has been applied to only one or a very limited number of sources, the applicant can identify those characteristic(s) unique

> to those sources that may have made the application of the control appropriate in those case(s) but not for the source under consideration. In showing unusual circumstances, objective factors dealing with the control technology and its application should be the focus of the consideration. The specifics of the situation will determine to what extent an appropriate demonstration has been made regarding the elimination of the more effective alternative(s) as BACT. In the absence of unusual circumstance, the presumption is that sources within the same category are similar in nature, and that cost and other impacts that have been borne by one source of a given source category may be borne by another source of the same source category.
>
> However, unusual circumstances may greatly affect the cost of controls in a specific application. If so they should be documented. An example of an unusual circumstance might be the unavailability in an arid region of the large amounts of water needed for a scrubbing system. Acquiring water from a distant location might add unreasonable costs to the alternative, thereby justifying its elimination on economic grounds. Consequently, where unusual factors exist that result in cost/economic impacts beyond the range normally incurred by other sources in that category, the technology can be eliminated provided the applicant has adequately identified the circumstances, including the cost or other analyses, that show what is significantly different about the proposed source.

Because the overwhelming majority of combined-cycle turbines are installing SCR, and because LWG has made no demonstration whatsoever that application of SCR to its project would be eliminated due to "unusual circumstances," SCR should be required.

Conclusions & Recommendations

- LWG has not adequately justified many of its SCR cost estimates that deviate from EPA guidelines.
- LWG has incorrectly applied methods presented in the EPA Control Cost Manual. Those errors result in grossly inflated cost estimates.
- NPS has provided estimates showing that the cost of SCR is less than $4,000 per ton of NO_x removed and is typical of the industry.
- NPS has provided information showing that most new combined-cycle gas turbines will be equipped with SCR.
- As for the issue of ammonia emissions resulting from SCR, we suggest that 5 ppm ammonia slip is common and only approach 10 ppm as the catalyst reaches the end of its life. The benefit of the NO_x reduction outweighs the ammonia slip concern.
- Because the overwhelming majority of combined-cycle turbines are installing SCR, and because LWG has made no demonstration whatsoever that application of SCR to its project would be eliminated due to "unusual circumstances," SCR should be required as BACT for the LWG project.

Table 2. Combined Cycle Turbine Permits Pending or Not Yet in RBLC

Facility Name/Location	Project Description					Power Output			Permit #	Permit Issue Date	NOx Emission Limits			
											Dry Lox-NOx Comb.		SCR	
	Simple Cycle	Combined Cycle	Peak Base	Turbine Type	Duct Burner	MW	mmBtu/hr	HP			Gas (ppm)	Oil (ppm)	Gas (ppm)	Oil (ppm)
AES--Red Oak		Y		GE 7241 (FA)		3 x186	3 x 1748		NJ					
Alabama Pwr--Theodore		Y			Y	210			AL				3.5	
Androscoggin Energy		Y			Y	3 x 50	3 x 619		ME				6.0	42.0
ARCO Watson Project						45			CA	Oct-97			5.0	
Bridgeport Energy Project													6.0	
Calpine--South Point		Y			Y	500			AZ		Y		3.0	
Casco Bay Energy		Y				520	1838	54943	ME				5.0	
Cogen Tech. Linden Venture		Y				581	1983	59275	NJ				3.5	
Desert Basin Gen		Y					2 x 1940		AZ				4.5	
Dighton, MA									MA				3.5	
Duke Energy--New Smyrna		Y		GE PG7241FA		2 x 165			FL		12.0			
Enron (LAER)									CA				2.5	
FPC--Hines		Y		W 501Frame		2 x 165			FL				6.0	
FPC--Polk														
Frontera Power		Y				330			TX		15.0			
Griffith Energy		Y			Y	650			AZ				3.0	
HDPP (LAER)									CA				3.0	
Hermiston Generating		Y							CA	Dec-95			4.5	
High Desert Power		Y							CA		9.0		2.5	
Kissimmee Utility--Cane Is. #3		Y		GE Frame 7A	Y	167			FL		12.0	42.0	6.0	15.0
Lakeland McIntosh CCT		Y				350			FL				7.5	15.0
Lake Worth Gen.		Y		GE Frame 7FA		186+74			FL		9.0	42.0		
LaPoloma Generating		Y				262 x 4			CA				3.0	
Mississippi Pwr--Daniels		Y				170			MI		Y		3.5	
Northwest Regional Power		Y		GE Frame 7FA		4 x 210	1530	45746	WA		9.0			
Orange Generation--Bartow		Y				2 x 41			FL		15.0			
Rotterdam, N.Y.									NY				4.5	
Sacramento Power						115			CA	Dec-94			3.0	
Sumas		Y				2 x 350			WA		9.0		4.5	
Sutter						170					Y		3.5	
TX-NM Pwr--Lordsburg		Y		aero		2 x 40			NM		15.0	25.0		
Theodore Co-Gen		Y			Y								3.5	
Three Mountain Power		Y				500			CA				2.5	
Tiverton, RI									RI				3.5	

(1) does not use dry low-NOx combustor technology

Lake Worth Generation
Table 1.a
Plant Data

				Capacity	
Site	NPS Area(s)	Source		(mmBtu/hr)	(MW)
LWG	EVER	1	CCT	1965	186
				each	each

Given/Assumptions

Source	CCT
Exhaust gas flow (lb/Hr)	3,710,000
Exhaust gas flow (acfm)	1,217,068
Basic Equipment Costs	$480,000
HRSG modification ($/1000 lb/Hr)	$40
Ammonia storage cost ($/1000 lb/Hr)	$35
Uncontrolled Emission rate (TPY)	438
Control efficiency (%)	61%
Operating Hours per Year	8,760
Operating Hours per Shift	8
Operating Shifts per Year	1095
Operating Labor Cost ($/hr)	15
Maintenance Labor Cost ($/hr)	15
Electrical Cost ($/kWh)	$0.04
Reagent Use (lb NH3/lb NOx)	0.6
Reagent Use (lb/hr)	139.4
Reagent Costs ($/T)	$300
Electrical use (kWh)	80
Catalyst replacement	$720,000
Catalyst disposal ($/1000 lb/Hr)	$28
Catalyst life (Yr)	5
Heat rate penalty (% of MW output)	0.5%
Catalyst Pressure Drop (in. H2O)	1.5
Ammonia slip (ppm)	5
Equipment Life (Yr)	15
Interest Rate (%)	7.00%

Lake Worth Generation
Table 1.b
Capital Costs (OAQPS Control Cost Manual Chapter 3--Catalytic Incinerators)

Cost Item		Factor	Cost
Direct Costs			CCT
Purchased equipment costs			
SCR			$480,000
HRSG modification			$148,400
Ammonia storage			$129,850
Total		A	$758,250
Sales taxes		0.06 A	$45,495
Freight		0.05 A	$37,913
Purchased equipment cost, PEC	B=	1.11 A	$841,658
Direct installation costs			
Foundations & supports		0.08 B	$67,333
Handling & erection		0.14 B	$117,832
Electrical		0.04 B	$33,666
Piping		0.02 B	$16,833
Insulation		0.01 B	$8,417
Painting		0.01 B	$8,417
Direct installation costs		0.30 B	$252,497
Site preparation	As required, SP		$5,000
Buildings	As required, Bldg.		$15,000
Total Direct Costs, DC		1.30 B+SP+Bldg	$1,114,155
Indirect Costs (installation)			
Engineering		0.10 B	$84,166
Construction and field expenses		0.05 B	$42,083
Contractor fees		0.10 B	$84,166
Start-up		0.02 B	$16,833
Performance test		0.01 B	$8,417
Contingencies		0.03 B	$25,250
Total Indirect Cost, IC		0.31 B	$260,914
Total Capital Investment = DC + IC		1.61 B+SP+Bldg	$1,375,069

Lake Worth Generation
Table 1.c
Annual Costs (OAQPS Control Cost Manual Chapter 3--Catalytic Incinerators)

Cost Item	Factor	Cost
Direct Annual Costs, DC		CCT
Operating labor		
Operator	0.5 hr/shift	$8,213
Supervisor	15% of operator	$1,232
Operating materials		
Reagent	139.4 lb/Hr * 8,760 Hr/yr * 300 $/T =	$183,172
Maintenance		
Labor	0.5 hr/shift	$8,213
Material	100% of maintenance labor	$8,213
Catalyst replacement		$144,000
Catalyst Disposal		$20,776
Electricity	0.04 $/kWh* 8,760 hr/yr* 80 ef. =	$28,032
Total DC		$401,849
Energy Costs		
Heat rate penalty	186 MW * 8,760 hr/yr * 1000 kW/MW * 0.005 loss * 0.04 $/kWh =	$325,872
Indirect Annual Costs, IC		
Overhead	60% of maintenance costs	$125,425
Administrative charges	2% of Total Capital Investment	$27,501
Property tax	1% of Total Capital Investment	$13,751
Insurance	1% of Total Capital Investment	$13,751
Capital recovery	0.1098 * [Total Capital Investment-(1+ 0.11)(Cat Cost)]	$133,426
Total IC		$313,853
Total Annual Cost	DC + IC	$1,041,574

Lake Worth Generation
Table 1.d
Cost Effectiveness

Source	CCT	Units
Pollutant	NOx	
Uncontrolled emissions	438	TPY
Control efficiency	61%	
Controlled emissions	170	TPY
Pollutants removed	268	TPY
Annual cost	$1,041,574	/yr
Annual cost - Emission fees saved	$1,033,542	@ $30/T
Cost/ton	$3,890	/T

Lake Worth Generation
Table 1.e
Environmental Impacts of SCR at 61% removal

NOx removed	268	TPY
Ammonia released	59	TPY @ 5 ppmv

5 ppmvd NOx* E-06 * (20.9/(20.9- 15 % O2)) * 17 MW NH3 * 8740 dscf/mmBtu (fuel input) F-factor(gas)/ 385 scf/lb-mole (vol/mol ratio) = 0.007 lbm/mmBtu

Golder Associates Inc.

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Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

Golder Associates

May 21, 1999

9839537

RECEIVED

MAY 24 1999

BUREAU OF
AIR REGULATION

Bureau of Air Regulation
New Source Review Section
Florida Department of Environmental Protection
Mail Station #5505
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Attention: Mr. Jeffery F. Koerner, P.E.

RE: DEP File No. 099- 0569-001-AC (PSD) Permit Application 0990568-001-AC
LWG Combined Cycle Project
Proposed Nitrogen Oxide Emissions during Power Augmentation PSD-FL-266

Dear Jeff:

This correspondence is submitted on behalf of Lake Worth Generation, L.L.C. (LWG) to address the additional information obtained from General Electric (GE) regarding the information presented for Steam Injection for Power Augmentation (SIPA) mode in our response letter to the Department on May 3, 1999. In that letter, LWG proposed alternative operating procedures to the project that would ultimately reduce emissions relative to oil firing. The alternative procedures would be a tradeoff in the amount of oil fired in any year with the ability to operate the combustion turbine in a power augmentation mode and/or duct firing when natural gas under a proposed operating scenario. For power augmentation, the proposed NO_x emissions were based on a maximum emission rate of 12 ppmvd corrected to 15 percent oxygen. Based on further discussions with GE (see attached letter), GE will be performing field tests this fall and expects to guarantee a NO_x emission rate of 9 ppmvd when operating in SIPA mode.

The NO_x emissions have been revised to account for the 9 ppmvd during power augmentation and are summarized in the attached Table 2-6.

LWG and I would like to meet with you in the next several weeks after you have reviewed the information. We are also discussing several issues with GE, including averaging time for determining compliance with NO_x emission limits (i.e., use of 24-hour block average both for oil- and gas-firing) as well as excess emissions during coldstartup conditions. We trust that the information provided to date is sufficient for the Department's determination of completeness and that any issues can be resolved during our meeting and through the permit application review process.

In the meantime, please feel free to call me at (352) 336-5600 if you have questions. Your expeditious review is appreciated.

Sincerely,

GOLDER ASSOCIATES INC.

Robert C McLean Jr

Kennard F. Kosky, P.E. for
Principal

Enclosure

cc: R Paul Doherty, LWG
Brian Chatlosh, LWG
Leonard Shaperio, Energy Resources Group, Inc.
Joseph A. McGlothin, McWirter, Reeves, McGlothlin, Davidson, Rief and Bakas, P.A.
A.A. Linero, FDEP Tallahassee
Richard A. Zwolak, GAI Tampa

SED
EPA
NPS
File

Duct Firing with 2,000 hours of Operation (NOx Emission Basis, Power Augmentation, Revised May 21, 1999)

Parameter	Oil-Firing	Power Augmentation	Duct Firing (DF)	PA & DF	Difference Oil and PA & DB
Heat Input (mmBtu/hr-HHV)	1,965	1,890	200	2,090	
Heat Input (mmBtu/yr-HHV)	1,965,000	3,779,360	400,000	4,179,360	
Emissions					
Nitrogen Oxides					
Emission Basis	42.0	9.0	0.1		
Emission Units	ppmvd[1]	ppmvd[1]	lb/mmBtu		
Emissions (lb/hr)	362.4	66.2	20.0	86.2	
Emissions (tons/year)	181.2	66.2	20.0	86.2	-95.0
Hours per Year	1,000	2,000	2,000	2,000	
Carbon Monoxide					
Emission Basis	20.0	15.0	0.1		
Emission Units	ppmvd	ppmvd	lb/mmBtu		
Emissions (lb/hr)	73.4	54.0	20.0	74.0	
Emissions (tons/year)	36.7	54.0	20.0	74.0	37.3
Hours per Year	1,000	2,000	2,000	2,000	
Volatile Organic Compounds					
Emission Basis	7.0	3.5	0.003		
Emission Units	ppmvw	ppmvw	lb/mmBtu		
Emissions (lb/hr)	16.5	8.0	0.6	8.6	
Emissions (tons/year)	8.3	8.0	0.6	8.6	0.4
Hours per Year	1,000	2,000	2,000	2,000	
Sulfur Dioxide					
Emission Basis	0.1	1.0	0.1		
Emission Units	% S	grain/100 cf	grain/100 cf		
Emissions (lb/hr)	101.5	5.1	0.3	5.4	
Emissions (tons/year)	50.8	5.1	0.3	5.4	-45.4
Hours per Year	1,000	2,000	2,000	2,000	
Particulate Matter					
Emission Basis	17.0	9.0	0.002		
Emission Units	lb/hr	lb/hr	lb/mmBtu		
Emissions (lb/hr)	17.0	9.0	0.4	9.4	
Emissions (tons/year)	8.5	9.0	0.4	9.4	0.9
Hours per Year	1,000	2,000	2,000	2,000	
Total Emissions (tons/year)	285	142	41	184	-101.8

[1] corrected to 15 percent oxygen

GE Power Systems

Douglas Lemmo, P.E.
Account Manager

General Electric International, Inc.
3960 Mystic Valley Parkway
Medford, MA 02155
Phone: 781-393-5246, Dial Comm 8*598-5246
Fax 781-393-5290, Dial Comm 8*598-5290
Email: doug.lemmo@geps.ge.com

14 May 99

Mr. Paul Doherty
Director of Business Development
Thermo ECOtek
245 Winter St. Suite 300
Waltham, MA 02154

Dear Mr. Doherty,

In response to your question concerning the NOx emission rate of GE's PG 7241 FA gas turbine when operating in the Steam Injection for Power Augmentation (SIPA) mode, I have the following response: As stated in previous correspondence, the NOx emission rate for the 7241FA with the DLN (Dry Low NOx) 2.6 combustor is 9.0 ppmdv @ 15 % from 50% to 100% load. The one exception to this is in the SIPA mode of operation in which the current guaranty level for NOx is 12 ppmdv @ 15% O2. This slightly higher level is expected to be temporary since it is GE's objective to bring this level down to the 9 ppm level or below. Steam Injection for Power Augmentation is a new option on the 2.6 DLN combustor and until the lower NOx emission level can be field measured and verified in actual field tests, GE feels that it is prudent to conservatively state the NOx guaranty level.

GE has field tested the 2.0 combustor with SIPA on several 7FA gas turbines and will be field testing the 2.6 combustor with SIPA this Fall on a 7FA gas turbine.. With the experience gained to date, and if the anticipated results from the Fall test are obtained, GE expects to be able to offer a 9.0 ppmdv NOx emission guaranty for the PG 7241 FA gas turbine contemplated for the Lake Worth Project.

I trust that the above answers your question on the status of the 9 ppm NOx guaranty when operating in the SIPA mode, if not, please don't hesitate to call me.

Sincerely,

Douglas Lemmo

pwraug051499

TO: Clair Fancy

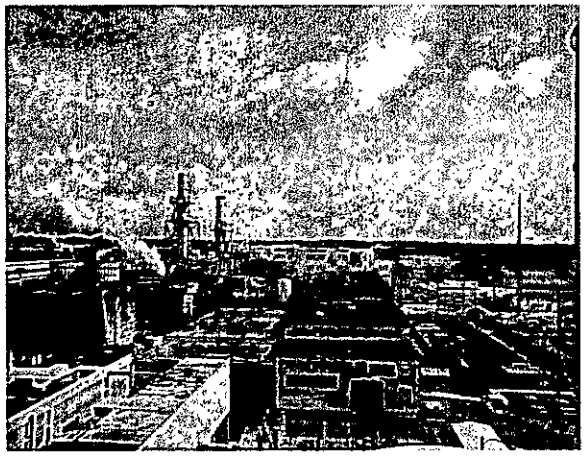
FROM: A. A. Linero

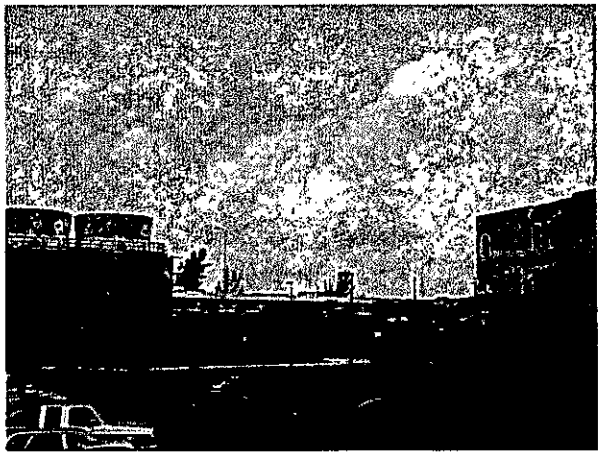
DATE: May 18, 1999

SUBJECT: Lake Worth Power Plant
Repowering Project (PSD-FL-266)

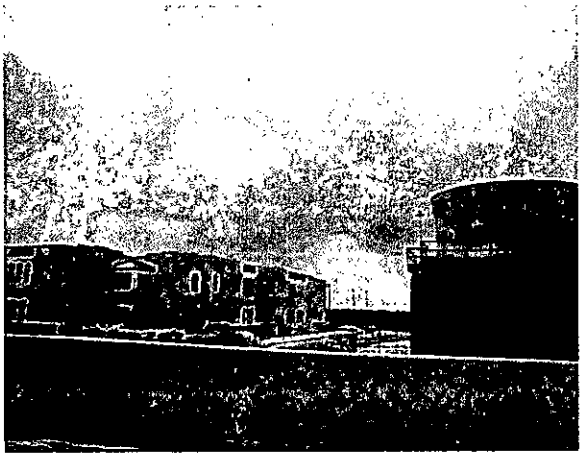
On April 22, 1999, Jeff Koerner and I visited the Lake Worth Power Plant. The purpose of the visit was to assess site-specific characteristics that may affect our control technology determination for a planned 250 MW combustion cycle turbine to be built by Lake Worth LLC. The steam will repower two units at the adjacent Lake Worth Power Plant.

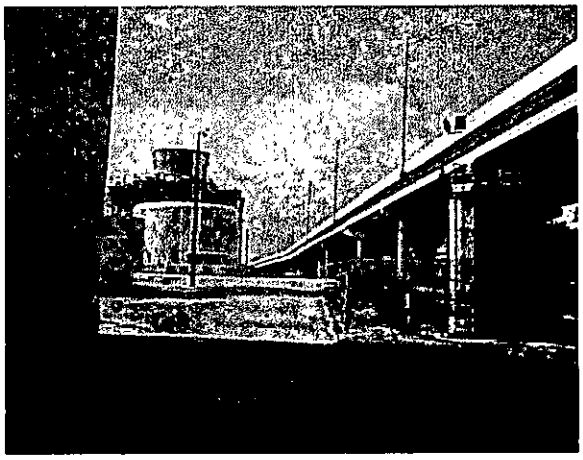
The plant is located immediately East of I-95 near a Lake Worth exit. The picture on the left below was taken from a vantagepoint on the south side of the plant. A high school located immediately to the north (on land ceded by the plant to the School Board) is easily visible. The new combustion turbine will be located along the axis of the North/South road that is seen on the right hand side of the picture. The proximity of the school to a plant cooling tower can be better appreciated by the photo on the right taken in a Westerly direction. I-95 is immediately behind the plant and school in this photo. A water well is barley visible in the photo.



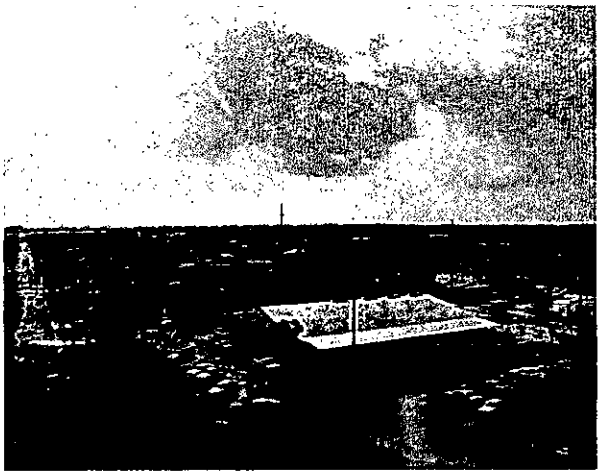


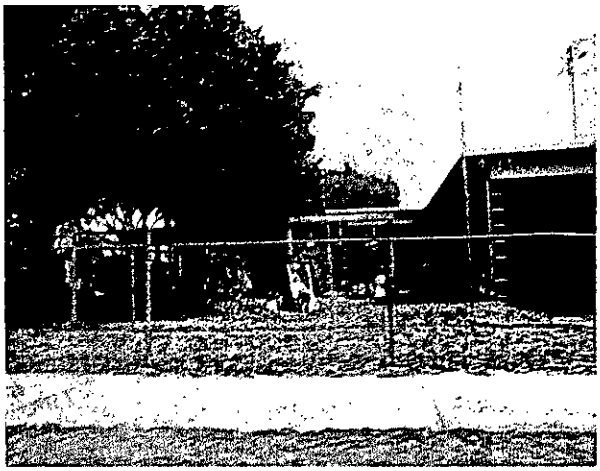
The photograph on the left below was taken from an automobile on I-95 towards the East. It shows the same cooling tower and high school as seen from I-95. The adjacent photograph is taken in a Southerly direction at ground level below I-95 and next to the same cooling tower.



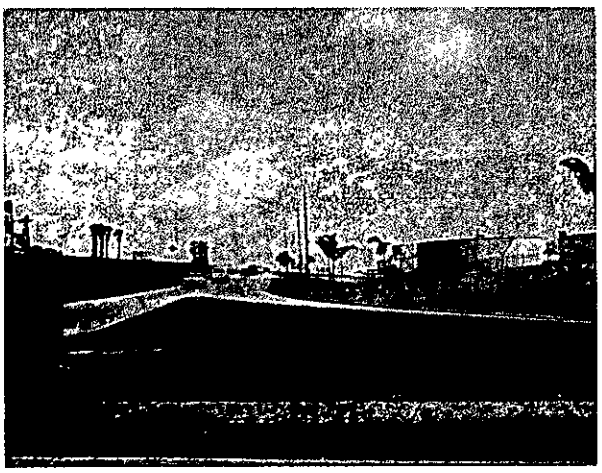


The photograph on the left below was taken from a stack on the South of the facility and is a view towards the East showing plant property in the foreground and a modest neighborhood in the background. There is a closed middle school (not visible) on plant property just to the left (North) of the foreground area that will be turned into a playground. There is also a day care center to the right (South) of the foreground. It is shown on the adjacent photograph as seen from a point just beyond the South boundary of the Lake Worth Utilities site.





The picture below (left) is of the access to I-95 as seen from a point about a quarter mile ~~east~~ West of the day care center. The picture on the right is of Jeff and me taken from the adjacent water plant in a Northerly direction towards the power plant and high school.



It is possible but not easy to install SCR at this site. However, if the plant can achieve single-digit NO_X emissions I would advise not installing SCR here. To continually achieve single digit NO_X values while burning gas, the operators may need to forego some options requested after submittal of the application. These include power augmentation and a duct burner. If they insist on these options, they will probably need to install SCR.

Golder Associates Inc.

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Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

Golder Associates

May 3, 1999

983-9537

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MAY 04 1999
BUREAU OF
AIR REGULATION

Bureau of Air Regulation, New Source Review Section
Florida Department of Environmental Protection
2600 Blair Stone Road, Mail Station #5505
Tallahassee, Florida 32399-2400

Attention: Mr. Jeffery F. Koerner, P.E.

RE: DEP File No. 099-0569-001-AC (PSD) Permit Application 0990568-001-AC
LWG Combined Cycle Project
Additional Information Request PSD FL-266

Dear Jeff:

This correspondence is submitted on behalf of Lake Worth Generation, L.L.C. (LWG) to address the additional information requested in your April 9, 1999 correspondence. This submittal also addresses the comments of the National Park Service dated April 15, 1999. The information requested is attached and is addressed in the same manner as requested.

LWG is also taking this opportunity to offer enhancements to the project that would ultimately reduce emissions relative to oil firing. The alternative would be a tradeoff in the amount of oil fired in any year with the ability to operate the combustion turbine in a power augmentation (PA) mode and/or duct firing (DF) using natural gas under a proposed operating scenario. The attached Table 2-6 presents heat input and emissions for oil-firing, PA and DF. LWG proposes that the Department allow the operation of combined cycle project to operate either a maximum of 1,000 hours of oil-firing or 2,000 hours of PA and/or DF operation on a prorated basis in any given year based on annual heat input. That is, for every hour where oil is not fired in any year than PA and/or DF would be authorized for 2 hours. But rather than account for hours of operation the determination would be based on heat input. For example, if oil was fired for 500,000 mmBtu/yr, then PA and/or DF would be authorized for 74.55 percent [(1,965,000-500,000)/1,965,000] of the maximum fuel usage in Table 2-6 or 3,115,909.6 mmBtu/yr (0.7455 x 4,179,360). As the turbine is operated more with PA and/or DF, the overall emissions would be lower when firing fuel oil (see Table 2-6). The emissions of NOx and SO_2 would be much less than oil firing. There would be a maximum potential increase of 37.3 tons/year in the annual emissions of CO relative to oil firing. The maximum short-term emission would be substantially lower when firing under PA or DF and only moderately increased with PA and DF (0.6 lb/hr increase). The maximum potential increases in annual emission for VOCs and PM are quite small and the short-term emission rate is much lower.

Portions of the permit application form have been updated to include the request of PA and/or DF. The results of the ambient air impacts do not change, since the worst case impacts were determined for oil and the modeling was performed as if oil operation occurred continuously over a 5-year period (see Section 6.4 in application and accompanying tables). The BACT on NO_x would not change since the analysis included higher emissions with oil. The BACT evaluation for CO would not change substantially since the increase in potential annual emissions is small. Moreover, the emissions for CO when firing gas under base load conditions have a 33 percent margin relative to the GE data. As noted in the application, a margin was added to CO to make sure NO_x emissions were 9 ppmvd or less.

LWG and I would like to meet with you after you have reviewed the information. I will call you this week. In the meantime please feel free to call if you have questions. Your expeditious review is appreciated.

Sincerely,

GOLDER ASSOCIATES INC.

Robert C McLane Jr.

Kennard F. Kosky, P.E.
Principal

KFK/arz

cc: Paul Doherty, LWG
Brian Chatlosh, LWG
Leonard Shaperio; Energy Resources Group, Inc.
Joseph A. McGlothin; McWirter, Reeves, McGlothlin, Davidson, Rief, and Bakas, P.A.
A.A. Linero, FDEP Tallahassee

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CC: J. Koerner, BAR
SEP
NPS
EPA

Table 2-6. Heat Input and Emissions for Oil-Firing and Alternative Operation with Power Augmentation and Duct Firing with 2,000 hours of Operation

	Oil-Firing	Power Augmentation	Duct Firing (DF)	PA & DF	Difference Oil and PA & DB
Heat Input (mmBtu/hr-HHV)	1,965.0	1,889.7	200.0	2,089.7	
Heat Input (mmBtu/yr-HHV)	1,965,000.0	3,779,360.0	400,000.0	4,179,360.0	
Emissions					
Nitrogen Oxides					
Emission Basis	42.0	12.0	0.1		
Emission Units	ppmvd[1]	ppmvd[1]	lb/mmBtu		
Emissions (lb/hr)	362.4	88.3	20.0	108.3	
Emissions (tons/year)	181.2	88.3	20.0	108.3	-72.9
Hours per Year	1,000	2,000	2,000	2,000	
Carbon Monoxide					
Emission Basis	20.0	15.0	0.1		
Emission Units	ppmvd	ppmvd	lb/mmBtu		
Emissions (lb/hr)	73.4	54.0	20.0	74.0	
Emissions (tons/year)	36.7	54.0	20.0	74.0	37.3
Hours per Year	1,000	2,000	2,000	2,000	
Volatile Organic Compounds					
Emission Basis	7.0	3.5	0.003		
Emission Units	ppmvw	ppmvw	lb/mmBtu		
Emissions (lb/hr)	16.5	8.0	0.6	8.6	
Emissions (tons/year)	8.3	8.0	0.6	8.6	0.4
Hours per Year	1,000	2,000	2,000	2,000	
Sulfur Dioxide					
Emission Basis	0.1	1.0	0.1		
Emission Units	% S	grain/100 cf	grain/100 cf		
Emissions (lb/hr)	101.5	5.1	0.3	5.4	
Emissions (tons/year)	50.8	5.1	0.3	5.4	-45.4
Hours per Year	1,000	2,000	2,000	2,000	
Particulate Matter					
Emission Basis	17.0	9.0	0.002		
Emission Units	lb/hr	lb/hr	lb/mmBtu		
Emissions (lb/hr)	17.0	9.0	0.4	9.4	
Emissions (tons/year)	8.5	9.0	0.4	9.4	0.9
Hours per Year	1,000	2,000	2,000	2,000	
Total Emissions (tons/year)	285	164	41	206	-79.8

[1] corrected to 15 percent oxygen

Scope of Application

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

Emissions Unit ID		Description of Emissions Unit	Permit Type
Unit #	Unit ID		
1R	---	GE 7FA- Combustion Turbine	AC1A
2R	---	Duct Burner System associated with HRSG	AC1A

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

4. Professional Engineer's Statement:

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

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

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

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

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

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

Signature (seal) Date: May 2, 1999

* Attach any exception to certification statement.

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through L as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application. Some of the subsections comprising the Emissions Unit Information Section of the form are intended for regulated emissions units only. Others are intended for both regulated and unregulated emissions units. Each subsection is appropriately marked.

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

Type of Emissions Unit Addressed in This Section

1. Regulated or Unregulated Emissions Unit? Check one:

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

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

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

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

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

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

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

Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section (limit to 60 characters): **GE 7FA- Combustion Turbine**		
2. Emissions Unit Identification Number: [ ] No Corresponding ID [X] Unknown		
3. Emissions Unit Status Code: C	4. Acid Rain Unit? [X] Yes [ ] No	5. Emissions Unit Major Group SIC Code: 49
6. Emissions Unit Comment (limit to 500 characters): **The emission unit is a General Electric (GE) Frame 7FA Advanced Combustion Turbine. The unit will fire primarily natural gas with distillate oil as backup and can be operated in both simple cycle and combined cycle modes. The turbine inlet air will be cooled with steam absorption chillers to a temperature of about 55 degrees F. Refer to Part II for discussion.**		

Emissions Unit Control Equipment Information

A.

1. Description (limit to 200 characters):

Dry Low-NOx Combustion - natural gas

2. Control Device or Method Code: **25**

B.

1. Description (limit to 200 characters):

Water Injection - Distillate Oil

2. Control Device or Method Code: **28**

C.

1. Description (limit to 200 characters):

2. Control Device or Method Code:

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

Emissions Unit Details

1. Initial Startup Date:	
2. Long-term Reserve Shutdown Date:	
3. Package Unit: Manufacturer: General Electric	Model Number: 7FA
4. Generator Nameplate Rating:	186 MW
5. Incinerator Information: Dwell Temperature:	°F
Dwell Time:	seconds
Incinerator Afterburner Temperature:	°F

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate:	1,965	mmBtu/hr
2. Maximum Incineration Rate:	lbs/hr	tons/day
3. Maximum Process or Throughput Rate:		
4. Maximum Production Rate:		

5. Operating Capacity Comment (limit to 200 characters):

Maximum heat input and rating at turbine inlet temperature of 45 degrees F oil firing. Natural Gas is 176 MW and 1,817 MMBtu/hr. Heat input as High Heating Value (HHV).

Emissions Unit Operating Schedule

1. Requested Maximum Operating Schedule:

	hours/day		days/week
	weeks/yr	8,760	hours/yr

D. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

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

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

See Attachment LW-EU1-D
See Part II

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

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **See Part II**	
2. Emission Point Type Code: [ ] 1 [ ] 2 [X] 3 [ ] 4	
3. Descriptions of Emissions Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): **Unit can exhaust through a simple cycle by-pass stack and HRSG stack.**	
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:	
5. Discharge Type Code: [ ] D [ ] F [ ] H [ ] P [ ] R [X] V [ ] W	
6. Stack Height:	**150** feet
7. Exit Diameter:	**18** feet
8. Exit Temperature:	**220** °F

9. Actual Volumetric Flow Rate:	**1,217,068**	acfm
10. Percent Water Vapor:	**10.9**	%
11. Maximum Dry Standard Flow Rate:	**1,084,408**	dscfm
12. Nonstack Emission Point Height:		feet

13. Emission Point UTM Coordinates:

Zone: **17** East (km): **592.8** North (km): **2943.7**

14. Emission Point Comment (limit to 200 characters):

Stack conditions for combined cycle operation and turbine inlet of 45 degrees F oil firing. See Part II for other inlet temperatures, loads, stack parameters, and simple cycle operation.

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

Segment Description and Rate: Segment 1 of 2

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (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: **1.77**	5. Maximum Annual Rate: **15,544**
6. Estimated Annual Activity Factor:	
7. Maximum Percent Sulfur:	8. Maximum Percent Ash:
9. Million Btu per SCC Unit: **1,024**	
10. Segment Comment (limit to 200 characters): **Maximum Hourly Rate = 1.774 (rounded to 1.77). Max. and Annual based on 45 deg. F turbine inlet. Million BTU/SCC as HHV.**	

Segment Description and Rate: Segment 2 of 2

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Distillate (No. 2) Fuel Oil**	
2. Source Classification Code (SCC): **2-01-001-01**	
3. SCC Units: **1,000 Gallons Used**	
4. Maximum Hourly Rate: **14.4**	5. Maximum Annual Rate: **14,415**
6. Estimated Annual Activity Factor:	
7. Maximum Percent Sulfur: **0.05**	8. Maximum Percent Ash:
9. Million Btu per SCC Unit: **136**	
10. Segment Comment (limit to 200 characters): **Based on HHV of 19,200 and 7.1 lb/gallon. Annual based on 1,000 hours at 45 degrees F.**	

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

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM			EL
SO2			EL
NOx	025	028	EL
CO			EL
VOC			EL
PM10			EL

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

Pollutant Detail Information:

1. Pollutant Emitted: **PM**
2. Total Percent Efficiency of Control: %
3. Potential Emissions: **17** lb/hour **43.4** tons/year
4. Synthetically Limited? [ ] Yes [**X**] No
5. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/yr
6. Emission Factor: **17 lb/hr** Reference: **GE, 1998**
7. Emissions Method Code: [ ] 0 [ ] 1 [**X**] 2 [ ] 3 [ ] 4 [ ] 5
8. Calculation of Emissions (limit to 600 characters): **Refer to Part II for calculations.**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): **Lb/hour based on maximum for oil-firing. Annual based on 7,760 hours gas firing and 1,000 hours oil-firing at 45 degrees F turbine inlet.**

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**		
2. Future Effective Date of Allowable Emissions:		
3. Requested Allowable Emissions and Units: **10 % Opacity**		
4. Equivalent Allowable Emissions:	**9** lb/hour	**39.4** tons/year
5. Method of Compliance (limit to 60 characters): **VE Test < 10% Opacity**		
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Natural gas firing; Based on manufacturer data. Opacity limit proposed in lieu of lb/hr limit.**		

B.

1. Basis for Allowable Emissions Code: **OTHER**		
2. Future Effective Date of Allowable Emissions:		
3. Requested Allowable Emissions and Units: **17 lb/hour**		
4. Equivalent Allowable Emissions:	**17** lb/hour	**8.5** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 5 or 17**		
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Distillate oil firing. Based on manufacturer data. Annual based on 1,000 hours/year.**		

Emissions Unit Information Section 1 of 2

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

Pollutant Detail Information:

1. Pollutant Emitted: **SO2**
2. Total Percent Efficiency of Control: %
3. Potential Emissions: **101.5** lb/hour **70.3** tons/year
4. Synthetically Limited? [ ] Yes [**X**] No
5. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/yr
6. Emission Factor: **0.05 % S; 1 gr/100cf** Reference: **Golder, 1998**
7. Emissions Method Code: [ ] 0 [ ] 1 [**X**] 2 [ ] 3 [ ] 4 [ ] 5
8. Calculation of Emissions (limit to 600 characters): **Refer to Part II for calculations.**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): **Lb/hour (oil-firing) and tons/year at 45 degrees F turbine inlet temperature; annual based on 7,760 hours gas-firing and 1,000 hours oil-firing.**

Emissions Unit Information Section 1 of 2

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units:	
4. Equivalent Allowable Emissions:	**5.1** lb/hour **22** tons/year
5. Method of Compliance (limit to 60 characters): **Fuel Sampling; vendor sampling pipeline quality natural gas**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Requested Allowable Emissions and Units = pipeline quality natural gas. See Part II; Allowable based on typical maximum fuel sulfur content.**	

B.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **0.05 % Sulfur**	
4. Equivalent Allowable Emissions:	**101.5** lb/hour **50.7** tons/year
5. Method of Compliance (limit to 60 characters): **Fuel Sampling**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Distillate oil-firing; NSPS; 40 CFR Part 60; Subpart GG [60.333(b)] limits to 0.8% S. Annual based on 1,000 hours.**	

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

Pollutant Detail Information:

1. Pollutant Emitted: **NOx**
2. Total Percent Efficiency of Control: %
3. Potential Emissions: **362.4** lb/hour **438.1** tons/year
4. Synthetically Limited? [ ] Yes [**X**] No
5. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/yr
6. Emission Factor: **42 /9 ppmvd@15% O2** Reference: **GE,1998**
7. Emissions Method Code: [ ] 0 [ ] 1 [**X**] 2 [ ] 3 [ ] 4 [ ] 5
8. Calculation of Emissions (limit to 600 characters): **Refer to Part II for calculations.**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): **Lb/hour (oil-firing) and tons/year at 45 degrees F turbine inlet temperature. Lb/hr for oil-firing. Annual based on 7,760 hours gas-firing and 1,000 hours oil-firing.**

Emissions Unit Information Section 1 of 2

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **9 ppmvd @ 15% O2**	
4. Equivalent Allowable Emissions:	**66** lb/hour **290** tons/year
5. Method of Compliance (limit to 60 characters): **CEM-Part 75; 30-day rolling average**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Natural gas; See Part II; Allowable based on manufacturer data with margin. CEM will be installed prior to by-pass stack.**	

B.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **42 ppm @ 15% O2**	
4. Equivalent Allowable Emissions:	**362.4** lb/hour **181.2** tons/year
5. Method of Compliance (limit to 60 characters): **CEM-Part 75; 24-hour block average**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Distillate oil-firing. CEM Montoring Method. Annual based on 1,000 hours.**	

Emissions Unit Information Section 1 **of** 2

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **12 ppmvd @ 15% O2**	
4. Equivalent Allowable Emissions: **88.3** lb/hour	**88.3** tons/year
5. Method of Compliance (limit to 60 characters): **CEM-Part 75; 30-day rolling average- prorated**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Power augmentation with natural gas. See Part II.**	

B.

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

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION

(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: **CO**

2. Total Percent Efficiency of Control: %

3. Potential Emissions: **73.4** lb/hour **204.5** tons/year

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

5. Range of Estimated Fugitive/Other Emissions:

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

6. Emission Factor: **12 / 12 ppmvd**

   Reference: **GE, 1998**

7. Emissions Method Code:

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

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

   Refer to Part II for calculations.

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

   Lb/hour (oil-firing) and tons/year at 45 degrees F turbine inlet temperature. Annual based on 7,760 hours gas-firing and 1,000 hours oil-firing.

Emissions Unit Information Section 1 of 2

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **12 ppmvd**	
4. Equivalent Allowable Emissions:	**43.2** lb/hour **189.4** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 10; Initial Compliance Test Only**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Natural gas firing, see Part II; Allowable based on manufacturer data with margin.**	

B.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **20 ppmvd**	
4. Equivalent Allowable Emissions:	**73.4** lb/hour **36.7** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 10; Initial compliance test only**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Distillate oil-firing. Annual based on 1,000 hours.**	

Emissions Unit Information Section 1 of 2

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**
2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **15 ppmvd**
4. Equivalent Allowable Emissions: **54** lb/hour **54** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 10**
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Power Augmentation with Natural Gas. See Part II.**

B.

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

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

Pollutant Detail Information:

1. Pollutant Emitted: **VOC**
2. Total Percent Efficiency of Control: %
3. Potential Emissions: **16.5** lb/hour **38.78** tons/year
4. Synthetically Limited? [ ] Yes [**X**] No
5. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/yr
6. Emission Factor: **3.5 ppmvw** Reference: **GE,1998; Golder,1999**
7. Emissions Method Code: [ ] 0 [ ] 1 [**X**] 2 [ ] 3 [ ] 4 [ ] 5
8. Calculation of Emissions (limit to 600 characters): **Refer to Part II for calculations.**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): **Lb/hour (oil-firing) and tons/year at 45 degrees F turbine inlet temperature, exclusive of background. Annual based on 7,760 hours gas-firing and 1,000 hours oil-firing.**

Emissions Unit Information Section 1 of 2
Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **3.5 ppmvw**	
4. Equivalent Allowable Emissions: **7.9** lb/hour	**34.5** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 25A; Initial Compliance Test Only**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Natural gas-firing; see Part II; Allowable based on manufacturer data with margin.**	

B.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **7 ppmvw**	
4. Equivalent Allowable Emissions: **16.5** lb/hour	**8.25** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 25A; Initial compliance test only**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Distillate oil firing; annual based on 1,000 hours.**	

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

Pollutant Detail Information:

1. Pollutant Emitted: **PM10**

2. Total Percent Efficiency of Control: %

3. Potential Emissions: **17** lb/hour **43.4** tons/year

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

5. Range of Estimated Fugitive/Other Emissions:

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

6. Emission Factor: **17 lb/hr**

   Reference: **GE, 1998**

7. Emissions Method Code:

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

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

   Refer to Part II for calculations.

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

   Lb/hour based on maximum for oil-firing. Annual based on 7,760 hours gas-firing and 1,000 hours oil-firing at 45 degrees F turbine inlet.

Emissions Unit Information Section 1 of 2

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **10 % Opacity**	
4. Equivalent Allowable Emissions: **9** lb/hour	**39.4** tons/year
5. Method of Compliance (limit to 60 characters): **VE Test < 10% Opacity**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Natural gas-firing; Based on manufacturer data. Opacity limit proposed in lieu of lb/hr limit.**	

B.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **17 lb/hour**	
4. Equivalent Allowable Emissions: **17** lb/hour	**8.5** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 5 or 17**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Distillate oil-firing. Based on manufacturer data. Annual based on 1,000 hours/year.**	

I. VISIBLE EMISSIONS INFORMATION
(Regulated Emissions Units Only)

Visible Emissions Limitations: Visible Emissions Limitation 1 of 2

1.	Visible Emissions Subtype: **VE10**
2.	Basis for Allowable Opacity: [ ] Rule [X] Other
3.	Requested Allowable Opacity Normal Conditions: **10** % Exceptional Conditions: **100** % Maximum Period of Excess Opacity Allowed: **6** min/hour
4.	Method of Compliance: **Annual VE Test EPA Method 9**
5.	Visible Emissions Comment (limit to 200 characters): **Natural gas-firing. FDEP Rule 62-210.700(1). Allowed for 2 hours (120 minutes) per 24 hours for start up, shutdown and malfunction.**

Visible Emissions Limitations: Visible Emissions Limitation 2 of 2

1.	Visible Emissions Subtype: **VE20**
2.	Basis for Allowable Opacity: [ ] Rule [X] Other
3.	Requested Allowable Opacity Normal Conditions: **20** % 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): **Natural gas-firing. Distillate oil-firing FDEP Rule 62-210.700(1). Allowed for 2 hours (120 minutes) per 24 hours for start up, shutdown and malfunction.**

J. CONTINUOUS MONITOR INFORMATION
(Regulated Emissions Units Only)

Continuous Monitoring System Continuous Monitor 1 of 1

1. Parameter Code: EM	2. Pollutant(s): NOx
3. CMS Requirement: [X] Rule [ ] Other	
4. Monitor Information: Monitor Manufacturer: Not Yet Determined Model Number: Serial Number:	
5. Installation Date: 01 Jan 2001	
6. Performance Specification Test Date:	
7. Continuous Monitor Comment (limit to 200 characters): **NOx CEM proposed to meet requirements of 40 CFR Part 75. Will include dilution monitor (oxygen or carbon dioxide). Installed prior to by-pass stack.**	

Continuous Monitoring System Continuous Monitor _____ of _____

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

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

(Regulated and Unregulated Emissions Units)

PSD Increment Consumption Determination

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

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

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

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

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

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

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

2. Increment Consuming for Nitrogen Dioxide?

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

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

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

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

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

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

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

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

Supplemental Requirements for All Applications

1.	Process Flow Diagram	
	[X] Attached, Document ID: Part II	
	[ ] Not Applicable	[ ] Waiver Requested
2.	Fuel Analysis or Specification	
	[X] Attached, Document ID: Part II	
	[ ] Not Applicable	[ ] Waiver Requested
3.	Detailed Description of Control Equipment	
	[X] Attached, Document ID: Part II	
	[ ] Not Applicable	[ ] Waiver Requested
4.	Description of Stack Sampling Facilities	
	[X] Attached, Document ID: Part II	
	[ ] Not Applicable	[ ] Waiver Requested
5.	Compliance Test Report	
	[ ] Attached, Document ID: _____	[X] Not Applicable
	[ ] Previously Submitted, Date: _____	
6.	Procedures for Startup and Shutdown	
	[ ] Attached, Document ID: _____	[X] Not Applicable
7.	Operation and Maintenance Plan	
	[ ] Attached, Document ID: _____	[X] Not Applicable
8.	Supplemental Information for Construction Permit Application	
	[X] Attached, Document ID: Part II	[ ] Not Applicable
9.	Other Information Required by Rule or Statute	
	[X] Attached, Document ID: Part II	[ ] Not Applicable

Additional Supplemental Requirements for Category I Applications Only

10. Alternative Methods of Operation

[ ] Attached, Document ID: _____ [ ] Not Applicable

11. Alternative Modes of Operation (Emissions Trading)

[ ] Attached, Document ID: _____ [ ] Not Applicable

12. Identification of Additional Applicable Requirements

[ ] Attached, Document ID: _____ [ ] Not Applicable

13. Compliance Assurance Monitoring Plan

[ ] Attached, Document ID: _____ [ ] Not Applicable

14. Acid Rain Permit Application (Hard Copy Required)

[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
Attached, Document ID: _____

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

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

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

[ ] Not Applicable

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through L as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application. Some of the subsections comprising the Emissions Unit Information Section of the form are intended for regulated emissions units only. Others are intended for both regulated and unregulated emissions units. Each subsection is appropriately marked.

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

Type of Emissions Unit Addressed in This Section

1. Regulated or Unregulated Emissions Unit? Check one:

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

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

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

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

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

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

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

Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section (limit to 60 characters): **Duct Burner System associated with HRSG**		
2. Emissions Unit Identification Number: [ ] No Corresponding ID [X] Unknown		
3. Emissions Unit Status Code: **A**	4. Acid Rain Unit? [X] Yes [ ] No	5. Emissions Unit Major Group SIC Code: **49**
6. Emissions Unit Comment (limit to 500 characters): **The emission unit cannot operate unless the combustion turbine is operational.**		

Emissions Unit Control Equipment Information

A.

1. Description (limit to 200 characters):

Low-NOx Burners

2. Control Device or Method Code: **24**

B.

1. Description (limit to 200 characters):

2. Control Device or Method Code:

C.

1. Description (limit to 200 characters):

2. Control Device or Method Code:

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

Emissions Unit Details

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

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate:		200	mmBtu/hr
2. Maximum Incineration Rate:	lbs/hr		tons/day
3. Maximum Process or Throughput Rate:			
4. Maximum Production Rate:			
5. Operating Capacity Comment (limit to 200 characters): **Maximum heat input based on natural gas-firing only (HHV). Requested hours of operation based on maximum fuel use rate.**			

Emissions Unit Operating Schedule

1. Requested Maximum Operating Schedule:			
	24 hours/day	7	days/week
	52 weeks/yr	2,000	hours/yr

D. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

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

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

See Attachment LW-EU1-D

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

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **See Part II**
2. Emission Point Type Code: [ ] 1 [x] 2 [ ] 3 [ ] 4
3. Descriptions of Emissions Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): **DB only operates when CT is operating. DB and CT gases will exhaust through a single HRSG stack.**
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:
5. Discharge Type Code: [ ] D [ ] F [ ] H [ ] P [ ] R [x] V [ ] W
6. Stack Height: feet
7. Exit Diameter: feet
8. Exit Temperature: °F

9. Actual Volumetric Flow Rate:	acfm
10. Percent Water Vapor:	%
11. Maximum Dry Standard Flow Rate:	dscfm
12. Nonstack Emission Point Height:	feet
13. Emission Point UTM Coordinates: Zone: East (km): North (km):	
14. Emission Point Comment (limit to 200 characters): **See Appendix A in Part II.**	

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

Segment Description and Rate: Segment 1 of 2

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters):

   Natural Gas

2. Source Classification Code (SCC):

   1-01-006-01

3. SCC Units:

   Million Cubic Feet Burned

4. Maximum Hourly Rate:	5. Maximum Annual Rate:
0.195	**391**

6. Estimated Annual Activity Factor:

7. Maximum Percent Sulfur:	8. Maximum Percent Ash:

9. Million Btu per SCC Unit:

   1,024

10. Segment Comment (limit to 200 characters):

    Maximum Annual Rate = 390.6 (rounded to 391). Max. Annual rate is based on 2,000 hr/yr operation at max hr fuel use rate but can be increased if lower firing rates are utilized.

Segment Description and Rate: Segment 2 of 2

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Distillate (No. 2) Fuel Oil**	
2. Source Classification Code (SCC):	
3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:
6. Estimated Annual Activity Factor:	
7. Maximum Percent Sulfur:	8. Maximum Percent Ash:
9. Million Btu per SCC Unit:	
10. Segment Comment (limit to 200 characters):	

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

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM			EL
SO2			EL
NOx	024		EL
CO			EL
VOC			EL

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

Pollutant Detail Information:

1. Pollutant Emitted: **PM**
2. Total Percent Efficiency of Control: %
3. Potential Emissions: **0.4** lb/hour **0.4** tons/year
4. Synthetically Limited? [**X**] Yes [ ] No
5. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/yr
6. Emission Factor: **0.002 lb/MMBtu** Reference: **Req. by applicant**
7. Emissions Method Code: [ ] 0 [ ] 1 [**X**] 2 [ ] 3 [ ] 4 [ ] 5
8. Calculation of Emissions (limit to 600 characters): **See Table 2-6 in Part II**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): **Annual emission for 2,000 hr/yr operation at maximum heat input of 200 MMBtu/hr.**

Emissions Unit Information Section 2 of 2
Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **10 % Opacity**	
4. Equivalent Allowable Emissions: **0.4** lb/hour	**0.4** tons/year
5. Method of Compliance (limit to 60 characters): **Initial Compliance Test, EPA Method 9**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Requesting limit to be combined with CT limit for demonstrating compliance.**	

B.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **17 lb/hour**	
4. Equivalent Allowable Emissions: **17** lb/hour	**8.5** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 5 or 17**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Distillate oil firing. Based on manufacturer data. Annual based on 1,000 hours/year.**	

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

Pollutant Detail Information:

1. Pollutant Emitted: **SO2**
2. Total Percent Efficiency of Control: %
3. Potential Emissions: **0.3** lb/hour **0.3** tons/year
4. Synthetically Limited? [**X**] Yes [ ] No
5. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/yr
6. Emission Factor: **1 gr/100cf** Reference: **Req. by applicant**
7. Emissions Method Code: [ ] 0 [ ] 1 [**X**] 2 [ ] 3 [ ] 4 [ ] 5
8. Calculation of Emissions (limit to 600 characters): **See Table 2-6 in Part II.**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): **Annual emission for 2,000 hr/yr operation at maximum heat input of 200 MMBtu/hr.**

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code:	OTHER
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units:	1 gr/100 cf
4. Equivalent Allowable Emissions:	0.3 lb/hour 0.3 tons/year
5. Method of Compliance (limit to 60 characters):	Vendor Sampling
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):	Requesting limit to be combined with CT limit for demonstrating compliance, i.e., fuel sampling.

B.

1. Basis for Allowable Emissions Code:	OTHER
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units:	0.05 % Sulfur
4. Equivalent Allowable Emissions:	101.5 lb/hour 50.7 tons/year
5. Method of Compliance (limit to 60 characters):	Fuel Sampling
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):	Distillate oil-firing; NSPS; 40 CFR Part 60; Subpart GG [60.333(b)] limits to 0.8% S. Annual based on 1,000 hours.

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

Pollutant Detail Information:

1. Pollutant Emitted: **NOx**
2. Total Percent Efficiency of Control: **50** %
3. Potential Emissions: **20** lb/hour **20** tons/year
4. Synthetically Limited? [**X**] Yes [ ] No
5. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/yr
6. Emission Factor: **0.1 lb/MMBtu** Reference: **Proposed by applicant**
7. Emissions Method Code: [ ] 0 [ ] 1 [**X**] 2 [ ] 3 [ ] 4 [ ] 5
8. Calculation of Emissions (limit to 600 characters): **See Table 2-6 in Part II.**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): **Annual emission for 2,000 hr/yr operation at maximum heat input of 200 MMBtu/hr.**

Emissions Unit Information Section 2 **of** 2

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **0.1 lb/MMBtu**	
4. Equivalent Allowable Emissions:	**20** lb/hour **20** tons/year
5. Method of Compliance (limit to 60 characters): **Annual Compliance Test, EPA Method 20 or 7C**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Requesting limit to be combined with CT limit for demonstrating compliance.**	

B.

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

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

Pollutant Detail Information:

1. Pollutant Emitted: **CO**
2. Total Percent Efficiency of Control: %
3. Potential Emissions: **20** lb/hour **20** tons/year
4. Synthetically Limited? [ ] Yes [**X**] No
5. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/yr
6. Emission Factor: **0.1 / 12 ppmvd** Reference: **Req. by applicant**
7. Emissions Method Code: [ ] 0 [ ] 1 [**X**] 2 [ ] 3 [ ] 4 [ ] 5
8. Calculation of Emissions (limit to 600 characters): **See Table 2-6 in Part II**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): **Annual emissions for 2,000 at maximum heat input of 200 MMBtu/hr.**

Emissions Unit Information Section 2 of 2

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **20 lbs/hr**	
4. Equivalent Allowable Emissions:	**20** lb/hour **20** tons/year
5. Method of Compliance (limit to 60 characters): **Annual Compliance Test, EPA Method 10**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Requesting limit to be combined with CT limit for demonstrating compliance.**	

B.

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

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

Pollutant Detail Information:

1. Pollutant Emitted: **VOC**
2. Total Percent Efficiency of Control: %
3. Potential Emissions: **0.6** lb/hour **0.6** tons/year
4. Synthetically Limited? [**X**] Yes [ ] No
5. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/yr
6. Emission Factor: **0.003 lb/MMBtu** Reference: **Req. by applicant**
7. Emissions Method Code: [ ] 0 [ ] 1 [**X**] 2 [ ] 3 [ ] 4 [ ] 5
8. Calculation of Emissions (limit to 600 characters): **See Table 2-6 in Part II**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): **Annual emission for 2,000 hr/yr operation at maximum heat input of 200 MMBtu/hr**

I. VISIBLE EMISSIONS INFORMATION
(Regulated Emissions Units Only)

Visible Emissions Limitations: Visible Emissions Limitation 1 of 2

1.	Visible Emissions Subtype: **VE10**
2.	Basis for Allowable Opacity: [ ] Rule [X] Other
3.	Requested Allowable Opacity Normal Conditions: **10** % Exceptional Conditions: **100** % Maximum Period of Excess Opacity Allowed: **6** min/hour
4.	Method of Compliance: **EPA Method 9**
5.	Visible Emissions Comment (limit to 200 characters): **Determine during initial operation only.**

Visible Emissions Limitations: 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: **60** min/hour
4.	Method of Compliance: **Best operating practice**
5.	Visible Emissions Comment (limit to 200 characters): **Rule 62-210.700. Maximumperiod of excess opacity allowed: 2 hr/24hr.**

J. CONTINUOUS MONITOR INFORMATION
(Regulated Emissions Units Only)

Continuous Monitoring System Continuous Monitor _____ of _____

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

Continuous Monitoring System Continuous Monitor _____ of _____

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

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

PSD Increment Consumption Determination

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

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

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

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

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

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

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

2. Increment Consuming for Nitrogen Dioxide?

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

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

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

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

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

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

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

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

Supplemental Requirements for All Applications

1.	Process Flow Diagram	
	[X] Attached, Document ID: Part II	
	[ ] Not Applicable	[ ] Waiver Requested
2.	Fuel Analysis or Specification	
	[X] Attached, Document ID: Part II	
	[ ] Not Applicable	[ ] Waiver Requested
3.	Detailed Description of Control Equipment	
	[ ] Attached, Document ID: _____	
	[X] Not Applicable	[ ] Waiver Requested
4.	Description of Stack Sampling Facilities	
	[X] Attached, Document ID: Part II	
	[ ] Not Applicable	[ ] Waiver Requested
5.	Compliance Test Report	
	[ ] Attached, Document ID: _____	[X] Not Applicable
	[ ] Previously Submitted, Date: _____	
6.	Procedures for Startup and Shutdown	
	[ ] Attached, Document ID: _____	[X] Not Applicable
7.	Operation and Maintenance Plan	
	[ ] Attached, Document ID: _____	[X] Not Applicable
8.	Supplemental Information for Construction Permit Application	
	[X] Attached, Document ID: Part II	[ ] Not Applicable
9.	Other Information Required by Rule or Statute	
	[ ] Attached, Document ID: _____	[X] Not Applicable

Additional Supplemental Requirements for Category I Applications Only

10. Alternative Methods of Operation

[ ] Attached, Document ID: _____ [ ] Not Applicable

11. Alternative Modes of Operation (Emissions Trading)

[ ] Attached, Document ID: _____ [ ] Not Applicable

12. Identification of Additional Applicable Requirements

[ ] Attached, Document ID: _____ [ ] Not Applicable

13. Compliance Assurance Monitoring Plan

[ ] Attached, Document ID: _____ [ ] Not Applicable

14. Acid Rain Permit Application (Hard Copy Required)

[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
Attached, Document ID: _____

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

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

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

[ ] Not Applicable

ATTACHMENT LW-EU1-D

APPLICABLE REQUIREMENTS LISTING

ATTACHMENT LW-EU1-D

Applicable Requirements Listing - Power Plants

EMISSION UNIT: LWG: HRSG Duct Burners

FDEP Rules:
Air Pollution Control-General Provisions:

62-204.800(7)(b)3.	-	NSPS Subpart Db (Applicable to DBs Only)
62-204.800(7)(d)	-	NSPS General Provisions

Stationary Sources-General:

62-210.650	- Circumvention
62-210.700(1)	- Excess Emissions
62-210.700(4)	- Excess Emissions
62-210.700(6)	- Excess Emissions

Stationary Sources-Emission Monitoring (Applicable to CT/DB):

62-297.310(1)	- Test Runs-Mass Emission
62-297.310(2)(b)	- Operating Rate; other than CTs;no CT
62-297.310(3)	- Calculation of Emission
62-297.310(4)(a)1.	- Applicable Test Procedures;Sampling time
62-297.310(4)(b)	- Sample Volume
62-297.310(4)(d)	- Calibration
62-297.310(4)(e)	- EPA Mehtod 5-only
62-297.310(5)	- Determination of Process Variables
62-297.310(6)(a)	- Permanent Test Facilities-general
62-297.310(6)(c)	- Sampling Ports
62-297.310(6)(d)	- Work Platforms
62-297.310(6)(e)	- Access
62-297.310(6)(f)	- Electrical Power
62-297.310(6)(g)	- Equipment Support
62-297.310(7)(a)1.	- Applies to CT/DB
62-297.310(7)(a)3.	- Permit Renewal Test Required
62-297.310(7)(a)4.b.	- Annual Test
62-297.310(7)(a)9.	- FDEP Notification - 15 days
62-297.310(8)	- Test Reports

Federal Rules:
NSPS General:

40 CFR 60.7(b); (f)	- Notification and Recordkeeping
40 CFR 60.8(e)	- Performance Tests
40 CFR 60.11(a)	- Compliance (Ref. S. 60.8)
40 CFR 60.11(d)	- Compliance (maintain air pollution conrol equipment)

NSPS Subpart Db:

40 CFR 60.44b(a)(4)(i)	- NOx; gas (0.2 lb/mmBtu)
40 CFR 60.46b(a)	- Compliance and Performace Methods; comply at all times
40 CFR 60.46b(c)	- Performance tests for NOx
40 CFR 60.46b(f)	- NOx for DB systems
40 CFR 60.48b(h)	- Monitoring for NOx not required for DB

The Acid Rain Program Rules are identified in Attachment LW-EU1A-D and are applicable to the combustion turbine and duct burners as a single unit.

LWG Responses to FDEP Questions Dated April 9, 1999

1. Common Control Issues: **Please verify the following items:**

   - **Question/Comment**: LWG will enter into a long term lease (40 years) of this property from the City of Lake Worth which also operates the T.G. Smith Power Plant on the same site. **Response**: LWG will lease a portion of property owned by the City of Lake Worth. The property has been leased and includes the outlined parcel of land identified in the Site Plan included in the air permit application. The property is located between water treatment plant and public works facilities and adjacent to existing facilities associated with the T.G. Smith Power Plant.

   - **Question/Comment**: Existing T.G. Smith employees will be used to operate and maintain the new combustion gas turbine. **Response**: The new combustion turbine will be operated in combined cycle mode. LWG will contract with the City of Lake Worth to operate the combined cycle unit.

   - **Question/Comment**: The new unit will generate a maximum of 260 MW of power under combined cycle operation: 186 MW directly from the new combustion gas turbine/electrical generator while firing distillate oil and an additional 74 MW from steam produced by the heat recovery steam generator (HRSG) and supplied to existing turbine/electric generators at the collocated T.G. Smith Power Plant. **Response**: The statement is correct with the clarification that LWG will supply steam to one steam electric turbine operated by LWG as part of an LWG combined cycle unit and will sell steam to the City for its use in the Unit S-3. The new unit will generate a maximum of 260 MW of power under combined cycle operation: 186 MW directly from the new combustion gas turbine/electrical generator while firing natural gas and distillate oil and an additional 74 MW from steam produced by the heat recovery steam generator (HRSG) and supplied to existing turbine/electric generators at the collocated T.G. Smith Power Plant.

   - **Question/Comment**: The T.G. Smith Power Plant will purchase this steam as a top priority when it is available and when there is a demand. **Response**: The City would purchase steam for its use in Unit S-3 based on contractual arrangements with LWG. Those arrangements are designed to provide steam to the City more economically than the alternative of using the Unit S-3 boiler. The City would operate Unit S-3 based on the needs of its customers.

   - **Question/Comment**: Because less than 75 MW of power will be produced by steam, this project will avoid power plant siting requirements. **Response**: Review under Florida's Power Plant Siting Act (PPSA) is not required. Review is not required for either new plant sites less than 75 MW or existing plants where there is no increase in steam generating capability. The existing Unit S-1, S-2, S-3 and S-4 have a generating capacity of 74 MW. Following implementation of the project, the total steam generating capability will remain the same. The steam generators (i.e., boilers) for Units S-1, S-2 and S-4 will no longer be used. Accordingly, the threshold for PPSA review is not triggered and Site Certification is not required.

   - **Question/Comment**: Although collocated with the existing Tom G. Smith Power Plant, the applicant maintains that there is independent ownership and control of the new combustion gas turbine. **Response**: LWG will lease from the City of Lake Worth a portion of the T.G. Smith Plant separate from that identified by the City as the PPSA certified site of Unit S-5 (refer to Site Plan in application). LWG will own, operate and control the new combustion gas turbine on the leased property.

2. **Question/Comment**: Pollutant Emissions Standards: Please submit the manufacturer's written guarantee or the summary from recent actual emissions tests of this model combustion turbine that the unit is capable of achieving the following emissions standards *as requested in the permit application* at both 50% load and 100% load. **Response**: Attached are data sheets supplied by GE to LWG for the proposed Frame 7FA turbine firing natural gas and distillate oil. The data sheet for natural gas provides performance data at 55 degrees F, which is the operating temperature for the chillers proposed for the project. The loads provided for natural gas are 100 percent (base), 75

percent, 50 percent and 25 percent. The latter is a transitional point that could occur during start-up and shutdown. The data sheet for distillate oil firing is for a range of temperatures at base load. The oil data provided is for using distillate oil with a sulfur content of 0.5 percent which is much higher than that proposed. GE is willing to guarantee these values. GE has also provided similar data for the Florida Power & Light Company's Fort Myers Repowering Project (6 GE Frame 7FA's), the Santa Rosa Energy's Project (1 GE Frame 7FA), the Duke Energy's Project (2 GE Frame 7FA's), the Kissimmee Utility Authority's Cane Island Unit 3 (1 GE Frame 7FA) and the Oleander Power Project (5 GE Frame 7FA's). The data for all machines are very similar. There are a few differences between the data sheet and what was proposed as BACT. For CO when firing natural gas, a 3 ppmvd margin was added. Since the control of NOx emissions can effect emissions of CO, a margin was added. For VOC's, the data provided by GE is for unburned hydrocarbons rather than volatile organic compounds. Adjustments to the unburned hydrocarbons were made to more accurately reflect VOC emissions. The emissions and compliance methods proposed in the following are acceptable to LWG with an exception of dilution monitor for the CEM and the proposed PM emission rate for oil. 40 CFR Part 75 will allow either oxygen or carbon dioxide monitoring. With either monitor, the NOx concentration can be corrected to 15 percent oxygen. This would provide flexibility since a CEM vendor has not been selected. For the PM emission rate when firing oil, it is requested that the averaging time be much greater than a 3-hours since the emission rate is quite low relative to the flow volume. At an emission rate of 17 lb/hr the concentration is 0.002 grains per standard cubic feet of air. This is much less than concentrations observed for other PM sources with baghouses. It is requested that the averaging time indicate a footnote allowing a sufficient time to obtain a valid sample for each run. Also, it is requested that only initial sampling be required.

Pollutant	Fuel Type	Requested Limits (less than or equal to)	Compliance Method
CO	gas	12.0 ppmvd, 3-hour average	EPA Method 10, initial test only
	oil	20.0 ppmvd, 3-hour average	EPA Method 10, initial test only
NOx	gas	9.0 ppmvd @ 15% O2, 30-day rolling average	CEM w/dilution monitor for O2 in accordance with 40 CFR 75
	oil	42.0 ppmvd @ 15% O2, 24-hour block average	CEM w/dilution monitor for O2 in accordance with 40 CFR 75
PM/PM10	gas	None (request opacity limit in lieu of PM limit)	None
	oil	17.0 lb/hour, 3-hour average	EPA Method 5 or 17
SO2	gas	1.0 grain per 100 SCF of gas	Fuel sampling/analysis by vendor
	oil	0.05% sulfur by weight	Fuel monitoring plan similar to NSPS Subpart GG
VOC	gas	3.5 ppmvw, as methane, 3-hour average	EPA Method 25A, initial only
	oil	7.0 ppmvw, as methane, 3-hour average	EPA Method 25A, initial only
Opacity	gas	10% except for up to 100% for one 6-minute period per hour	EPA Method 9
	oil	20% except for up to 100% for one 6-minute period per hour	EPA Method 9

a. The ambient impacts were modeled based on the maximum predicted "pound per hour" emission rates. The draft permit will most likely include corresponding "pounds per hour" limits for all regulated pollutants. **Please comment.** **Response:** Limitations in "pounds per hour" have not been included in some of the Department's recent PSD air permits (e.g., KUA Cane Island Unit 3 and Duke Energy Project). We would request that limitation in "pounds

per hour" not be included for the LWG project since the addition of a limit expressed differently can be misinterpreted. As provided in the application, turbine performance is a function of turbine inlet temperature, which may affect the observed "pounds per hour". Also, turbine performance is a minimum guaranteed value and may be higher and thus affect "pounds per hour". The application accounted for this is increasing the mass flow to produce a margin on emissions.

b. The CO limits were proposed as BACT and will result in potential emissions greater than 100 tons per year. Rule 62-297.310 requires annual compliance tests for such regulated pollutants. In addition, the application states that CO will remain as an indicator of "good combustion practices". The Department is considering a requirement to conduct initial testing as well as testing during the annual RATA for the NOx continuous monitor. Also, the Department assumes the CO limits of 12/20 ppmdv for firing gas/oil are corrected for dilution to 15% oxygen similar to NOx. **Please comment.** **Response:** Testing during the RATA would be appropriate if the emissions are greater than 100 tons/year. However, Rule 62-297.310(7)(a)4. would require annual testing unless it was otherwise stated in the permit. Since there is margin in the requested CO emission rate, the actual emissions may be less than 100 tons/year. In the event emissions are less than 100 tons/year, some provision to test every 5-years may be more appropriate.

c. The applicant proposes that BACT for PM/PM10 be defined as a very low sulfur fuel - either pipeline natural gas or light distillate fuel oil containing no more than 0.05% sulfur by weight. The applicant also requests a limit of 17 pounds of PM per hour while burning distillate oil, but no limit while burning natural gas. However, as a surrogate parameter for PM/PM10, the applicant requests separate visible emissions standards for burning natural gas and distillate oil. The Department is considering a visible emissions standard of 10% opacity for firing either gas or oil similar to recent permits for combustion turbines. **Please comment. Also, provide performance curves for opacity and PM versus combustion turbine load while burning natural gas and oil.** **Response:** An opacity limit of 10% is appropriate for gas firing. However, an opacity limit for oil may be appropriate after initial testing demonstrates compliance with the PM emission rate. As noted above, there is difficulty in determining the particulate emission rate due to the low PM concentration in the gas stream. Indeed, the concentration for oil at about 0.002 grains per standard cubic feet is similar to that of gas of 0.0013 grains per standard cubic feet. Performance curves, for opacity versus turbine performance, are not available since opacity is constant from 0 to 100 percent based on GE data. Actual tests at similar combustion turbines (e.g., the "F" Class turbines at FPL Martin Units 3 and 4 and FPL Lauderdale Units 4 and 5) have visible emissions that meet the proposed limits. Data from these facilities and confirmed by GE that opacity of 5 percent when firing gas and 10 percent while firing distillate oil can be achieved. Moreover, the low PM concentration in the exhaust gas would limit the observance of any plume.

d. The applicant proposed NOx emissions limits of 9 ppmvd while burning gas and 42 ppmvd while burning oil - each of which includes at least 20% margin for compliance. The ambient impact analyses were based on the maximum potential *hourly* emissions rate developed from these proposed limits. A *24-hour block average* is requested for the burning of oil while a *30-day rolling average* is requested while burning gas. The Department is considering a 24-hour block average for both fuels similar to recent permits for combustion turbines. **Please provide some justification for why a longer averaging period may be needed while burning natural gas. Also, previous BACT determinations for other states establish NOx limits of 25 ppmvd while burning distillate oil and injecting water. Why isn't the lower NOx limit for oil justified for this project?** **Response:** An averaging time of 30-days was requested, since it is consistent with 403.0872(13)(b) Florida Statutes which states: "(b) For emission units that are subject to continuous monitoring requirements under 42 U.S.C. ss. 7661-7661f or 40 Part C.F.R. part 75, compliance with the nitrogen oxides emission limits shall be demonstrated based on a 30-day rolling average, except as specifically provided by 40 C.F.R. 60 or 76." There are no short-term emission limits in 40 C.F.R 60 or 76 for the project in the level proposed. Since the NOx will be controlled using combustion techniques, an averaging

time of 30 days rolling is appropriate to account for combustion changes. For oil firing, water injection will be used and operated with injection control systems that will limit NOx formation by cooling the combustion zone. The difference between the averaging time for gas and oil is reflected by the different control methods. GE has indicated that both the proposed emission limits for NOx of 9 ppmvd corrected to 15 percent oxygen when firing gas and 42 ppmvd corrected to 15 percent oxygen when firing oil can be achieved on a 24-hour block average basis. The margin added to the NOx emission rates was for determining pounds per hour and not concentration. The margin reflects higher pounds per hour to account for variability in performance. For NOx, the impacts are evaluated against the PSD increments and ambient air quality standards, which are based on an annual averaging time. The impacts for the worst-case NOx emissions, i.e., for oil firing at a concentration of 42 ppmvd, were insignificant. Impacts with gas firing are about 5 times less than that of oil firing. The emission rate for oil firing reflect GE's guaranteed level of 42 ppmvd for the Frame 7FA. GE knows of no GE gas turbine operating on fuel oil achieving 25 ppmvd corrected to 15 percent oxygen. Increasing water injection in an attempt to reduce NOx emissions to below 42 ppmvd will increased parts wear, potentially damage the gas turbine and increase CO emissions. This is the lowest emission guaranteed by GE. LWG cannot provide the Department reasonable assurance that lower levels can be achieved. Lower emission levels are also not available for other "F" Class combustion turbines.

e. The applicant proposed "pipeline natural gas" defined as 1 grain per 100 SCF of gas to be BACT for SO2 while firing gas. The draft permit for a similar combustion turbine project (Kissimmee Utility Authority) proposed a sulfur limit of 20 grains of sulfur per 100 SCF of gas. **Please explain this apparent discrepancy.** **Response:** The proposed limit of 1 grain sulfur per 100 cubic feet (cf) reflect actual data from Florida Gas Transmission pipeline measurements. Indeed, the average is about 0.4 grains/100 cf with a maximum of about 0.8 grains/100 cf over the last 10 years. For reference, the AP-42 emission factor is 0.2 grains/100 cf. The 20 grains per 100 cf cited in the KUA application reflects the Federal Energy Regulatory Commission (FERC) maximum allowable for pipeline suppliers. This concentration dos not reflect the actual data for pipeline natural gas.

f. The applicant proposes an alternate sampling plan for fuel nitrogen and sulfur in order to comply with the NSPS. The nitrogen sampling requirement would be replaced by the NOx CEM. The application mentions an EPA Region 5 memo about an acceptable alternate fuel sampling plant, but provides no details. **Please prepare a separate document describing the substitution of continuous NOx monitoring for fuel nitrogen monitoring and details of the fuel sulfur monitoring plan including the sampling frequency and methods of analysis. This document will be submitted to EPA for approval as an alternate fuel sampling plan.** **Response:** Please find attached EPA Applicability Determination from Region V dated 1/16/96 regarding Custom Fuel Monitoring. Also attached is a request for a Custom Fuel Monitoring Schedule to be submitted to EPA.

g. Potential emissions of sulfuric acid mist (SAM) are estimated to be 10.9 tons per year. The PSD significant emissions rate is 7 tons per year. There are no other details regarding SAM in the application. **What is the proposed BACT determination for SAM and method of compliance?** **Response:** The intent of Section 4.3.7 was to address "SO_2 and other regulated pollutants", which included sulfuric acid mist (SAM). For the proposed, there are no other controls for SAM other than the sulfur content in the fuel. Natural gas produces the lowest sulfur oxides emission rates for any source. The use of 0.05 percent sulfur distillate is also the lowest sulfur fuel oil available.

h. The applicant has requested up to 2 hours of excess emissions per 24-hour period resulting from start up, shut down, and malfunction supposedly allowed by Rule 62-210.700, F.A.C. The applicant also requested up to 4 hours of excess emissions during cold start up of the combined cycle plant. **Please provide supporting information from the manufacturer as to the duration of startup and shutdown for this model combustion turbine. How frequently would the plant perform a cold startup of the gas turbine for combine cycle operation?** *Note: Because this unit is subject to PSD and NSPS, any conditions permitting*

excess emissions are subject to approval by the EPA. **Response:** Please find attached performance charts that gas turbine speed and load and steam turbine speed and load as a function of time. For a cold start, i.e., a shutdown of longer than 72 hours, the steam cycle [heat recovery steam generator (HRSG) and steam turbine] cannot take the amount of steam that can be produced by the gas turbine. The gas turbine start-up, from zero to full load can be accomplished in about 1-hour. However, when the HRSG and steam turbine are cold, the metals cannot take the amount of heat generated by the turbine. As a result, the gas turbine will be operated at low loads where the pre-mixed DLN mode is not fully functional. The maximum amount that this will occur is for 4-hours. LWG expects a range of 30 to 50 coldstarts per year. Under Section 40 C.F.R. 60.8(c) emissions in excess of the NSPS are not considered a violation unless otherwise stated in the applicable subpart. The NSPS under Subpart GG do not restrict emissions during startup, shutdown or malfunction. Therefore, EPA approval is not required. Excess emissions will be reported to the FDEP as required in the quarterly emission reports.

3. Control Equipment: **Please provide supporting documentation from the manufacturer regarding the following control equipment and pollutants:**

   a. Performance curves for CO, NOx, and VOC emissions versus combustion turbine load when controlled by dry low NOx only and burning natural gas.

   b. Performance curves for CO, NOx, and VOC emissions versus the water injection rate for 50%, 75% and 100% loads on the combustion turbine when controlled by water injection and burning low sulfur distillate fuel oil.

   c. Performance curves of CO, NOx, PM, VOC, and visible emissions for start up and shut down of the combustion turbine in simple cycle and combined cycle modes while burning natural gas and low sulfur distillate oil.

   Also, please describe the control system that will inject water to reduce NOx emissions. Is it linked to the NOx continuous monitor or turbine load? Response: Performance data for the turbines under the conditions outlined in items a., b. and c. are attached as part of the response to item 2. As noted from the data supplied by GE, emission rates will be met across all loads from 50 to 100 percent. The gas turbine will only be operated at loads lower than 50 percent during startup, shutdown or malfunction. Data has been provided for low load (i.e. 25 percent) operation.

4. Emissions Limited Pollutants: Page 27 of the application indicates that only SO2 and NOx are "emissions limited pollutants". Because the BACT process also establishes limits for CO and PM/PM10 these pollutants should also be included as "emissions limited". Also, if a limit is assumed by the applicant for VOC, this would also become an emissions limited pollutant. A test failure for an emissions limited pollutant is a violation. **Please comment. Response:** The "emissions limited pollutant" designation was intended to reflect the NSPS requirement. When the permit is issued, it is understood that CO, VOCs and PM/PM10 will also be "emissions limited pollutants" and subject to the Department's enforcement requirements if the emission rates are exceeded under the compliance methods.

5. Modeled Ambient Impacts - Class I Significant Impact Levels for Everglades National Park:

   a. For combined cycle operation burning distillate oil, the 3-hour and 24-hour predicted concentrations of SO2 exceed the recommended NPS levels indicated in the application (Table 6-10). **Please submit more detailed modeling or a valid justification as why more detailed monitoring isn't necessary. Response:** For combined cycle operation burning distillate oil, the maximum 3-hour and 24-hour SO2 concentrations of SO2 were predicted to be less than the PSD Class I significant impact levels but greater than the NPS levels. Based on discussions with FDEP, the EPA levels formed the basis of comparison to determining whether the project's impacts would cause or contribute to potential exceedances of PSD Class I increments. In addition, these results did not account for pollutant emission reductions and, therefore, concentration reductions, from existing Unit 4 that will be shutdown as part of this project. By accounting for the SO2 emission reductions due to Unit 4, the net change in the

project's maximum concentrations is predicted to be below both the EPA and NPS significant impact levels.

b. The application indicates that the "rural" option as selected for ISCST3 modeling. The proposed CT will be collocated on an existing power plant site, next to a high school, near a middle school, beside Interstate I-95, and close to an older residential neighborhood. **Why was the "rural" option selected? Please explain the selection of the "rural" option rather than the "urban" option? Response:** The "rural" option was selected for ISCST3 modeling since more than 50 percent of the land use within a 3-kilometer (km) radius of the project site was assumed to be rural. This classification is based on the meteorological land use scheme developed by Auer (1978) as recommended by the EPA in the Guideline on Air Quality Models (Appendix W, 40 CFR Part 51). Based on site visits around the plant and a review of USGS maps for Lake Worth and Palm Beach, it is estimated that approximately 45 percent of the area can be described as industrial, commercial, or compact residential. The remaining 55 percent of the area can be described as water surfaces and lakes (e.g., Lake Osborne, Intracoastal Waterway), metropolitan natural (John Prince Park, Palm Beach County Airpark), or common residential. As such, the rural classification is appropriate for addressing air quality impacts due to the project emissions.

c. **Is there a more current, qualified, 5-year meteorological data set available than the one used (1987 to 1991)? If so, why wasn't that data set used? Response:** The 5-year meteorological data set of 1987 to 1991 that was used in the modeling was based on the latest data set available from EPA's Technical Transfer Network (TTN) website, Support Center for Regulatory Air Models (SCRAM) (http://www.epa.gov/ttn/scram/). Although surface observations for the National Weather Service (NWS) for Palm Beach International (PBI) Airport are available from 1984 to 1992, the corresponding mixing height data from PBI are available only through 1991. Thus, the data from 1987 to 1991 was determined to be the latest data available to address potential impacts for the project.

6. Modeled Ambient Impacts - Determining Compliance with PSD Class II Increments and AAQS:

Table 6-7 of the application indicates a maximum predicted 24-hour SO2 concentration of 5 ug/m3 while burning oil during combined cycle operation. This is equal to the EPA significant impact level also identified in Table 6-7. **Please submit more detailed modeling or a valid justification as to why this isn't necessary. Response**: More detailed air dispersion modeling was performed to obtain the overall maximum 24-hour concentration for the project. As discussed in the Air Permit Application, initial air modeling of the project's emissions was performed using 720 grid receptors in a screening analysis. Detailed air modeling analyses were performed using a dense receptor grid to produce the maximum 24-hour SO2 concentration of 5 ug/m3. It should be noted that this concentration was predicted for only one year (i.e., 1987) at only one receptor located 200 m to the west-southwest (240 degrees) from the proposed HRSG stack (i.e., one occurrence from a potential 1,826 24-hour concentrations predicted at that receptor). For all other receptors for that year and at all receptors for other years, the maximum 24-hour SO2 concentrations were predicted to be 15 percent or more lower than the 5 ug/m3. It was concluded that additional modeling was unnecessary since the maximum concentrations did not exceed the significant impact level of 5 ug/m3 and was predicted to occur in a very limited area for only one 24-hour period in the five years considered in the analysis, and was based on oil-firing which will be limited to 1,000 hours per year.

7. Typos/Corrections:

a. *Correction on page 28*: PTE comment indicates "7760" hours of oil firing and 1000 hours of gas firing. This should be reversed. **Response**: Comment noted and a corrected page included in responses.

b *Correction on page 7-1*: Under the discussion of Class I impacts (section 7.3), the applicant states that the project is more than 150 km away from the nearest Class I area. It then goes on to state that the Everglades National Park is the nearest Class I area and is only 104 km from the project. In addition, a comment made that this project will actually *expand* increment because the T.G. Smith Power Plant will not operate several steam generating units. However, there is no request to secure federally enforceable conditions that would require the existing power plant to buy steam from the proposed CT nor shut down any existing units. Therefore, increments will be *consumed.* **Please comment.** **Response:** The sentence in Section 7.3 was intended to say that the project was more than 100 kilometers from the Class I area. As part of the contract with LWG, the boilers for Units 1 and 4 will no longer operate when the combined cycle project is constructed. Both these units are included in the Title V permit for the facility and were existing sources in the PSD baseline. Modeling has been performed and the net affect is an expansion to the PSD Increment in the Everglades National Park Class I Area. See responses to 8 for impact results.

8. NPS BACT Review: Don Shepherd of the National Parks Service provided comments regarding this application. **Please provide the requested additional information.** **Response:** Please see the attached specific responses.

NPS Ambient Impact Modeling Review: The Department has not yet received comments from the National Parks Services regarding the modeling analyses. These questions will be forwarded for your comment as soon as I receive them. **Response:** Please see the attached specific responses.

Responses to National Park Service Comments on BACT Evaluation

1. Comment: Copy of the vendor price estimate for "SCR Associated Equipment" at the 61% control level proposed. Response: The vendor estimate for a gas only SCR system is attached. The Vendor Associated Equipment includes ammonia injection skid, AIG manifold with flow control, ammonia/air dilution skid and internal casing. It does not included the catalyst which has been included in the Recurring Capital Costs. The cost is $1,200,000 – $720,000 = $480,000.

2. Comment: Justification (including vendor estimates) for including the cost of "HRSG Modification" as a Direct Capital Cost. Response: The HRSG Modification reflects the installation of a SCR spool piece in the HRSG in the zone of the appropriate temperature. As noted from the vendor estimate, the HRSG depth must be increased by about 16 feet. Since a HRSG manufacturer, the basis of this cost was previous projects were Golder Associates developed cost algorithms based on mass flow of the turbine. The cost is $120 per 1,000 lb mass of flow. The mass flow used for the GE Frame 7FA is 3,988,600 lb/hr; $120/1,000 lb/hr x 3,988,600 lb/hr = $478,632. It should be recognized that this cost is for the HRSG spool piece and did not include upgrading the materials downstream of the SCR system. GE in a presentation to EPA Region IV presented documentation of HRSG material fouling when distillate oil is used. Such fouling includes ammonium sulfates that are highly corrosive (see BACT evaluation for more discussion). GE recommends for their designs that upgraded materials are required when more than 500 hours of oil is utilized. For the LWG project 1,000 hours of oil are proposed. This could increase the HRSG cost substantially more than that provided in the cost estimate.

3. Comment: Description and justification for "Instrumentation Costs". At the low level of NOx removal efficiency proposed, what is required beyond that supplied by the SCR vendor? Response: As noted from the last page of the vendor estimate under Excluded from Scope of Supply, monitors are not included. It should be noted that the proposed NOx removal efficiency is quite high given the start of NOx reduction from 9 ppmvd. Moreover, measurements of NOx at levels of 3.5 ppmvd from a combustion turbine would be uncertain at best due to the low concentration.

4. Comment: Catalyst cost and life expectancy at the proposed efficiency and hours of operation in combined cycle mode. Response: The catalyst cost is shown as a recurring capital cost of $936,000. The cost is based on the vendor estimate of $720,000 for a gas-only design plus 30 percent for oil capability. The 30 percent is a conservative based previous estimates for gas-only and oil capable catalysts. The calculation is $720,000 x 1.3 = $936,000. The catalyst is handled as a recurring capital cost since the cost is considerable. This is more appropriate from an economic analysis standpoint since including these cost in both the capital and operating costs is inappropriate. The life expectancy for the catalyst is quoted from 5 to 7 years; however, the guarantee is 3 years.

5. Comment: An example of an actual cost for a PSM/RMP and plan update for a similar facility. Response: The use of either anhydrous or aqueous ammonia will require a PSM/RMP plan EPA regulations promulgated to implement Section 112r of the Clean Air Act. Golder Associates has prepared dozens of such PSM/RMP plans that included power plants in general as well as the use of ammonia. The preparation of a PSM/RMP is specific to both the design of the facility and the location. The cost estimate, provided in the BACT cost evaluation, is appropriate and probably low based on Golder Associates experience. The location of an SCR system at the proposed site introduces urban factors in determining the toxic endpoints. In addition, close location of the to Interstate 95 suggests significant risks of a spill. As noted from the application, when taking together the potential risks of the location, the use of SCR is inappropriate.

6. Comment: Justification for a 10% "Contingency" Indirect Cost as opposed to 3% used by the OAQPS manual. Response: The 10 percent contingency reflects the uncertainty in the HRSG design with using 1,000 hours/year of oil and restricted space for the site. Upgrading the HRSG alone would be higher than the contingency included in the cost calculations.

7. Comment: Quote from an ammonia supplier. Response: Several chemical supply companies were contacted to obtain ammonia costs delivered to the site. There are no major ammonia suppliers on the

east cost of Florida and must be transported from the Tampa Bay area. The cost was obtained via phone by Golder Associates from ???.

8. Comment: Justification of "Inventory Cost" and associated interest rate, considering vendor estimate of catalyst life. Response: The inventory cost reflect the capital recovery cost of spare (1/3) catalysts. Spare catalyst would insure operation of the unit if the efficiency reduces with time. The vendor estimate of catalyst life is not relevant to this estimate. The capital recovery is based on 10 percent over 20 years. (See also item 15 below.)

9. Comment: Vendor quotes for catalyst disposal costs. Response: The estimate is based on a cost algorithm developed by Golder Associates from many projects and is $28/1,000 lb/hr of mass flow from the turbine. The vendor quotation does not include this costs.

10. Comment: Justification for the addition of the second and third 10% "Contingency" Direct Annual Cost and Energy Cost not found in the OAQPS Cost Manual. Response: The 10 percent contingency reflects the uncertainty in a budgetary estimate for appropriate annual costs. For budgetary estimating purposes, an contingency of 10 percent is appropriate based on good engineering practice.

11. Comment: Calculations of electrical use. Response: The cost for electrical use, as described in the cost estimate, is based 80 kW-hour electrical usage by the dilution fans. For the "F" Class turbine, two dilution fans would be required to mix ammonia with air. The cost is calculated as 80 kW-hour x 8,760 hours per year x $0.04/kW = $28,032.

12. Comment: Justification for the inclusion of the Heat Rate Penalty and "additional fuel costs". Why is this not double counting. Response: These are separate cost items. The MW Lost and Heat Rate Penalty reflects two distinctly different costs. First, the MW Loss is the amount of revenue lost due to the reduced turbine output directly caused by the SCR catalyst bed. The Heat Rate Penalty reflects the additional fuel cost for each MW generated. Thus, both power is effectively lost and it takes more fuel to produce power.

13. Comment: Why is "Capacity Loss" independent of an in addition to normal maintenance downtime? Response: The "Capacity Loss" reflects potential energy lost due to change out of the SCR catalyst. LWG as an independent power producer will have contracts to supply both "capacity" and "energy". Capacity requirements in contract reflect the need for the plant to be available to supply the power. If it is unavailable than the capacity payment are reduced. These costs are reflected in the Capacity Loss estimate.

14. Comment: Justification for fuel escalation cost. Response: The Fuel Escalation reflects the escalation of fuel cost over time. This has occurred with both natural gas and distillate oil. The cost was based on a nominal increase of 3 percent.

15. Comment: Justification for the use of 10% interest rates in calculating Capital Recovery Factors as opposed to the 7% rate contained in the OAQPS Cost Manual. Response: The Capital Recovery Factor is more than just simple interest rate. For LWG, the Capital Recovery Factor of 10 percent reflects cost of capital that includes not only interest but also initial financing charges, the interest during construction and other private sector costs. Since the project must be financed independently, the cost of capital must incorporate the risks associated with the project. This is much higher for privately financed projects than public projects. It should be noted that the OAQPS Cost Control Manual provides examples for estimating control costs. In the BACT evaluation, the economic evaluation must be performed on a project specific basis as discussed in EPA's Draft Top-Down BACT Guidance Document (1990).

Comment: As for the issue of ammonia emissions resulting from the addition of SCR, we suggest that 10 ppm ammonia slip is not representative of normal operation. Rather, ammonia emissions would be expected to be well below 5 ppm and only approach 10 ppm as the catalyst reaches the end of its life. Response: The concentration of 10 ppm reflects the manufacturer guarantee regarding ammonia slip. While ammonia slip is lower in the early stages of SCR operation it does increase over time. In performing air emissions evaluation one must use the manufacturer rated information to compare emission appropriately. For example, GE incorporates a 20 percent margin in the design of the DLN combustor to assure an emission concentration of 9 ppmvd corrected to 15 percent oxygen is not exceeded. Indeed, the

data for Fort St. Vrain clearly show NOx values between 6 and 8 ppmvd (corrected). In contrast, an SCR system is designed for a fixed control concentration based on the CEMs data and ammonia injection rate. This difference has not been accounted for in the cost calculations.

Responses to NPS Ambient Air Modeling Analysis

As stated in the PSD permit application, there will be an expansion of the PSD increment due to the net reductions of potential pollutant emissions from the existing units. The air modeling results presented in the application did not account for pollutant emission reductions and, therefore, concentration reductions, from existing Units 1 and 4 that will be shutdown as part of this project. To account for these emission reductions, air modeling was performed for the project together with emission reductions due to Unit 4 alone. The two sources were modeled in the same run (one with positive emissions, the other with negative emissions) using the same model and methods as described in the application. Pollutant concentrations were predicted using 5 years of meteorological data at the PSD Class I area of the Everglades National Park. Because the proposed project will be limited to the amount of oil used in a year, the annual average concentrations were estimated using an emission rate based on firing natural gas for 7,760 hours and distillate fuel oil for 1,000 hours. The short-term average concentrations (i.e., 24 hours or less) were based on the emission rates for distillate fuel oil, which are higher than those for natural gas-firing.

The maximum changes in concentrations were predicted as follows:

Pollutant	Averaging Period	Predicted Concentration (ug/m^3)
SO_2	Annual	-0.06
	24-hour	0.0 to -2.6
	3-hour	0.0 to -13.7
NO_2	Annual	-0.008
PM10	Annual	-0.003
	24-hour	0.0 to -0.12

(Note: Because the model does not allow negative concentrations to be printed, two model runs were performed for the short-term averaging period. The first run was performed that included the proposed source with positive emissions and the existing Unit 4 with negative emissions; this resulted in zero concentrations as shown. The second run was performed that included the proposed source with negative emissions and the existing Unit 4 with positive emissions; this resulted in the maximum reductions in 3- and 24-hour average concentrations.

By accounting for the emission reductions due to Unit 4 alone, the net change in the project's maximum concentrations is predicted to be zero or lower. Therefore, there will be a net positive benefit to the environment when the repowering project is operational. As a result, an AQRV analysis is not warranted due to the expected improvement in air quality, particularly for visibility impairment and deposition impacts.

GE DATA

ADDITIONAL INFORMATION

ECOtek

ESTIMATED PERFORMANCE PG7241(FA)

Load Condition		BASE	BASE	BASE	BASE	BASE
Ambient Temp.	Deg F.	45.	50.	59.	75.	95.
Fuel Type		Dist.	Dist.	Dist.	Dist.	Dist.
Fuel LHV	Btu/lb	18,300	18,300	18,300	18,300	18,300
Fuel Temperature	Deg F	80	80	80	80	80
Liquid Fuel H/C Ratio		1.8	1.8	1.8	1.8	1.8
Output	kW	185,500.	183,800.	180,300.	172,500.	158,600.
Heat Rate (LHV)	Btu/kWh	10,010.	10,020.	10,030.	10,090.	10,260.
Heat Cons. (LHV) X 10^6	Btu/h	1,856.9	1,841.7	1,808.4	1,740.5	1,627.2
Exhaust Flow X 10^3	lb/h	3794.	3758.	3690.	3559.	3372.
Exhaust Temp.	Deg F.	1084.	1089.	1097.	1113.	1132.
Exhaust Heat (LHV) X 10^6	Btu/h	1026.8	1019.5	1002.5	972.0	927.7
Water Flow	lb/h	126,840.	125,150.	121,590.	112,780.	95,100.

EMISSIONS

NOx	ppmvd @ 15% O2	42.	42.	42.	42.	42.
NOx AS NO2	lb/h	330.	327.	321.	309.	289.
CO	ppmvd	20.	20.	20.	20.	20.
CO	lb/h	67.	66.	65.	62.	59.
UHC	ppmvw	7.	7.	7.	7.	7.
UHC	lb/h	15.	15.	15.	14.	13.
SO2	ppmvw	115.0	115.0	115.0	115.0	113.0
SO2	lb/h	964.0	956.0	939.0	904.0	845.0
SO3	ppmvw	6.0	6.0	6.0	6.0	6.0
SO3	lb/h	63.0	63.0	62.0	59.0	55.0
Sulfur Mist	lb/h	101.0	101.0	99.0	95.0	89.0
Particulates	lb/h	17.0	17.0	17.0	17.0	17.0

EXHAUST ANALYSIS % VOL.

Argon	0.85	0.86	0.84	0.85	0.84
Nitrogen	71.54	71.46	71.31	70.94	70.26
Oxygen	11.10	11.08	11.04	10.98	10.93
Carbon Dioxide	5.61	5.61	5.61	5.58	5.49
Water	10.90	11.00	11.20	11.66	12.48

SITE CONDITIONS

Elevation	ft.	0.0
Site Pressure	psia	14.7
Inlet Loss	in Water	3.0
Exhaust Loss	in Water	5.5
Relative Humidity	%	60
Application		7FH2 Hydrogen-Cooled Generator
Combustion System		9/42 DLN Combustor

Emission information based on GE recommended measurement methods. NOx emissions are corrected to 15% O2 without heat rate correction and are not corrected to ISO reference condition per 40CFR 60.335(c)(1). NOx levels shown will be controlled by algorithms within the SPEEDTRONIC control system.

Distillate Fuel is Assumed to have 0.015% Fuel-Bound Nitrogen, or less.
FBN Amounts Greater Than 0.015% Will Add to the Reported NOx Value.
Sulfur Emissions Based On 0.5 WT% Sulfur Content in the Fuel.

IPS- version code- 1 . 4 . 1 Opt: N
PALMERWI 1/20/99 09:50 ECOtek1.dat

Lake Worth Generation, LLC 4 Mar 99

ESTIMATED PERFORMANCE PG7241(FA)

Load Condition		BASE	75%	50%	25%
Ambient Temp.	Deg F.	55.	55.	55.	55.
Fuel Type		Methane	Methane	Methane	Methane
Fuel LHV	Btu/lb	21,515	21,515	21,515	21,515
Fuel Temperature	Deg F	80	80	80	80
Output	kW	171,400.	128,500.	85,700.	42,800.
Heat Rate (LHV)	Btu/kWh	9,410.	10,240.	12,330.	17,070.
Heat Cons. (LHV) X 10^6	Btu/h	1,612.9	1,315.8	1,056.7	730.6
Exhaust Flow X 10^3	lb/h	3556.	2895.	2398.	2154.
Exhaust Temp.	Deg F.	1118.	1155.	1200.	1041.
Exhaust Heat (LHV) X 10^6	Btu/h	969.2	829.0	724.4	555.0

EMISSIONS

NOx	ppmvd @ 15% O2	9.	9.	9.	81.
NOx AS NO2	lb/h	60.	48.	38.	236.
CO	ppmvd	9.	9.	9.	47.
CO	lb/h	29.	24.	20.	92.
UHC	ppmvw	7.	7.	7.	21.
UHC	lb/h	14.	11.	9.	26.
Particulates	lb/h	9.0	9.0	9.0	9.0

EXHAUST ANALYSIS % VOL.

Argon	0.90	0.89	0.89	0.90
Nitrogen	74.35	74.37	74.48	75.14
Oxygen	12.32	12.38	12.72	14.59
Carbon Dioxide	3.84	3.81	3.66	2.81
Water	8.60	8.55	8.25	6.56

SITE CONDITIONS

Elevation	ft.	50.0
Site Pressure	psia	14.67
Inlet Loss	in Water	4.0
Exhaust Loss	in Water	12.0
Relative Humidity	%	70
Application		
Combustion System		9/42 DLN Combustor

Emission information based on GE recommended measurement methods. NOx emissions are corrected to 15% O2 without heat rate correction and are not corrected to ISO reference condition per 40CFR 60.335(c)(1). NOx levels shown will be controlled by algorithms within the SPEEDTRONIC control system.

IPS- version code- 1 . 5 . 0 Opt: 72411298
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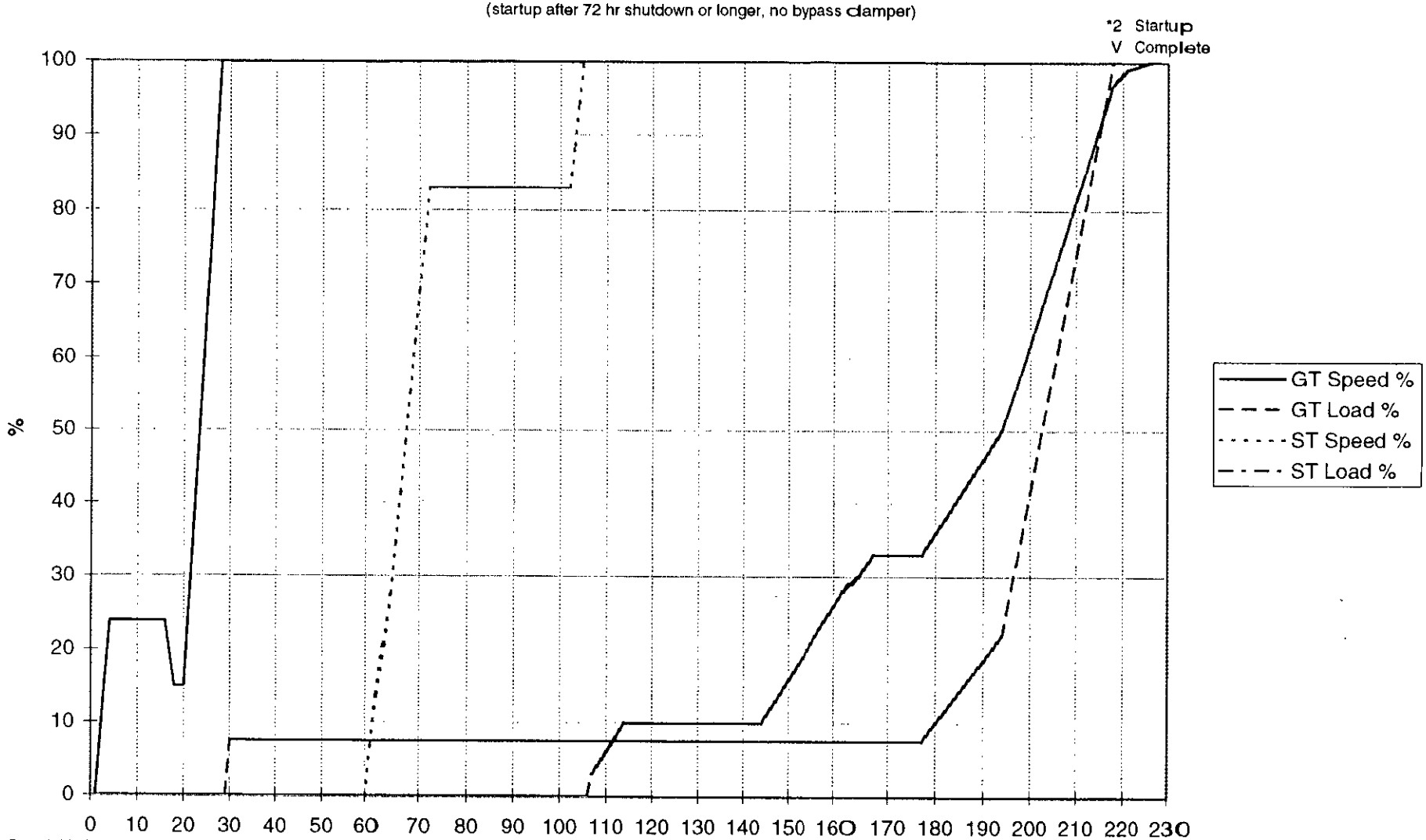
Typical 107FA Coldstart (multishaft)

(startup after 72 hr shutdown or longer, no bypass damper)



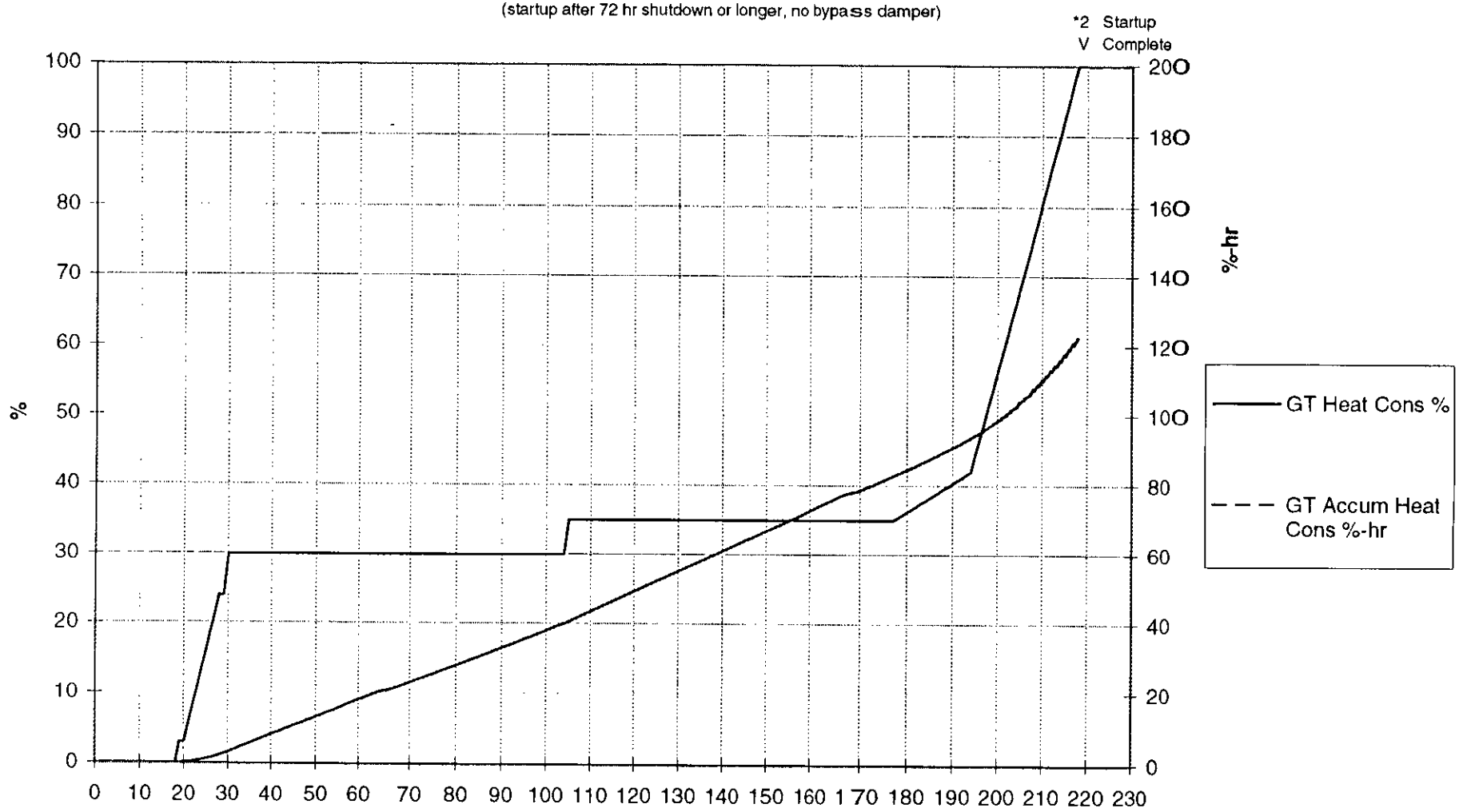
*1 Start initiation at min = 0. Ready to start conditions satisfied previously.

*2 GT base load operation at exhaust temp control spec limit, full open compressor IGV position, ST valves full open.

551HA541
GRS 06/15/98

Typical 107FA Coldstart (multishaft)

(startup after 72 hr shutdown or longer, no bypass damper)



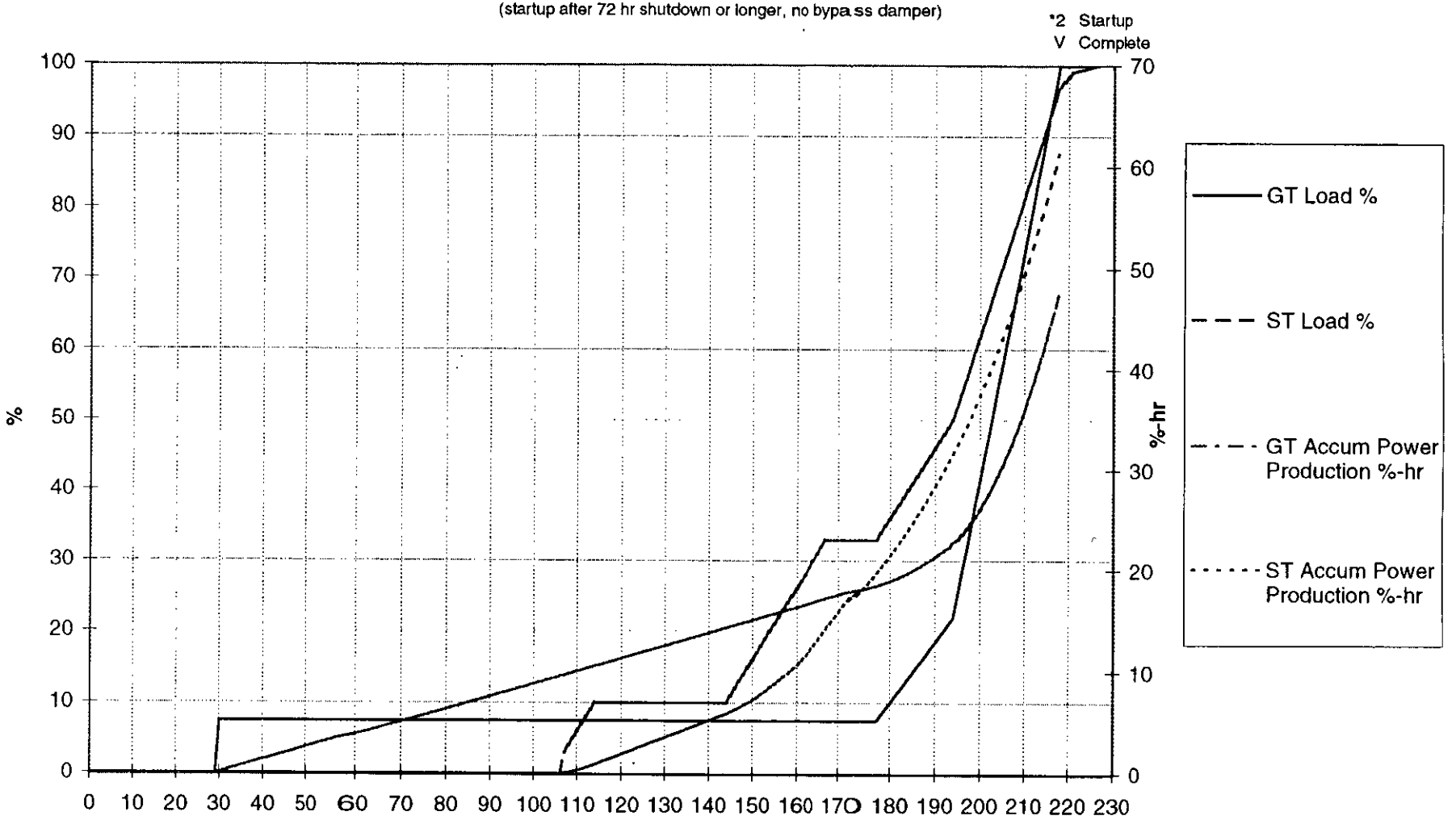
*1 Start initiation at min = 0. Ready to start conditions satisfied previously.

*2 GT base load operation at exhaust temp control spec limit, full open compressor IGV position, ST valves full open.

551HA542
GRS 06/15/98

Typical 107FA Coldstart (multishaft)

(startup after 72 hr shutdown or longer, no bypass damper)



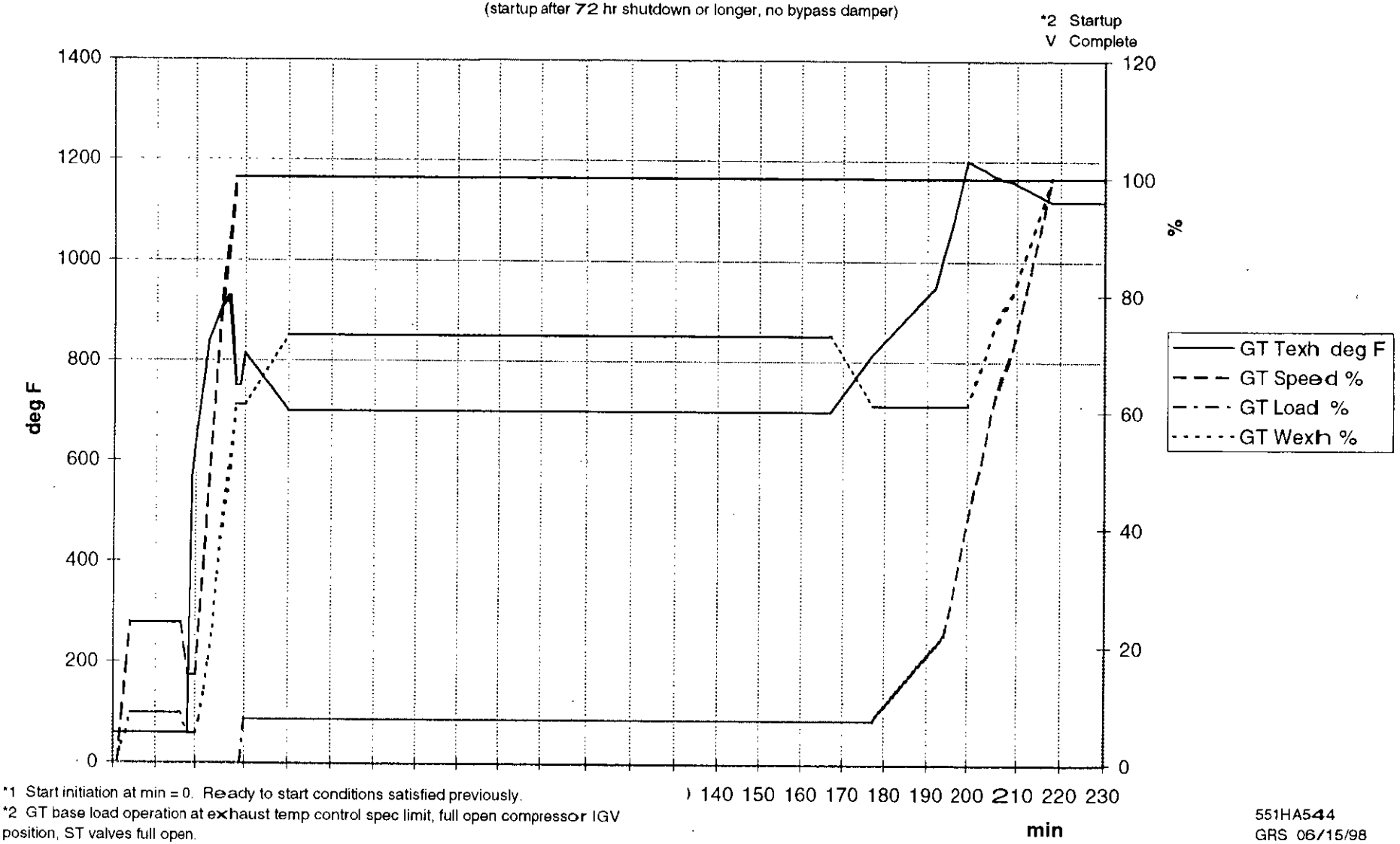
*1 Start initiation at min = 0. Ready to start conditions satisfied previously.

*2 GT base load operation at exhaust temp control spec limit, full open compressor IGV position, ST valves full open.

551HA543
GRS 06/15/98

Typical 107FA Coldstart (multishaft)

(startup after 72 hr shutdown or longer, no bypass damper)



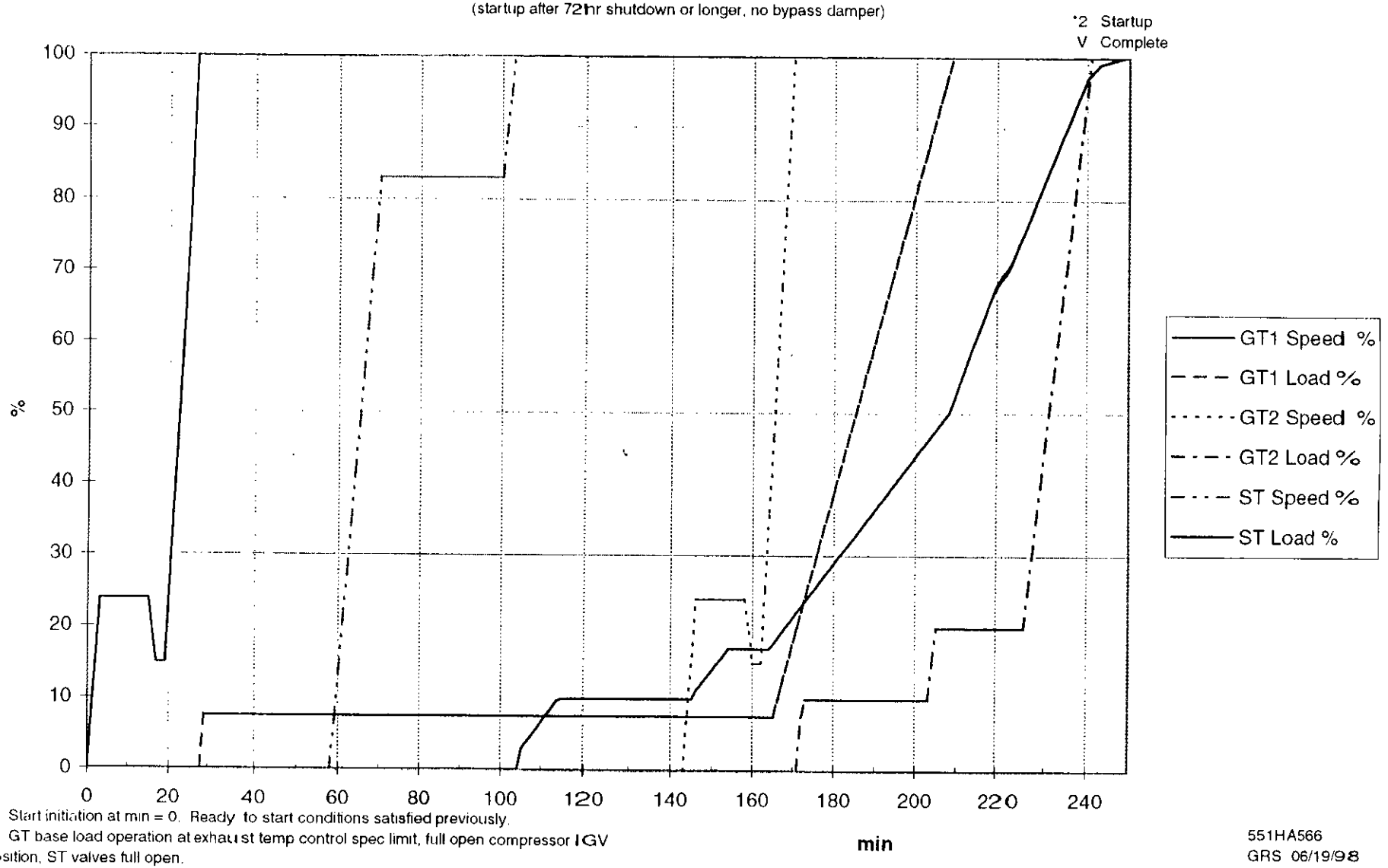
*1 Start initiation at min = 0. Ready to start conditions satisfied previously.

*2 GT base load operation at exhaust temp control spec limit, full open compressor IGV position, ST valves full open.

551HA544
GRS 06/15/98

Typical 207FA Coldstart

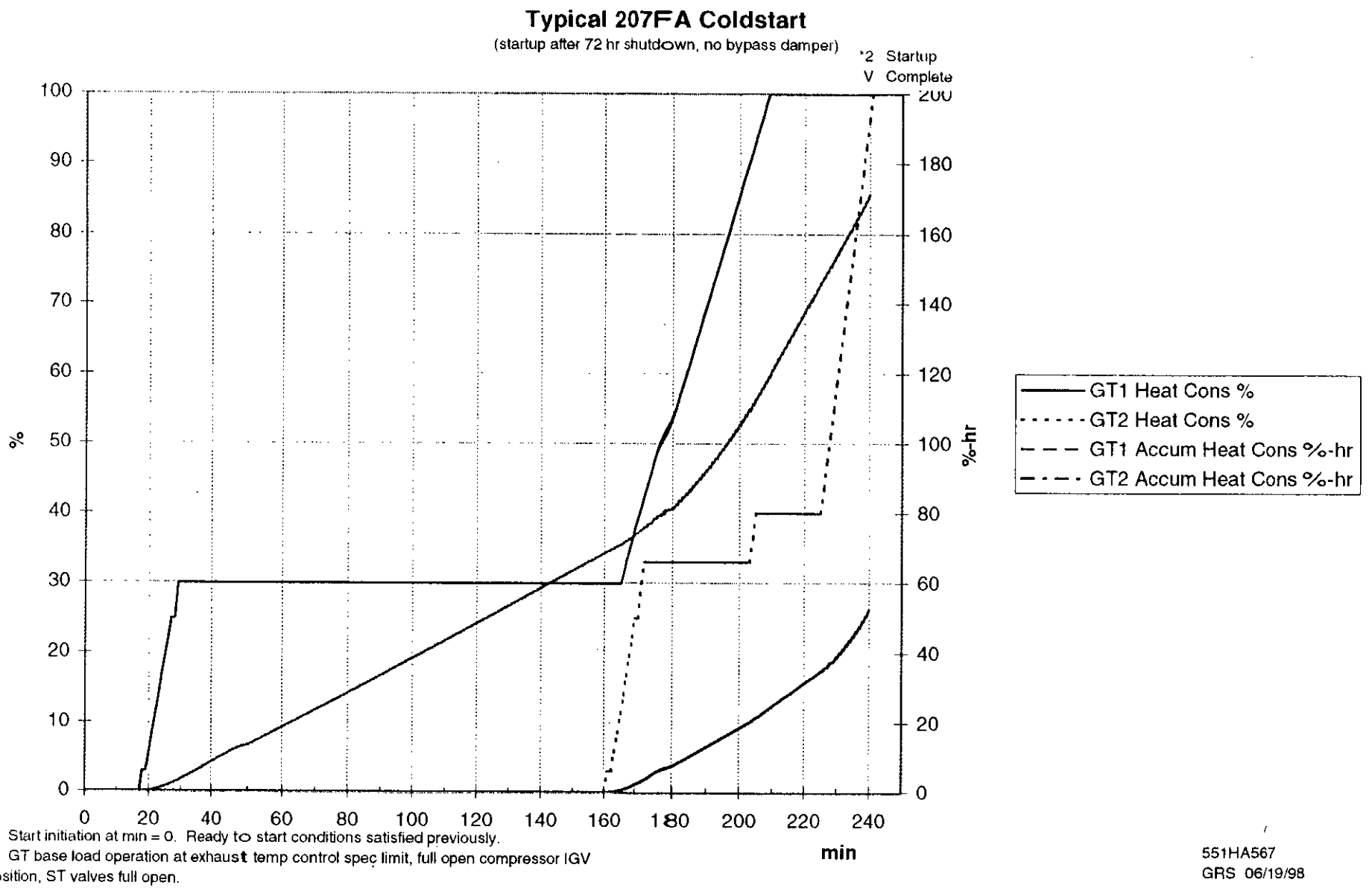
(startup after 72hr shutdown or longer, no bypass damper)



*1 Start initiation at min = 0. Ready to start conditions satisfied previously.

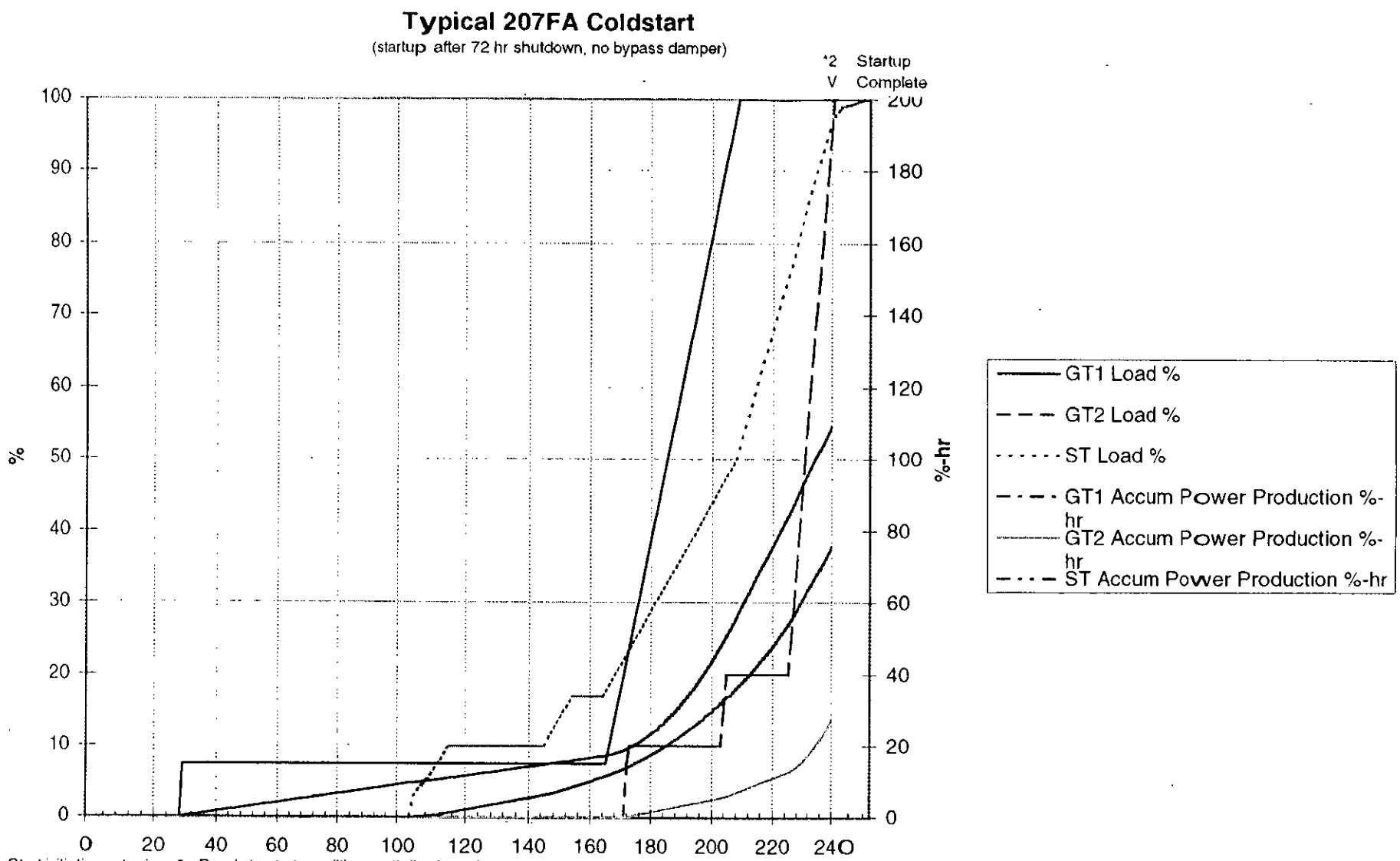
*2 GT base load operation at exhaust temp control spec limit, full open compressor IGV position, ST valves full open.

551HA566
GRS 06/19/98



*1 Start initiation at min = 0. Ready to start conditions satisfied previously.
*2 GT base load operation at exhaust temp control spec limit, full open compressor IGV position, ST valves full open.

551HA567
GRS 06/19/98

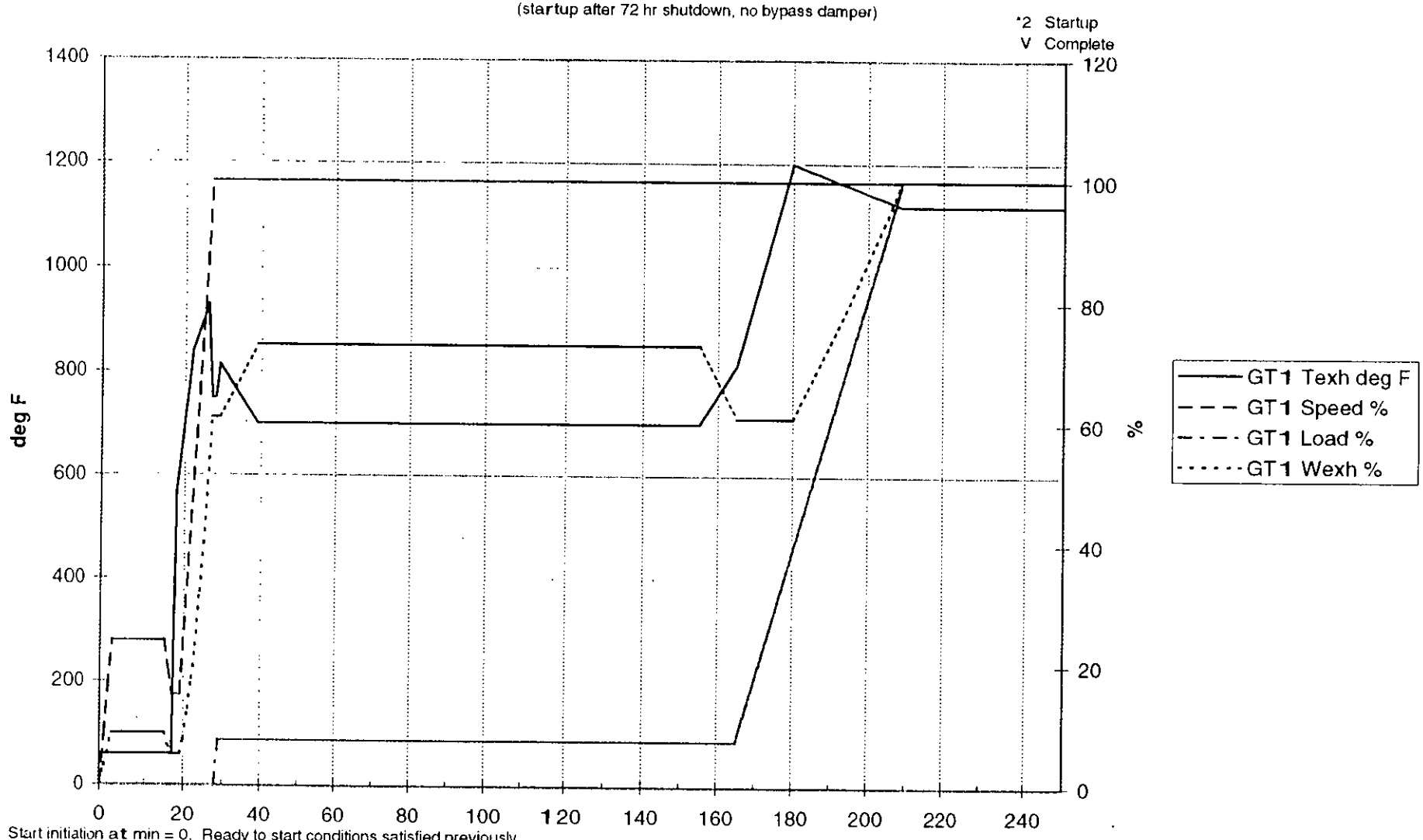


*1 Start initiation at min = 0. Ready to start conditions satisfied previously.
*2 GT base load operation at exhaust temp control spec limit, full open compressor IGV position, ST valves full open.

551HA568
GRS 06/19/98

Typical 207FA Coldstart

(startup after 72 hr shutdown, no bypass damper)



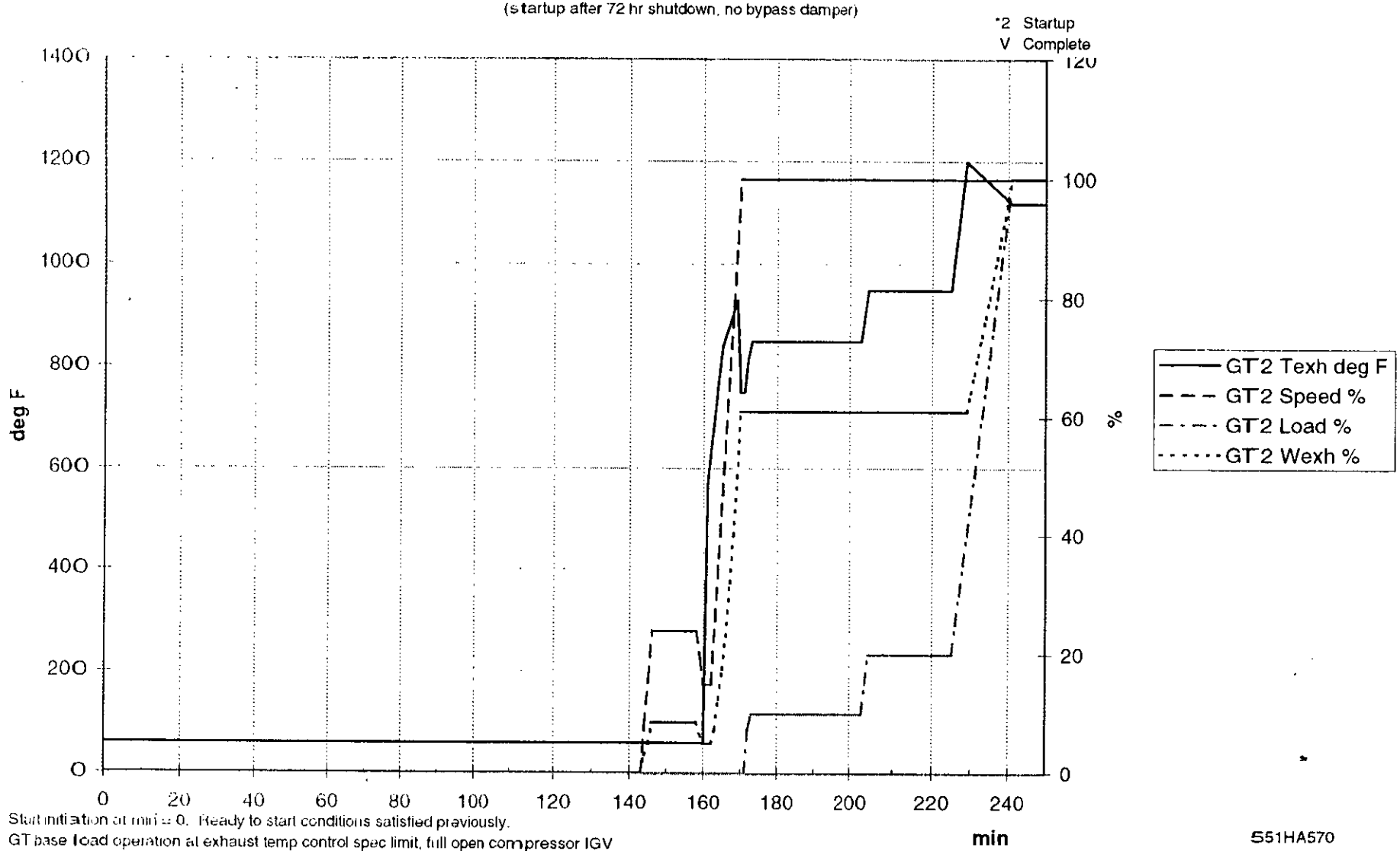
*1 Start initiation at min = 0. Ready to start conditions satisfied previously.

*2 GT base load operation at exhaust temp control spec limit, full open compressor IGV position, ST valves full open.

551HA569
GRS 06/19/98

Typical 207FA Coldstart

(startup after 72 hr shutdown, no bypass damper)

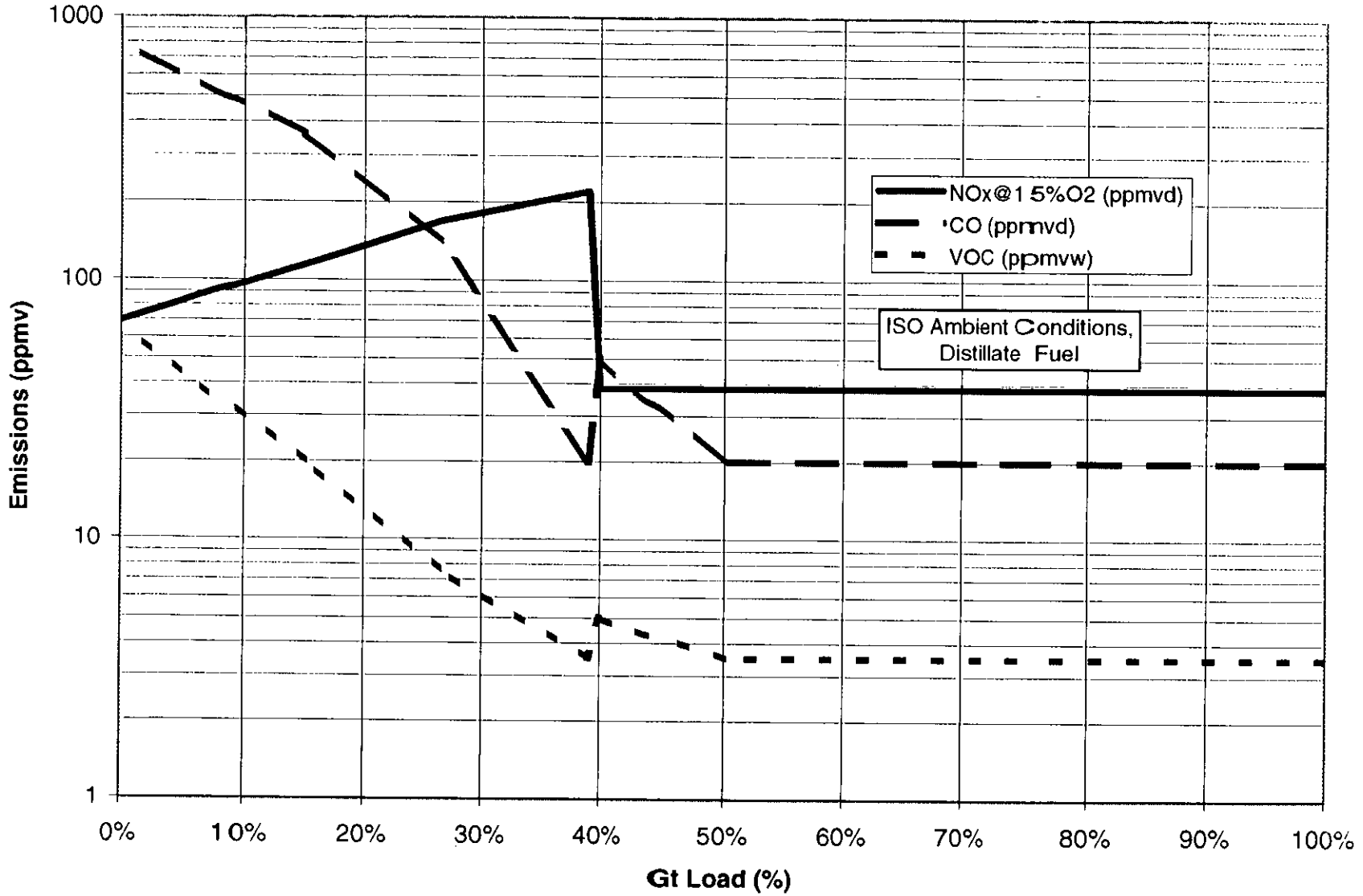


*1 Start initiation at min = 0. Ready to start conditions satisfied previously.

*2 GT base load operation at exhaust temp control spec limit, full open compressor IGV position, ST valves full open.

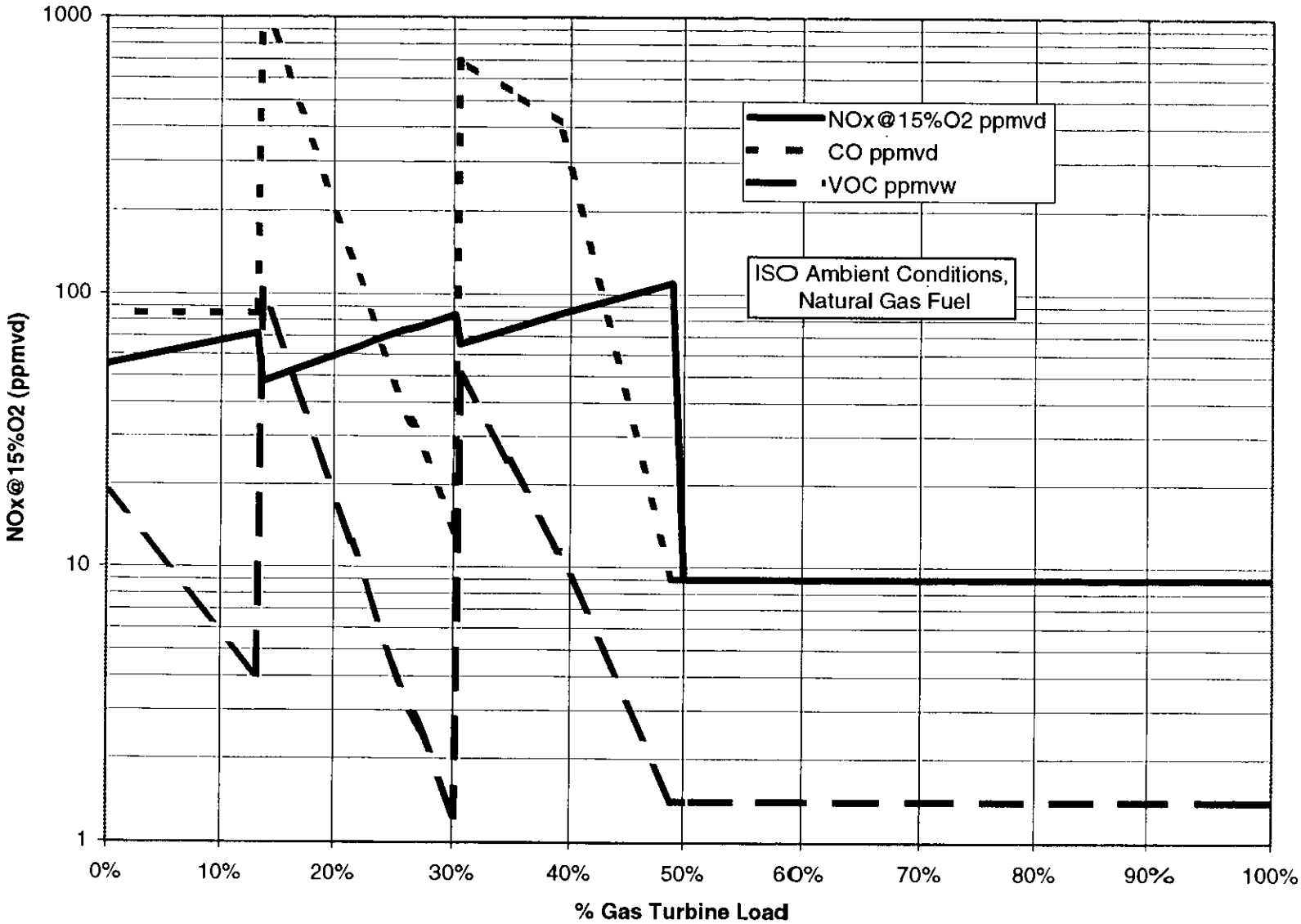
551HA570
GRS 06/19/98

7241FA with DLN2.6 Combustor
Estimated Emissions - Liquid Fuel / Water Injection



Prepared by GE Power Systems 5/3/99

PG7241FA with DLN2.6 Combustor
Estimated Emissions vs Gas Turbine Load



prepared by GEPS, 5/3/99

Determination Detail

Control Number: 9600034

Category: NSPS
EPA Office: Region 5
Date: 01/16/1996
Title: Custom Fuel Monitoring
Recipient: Wright, Amy
Author: Czerniak, George
Comments:

Abstract:

Q: Will EPA grant a request for a custom fuel monitoring schedule for (pipeline) natural gas fired turbines regulated by Subpart GG and Title IV (Acid Rain)?

A: Yes, this request is granted provided certain Acid Rain requirements are met.

Letter:

Amy Wright
Dayton Power and Light Company
O.H. Hutchings Station
9200 Chautauqua Road
Miamisburg, Ohio 45342

Dear Ms. Wright;

This is in response to your request for a custom fuel schedule, pursuant to the New Source Performance Standards (NSPS) Subpart GG, Section 60.334(b)(2), dated August 31, 1995. This request was originally sent to Donald Schregardus, Director, Ohio Environmental Protection Agency and later faxed to George Czerniak, United States Environmental Protection Agency (USEPA), Region 5, on September 9, 1995. In your request you proposed a custom fuel schedule under which no sampling of natural gas would be required for the combustion turbines installed, or to be installed under the Permit to Install application number 08-2507.

The three combustion turbines for which this custom schedule would apply are affected units under the "Acid Rain Program", Title IV of the Clean Air Act Amendments. Emissions from a Title IV effected unit are required to be monitored according to 40 CFR Part 75 "Continuous Emission Monitoring" for sulfur dioxide (SO2). Under Part 75, appendix D, a gas fired turbine that is using pipeline quality natural gas as it's primary fuel can use the default value of 0.0006 lb/mmBtu to account for the units SO2 emissions. With this the USEPA has recognized that the sulfur content of pipeline quality natural gas is low enough to warrant the use of a default value for SO2 emissions.

Therefore, the Regional office of the USEPA approves the custom fuel schedule of no fuel sampling for these three units provided the following requirements are met.

☐ Each unit has been issued and is in possession of an approved Phase II Acid Rain Permit.

☐ Each unit has submitted a Monitoring Plan, certified by signature of the Designated Representative, that commits to using a primary fuel of pipeline supplied natural gas.

☐ Each unit is monitoring SO2 emissions using methods consistent with the requirements of Part 75 and certified by the USEPA.

This custom schedule will only be valid when pipeline natural gas is used as a primary fuel. If the primary fuel for these units is changed to anything other than this, SO2 emissions must be accounted for by using daily fuel sampling and analysis.

If you have any questions regarding this determination please contact Allan Batka of my staff at (312) 353-3716.

Sincerely yours,

George Czerniak, Chief
Air Enforcement and Compliance Assurance Branch

ENGELHARD

ENGELHARD CORPORATION
2205 CHEQUERS COURT
BEL AIR, MD 21015
PHONE 410-569-0297
FAX 410-569-1841
E-Mail Fred_Booth@ENGELHARD.COM

September 15, 1998

Golder Associates, Inc.
6241 NW 23rd St.
Gainesville, FL 32653

ATTN: Steve maltby

RE: [redacted]
Camet® CO and NOxCAT™ VNX™ SCR Catalyst Systems
Engelhard Budgetary Proposal EPB98242

Dear Mr. Maltby,

We provide Engelhard Budgetary Proposal EPB98242 for Engelhard Camet® CO and NOxCAT™ VNX™ SCR Catalyst systems. This is per your Fax of September 14, 1998.

Our Proposal is based on:

- CO Catalyst for 90% CO reduction;
- SCR Catalyst for NOx reductions from 9 ppmvd@15%O_2 to 3.5 ppmvd@15%O_2 with ammonia slip of 10 ppmvd @ 15% O_2;
- Scope is assumed to be normal scope to HRSG supplier:

  CO system - Internal support frame and CO Catalyst modules and SCR System - internal support frame and VNX modules - both installed inside HRSG internally insulated casing;

  Ammonia delivery system components

- Assumed HRSG cross section of 57 ft. H x 32 ft. W;

We request the opportunity to work with you on this project.

Sincerely yours,

ENGELHARD CORPORATION

Frederick A. Booth
Senior Sales Engineer

cc: Nancy Ellison - Proposal Administrator

ENGELHARD

Golder Associates
[redacted]
CO and SCR Catalyst Systems
Engelhard Budgetary Proposal EPB98242
September 15, 1998

ENGELHARD CORPORATION
CAMET® CO CATALYST SYSTEM
NOxCAT™ VNX™ SCR NOx ABATEMENT CATALYST SYSTEM

Engelhard Corporation ("Engelhard") offers to supply to Buyer the **Camet®** metal substrate CO System and **NOxCAT™ VNX™** ceramic substrate SCR systems summarized per the technical data and site conditions provided.

Scope of Supply
1. Engelhard **Camet®** CO catalyst in modules with internal support frame;
2. Engelhard **NOxCAT™ VNX™** SCR catalyst in modules with internal support frame;
3. Ammonia Delivery System Components - 28% aqueous ammonia to skid

BUDGET PRICES:	Per Turbine	CO System		SCR System
		$700,000		$1,200,000
	Replacement CO Catalyst	$600,000	**Replacement SCR Catalyst**	$ 720,000

WARRANTY AND GUARANTEE:

Mechanical Warranty: One year of operation* or 1.5 years after catalyst delivery, whichever occurs first.

Performance Guarantee: Three (3) years of operation* or 3.5 years after catalyst delivery, whichever occurs first. Catalyst warranty is prorated over the guaranteed life.

**Operation is considered to start when exhaust gas is first passed through the catalyst.*

Expected Life 5 - 7 years

SCR SYSTEM DESIGN BASIS:

Gas Flow from:	Combustion Turbine
Gas Flow:	Horizontal
Fuel:	Natural Gas
Gas Flow Rate (At catalyst face):	See Performance data - Designed for Gas Velocities within ±15% at the reactor inlet
Temperature (At catalyst face):	Designed for Gas Temperatures must be within $\pm 20^0$F at the reactor inlet
CO Inlet (At catalyst face):	12 ppmvd - See Performance Data
CO Reduction	90%
NOx Inlet (At catalyst face):	9 ppmvd @ 15% O_2
NOx Outlet(At catalyst face):	3.5 ppmvd@15%O_2
NH_3 Slip:	10 ppmvd @ 15%O_2
HRSG Cross Section	57 ft. x 32 ft. - Inside Liner Sheets

ENGELHARD

Golder Associates

[redacted]

CO and SCR Catalyst Systems
Engelhard Budgetary Proposal EPB98242
September 15, 1998

Performance Data

GIVEN / CALCULATED DATA	
GIVEN: TURBINE EXHAUST FLOW, lb/hr	3,710,000
TURBINE EXHAUST FLUE GAS ANALYSIS, % VOL.	ASSUMED
N2	75.23
O2	12.61
CO2	3.63
H2O	7.60
Ar	0.93
GIVEN: TURBINE CO, ppmvd	12
CALC.: TURBINE CO, lb/hr	40.5
GIVEN: TURBINE NOx, ppmvd @ 15%O2	9
CALC.: TURBINE NOx, lb/hr	61.3
CALCULATED FLUE GAS MOL. WT.	28.45
FLUE GAS TEMP. @ CO and SCR CATALYST, F	650
DESIGN REQUIREMENTS	
CO OUT, ppmvd@15%O2	1.0
NOx OUT, ppmvd@15%O2	3.5
NH3 SLIP, ppmvd@15%O2	10
CO and SCR PRESSURE DROP, "WG - Max.	
GUARANTEED PERFORMANCE DATA	
CO CATALYST CO CONVERSION, % - Min.	90.0%.
CO OUT, lb/hr - Max.	4.0
CO OUT, ppmvd@15%O2 - Max.	1.0
CO PRESSURE DROP, "WG - Max.	1.1
SCR CATALYST NOx CONVERSION, % - Min.	61.1%
NOx OUT, ppmvd@15%O2 - Max.	3.5
EXPECTED AQUEOUS NH3 (28% SOL.) FLOW, lb/hr	139.4
NH3 SLIP, ppmvd@15%O2 - Max.	10
SCR PRESSURE DROP, "WG - Max.	1.5

ENGELHARD

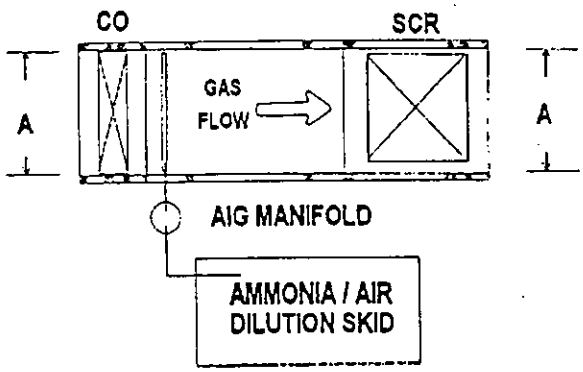
Golder Associates
[redacted]
CO and SCR Catalyst Systems
Engelhard Budgetary Proposal EPB98242
September 15, 1998

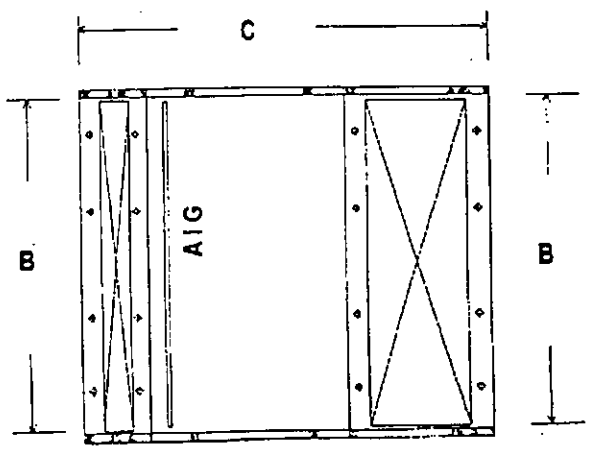
Scope of Supply: The equipment supplied is installed by others in accordance with Engelhard design and installation instructions.
Engelhard **Camet®** CO and **NOxCAT™ VNX™** SCR catalyst in modules;
Internal support frames for catalyst modules - installed inside HRSG internally insulated casing;

Ammonia Delivery System Components: Aqueous (28% Sol.) Ammonia to skid
Ammonia Injection Grid (AIG);
AIG manifold with flow control valves ;
NH_3/Air dilution skid: Pre-piped & wired (including all valves and fittings)
Two (2) dilution air fans, one for back-up purposes
Panel mounted system controls for:
Blowers (on/off/flow indicators)
Air/ammonia flow indicator and controller
System pressure indicators
Main power disconnect switch

Assumed Dimensions:

Inside Liner Width	**(A)**	**32'-0"**
Inside Liner Height	**(B)**	**57'-0"**
Reactor Depth - CO and SCR	**(C)**	**15'-6"**





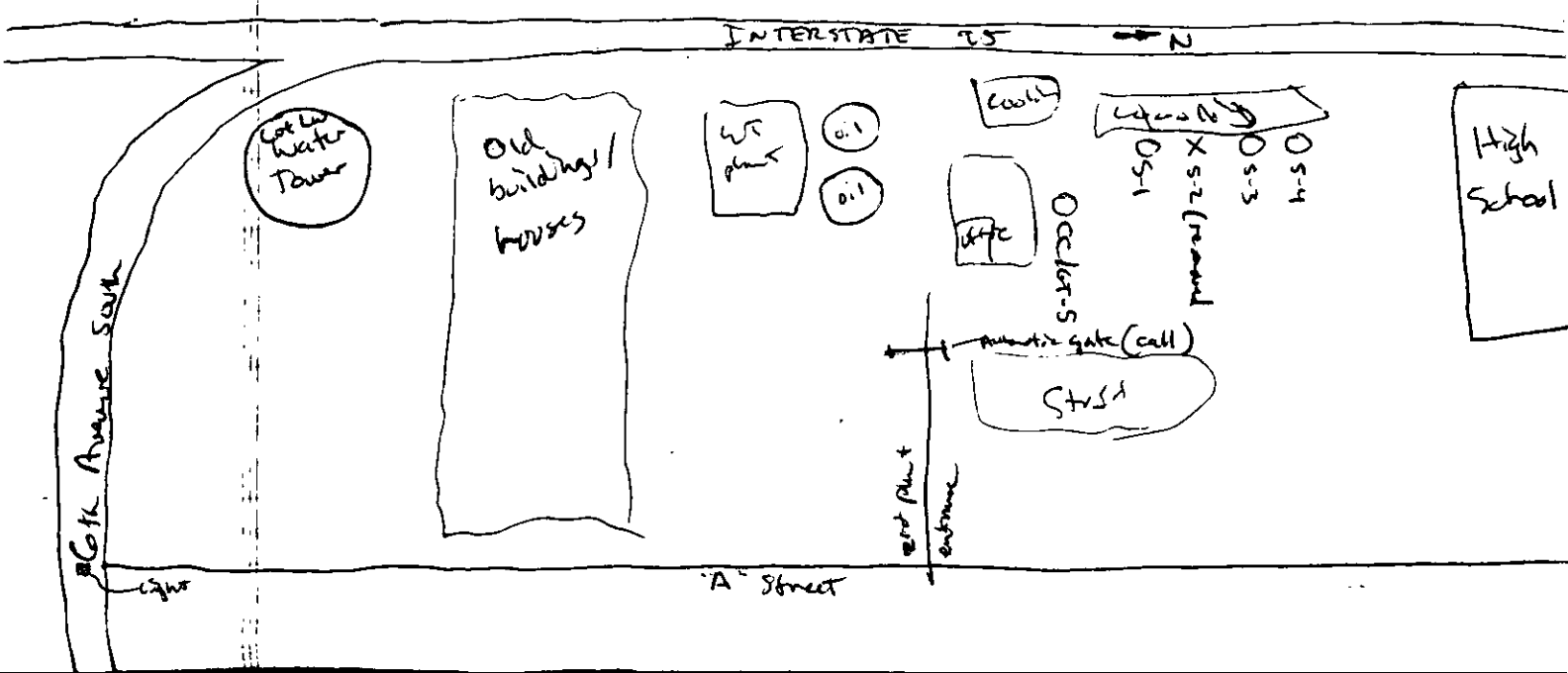
Excluded from Scope of Supply:
Ammonia storage and pumping
Internally insulated Duct (HRSG Casing) including any Transitions to and from reactor housings
Any interconnecting field piping or wiring
Electrical grounding equipment
Utilities
Foundations
All Monitors
All other items not specifically listed in Scope of Supply

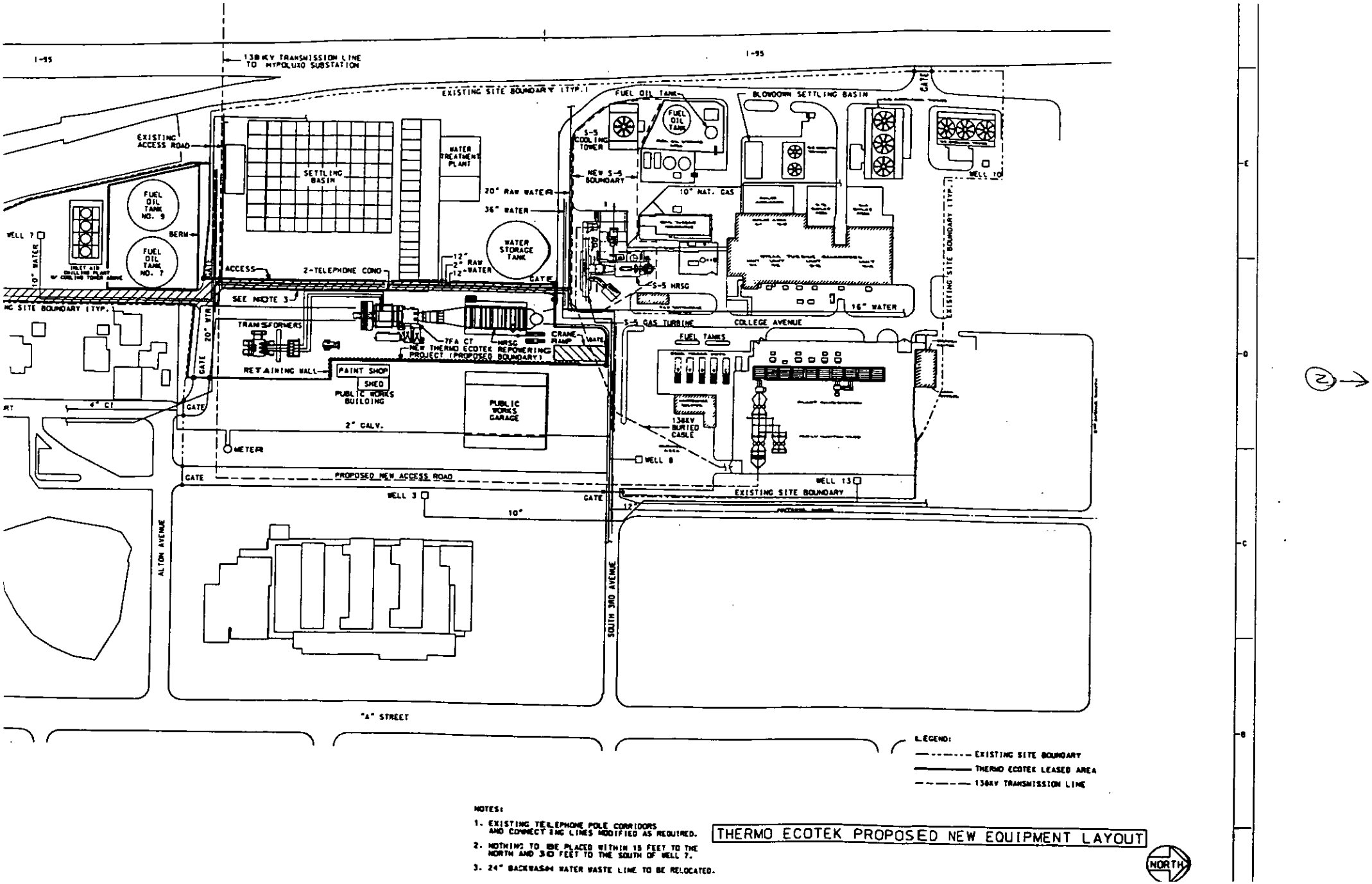
4-22-99

Met w/Al Libero and Mike Ridge (City of Lake Worth) for a plant tour. Al took lots of pictures with his cool digital camera. We climbed up on the roof of one of the powerplant buildings to get a photo of how close the boilers / turbine / cooling towers were to I-95. We also climbed up on the roof of the WT plant for same reason. We toured the power generation building & saw a turbine disassembled. We also toured the control room and CEM building.

Important Notes

- Plant sits on top of a well field
- A day care center is located just across 6th Avenue South.
- The middle school was demolished, but they're putting up ballfields and a park. (< 200 yards from plant.)
- High school sits < 100 yards from plant.
- Ammonia tanks would probably only fit near existing fuel oil tanks.





NOTES:

1. EXISTING TELEPHONE POLE CORRIDORS AND CONNECTING LINES MODIFIED AS REQUIRED.
2. NOTHING TO BE PLACED WITHIN 15 FEET TO THE NORTH AND 30 FEET TO THE SOUTH OF WELL 7.
3. 24" BACKWASH WATER WASTE LINE TO BE RELOCATED.

THERMO ECOTEK PROPOSED NEW EQUIPMENT LAYOUT

NORTH

Department of Environmental Protection

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

Jeb Bush
Governor

David B. Struhs
Secretary

CERTIFIED MAIL - Return Receipt Requested

April 19, 1999

Mr. Brian Chatlosh, Manager
Lake Worth Generating, L.L.C.
245 Winter Street, Suite 300
Waltham, MA 02451

Subject: **Forward of Comments from the National Parks Service**
DEP File No. 099-0569-001-AC (PSD Permit Application)
Proposed Combined Cycle Gas Turbine Generator

Dear Mr. Chatlosh:

On April 16, 1999, I received the attached information from the National Parks Services. I am forwarding this document for your comments. If there are any questions, please call me at (561) 355-3136, extension 1142. Matters regarding modeling issues should be directed to Cleve Holladay (Department meteorologist) at (850) 921-8986.

Sincerely,

Jeffery F. Koerner, P.E.
Bureau of Air Regulation
New Source Review Section

/jfk

cc: Mr. Paul Doherty, P.E., LWGLLC
Mr. Ken Kosky, P.E., Golder Associates
Ms. Margaret Johnstone, T.G. Smith Power Plant
Mr. Greg Worley, EPA
Mr. Isadore Goldman, P.E., SED-DEP
Mr. Jim Stormer, PBCHD

Filename: LWG_RFI.DOC

NATIONAL PARK SERVICE
AIR RESOURCES DIVISION

P.O. BOX 25287, Denver, CO 80225-0287

FACSIMILE COVER SHEET

Date: April 16, 1999

Telephone: (303)969-2817
Fax: (303) 969-2822

To: Jeff Koerner

From: Dee Morse
Policy, Planning, and Permit Review Branch

Subject: NPS comments on the Lake Worth LLC Facility PSD Permit Application. If you have any questions concerning our comments give me a call at (303) 969-2817.

Number of Pages:4
(Including this cover sheet)

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

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

United States Department of the Interior

NATIONAL PARK SERVICE
Air Resources Division
P.O. Box 25287
Denver, CO 80225

IN REPLY REFER TO:

April 15, 1999

N3615 (2350)

A.A. Linero, PE, Administrator
Florida Department of Environmental Protection
New Source Review Section
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Linero:

We have reviewed the Prevention of Significant Deterioration (PSD) permit application for the Lake Worth Generation, LLC facility (LWG) located in Palm Beach County, Florida. The facility is located approximately 104 kilometers north of Everglades National Park, a Class I air quality area administered by the National Park Service (NPS). The proposed LWG project will consist of a combustion turbine-electric generator that will repower an existing steam electric generator. LWG proposes one GE Frame 7FA gas-fired combined cycle combustion turbine (CCT) with heat recovery steam generator and steam turbine, with a total output of 170 megawatts (MW). The LWG CCT will emit a total of 438 tons per year (TPY) of nitrogen oxide (NO_x), 70 TPY of sulfur dioxide (SO_2), 43 TPY of particulate matter (PM_{10}), and 39 TPY of volatile organic compounds. Based on these emissions we have the following comments regarding the air quality and the Best Available Control Technology (BACT) analyses. We previously provided BACT comments to Jeffery F. Koerner, who incorporated them into the April 9, 1999, letter that the Florida Department of Environmental Protection sent to LWG.

The review of the air quality analysis indicates the impacts to the Class I increments will be below the proposed Environmental Protection Agency (EPA) significant levels for nitrogen dioxide, PM_{10}, and SO_2 for all averaging periods when the turbine is firing natural gas or oil. Therefore, the increment analysis is complete.

The LWG permit application fails to address impacts to Air Quality Related Values (AQRVs), therefore the AQRV analysis is incomplete. The applicant states, "Because the proposed combustion turbine will be fired primarily with natural gas, a clean fuel, and there will be an expansion of the PSD increment due to a net reduction of potential pollutant emissions from existing units the proposed project will not significantly affect or impair visibility or soils and vegetation in the Class I area." Even though there will be

an expansion of the Class I increment and impacts are below the Class I increment significant values, impacts to AQRVs may still occur. The EPA makes it clear that the increment and AQRV analyses are separate analyses. Therefore, a source could be "insignificant" from an increment standpoint, but still cause adverse AQRV impacts.

The applicant must assess impacts to the AQRVs, including visibility impairment and acid deposition impacts, before we can concur that the application is complete. The applicant should follow the guidance for the acid deposition and regional haze analyses in the EPA document *Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 1 Report: Interim Recommendation for Modeling Long Range Transport and Impacts on Regional Visibility* (EPA-454/R-93-015, April 1993). The NPS considers a 5% change in extinction as an impact to visibility. Adverse impacts to visibility are based on the frequency, magnitude and duration of the impacts. The applicant should contact John Notar of my staff at (303) 969-2079, for the data and revised methodology to perform the regional haze analysis. A coherent plume analysis with the EPA VISCREEN analysis is not required due to the distance of the source from the park.

Future PSD applications which require long-range transport analyses, for NPS and Fish and Wildlife Services Class I areas, should follow the latest guidance in the EPA document *Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts EPA-454/R-98-019 December 1998*. The IWAQM Phase 2 analyses are based on the CALPUFF model for both a screening level analysis and refined analysis.

Regarding BACT, LWG is proposing to meet a NO_x limit of 9 parts per million (ppm) using Dry Low-NOx (DLN) combustors. LWG asserts that adding Selective Catalytic Reduction (SCR) to further reduce NO_x emissions from a CCT equipped with DLN would create adverse ammonia emissions and excessive costs. Although LWG evaluated the feasibility of applying SCR downstream of DLN to reduce NO_x emissions to 3.5 ppm, it has not provided sufficient information to support its claim of economic unfeasibility. Specific items for which more information is needed are:

1. A copy of the vendor price estimate for "SCR Associated Equipment" at the 61% control level proposed.
2. Justification (including vendor estimates) for including the cost of "HRSG Modification" as a Direct Capital Cost.
3. Description and justification for "Instrumentation Costs." At the low level of NO_x removal efficiency proposed, what additional instrumentation is required beyond that supplied by the SCR vendor?
4. Catalyst cost and life expectancy at the proposed control efficiency and hours of operation in the combined-cycle mode.
5. An example of an actual price for a PSM/RMP and plan update for a similar facility.
6. Justification for a 10% "Contingency" Indirect Cost as opposed to 3% used by OAQPS Cost Manual.
7. Quote from an ammonia supplier.

8. Justification for "Inventory Cost" and associated interest rate, considering vendor estimate of catalyst life.
9. Vendor quotes and justification for catalyst disposal cost.
10. Justification for addition of second and third 10% "Contingency" Direct Annual Cost and Energy Cost not found in the OAQPS Cost Manual.
11. Calculation of electrical use.
12. Justification for inclusion of both the Heat Rate Penalty and "additional fuel costs." Why is this not "double-counting?"
13. Why is "Capacity Loss" independent of and in addition to normal maintenance downtime?
14. Justification for "Fuel Escalation" cost.
15. Justification for use of 10% interest rates in calculating Capital Recovery Factors as opposed to the 7% rate contained in the OAQPS Cost Manual.

NO_x limits in the 3.0-3.5 ppm range are becoming common; these concentrations are achieved by the combination of DLN and SCR. We recommend that LWG use SCR and DLN to reduce NO_x emissions in the 3.0-3.5 ppm range.

As for the issue of ammonia emissions resulting from the addition of SCR, we suggest that 10 ppm ammonia slip is not representative of normal operation. Rather, ammonia emissions would be expected to be well below 5 ppm and only approach 10 ppm as the catalyst reaches the end of its life. The benefit of the NO_x reduction outweighs the ammonia slip issue.

We ask that you require LWG to perform the AQRV analyses along with the request for additional information on BACT and allow the NPS sufficient time to review this information before the final permit is issued. Thank you for involving us in the review of the LWG PSD permit application. Please do not hesitate to contact Mr. Dee Morse of my staff at (303) 969-2817 if you have any questions concerning our comments.

Sincerely,

John Bunyak

John Bunyak
Chief, Policy, Planning and Permit Review Branch

CC: J. Koerner
SED
EPA

FACSIMILE TRANSMITTAL COVER SHEET

DATE: April 9, 1999

FROM: Jeff Koerner, BAR - New Source Review Section
Fax: 561-355-2442
Phone: (561) 355-3136, ext. 1142
Email: jeff_koerner@doh.state.fl.us

TO: Ken Kosky, P.E., Golder Associates Inc.
Fax: (352) 336-6603

RE: Lake Worth Generating L.L.C. - PSD Permit Application

Ken,

I'm faxing the letter I mailed today requesting some additional information for this project. I'm still working out of my old office in West Palm Beach (Health Department) for the next few weeks. If you have any questions, please contact me at any of the above numbers.

Thanks!

Jeff

********** -IND. XMT JOURNAL- ********** DATE APR-09-1999 ***** TIME 15:42 *********

DATE/TIME = APR-09-1999 15:36

JOURNAL No. = 06

COMM.RESULT = OK

PAGE(S) = 006

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FILE No. =

MODE = TRANSMISSION

DESTINATION = 913523366603

RECEIVED ID = / 3523366603

RESOLUTION = STD

********** - - ***** - - **********

Department of Environmental Protection

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

Jeb Bush
Governor

David B. Struhs
Secretary

CERTIFIED MAIL - Return Receipt Requested

April 9, 1999

Mr. Brian Chatlosh, Manager
Lake Worth Generating, L.L.C.
245 Winter Street, Suite 300
Waltham, MA 02451

Subject: **Request For Additional Information**
DEP File No. 099-0569-001-AC (PSD Permit Application)
Proposed Combined Cycle Gas Turbine Generator

Dear Mr. Chatlosh:

On March 15, 1999, the Department received your application and complete fee for an air pollution construction permit for a combined cycle gas turbine electrical generator to be located at 117 College Street in Lake Worth, Palm Beach County, Florida. The application is incomplete. In order to continue processing your application, the Department will need the additional information requested on the attached pages. Should your response to any of these items require new calculations, please submit the new calculations, assumptions, reference material and appropriate revised pages of the application form.

Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to Department requests for additional information of an engineering nature. Permit applicants are advised that Rule 62-4.055(1), F.A.C. now requires applicants to respond to requests for additional information within 90 days. If there are any questions, please call me at (561) 355-3136, extension 1142. Matters regarding modeling issues should be directed to Cleve Holladay (Department meteorologist) at (850) 921-8986.

Sincerely,

Jeffery F. Koerner, P.E.
Bureau of Air Regulation
New Source Review Section

/jfk

cc: Mr. Paul Doherty, P.E., LWGLLC
Mr. Ken Kosky, P.E., Golder Associates
Ms. Margaret Johnstone, T.G. Smith Power Plant
Mr. Greg Worley, EPA
Mr. John Bunyak, NPS
Mr. Isadore Goldman, P.E., SED-DEP
Mr. Jim Stormer, PBCHD

Z 529 721 351

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PS Form **3800**, April 1995

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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
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Consult postmaster for fee.

3. Article Addressed to:

Brian Chatlosh
Lake Worth Generating, L.L.C.
245 Winter Street, Ste. 300
Waltham, MA 02451

4a. Article Number

Z 529 721 351

4b. Service Type

☐ Registered ☒ Certified
☐ Express Mail ☐ Insured
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7. Date of Delivery 4/15

5. Received By: *(Print Name)*

6. Signature: *(Addressee or Agent)*

X L. Lessueille

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

FJG/JFK/lh

Thank you for using Return Receipt Service.

PS Form **3811**, December 1994 102595-98-B-0229 Domestic Return Receipt

ITEMS OF INCOMPLETENESS

1. Common Control Issues: **Please verify the following items:**

   - LWG will enter into a long term lease (40 years) of this property from the City of Lake Worth which also operates the T.G. Smith Power Plant on the same site.
   - Existing T.G. Smith employees will be used to operate and maintain the new combustion gas turbine.
   - The new unit will generate a maximum of 260 MW of power under combined cycle operation: 186 MW directly from the new combustion gas turbine/electrical generator while firing distillate oil and an additional 74 MW from steam produced by the heat recovery steam generator (HRSG) and supplied to existing turbine/electric generators at the collocated T.G. Smith Power Plant.
   - The T.G. Smith Power Plant will purchase this steam as a top priority when it is available and when there is a demand.
   - Because less than 75 MW of power will be produced by steam, this project will avoid power plant siting requirements.
   - Although collocated with the existing Tom G. Smith Power Plant, the applicant maintains that there is independent ownership and control of the new combustion gas turbine.

2. Pollutant Emissions Standards: Please submit the manufacturer's written guarantee or the summary from recent actual emissions tests of this model combustion turbine that the unit is capable of achieving the following emissions standards *as requested in the permit application* at both 50% load and 100% load.

Pollutant	Fuel Type	Requested Limits (less than or equal to)	Compliance Method
CO	gas	12.0 ppmvd, 3-hour average	EPA Method 10, initial test only
	oil	20.0 ppmvd, 3-hour average	EPA Method 10, initial test only
NOx	gas	9.0 ppmvd @ 15% O2, 30-day rolling average	CEM w/dilution monitor for O2 in accordance with 40 CFR 75
	oil	42.0 ppmvd @ 15% O2, 24-hour block average	CEM w/dilution monitor for O2 in accordance with 40 CFR 75
PM/PM10	gas	None (request opacity limit in lieu of PM limit)	None
	oil	17.0 lb/hour, 3-hour average	EPA Method 5 or 17
SO2	gas	1.0 grain per 100 SCF of gas	Fuel sampling/analysis by vendor
	oil	0.05% sulfur by weight	Fuel monitoring plan similar to NSPS Subpart GG
VOC	gas	3.5 ppmvw, as methane, 3-hour average	EPA Method 25A, initial only
	oil	7.0 ppmvw, as methane, 3-hour average	EPA Method 25A, initial only
Opacity	gas	10% except for up to 100% for one 6-minute period per hour	EPA Method 9
	oil	20% except for up to 100% for one 6-minute period per hour	EPA Method 9

   a. The ambient impacts were modeled based on the maximum predicted "pound per hour" emission rates. The draft permit will most likely include corresponding "pounds per hour" limits for all regulated pollutants. **Please comment.**

   b. The CO limits were proposed as BACT and will result in potential emissions greater than 100 tons per year. Rule 62-297.310 requires annual compliance tests for such regulated pollutants. In addition, the application states that CO will remain as an indicator of "good combustion practices". The Department is considering a requirement to conduct initial testing as well as testing during the annual RATA for the NOx continuous monitor. Also, the

Department assumes the CO limits of 12/20 ppmdv for firing gas/oil are corrected for dilution to 15% oxygen similar to NOx. **Please comment.**

c. The applicant proposes that BACT for PM/PM10 be defined as a very low sulfur fuel - either pipeline natural gas or light distillate fuel oil containing no more than 0.05% sulfur by weight. The applicant also requests a limit of 17 pounds of PM per hour while burning distillate oil, but no limit while burning natural gas. However, as a surrogate parameter for PM/PM10, the applicant requests separate visible emissions standards for burning natural gas and distillate oil. The Department is considering a visible emissions standard of 10% opacity for firing either gas or oil similar to recent permits for combustion turbines. **Please comment. Also, provide performance curves for opacity and PM versus combustion turbine load while burning natural gas and oil.**

d. The applicant proposed NOx emissions limits of 9 ppmvd while burning gas and 42 ppmvd while burning oil - each of which includes at least 20% margin for compliance. The ambient impact analyses were based on the maximum potential *hourly* emissions rate developed from these proposed limits. A *24-hour block average* is requested for the burning of oil while a *30-day rolling average* is requested while burning gas. The Department is considering a 24-hour block average for both fuels similar to recent permits for combustion turbines. **Please provide some justification for why a longer averaging period may be needed while burning natural gas. Also, previous BACT determinations for other states establish NOx limits of 25 ppmvd while burning distillate oil and injecting water. Why isn't the lower NOx limit for oil justified for this project?**

e. The applicant proposed "pipeline natural gas" defined as 1 grain per 100 SCF of gas to be BACT for SO2 while firing gas. The draft permit for a similar combustion turbine project (Kissimmee Utility Authority) proposed a sulfur limit of 20 grains of sulfur per 100 SCF of gas. **Please explain this apparent discrepancy.**

f. The applicant proposes an alternate sampling plan for fuel nitrogen and sulfur in order to comply with the NSPS. The nitrogen sampling requirement would be replaced by the NOx CEM. The application mentions an EPA Region 5 memo about an acceptable alternate fuel sampling plant, but provides no details. **Please prepare a separate document describing the substitution of continuous NOx monitoring for fuel nitrogen monitoring and details of the fuel sulfur monitoring plan including the sampling frequency and methods of analysis. This document will be submitted to EPA for approval as an alternate fuel sampling plan.**

g. Potential emissions of sulfuric acid mist (SAM) are estimated to be 10.9 tons per year. The PSD significant emissions rate is 7 tons per year. There are no other details regarding SAM in the application. **What is the proposed BACT determination for SAM and method of compliance?**

h. The applicant has requested up to 2 hours of excess emissions per 24-hour period resulting from start up, shut down, and malfunction supposedly allowed by Rule 62-210.700, F.A.C. The applicant also requested up to 4 hours of excess emissions during cold start up of the combined cycle plant. **Please provide supporting information from the manufacturer as to the duration of startup and shutdown for this model combustion turbine. How frequently would the plant perform a cold startup of the gas turbine for combine cycle operation?** *Note: Because this unit is subject to PSD and NSPS, any conditions permitting excess emissions are subject to approval by the EPA.*

3. Control Equipment: **Please provide supporting documentation from the manufacturer regarding the following control equipment and pollutants:**

a. Performance curves for CO, NOx, and VOC emissions versus combustion turbine load when controlled by dry low NOx only and burning natural gas.

b. Performance curves for CO, NOx, and VOC emissions versus the water injection rate for 50%, 75% and 100% loads on the combustion turbine when controlled by water injection and burning low sulfur distillate fuel oil.

c. Performance curves of CO, NOx, PM, VOC, and visible emissions for start up and shut down of the combustion turbine in simple cycle and combined cycle modes while burning natural gas and low sulfur distillate oil.

Also, please describe the control system that will inject water to reduce NOx emissions. Is it linked to the NOx continuous monitor or turbine load?

4. Emissions Limited Pollutants: Page 27 of the application indicates that only SO2 and NOx are "emissions limited pollutants". Because the BACT process also establishes limits for CO and PM/PM10 these pollutants should also be included as "emissions limited". Also, if a limit is assumed by the applicant for VOC, this would also become an emissions limited pollutant. A test failure for an emissions limited pollutant is a violation. **Please comment.**

5. Modeled Ambient Impacts - Class I Significant Impact Levels for Everglades National Park:

   a. For combined cycle operation burning distillate oil, the 3-hour and 24-hour predicted concentrations of SO2 exceed the recommended NPS levels indicated in the application (Table 6-10). **Please submit more detailed modeling or a valid justification as why more detailed monitoring isn't necessary.**

   b. The application indicates that the "rural" option as selected for ISCST3 modeling. The proposed CT will be collocated on an existing power plant site, next to a high school, near a middle school, beside Interstate I-95, and close to an older residential neighborhood. **Why was the "rural" option selected? Please explain the selection of the "rural" option rather than the "urban" option?**

   c. **Is there a more current, qualified, 5-year meteorological data set available than the one used (1987 to 1991)? If so, why wasn't that data set used?**

6. Modeled Ambient Impacts - Determining Compliance with PSD Class II Increments and AAQS:

   Table 6-7 of the application indicates a maximum predicted 24-hour SO2 concentration of 5 ug/m3 while burning oil during combined cycle operation. This is equal to the EPA significant impact level also identified in Table 6-7. **Please submit more detailed modeling or a valid justification as to why this isn't necessary.**

7. Typos/Corrections:

   a. *Correction on page 28*: PTE comment indicates "7760" hours of oil firing and 1000 hours of gas firing. This should be reversed.

   b *Correction on page 7-1*: Under the discussion of Class I impacts (section 7.3), the applicant states that the project is more than 150 km away from the nearest Class I area. It then goes on to state that the Everglades National Park is the nearest Class I area and is only 104 km from the project. In addition, a comment made that this project will actually *expand* increment because the T.G. Smith Power Plant will not operate several steam generating units. However, there is no request to secure federally enforceable conditions that would require the existing power plant to buy steam from the proposed CT nor shut down any existing units. Therefore, increments will be *consumed.* **Please comment.**

8. NPS BACT Review: Don Shepherd of the National Parks Service provided comments regarding this application. **Please provide the requested additional information.** (attached)

9. NPS Ambient Impact Modeling Review: The Department has not yet received comments from the National Parks Services regarding the modeling analyses. These questions will be forwarded for your comment as soon as I receive them.

Filename: LWG_RFI.DOC

NPS Comments on BACT Determination

Author: Dee_Morse@nps.gov [SMTP:Dee_Morse@nps.gov] at EXCHD
Date: 4/5/99 4:14 PM
Priority: Normal
TO: Jeff Koerner at DOH50CHD
CC: linero_a@dep.state.fl.us [SMTP:linero_a@dep.state.fl.us] at EXCHDOH,
Don_Shepherd@nps.gov [SMTP:Don_Shepherd@nps.gov] at EXCHDOH
Subject: Lake Worth Generating

Hello, my name is Dee Morse, I am with the National Park Service Air Resources Division. We are reviewing the Lake Worth Generating facility draft air quality permit application. Don Shepherd (in our office) spoke to you today about the BACT section of the draft application and asked that I send to you his questions concerning the BACT section. Therefore, here are Don's questions:

Lake Worth Generating (LWG) is proposing to meet a nitrogen oxides (NOx) limit of 9 parts per million (ppm) using Dry Low-NOx (DLN) combustors. LWG appears to be arguing that the addition of Selective Catalytic Reduction (SCR) to further reduce NOx emissions from a CCT equipped with DLN would create adverse ammonia emissions and excessive costs.

Although LWG evaluated the feasibility of applying SCR downstream of DLN to reduce NOx emissions to 3.5-ppm, it has not provided sufficient information to support its claim of economic unfeasibility. Specific items for which more information is needed are:

1. A copy of the vendor price estimate for "SCR Associated Equipment" at the 61% control level proposed.
2. Justification (including vendor estimates) for including the cost of "HRSG Modification" as a Direct Capital Cost.
3. Description and justification for "Instrumentation Costs." At the low level of NOx removal efficiency proposed, what additional instrumentation is required beyond that supplied by the SCR vendor?
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7. Quote from an ammonia supplier.
8. Justification for "Inventory Cost" and associated interest rate, considering vendor estimate of catalyst life.
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As for the issue of ammonia emissions resulting from the addition of SCR, we suggest that 10-ppm ammonia slip is not representative of normal operation. Rather, ammonia emissions would be expected to be well below 5 ppm and only approach 10 ppm as the catalyst reaches the end of its life.

Department of
Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

March 17, 1999

Mr. Gregg Worley, Chief
Preconstruction/HAP Section
Air, Radiation Technology Branch
US EPA Region IV
61 Forsyth Street
Atlanta, Georgia 30303

Re: Lake Worth Generation, LLC
250 MW Combined Cycle Project
0990568-001-AC, PSD-FL-266

Dear Mr. Worley:

Enclosed is a copy of a PSD application for a nominal 244 MW combined cycle project planned by Lake Worth Generation, LLC at the site of an existing power plant owned and operated by the City of Lake Worth, Palm Beach County, Florida. The project consists of one nominal 170 MW General Electric PG7241FA combustion turbine-electrical generator with an unfired heat recovery steam generator that will repower an existing steam electrical generator. While the main fuel will be pipeline natural gas, maximum 0.05 percent sulfur fuel oil is proposed for a maximum of 1000 hours.

Best Available Control Technology emission limits of NO_X are proposed as 9 ppmvd @ 15 % O_2 by Dry Low NO_X technology when burning gas and 42 ppmvd when burning fuel oil. These units emit very low levels of carbon monoxide, particulate emissions and volatile organic compounds.

We would appreciate your earliest review and comment. This project is not subject to Florida's Power Plant Siting Act. If the application is complete, we will make a preliminary determination within 60 days of receipt, issue our Intent by Day 74, and take a final action 30 days after we receive Proof of Publication.

We will also provide you with a copy of our Intent, Draft Permit and Draft BACT for your further comment during the 30-day comment period. If you have any questions on this matter please call me at 850/921-9523.

Sincerely,

3/17

A. A. Linero, P.E., Administrator
New Source Review Section

AAL/aal

Enclosures

Department of
Environmental Protection

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

Jeb Bush
Governor

David B. Struhs
Secretary

March 17, 1999

Mr. John Bunyak, Chief
Policy, Planning & Permit Review Branch
NPS-Air Quality Division
Post Office Box 25287
Denver, CO 80225

Re: Lake Worth Generation, LLC
250 MW Combined Cycle Project
0990568-001-AC, PSD-FL-266

Dear Mr. Bunyak:

Enclosed is a copy of a PSD application for a nominal 244 MW combined cycle project planned by Lake Worth Generation, LLC at the site of an existing power plant owned and operated by the City of Lake Worth, Palm Beach County, Florida. The project consists of one nominal 170 MW General Electric PG7241FA combustion turbine-electrical generator with an unfired heat recovery steam generator that will repower an existing steam electrical generator. While the main fuel will be pipeline natural gas, maximum 0.05 percent sulfur fuel oil is proposed for a maximum of 1000 hours.

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We will also provide you with a copy of our Intent, Draft Permit and Draft BACT for your further comment during the 30-day comment period. If you have any questions on this matter please call me at 850/921-9523.

Sincerely,

3/17

A. A. Linero, P.E., Administrator
New Source Review Section

AAL/aal

Enclosures