FPL

December 29, 2005

A.A. Linero, P.E.
Program Administrator, South Permitting
Department of Environmental Protection
Bureau of Air Regulation
111 S. Magnolia Drive, Suite 4
Tallahassee, FL 32399-2400

Re: Florida Power & Light Company
West County Energy Center Project
DEP File No. 0990646-001-AC (PSD-FL-354)

Dear Mr. Linero:

We would like to thank you for all the time and care you have taken in your review of the West County Energy Center Project (West County or WCEC). It is very exciting to be working on a project with new and improved technology, specifically the Mitsubishi Power Systems (MPS) MPS-501G combustion turbine. Florida Power & Light Company (FPL) made the decision to invest in this technology after an extensive evaluation process which looked at the various advanced combustion turbine's commercially available. The use of the MPS-501G advanced combustion turbine for this project will result in an overall combined cycle plant performance improvement of approximately 250 btu/kWh from our most recent combined cycle plant using F class advanced combustion turbines. We are confident that the MPS-501G machine will meet our expectations and be an exceptional addition to our fleet. However, use of this technology does present a level of uncertainty that we hope the Department recognizes and will allow a reasonable amount of flexibility so that we can demonstrate the improved efficiencies that will be gained.

In our conversations about the technical details of these machines, we recognized that it would be helpful to provide additional data to support some of our conclusions. We hope this information will allow the Department to draw the same conclusions regarding the capabilities of these machines and the appropriate requirements for the project. This letter conveys the additional data and provides explanations, where appropriate, on NOx, CO, and VOC, auxiliary boilers, emergency diesel generators and the ecological research performed for the project. Also attached to this letter is a document (**Attachment 1**) outlining some edits that we would like you to consider as we work through the "very preliminary" draft permit issued for internal review. We have not provided specific comments on the entire "Technical

Evaluation and Preliminary Determination". Once you have had the opportunity to review the data presented here and our comments, we would anticipate that you would update the document based on the Department's review. We would like the opportunity to review and comment on the next draft of both the Air Permit and the Technical Evaluation and Preliminary Determination.

In Attachment 1, you will notice that each of the combined cycle units (three-on-one configurations with the MPS-501G combustion turbines) is capable of producing 1,250 megawatts (MWs) rather than the original 1,100 MWs. This additional power generation capability is the result of improved performance, which includes a 2,400 psig/1080°F/1100°F cycle with higher than expected combustion turbine output. Golder Associates has reviewed the range of emissions and consequent impacts as described in the PSD Air Permit and Site Certification Applications. The emissions and impacts are within the ranges presented. The change in MW power generation has no increased emissions or impacts.

Performance and emission tables (Tables A-MPS 1 through 12 included as **Attachment 2)** reflecting the guarantees provided by MPS for the WCEC are enclosed. These tables include the emissions when firing natural gas with duct firing. MPS has guaranteed emission rates at 100 percent load and loads from 60 percent to 90 percent load. The performance and emission tables demonstrate that the performance and emissions are within the envelope included in the original applications. The air impact analyses were conducted for a wide range of turbine inlet conditions (35 °F, 59 °F and 95 °F) and loads (100 and 75 percent). This range in load and turbine inlet temperatures would envelope the performance of the MPS-501G machines selected for the WCEC. As a result, the conclusions reached in the air quality impact sections presented in the Air Construction/PSD Application (Sections 6.0 and 7.0), which demonstrated compliance with ambient air quality standards and PSD Increments are still appropriate for the WCEC using the MPS-501G combustion turbines.

Presented below are the key areas discussed during our November 21, 2005 meeting including information requested by the Department. We have attached specific comments on the very preliminary draft that reflect the MPS information and our comments.

1. NOx Emission Limits: As we have discussed, FPL requested a NOx emission limit of 2.5 ppmvd corrected to 15 percent oxygen when firing natural gas in the Air Construction/PSD Application. We consider this emissions limit as BACT for the WCEC. This is even more appropriate based on specific information obtained from MPS on the performance of the MPS-501G combustion turbine. MPS provided performance curves and tables for NOx emissions versus turbine load using both fuel oil and natural gas. This information is included as **Attachment 3**). A NOx emission limit of 2.5 ppmvd corrected to 15 percent oxygen is consistent as BACT when the WCEC is compared to other recent BACT determinations. This is based on two main factors: WCEC NOx control efficiency required compared to other projects, and WCEC performance (i.e., heat rate) compared to other projects.

Table 1a presents the comparison of the WCEC with the Florida Municipal Power Agency's (FMPA) Treasure Coast Energy Center (TCEC), Progress Energy's Hines Power Block 4 (HPB4) and FPL's Turkey Point Unit 5 (TP5). The emission limits for the TCEC project are proposed, while the emission limits for the Hines Power Block 4 (HPB4) and the Turkey Point Project have been previously approved. Tables 2a through 2c provide the basis for the comparisons in Table 1a. These data were developed from the information provided to the Department in applications as well as performance determined using model information (referred to as Gate Cycle) and engineering estimates. Tables 1a, 1b, and 2a through 2c are included as **Attachment 4**.

Table 1a presents the NOx control efficiency for each project. The NOx control efficiency for the WCEC at 2.5 ppmvd is greater than any other recent project. The NOx control efficiency for the WCEC at 2.5 ppmvd is greater than the TCEC at 2.0 ppmvd in both the fired (with duct burning) and unfired (without duct burning) cases. In its New Source Review Workshop Manual (Draft October 1990) EPA recognizes control efficiency as a factor in determining control hierarchy (Page B.25).

As shown in Table 1a, WCEC has better performance with the lower heat rate than other recent projects by about 4 percent to over 10 percent depending upon operating condition (unfired and fired). This difference in heat rates is significant. For example, a heat rate reduction of 5 percent for 1,000 MW of generation provides an additional 438,000 MW/year using the same amount of fuel and is equivalent to a 50 MW unit. As the Department is aware, current emission limits being proposed and promulgated as New Source Performance Standards (NSPS) are production based for electric utility units, and are expressed as lb/MW-hr. This type of limit reflects the efficiency of production. If an electric utility unit is more efficient than another unit, it will, all else being equal, have lower lb/MW-hr emissions; that is, less emissions are produced for the same amount of electricity production. Energy efficiency of a combined cycle unit is reflected by the heat rate expressed in Btu/kW-hr. This is reflected in fewer emissions for each MW generated. Clearly, the WCEC will be the most efficient combined cycle plant in Florida. Consideration of energy efficiency should be factored into a determination of BACT for the Project.

The efficiency of each project can be used to calculate an equivalent NOx stack gas concentration in ppmvd. Although a BACT emission limit of 2.5 ppmvd corrected to 15 percent oxygen is proposed for WCEC, the equivalent stack concentration for TCEC when efficiency is considered ranges from 2.17 to 2.28 ppmvd (see Table 1a). This comparison means that while the NOx emission rate for TCEC would be 2.0 ppmvd, the "effective" emission rate based on efficiency would be 2.17 to 2.28 ppmvd as compared to WCEC.

Determination of BACT is made on a case-by-case basis. In the Department's draft evaluation, the use of the Sithe project for comparison as BACT is not appropriate. These projects were clearly required to install NOx control technology that would also meet Lowest Achievable Emission Rate (LAER). LAER does not require a case-by-case comparison of energy, environment and economic impacts. LAER only recognizes that the emission rate can be achieved. As noted in the Department's technical evaluation and preliminary determination, projects in Michigan and Oregon, regions where LAER would not apply, were issued NOx emission limits of 2.5 ppmvd corrected to 15 percent oxygen. The use of the "case-by-case" comparison requirement of BACT is evident in the Department's determinations for the TP5 and HPB4 Projects. FPL proposed the NO_x limits of 2 ppmvd corrected to 15-percent O_2 when firing natural gas and 8 ppmvd corrected to 15-percent O_2 when firing ultra low-sulfur distillate oil for the TP5 Project due to the close proximity (less than 15 miles) to the Everglades National Park. Indeed, the Department recognized this in the recent issuance of the BACT determination for the Hines Energy Center Power Block 4. In the BACT determination, the Department stated: "The FPL facility is (nearly) adjacent to the Everglades National Park (ENP), and as such, the most stringent emission limits are appropriate." The Department on June 13, 2005 issued the final BACT determination for HPB4 that limited NO_x emissions to 2.5 ppmvd corrected to 15-percent O_2 when firing natural gas for a nominal 500-MW combined cycle unit. The combustion turbines proposed for WCEC will achieve even more NO_x control efficiency than the HPB4 Project as shown in Table 1a.

Taking together the "case-by-case" factors for the WCEC that include greater efficiency, and greater NOx control efficiency, FPL believes a BACT NOx limit of 2.5 ppmvd corrected to 15 percent oxygen is appropriate.

Regarding the NOx emission limit when firing oil, a catalyst vendor was contacted to provide additional information on the design basis for Selective Catalytic Reduction (SCR). The NOx emission limit when firing natural gas as the primary fuel establishes the catalyst volume since it requires the higher control efficiency. The oil emission limit is then established based on the natural gas design. Sulfur is not a significant factor in catalyst deactivation and is not a catalyst poison. For WCEC, a NOx emission limit of 10 ppmvd corrected to 15% oxygen is appropriate with an emission limit of 2.5 ppmvd for gas.

2. CO Emission Limits: FPL requests that the Department establish CO emission limits for the WCEC when firing natural gas similar to those established for Turkey Point Unit 5 and those proposed for the TCEC project. The limits for stack testing purposes would be 4.1 ppmvd corrected for 15 percent oxygen for full load, 7.6 ppmvd corrected for 15 percent oxygen when duct firing. A 24-hour block average of 10 ppmvd corrected for 15 percent oxygen is proposed for continuous compliance. As discussed previously, MPS has guaranteed full load CO emission rates when firing natural gas, the primary fuel, comparable to that proposed for TCEC and contained in the final Air Construction/PSD Permit for Turkey Point Unit 5. MPS has guaranteed CO emissions of 10 ppmvd corrected for 15 percent oxygen for loads from 60 percent to 90 percent. MPS Performance curves and tables are included as **Attachment 3**. As we discussed at our November meeting, operation at loads less than 60 percent would only likely occur during startup and shutdown periods. Indeed, WCEC will be the most efficient combined cycle plant in FPL's combined cycle fleet and is located in the load center. The benefits of this efficiency are also reflected in the lb/MW-hr CO emission rates shown in Table 1b. Clearly, the proposed CO emission rates for WCEC, when considered on a lb/MW-hr basis, would be the lowest of any recent combined cycle facility in Florida.

FPL requests a CO emission limit of 8 ppmvd corrected to 15 percent oxygen when firing distillate oil at full load and a CO emission limit of 10 ppmvd corrected to 15 percent oxygen for continuous compliance. This emission limit is consistent with the CO limits proposed for TCEC and established for TP5. Given the MPS guarantees regarding CO emissions, there is reasonable assurance that WCEC will comply with the requested CO emission rates without installation of an oxidation catalyst.

3. VOC Emission Rates: The proposed VOC emission limit of 1.2 ppmvd corrected to 15 percent oxygen for natural gas firing is acceptable. However, for natural gas firing with duct firing, FPL is requesting an emission limit of 1.5 ppmvd corrected to 15 percent oxygen. This proposed VOC emission limit is lower than the limit established for TP5 of 1.9 ppmvd corrected to 15 percent oxygen. When firing oil, FPL is requesting a VOC emission rate of 6 ppmvd corrected to 15 percent oxygen.

4. Auxiliary Boiler: While the boiler has not been purchased, a size of approximately 99.8 MMBtu/hr will accommodate the needs of the project. The startup steam needs for the WCEC are 30,000 lb/hr for a single CT/HRSG train. The startup sequence would initially start the first CT/HRSG train with sequential startups of the remaining CT/HRSG trains. An auxiliary boiler with a steam capacity of 85,000 lb/hr and a heat input of approximately 99.8 MMBtu/hr would envelope the startup process since a full 30,000 lb/hr steam would not be required for each train. Once steam is generated in the CT/HRSG trains, a portion can be used for operation.

5. Emergency Diesels: FPL recognizes that the emergency diesel generators that will be purchased would have to meet the NSPS Subpart IIII, when finalized. This proposed NSPS was not yet promulgated when our applications were submitted. We have two comments to the Department's proposed emission limits. First, the emission rates provided in the application were based on specific information on a unit currently available from Caterpillar. There is an inverse relationship between NOx emissions and other emissions from a diesel engine. For example, lower NOx emissions typically mean higher CO and VOC. Thus, using the NOx NSPS emission limit along with the emission limits provided in the application is not technically appropriate. FPL requests that the emission limits proposed by the Department be the same as those provided for in the NSPS. The emission limits for CO, VOC, and PM/PM_{10} would be 8.5 gram/hp-hr, 0.5 gram/hp-hr and 0.54 gram/hp-hr, respectively. The VOC limit was based on a total hydrocarbon limit in the NSPS of 1 gram/hp-hr and assuming 50 percent VOC, which is a common factor.

Second, since the NSPS has not yet been promulgated, FPL requests language in the permit that allows the emission limits to be changed based on the final NSPS.

6. Ecology: Enclosed for your information is the Ecology section from the SCA that provides information about the ecology at the site (see **Attachment 5**). The site is devoid of wetlands and there are no threatened or endangered species residing at this site. The Florida Fish and Wildlife Conservation Commission is a party to the Site Certification and provided no comments on the project. FPL met with the US Fish and Wildlife Service earlier this month and provided information on the project.

7. Fuel Oil Storage Tank Capacity: The PSD and Site Certification Applications reference the need for one 4.2 million-gallon oil storage tank per unit. At this stage in the design, FPL proposes to install two, 6.3 million-gallon oil storage tanks. This will provide assurances that 108 hours of operation on oil will be possible should the situation warrant the use of oil.

Since these specific MPS-501G combustion turbines have not been deployed in Florida, we have suggested that Mitsubishi representatives accompany FPL to Tallahassee to meet with you and others in the Department. A meeting would provide the opportunity for all attendees to gain first hand knowledge from the vendor. We have tentatively organized that meeting for Monday, January 9 based on our understanding of your availability. Please confirm that this date is still acceptable.

We appreciate your consideration of the information provided in this letter, the attachments, and the proposed clarifications to the "very preliminary" draft permit. If you have any questions or require additional information, please contact me at (561) 691-7518. We would welcome the opportunity to discuss the attached information in detail with you once you have had the chance to review it.

Sincerely,

Barbara P. Linkiewicz
Environmental Licensing Manager

cc: Steven Palmer, DEP Siting Coordination Office
Ken Kosky, Golder

Attachment 1

West County Energy Center

Requested Changes to “Very Preliminary” Draft PSD Permit

December 29, 2005

ATTACHMENT 1

West County Energy Center
PSD Air Permit – Very Preliminary Draft
FPL Comments

1) In Section I, page 2 of 24, we request the following clarification in the first paragraph of the Facility Description:

   The FPL West County Energy Center will be a nominal ~~2,220~~ 2,500 megawatt (MW) greenfield power plant. The initial phase is the construction of two nominal ~~1,000~~ 1,250 MW gas-fired combined cycle units that will use ultra low sulfur (ULS) fuel oil as backup fuel. The two combined cycle units are designated as Unit 1 and Unit 2.

2) In Section I, page 2 of 24, we request the following clarification in the second paragraph of the Facility Description:

   …and a common nominal ~~350~~ 500 MW steam-electrical generator.

3) In Section I, page 2 of 24, we request the following clarification in the list of New Emissions Units:

   007 Two nominal ~~4.2~~ 6.3 million distillate fuel oil storage tanks (Note: this capacity will allow approximately 108 hours of on-site oil storage.)
   011 Four nominal 2,250 KW (approximately 21 MMBtu) emergency generators
   012 One Emergency Fire Pump

4) In Section I, page 4 of 24, please add a period at the end of the sentence under "Compliance Authority".

5) In Section III.A, page 6 of 24, in the table, we request the following clarifications:

   Description: …The project also includes two steam turbine-electrical generators.

   Generating Capacity: Each of the six gas turbine-electrical generator sets has a nominal generating capacity of 250 MW. Each of the two steam turbine-electrical generators has a nominal generating capacity of ~~350~~ 500 MW. The total nominal generating capacity of each of the "3 on 1" combined cycle units, is approximately ~~1,100~~ 1,250 MW. The total generating capacity of the proposed project is ~~2,220~~ 2,500MW.

   Stack Parameters:

5) The heat input rates are 2,333 MMBtu per hour when firing natural gas and 2,117 MMBtu per hour when firing distillate fuel oil. The flow rates are 1,330,197 acfm for gas firing and 1,533,502 acfm for oil firing. The stack gas temperature should be 195 degrees F, not 188 degrees F for natural gas firing and is the same as indicated (293 degrees F) for oil firing.

6) In Section III.A, page 8 of 24, we request that 6.d (Oxidation Catalyst) be deleted pursuant to the discussions in the attached letter.

7) In Section III.A, page 8 of 24, in the section title "Performance Restrictions", we request the following clarifications:

7. Permitted Capacity – Gas Turbines: The maximum heat input rate to each gas turbine is 2,333 MMBtu per hour when firing natural gas and 2,117 MMBtu per hour when firing distillate fuel oil (based on compressor inlet air temperature of 59° F, the lower heating value (LHV) of each fuel, and 100% load).

11.b. Inlet ~~Fogging~~ Conditioning: In accordance with the manufacturer's recommendation and appropriate ambient conditions, the evaporative cooling system may be operated to reduce the compressor inlet air temperature and provide additional direct, shaft-driven electrical power. ~~This method of operation is commonly referred to as "fogging."~~

8) Section III.A, page 9 of 24, we request the following clarifications:

11.c. *Duct Firing*: When firing natural gas, each HRSG system may fire natural gas in the duct burners to provide additional steam-generated electrical power. The total combined heat input rate to the duct burners (all six HRSGs) shall not exceed 7,395,840 MMBtu (LHV) during any consecutive 12 months.

12. Emissions Standards: The emission limits in this condition are requested to be changed to the following based on the comments and information provided below (see discussion in attached letter). Note: stack test is at 100% load.

Pollutant	Fuel	Method of Operation	Stack Test, 3-Run Average		CEMS Block Average
			ppmvd @ 15% O_2	lb/hour	ppmvd @ 15% O_2
CO [a]	Oil	Combustion Turbine (CT)	~~4.1~~/8	~~25.8~~/42.0	~~4.1~~/10, 24-hr
	Gas	CT & Duct Burner (DB)	~~4.1~~/7.6	~~26.7~~/52.5	~~4.1~~/10, 24-hr
		CT Normal	4.1	~~24.6~~/23.2	~~4.1~~/10, 24-hr
NO_X [b]	Oil	CT	~~8.0~~/10.0	~~82.4~~/87.4	~~8.0~~/10.0, 24-hr
	Gas	CT &DB	~~2.0~~/2.5	~~24.2~~/28.3	~~2.0~~/2.5, 24-hr
		CT Normal	~~2.0~~/2.5	~~20.0~~/23.8	
PM/PM_{10} [c]	Oil/Gas	All Modes	Fuel Specifications Visible emissions shall not exceed 10% opacity for each 6-minute block average.		
SAM/SO_2 [d]	Oil/Gas	All Modes	Fuel Specifications		

VOC [e]	Oil	CT	~~1.2~~/6.0	~~4.5~~/19.6	NA
	Gas	CT & DB	~~1.2~~/1.5	~~4.1~~/5.4	NA
		CT Normal	1.2	4.1	NA
Ammonia [f]	Oil/Gas	CT, All Modes	5	NA	NA

Note: Please add the following sentence to footnote (a) The stack test limits apply only at high load (90-100% of the combustion turbine capacity).

8) Section III.A, page 11 of 24, we request the following clarifications:

18.a. *Steam Turbine / HRSG System Cold Startup*: For cold startup of the steam turbine system, excess emissions from any gas turbine/HRSG system shall not exceed eight hours in any 24-hour period. A cold "startup of the steam turbine system" is defined as startup of the 3-on-1 combined cycle system following a shutdown of the steam turbine lasting at least 48 hours.

Eight hours is needed for cold start-up of the steam turbine system because of the increased hold times for pre-warming that are required for the Toshiba steam turbine. Both Manatee and Martin projects which have Toshiba steam turbines, are having difficulty managing the six hour limit. The situation is even more critical for the WCEC project due to the higher cycle efficiency (2,400 psig/1,080 degrees F/1,100 degrees F versus 2,100 psig/1,050 degrees F/1,050 degrees F). Adequate time is needed to address water chemistry challenges due to the higher temperatures as well as the thicker drums.

18.d *Fuel Switching*: For ~~oil-to-gas~~ fuel switching, excess emissions shall not exceed ~~1~~ 2 hours in any 24-hour period.

9) Section III.A, page 16 of 24, we request the clarifications below. Recognizing that quarterly reports contain all NSPS and State requirements, this clarification combines the quarterly and semiannual reports.

32.b. Quarterly Permit Excess Emissions Report: Within 30 days following the end of each calendar-quarter, the permittee shall submit a report to the Compliance Authority summarizing periods of CO and NOx emissions in excess of the BACT permit standards following the NSPS format provided in 40 CFR 60.7(c), Subpart A. This also includes reporting any periods of excess emissions as applicable and defined by NSPS Subpart KKKK when the rule is finalized. Periods of startup, shutdown and malfunction shall be monitored, recorded and reported as excess emissions when emission levels exceed the standards specified in the permit. In addition, the report shall summarize the CEMS systems monitor availability for the previous quarter.

For purposes of reporting emissions in excess of NSPS Subpart GG, excess emissions from the gas turbine are defined as: any operating hour in which the CEMS 4-hr rolling average NOx concentration exceeds the NSPS NOx emissions; and any monitoring period during which the sulfur content of the fuel being fired in the gas turbine exceeds the NSPS standard identified in Appendix GG. For purposes of reporting emissions in excess of NSPS Subpart Da, excess emissions from duct firing are defined as: NOx or PM emissions in excess of the NSPS standards except during periods of startup, shutdown, or malfunction; and SO2 emissions in excess of the NSPS standards except during startup or shutdown.

32.c. *NSPS Semi-Annual Reports*:
The submittal of the Quarterly Excess Emission Reports shall constitute compliance with the requirements of 40 CFR 60.7(d) for the submittal of the Semi-Annual Excess Emissions Report.

{Note: If there are no periods of excess emissions as defined in NSPS Subparts GG, Da, or KKKK, a statement to that effect may be submitted with the Quarterly Excess Emissions Report to suffice for the NSPS Semi-Annual Report.}

[Rules 62-4.130, 62-204.800, 62-210.700(6), F.A.C.; and 40 CFR 60.7, and 60.322(j)(1)]

10) Section III.B, page 17 of 24, we request the following clarifications:

Emission Unit Description
007: Two ~~4.2~~ 6.3 million gallon distillate fuel oil storage tanks

Equipment Specifications
2. Equipment: The permittee is authorized to install, operate, and maintain two ~~4.2~~ 6.3 million gallon distillate fuel oil storage tanks designed to provide ultra low sulfur fuel oil to the gas turbines.

11) Section III. D. pages 19 and 20 of 24. Auxiliary Boiler and Process Heater. As described in the permit application, these sources are not operated continuously and meet the Department criteria for generic exemptions of 5 tons/year in Rule 62-210.300(3)F.A.C. These units are normally classified as insignificant activities in Title V permits. Due to the limited operation and small amount of emissions, FPL requests that the proposed emission limits and testing requirements be deleted.

12) Section III, page 21 of 24, we request the following clarifications:

Equipment Specifications
3. Equipment: The permittee is authorized to install, operate, and maintain ~~two~~ four 2,250 Kw emergency generators.

Emissions and Performance Requirements

4. Hours of Operation and Fuel Specifications: Change hours from 99 to 160, as requested in PSD application.

5. Emergency Generators BACT Emissions Limits: The emission limits for CO, VOC, and PM/PM_{10} should be 8.5 gram/hp-hr, 0.5 gram/hp-Thhr and 0.54 gram/hp-hr, respectively. (see attached letter for explanation).

13) Section III, page 23 of 24, we are providing the following information to be included.

Emission Unit Description
012: Diesel engine fire pump (approximately 300 hp) with associated __500 gallon fuel oil storage tank.
Equipment Specifications
3. Equipment: The permittee is authorized to install, operate, and maintain __one__ diesel engine driven fire pump (approximately _300___ hp) and an associated ~~XOO~~ __500__ gallon fuel oil storage tank.

Emissions and Performance Restrictions
4. Hours of Operation: The fire pump may operate in response to emergency conditions and __40 non-emergency hours per year for maintenance testing.

Attachment 2

West County Energy Center

Design Information

Table A-MPS-1 through A-MPS-12

Table A-MPS-1. Design Information and Stack Parameters for the West County Energy Center Project
MPS 501G CT, Dry Low-NO_x Combustor, Natural Gas, Base Load

Parameter	CT Only Turbine Inlet Temperature				CT with Duct Burner Turbine Inlet Temperature			
	35 °F Case 8	59 °F Case 6	75 °F Case 4	95 °F Case 2	35 °F w/DB Case 7	59 °F w/DB Case 5	75 °F w/DB Case 3	95 °F w/DB Case 1
Combustion Turbine Performance								
Net power output (MW)	281.27	262.48	249.44	232.87	281.27	262.48	249.44	232.87
Net heat rate (Btu/kWh, LHV)	8,787	8,891	8,989	9,139	8,787	8,891	8,989	9,139
(Btu/kWh, HHV)	9,754	9,869	9,978	10,144	9,752	9,866	9,972	10,143
Heat Input (MMBtu/hr, LHV)	2,471	2,333	2,241	2,128	2,471	2,333	2,241	2,128
(MMBtu/hr, HHV)	2,743	2,590	2,488	2,362	2,743	2,590	2,488	2,362
Evaporative Cooler	Off	Off	Off	Off	Off	Off	Off	Off
Relative Humidity (%)	40	60	60	50	20	60	60	50
Fuel heating value (Btu/lb, LHV)	20,940	20,940	20,940	20,940	20,940	20,940	20,940	20,940
(Btu/lb, HHV)	23,243	23,243	23,243	23,243	23,243	23,243	23,243	23,243
(HHV/LHV)	1.110	1.110	1.110	1.110	1.110	1.110	1.110	1.110
Steam Flow (lb/hr)	NA	NA	NA	NA	NA	NA	NA	NA
Duct Burner (DB)								
Heat input (MMBtu/hr, HHV)	0	0	0	0	475	475	475	475
(MMBtu/hr, LHV)	0	0	0	0	427.9	427.9	427.9	427.9
CT/DB Exhaust Flow								
Mass Flow (lb/hr)- provided	5,083,000	4,842,000	4,670,000	4,454,000	5,102,086.0	4,861,086	4,689,086	4,473,086
- provided	NA	NA	NA	NA				
Temperature (°F) - provided	1124	1136	1145	1161	1,124	1,136	1,145	1,161
Moisture (% Vol.)	8.1	8.73	9.4	10.32	9.38	8.66	10.77	11.75
Oxygen (% Vol.)	12.10	12.05	11.96	11.82	10.69	10.55	10.43	10.22
Molecular Weight	28.45	28.69	28.30	28.20	28.37	28.60	28.22	28.11
Fuel Usage								
Fuel usage (lb/hr) = Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu (Fuel Heat Content, Btu/lb (LHV))								
Heat input (MMBtu/hr, LHV)	2,471	2,333	2,241	2,128	2,471	2,333	2,241	2,128
Heat content (Btu/lb, LHV)	20,940	20,940	20,940	20,940	20,940	20,940	20,940	20,940
Fuel usage (lb/hr)- calculated	118,004	111,414	107,020	101,624	118,004	111,414	107,020	101,624
Heat content (Btu/cf, LHV)- assumed	933	933	933	933	933	933	933	933
Fuel density (lb/ft³)	0.0446	0.0446	0.0446	0.0446	0.0446	0.0446	0.0446	0.0446
Fuel usage (cf/hr)- calculated	2,647,288	2,499,443	2,400,879	2,279,818	2,647,288	2,499,443	2,400,879	2,279,818
Fuel Usage - Duct Burner Only								
Fuel usage (lb/hr)- calculated	0	0	0	0	20,436	20,436	20,436	20,436
Fuel usage (cf/hr)- calculated	0	0	0	0	458,458	458,458	458,458	458,458
HRSG Stack								
HRSG - Stack Height (ft)	149	149	149	149	149	149	149	149
Diameter (ft)	22	22	22	22	22	22	22	22
HRSG Stack Flow Conditions								
Velocity (ft/sec) = Volume flow (acfm) / [((diameter)² /4) x 3.14159] / 60 sec/min								
Mass flow (lb/hr)	5,083,000	4,842,000	4,670,000	4,454,000	5,102,086	4,861,086	4,689,086	4,473,086
HRSG Stack Temperature (°F)	196	195	195	195	186	185	185	184
Molecular weight	28.45	28.69	28.30	28.20	28.37	28.60	28.22	28.11
Volume flow (acfm)	1,425,541	1,344,361	1,314,281	1,258,863	1,412,735	1,332,352	1,303,149	1,246,483
Diameter (ft)	22	22	22	22	22	22	22	22
Velocity (ft/sec)- calculated	62.5	58.9	57.6	55.2	61.9	58.4	57.1	54.7

Note: Universal gas constant = 1,545 ft-lb(force)/°R; atmospheric pressure = 2,116.8 lb(force)/ft²; 14.7 lb/ft³.

Source: MPS, 2005; CT Performance Data; Golder, 2005 - DB Calculations.

Table A-MPS-2. Maximum Emissions for Criteria Pollutants for the West County Energy Center Project
MPS 501 G CT, Dry Low-NO Combustor, Natural Gas, Base Load

Parameter	CT Only Turbine Inlet Temperature 35 °F Case 8	59 °F Case 6	75 °F Case 4	95 °F Case 2	CT with Duct Burner Turbine Inlet Temperature 35 °F w/DB Case 7	59 °F w/DB Case 5	75 °F w/DB Case 3	95 °F w/DB Case 1
Particulate from CT, DB, and SCR								
Total PM_{10} = PM_{10} (front half) + PM_{10} ($(NH_4)_2SO_4$) from SCR only								
a. PM_{10} (front half) (lb/hr)								
CT- provided	4.0	3.5	3.4	3.2	4.0	9.0	3.5	3.2
DB (lb/hr) - calculated	0.0	0.0	0.0	0.0	2.4	2.4	2.4	2.4
Total CT/DB emission rate (lb/hr)	4.0	3.5	3.4	3.2	6.4	11.4	5.9	5.6
b. PM_{10} ($(NH_4)_2SO_4$) from SCR only = Sulfur trioxide from conversion of SO_2 converts to ammonium sulfate (= PM_{10})								
Particulate from conversion of SO_2 = SO_2 emissions (lb/hr) x conversion of SO_2 to SO_3 x lb SO_3/lb SO_2 x conversion of SO_3 to $(NH_4)_2SO_4$ x lb $(NH_4)_2SO_4$/ lb SO_3								
SO_2 emission rate (lb/hr)- calculated	15.0	14.0	13.5	13.0	17.7	16.9	16.3	15.6
Conversion (%) from SO_2 to SO_3	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
MW SO_3/ SO_2 (80/64)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Conversion (%) from SO_3 to $(NH_4)_2(SO_4)$	100	100	100	100	100	100	100	100
MW $(NH_4)_2SO_4$/ SO_3 (132/80)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
SCR Particulate (lb/hr)- calculated	3.03	2.83	2.73	2.63	3.59	3.42	3.30	3.16
Total CT emission rate (lb/hr) [a]	4.0	3.5	3.4	3.2	6.4	11.4	5.9	5.6
Total HRSG stack emission rate (lb/hr) [a + b]	7.0	6.3	6.1	5.8	10.0	14.8	9.2	8.7
(lb/mmBtu, HHV)	NA	NA	NA	NA	NA	NA	NA	NA
Sulfur Dioxide								
SO_2 (lb/hr)= Natural gas (scf/hr) x sulfur content(gr/100 scf) x 1 lb/7000 gr x (lb SO_2 /lb S) /100								
Fuel use (cf/hr)	2,647,288	2,499,443	2,400,879	2,279,818	3,105,746	2,957,900	2,859,337	2,738,275
Sulfur content (grains/ 100 cf)	2	2	2	2	2	2	2	2
lb SO_2 /lb S (64/32)	2	2	2	2	2	2	2	2
CT emission rate (lb/hr)	15.1	14.3	13.7	13.0	NA	NA	NA	NA
HRSG stack emission rate (lb/hr)	15.1	14.3	13.7	13.0	17.7	16.9	16.3	15.6
HRSG stack emission rate (lb/hr) MPS provided	15	14	13.5	13				
Nitrogen Oxides								
NOx (lb/hr) = NOx (ppmvd@ 15% O_2) x {[20.9 x (1-Moisture (%)/100] - Oxygen, dry(%)} x 2116.8 lb/ft^2 x Volume flow (acfm) x 46 (mole. wgt NOx) x 60 min/hr / [1545 x (CT temp.(°F) + 460) x (20.9-15) x 1,000,000 (adj. for ppm)]								
CT/DB, ppmvd @15% O_2	15	15	15	15	16.3	16.0	16.5	16.5
Moisture (%)	8.1	8.73	9.4	10.32	9.38	8.66	10.77	11.75
Oxygen (%)	12.1	12.05	11.96	11.82	10.69	10.55	10.43	10.22
Turbine Flow (acfm)	3,442,161	3,276,227	3,221,473	3,114,495	3,465,115	3,299,355	3,244,732	3,137,986
Turbine Exhaust Temperature (°F)	1,124	1,136	1,145	1,161	1,124	1,136	1,145	1,161
CT/DB Emission rate (lb/hr)	148.5	138.6	134.6	127.9	189.0	181.0	176.0	168.0
CT/DB Emission rate (lb/hr)(provided)	151.0	143.0	138.0	130.0				
HRSG Stack emission rate, ppmvd @ 15% O_2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
HRSG Stack emission rate (lb/hr)	25.2	23.8	23.0	21.7	28.9	28.3	26.6	25.5
Carbon Monoxide								
CO (lb/hr) = CO(ppm) x {1 - Moisture(%)/100} x 2116.8 lb/ft^2 x Volume flow (acfm) x 28 (mole. wgt CO) x 60 min/hr / [1545 x (CT temp (°F) + 460°F) x 1,000,000 (adj. for ppm)]								
Basis, ppmvw - calculated	5.37	5.35	5.35	5.36	9.6	9.7	10.0	10.2
Basis, ppmvd @ 15% O2 - provided	4.10	4.10	4.10	4.10	6.2	6.1	6.4	6.5
Moisture (%)	8.10	8.73	9.40	10.32	9.38	8.66	10.77	11.75
Oxygen (%)	12.10	12.05	11.96	11.82	10.69	10.55	10.43	10.22
Turbine Flow (acfm)	3,442,161	3,276,227	3,221,473	3,114,495	3,465,115	3,299,355	3,244,732	3,137,986
Turbine Exhaust Temperature (°F)	1,124	1,136	1,145	1,161	1,124	1,136	1,145	1,161
CT/DB Emission rate (lb/hr)	24.7	23.07	22.4	21.3	43.7	42.1	41.4	40.3
HRSG Stack emission rate (lb/hr)	24.7	23.1	22.4	21.3	43.7	42.1	41.4	40.3
HRSG Stack emission rate (lb/hr)(provided)	24.5	23.2	23.0	21.3				
Volatile Organic Compounds								
VOCs (lb/hr) = VOC(ppmvd) x [1-Moisture(%)/100] x 2116.8 lb/ft^2 x Volume flow (acfm) x 16 (mole. wgt as methane) x 60 min/hr / [1545 x (CT temp (°F) + 460°F) x 1,000,000 (adj. for ppm)]								
Basis, ppmvw - calculated	1.31	1.30	1.30	1.31	2.2	2.2	2.3	2.3
Basis, ppmvd @ 15% O2 - provided	1.00	1.00	1.00	1.00	1.5	1.5	1.6	1.7
Moisture (%)	8.10	8.73	9.40	10.32	9.38	8.66	10.77	11.75
Oxygen (%) wet	12.10	12.05	11.96	11.82	10.69	10.55	10.43	10.22
Turbine Flow (acfm)	3,442,161	3,276,227	3,221,473	3,114,495	3,465,115	3,299,355	3,244,732	3,137,986
Turbine Exhaust Temperature (°F)	1,124	1,136	1,145	1,161	1,124	1,136	1,145	1,161
CT/DB Emission rate (lb/hr)	3.75	3.52	3.45	3.31	5.65	5.42	5.35	5.21
HRSG Stack emission rate (lb/hr)	3.75	3.52	3.45	3.31	5.65	5.42	5.35	5.21
HRSG Stack emission rate (lb/hr)(provided)	3.50	3.30	3.20	3.00				

Table A-MPS-2. Maximum Emissions for Criteria Pollutants for the West County Energy Center Project
MPS 501 G CT, Dry Low-NQ Combustor, Natural Gas, Base Load

Parameter	CT Only Turbine Inlet Temperature				CT with Duct Burner Turbine Inlet Temperature			
	35 °F Case 8	59 °F Case 6	75 °F Case 4	95 °F Case 2	35 °F w/DB Case 7	59 °F w/DB Case 5	75 °F w/DB Case 3	95 °F w/DB Case 1
Sulfuric Acid Mist								
Sulfuric Acid Mist (lb/hr)= SO_2 emission (lb/hr) x Conversion to H_2SO_4 (% by weight)/100								
CT SO_2 emission rate (lb/hr) - provided	15.0	14.0	13.5	13.0	17.7	16.9	16.3	15.6
CT Conversion to H_2SO_4 (% by weight) - provided	10	10	10	10	10	10	10	10
DB SO_2 emission rate (lb/hr) - provided	0	0	0	0	0.0	0.0	0.0	0.0
DB Conversion to H_2SO_4 (%) - provided	20	20	20	20	20	20	20	20
HRSG Stack emission rate (lb/hr)	2.30	2.14	2.07	1.99	2.72	2.59	2.50	2.40
- provided	2.3	2.1	2.1	2				
Lead								
Lead (lb/hr) = NA								
Emission Rate Basis	NA	NA	NA	NA	NA	NA	NA	NA
Emission rate (lb/hr)	NA	NA	NA	NA	NA	NA	NA	NA

Note: ppmvd= parts per million, volume dry; O_2= oxygen.

Source: MPS, 2005; CT Performance Data; Golder Associates, 2005 - DB Calculations.

Table A-MPS-3. Design Information and Stack Parameters for the West County Energy Center Project
MPS 501G CT, Dry Low-NO_x Combustor, Natural Gas, 75% Load

Parameter	Turbine Inlet Temperature			
	35 °F Case 12	59 °F Case 11	75 °F Case 10	95 °F Case 9
Combustion Turbine Performance				
Net power output (MW)	207.41	193.55	183.93	171.7
Net heat rate (Btu/kWh, LHV)	9,078	9,262	9,422	9,658
(Btu/kWh, HHV)	10,077	10,281	10,458	10,720
Heat Input (MMBtu/hr, LHV)	1,883	1,793	1,732	1,658
(MMBtu/hr, HHV)	2,090	1,990	1,923	1,840
Relative Humidity (%)	60	60	60	50
Fuel heating value (Btu/lb, LHV)	20,940	20,940	20,940	20,940
(Btu/lb, HHV)	23,243	23,243	23,243	23,243
(HHV/LHV)	1.110	1.110	1.110	1.110
CT Exhaust Flow				
Mass flow (lb/hr)- provided	4,156,000	3,998,000	3,885,000	3,742,000
- provided	NA	NA	NA	NA
Temperature (°F) - provided	1,082	1,098	1,110	1,126
Moisture (% Vol.)	7.57	8.17	8.84	9.76
Oxygen (% Vol.)	12.72	12.68	12.58	12.47
Molecular Weight	28.49	28.41	28.34	28.24
Fuel Usage				
Fuel usage (lb/hr) = Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu (Fuel Heat Content, Btu/lb (LHV))				
Heat input (MMBtu/hr, LHV)	1,883	1,793	1,732	1,658
Heat content (Btu/lb, LHV)	20,940	20,940	20,940	20,940
Fuel usage (lb/hr)- calculated	89,924	85,626	82,713	79,179
Heat content (Btu/cf, LHV)- assumed	933	933	933	933
Fuel density (lb/ft^3)	0.0446	0.0446	0.0446	0.0446
Fuel usage (cf/hr)- calculated	2,018,064	1,921,609	1,856,233	1,776,925
HRSG Stack				
HRSG - Stack Height (ft)	149	149	149	149
Diameter (ft)	22	22	22	22
HRSG Stack Flow Conditions				
Velocity (ft/sec) = Volume flow (acfm) / [((diameter)^2 /4) x 3.14159] / 60 sec/min				
Mass flow (lb/hr)- provided	4,156,000	3,998,000	3,885,000	3,742,000
HRSG Stack Temperature (°F)	184	185	186	187
Molecular weight	28.49	28.41	28.34	28.24
CT volume flow (acfm)	1,142,935	1,103,980	1,077,313	1,043,032
Diameter (ft)	22	22	22	22
Velocity (ft/sec)- calculated	50.1	48.4	47.2	45.7

Note: Universal gas constant = 1,545 ft-lb(force)/°R; atmospheric pressure = 2,116.8 lb(force)/ft^2; 14.7 lb/ft^3.

Source: MPS, 2005; CT Performance Data; Golder Associates, 2005.

Table A-MPS-4. Maximum Emissions for Criteria Pollutants for the West County Energy Center Project
MPS 501G CT, Dry Low-NO_x Combustor, Natural Gas, 75% Load

Parameter	Turbine Inlet Temperature 35 °F Case 12	59 °F Case 11	75 °F Case 10	95 °F Case 9
Particulate from CTand SCR				
Total PM_{10} = PM_{10} (front half) + PM_{10} ($(NH_4)_2SO_4$) from SCR only				
a. PM_{10} (front half) (lb/hr)				
CT- provided	3.0	3.0	3.0	3.0
b. PM_{10} ($(NH_4)_2SO_4$) from SCR only = Sulfur trioxide from conversion of SO_2 converts to ammonium sulfate (= PM_{10})				
Particulate from conversion of SO_2 = SO_2 emissions (lb/hr) x conversion of SO_2 to SO_3 x lb SO_3/lb SO_2 x conversion of SO_3 to $(NH_4)_2SO_4$ x lb $(NH_4)_2SO_4$/ lb SO_3				
SO_2 emission rate (lb/hr)- calculated	12.0	11.0	10.0	10.0
Conversion (%) from SO_2 to SO_3	9.8	9.8	9.8	9.8
MW SO_3/ SO_2 (80/64)	1.3	1.3	1.3	1.3
Conversion (%) from SO_3 to $(NH_4)_2(SO_4)$	100	100	100	100
MW $(NH_4)_2$ SO_4/ SO_3 (132/80)	1.7	1.7	1.7	1.7
SCR Particulate (lb/hr)- calculated	2.43	2.22	2.02	2.02
Total CT emission rate (lb/hr) [a]	3.0	3.0	3.0	3.0
Total HRSG stack emission rate (lb/hr) [a + b]	5.4	5.2	5.0	5.0
(lb/mmBtu, HHV)	NA	NA	NA	NA
Total CT emission rate (lb/hr) provided	4.8	4.6	4.4	4.3
Sulfur Dioxide				
SO_2 (lb/hr)= Natural gas (scf/hr) x sulfur content(gr/100 scf) x 1 lb/7000 gr x (lb SO_2 /lb S) /100				
Fuel use (cf/hr)	2,018,064	1,921,609	1,856,233	1,776,925
Sulfur content (grains/ 100 cf)	2	2	2	2
lb SO_2 /lb S (64/32)	2	2	2	2
HRSG Stack emission rate (lb/hr)- calculated	11.5	11.0	10.6	10.2
HRSG Stack emission rate (lb/hr) MPS provided	12.00	11.00	10.00	10.00
Nitrogen Oxides				
NOx (lb/hr) = NOx (ppmvd@ 15% O_2) x {[20.9 x (1-Moisture (%)/100] - Oxygen, dry(%)} x 2116.8 lb/ft^2 x Volume flow (acfm) x 46 (mole. wgt NOx) x 60 min/hr / [1545 x (CT temp.(°F) + 460) x (20.9-15) x 1,000,000 (adj. for ppm)]				
CT / DB, ppmvd @15% O_2	15	15	15	15
Moisture (%)	7.57	8.17	8.84	9.76
Oxygen (%)	12.72	12.68	12.58	12.47
Turbine Flow (acfm)	2,736,655	2,666,668	2,618,237	2,556,799
Turbine Exhaust Temperature (°F)	1,082	1,098	1,110	1,126
CT/DB Emission rate (lb/hr)	112.6	107.2	103.8	99.0
CT/DB Emission rate (lb/hr)(provided)	118.0	107.0	104.0	99.0
HRSG Stack emission rate, ppmvd @ 15% O_2	2.5	2.5	2.5	2.5
HRSG Stack emission rate (lb/hr)	19.7	17.8	17.3	16.5
Carbon Monoxide				
CO (lb/hr) = CO(ppm) x [1 - Moisture(%)/100] x 2116.8 lb/ft^2 x Volume flow (acfm) x 28 (mole. wgt CO) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]				
Basis, ppmvw	12.10	12.02	12.03	12.00
Basis, ppmvd @ 15% O2 - provided	10	10	10	10
Moisture (%)	7.57	8.17	8.84	9.76
Turbine Flow (acfm)	2,736,655	2,666,668	2,618,237	2,556,799
Turbine Exhaust Temperature (°F)	1,082	1,098	1,110	1,126
HRSG Exhaust Temperature (°F)	184	185	186	187
HRSG Stack emission rate (lb/hr)- calculated	44.5	42.6	41.6	40.1
HRSG Stack emission rate (lb/hr)- provided	46.0	43 0	42.0	40.0

Table A-MPS-4. Maximum Emissions for Criteria Pollutants for the West County Energy Center Project
MPS 501G CT, Dry Low-NO_x Combustor, Natural Gas, 75% Load

Parameter	Turbine Inlet Temperature			
	35 °F Case 12	59 °F Case 11	75 °F Case 10	95 °F Case 9
Volatile Organic Compounds				
VOCs (lb/hr) = VOC(ppmvd) x [1-Moisture(%)/100] x 2116.8 lb/ft^2 x Volume flow (acfm) x 16 (mole. wgt as methane) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]				
Basis, ppmvw	1.21	1.20	1.20	1.20
Basis, ppmvd @ 15% O2 - provided	1	1	1	1
Moisture (%)	7.57	8.17	8.84	9.76
Turbine Flow (acfm)	2,736,655	2,666,668	2,618,237	2,556,799
Turbine Exhaust Temperature (°F)	1,082	1,098	1,110	1,126
HRSG Exhaust Temperature (°F)	184	184	184	184
HRSG Stack emission rate (lb/hr)- calculated	2.82	2.71	2.64	2.54
HRSG Stack emission rate (lb/hr)- provided	3.00	2.00	2.00	2.00
Sulfuric Acid Mist				
Sulfuric Acid Mist (lb/hr)= SO_2 emission (lb/hr) x Conversion to H_2SO_4 (% by weight)/100				
CT SO_2 emission rate (lb/hr) - provided	12.0	11.0	10.0	10.0
CT Conversion to H_2SO_4 (% by weight) - provided	10	10	10	10
DB SO_2 emission rate (lb/hr) - provided	0	0	0	0
DB Conversion to H_2SO_4 (%) - provided	20	20	20	20
HRSG Stack emission rate (lb/hr)- calculated	1.84	1.68	1.53	1.53
- provided	1.9	1.6	1.6	1.5
Lead				
Lead (lb/hr) = NA				
Emission Rate Basis	NA	NA	NA	NA
HRSG Stack emission rate (lb/hr)	NA	NA	NA	NA

Note: ppmvd= parts per million, volume dry; O_2= oxygen.

Source: MPS, 2005; CT Performance Data; Golder, 2005.

Table A-MPS-5. Design Information and Stack Parameters for the West County Energy Center Project
MPS 501G CT, Dry Low-NO_x Combustor, Natural Gas, 60% Load

Parameter	Turbine Inlet Temperature			
	35 °F Case 12	59 °F Case 11	75 °F Case 10	95 °F Case 9
Combustion Turbine Performance				
Net power output (MW)	165.85	154.76	147.06	137.28
Net heat rate (Btu/kWh, LHV)	9,707	9,951	10,156	10,464
(Btu/kWh, HHV)	10,775	11,046	11,273	11,615
Heat Input (MMBtu/hr, LHV)	1,609	1,540	1,493	1,436
(MMBtu/hr, HHV)	1,786	1,709	1,657	1,594
Relative Humidity (%)	60	60	60	50
Fuel heating value (Btu/lb, LHV)	20,940	20,940	20,940	20,940
(Btu/lb, HHV)	23,243	23,243	23,243	23,243
(HHV/LHV)	1.110	1.110	1.110	1.110
CT Exhaust Flow				
Mass flow (lb/hr)- provided	3,493,000	3,375,000	3,293,000	3,188,000
- provided	NA	NA	NA	NA
Temperature (°F) - provided	1,141	1,158	1,170	1,187
Moisture (% Vol.)	7.68	8.29	8.95	9.87
Oxygen (% Vol.)	12.59	12.55	12.46	12.34
Molecular Weight	28.48	28.41	28.33	28.23
Fuel Usage				
Fuel usage (lb/hr) = Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu (Fuel Heat Content, Btu/lb (LHV))				
Heat input (MMBtu/hr, LHV)	1,609	1,540	1,493	1,436
Heat content (Btu/lb, LHV)	20,940	20,940	20,940	20,940
Fuel usage (lb/hr)- calculated	76,839	73,543	71,299	68,577
Heat content (Btu/cf, LHV)- assumed	933	933	933	933
Fuel density (lb/ft^3)	0.0446	0.0446	0.0446	0.0446
Fuel usage (cf/hr)- calculated	1,724,411	1,650,461	1,600,090	1,539,002
HRSG Stack				
HRSG - Stack Height (ft)	149	149	149	149
Diameter (ft)	22	22	22	22
HRSG Stack Flow Conditions				
Velocity (ft/sec) = Volume flow (acfm) / [((diameter)² /4) x 3.14159] / 60 sec/min				
Mass flow (lb/hr)- provided	3,493,000	3,375,000	3,293,000	3,188,000
HRSG Stack Temperature (°F)	175	176	178	180
Molecular weight	28.48	28.41	28.33	28.23
CT volume flow (acfm)	947,438	919,152	902,039	879,253
Diameter (ft)	22	22	22	22
Velocity (ft/sec)- calculated	41.5	40.3	39.5	38.6

Note: Universal gas constant = 1,545 ft-lb(force)/°R; atmospheric pressure = 2,116.8 lb(force)/ft²; 14.7 lb/ft.

Source: MPS, 2005; CT Performance Data; Golder Associates, 2005.

Table A-MPS-6. Maximum Emissions for Criteria Pollutants for the West County Energy Center Project
MPS 501G CT, Dry Low NO_x Combustor, Natural Gas, 60% Load

Parameter	Turbine Inlet Temperature			
	35 °F Case 12	59 °F Case 11	75 °F Case 10	95 °F Case 9
Particulate from CTand SCR				
Total PM_{10} = PM_{10} (front half) + PM_{10} ($(NH_4)_2SO_4$) from SCR only				
a. PM_{10} (front half) (lb/hr)				
CT- provided	3.0	2.0	2.0	2.0
b. PM_{10} ($(NH_4)_2SO_4$) from SCR only = Sulfur trioxide from conversion of SO_2 converts to ammonium sulfate (= PM_{10})				
Particulate from conversion of SO_2 = SO_2 emissions (lb/hr) x conversion of SO_2 to SO_3 x lb SO_3/lb SO_2 x conversion of SO_3 to $(NH_4)_2SO_4$ x lb $(NH_4)_2SO_4$/ lb SO_3				
SO_2 emission rate (lb/hr)- calculated	9.0	9.0	9.0	9.0
Conversion (%) from SO_2 to SO_3	9.8	9.8	9.8	9.8
MW SO_3/ SO_2 (80/64)	1.3	1.3	1.3	1.3
Conversion (%) from SO_3 to $(NH_4)_2(SO_4)$	100	100	100	100
MW $(NH_4)_2$ SO_4/ SO_3 (132/80)	1.7	1.7	1.7	1.7
SCR Particulate (lb/hr)- calculated	1.82	1.82	1.82	1.82
Total CT emission rate (lb/hr) [a]	3.0	2.0	2.0	2.0
Total HRSG stack emission rate (lb/hr) [a + b]	4.8	3.8	3.8	3.8
(lb/mmBtu, HHV)	NA	NA	NA	NA
Total CT emission rate (lb/hr) provided	4.1	3.9	3.8	3.6
Sulfur Dioxide				
SO_2 (lb/hr)= Natural gas (scf/hr) x sulfur content(gr/100 scf) x 1 lb/7000 gr x (lb SO_2 /lb S) /100				
Fuel use (cf/hr)	1,724,411	1,650,461	1,600,090	1,539,002
Sulfur content (grains/ 100 cf)	2	2	2	2
lb SO_2 /lb S (64/32)	2	2	2	2
HRSG Stack emission rate (lb/hr)- calculated	9.9	9.4	9.1	8.8
HRSG Stack emission rate (lb/hr) MHI provided	9.00	9.00	9.00	9.00
Nitrogen Oxides				
NOx (lb/hr) = NOx (ppmvd@ 15% O_2) x {[20.9 x (1-Moisture (%)/100] - Oxygen, dry(%)} x 2116.8 lb/ft^2 x Volume flow (acfm) x 46 (mole. wgt NOx) x 60 min/hr / [1545 x (CT temp.(°F) + 460) x (20.9-15) x 1,000,000 (adj. for ppm)]				
CT / DB, ppmvd @15% O_2	15	15	15	15
Moisture (%)	7.59	8.22	8.86	9.75
Oxygen (%)	12.68	12.63	12.57	12.48
Turbine Flow (acfm)	2,388,738	2,338,345	2,304,583	2,262,702
Turbine Exhaust Temperature (°F)	1,171	1,187	1,197	1,209
CT/DB Emission rate (lb/hr)	93.4	89.4	86.6	83.2
CT/DB Emission rate (lb/hr)(provided)	99.0	95.0	93.0	89.0
HRSG Stack emission rate, ppmvd @ 15% O_2	2.5	2.5	2.5	2.5
HRSG Stack emission rate (lb/hr)	16.5	15.8	15.5	14.8
Carbon Monoxide				
CO (lb/hr) = CO(ppm) x [1 - Moisture(%)/100] x 2116.8 lb/ft^2 x Volume flow (acfm) x 28 (mole. wgt CO) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]				
Basis, ppmvw	12.17	12.10	12.05	11.99
Basis, ppmvd @ 15% O2 - provided	10	10	10	10
Moisture (%)	7.59	8.22	8.86	9.75
Turbine Flow (acfm)	2,388,738	2,338,345	2,304,583	2,262,702
Turbine Exhaust Temperature (°F)	1,171	1,187	1,197	1,209
HRSG Exhaust Temperature (°F)	177	178	180	182
HRSG Stack emission rate (lb/hr)- calculated	37.9	36.3	35.2	33.8
HRSG Stack emission rate (lb/hr)- provided	39.0	37.0	36.0	35.0

Table A-MPS-6. Maximum Emissions for Criteria Pollutants for the West County Energy Center Project
MPS 501G CT, Dry Low NO_x Combustor, Natural Gas, 60% Load

Parameter	Turbine Inlet Temperature			
	35 °F Case 12	59 °F Case 11	75 °F Case 10	95 °F Case 9
<u>Volatile Organic Compounds</u>				
VOCs (lb/hr) = VOC(ppmvd) x [1-Moisture(%)/100] x 2116.8 lb/ft^2 x Volume flow (acfm) x 16 (mole. wgt as methane) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]				
Basis, ppmvw	1.22	1.21	1.20	1.20
Basis, ppmvd @ 15% O2 - provided	1	1	1	1
Moisture (%)	7.59	8.22	8.86	9.75
Turbine Flow (acfm)	2,388,738	2,338,345	2,304,583	2,262,702
Turbine Exhaust Temperature (°F)	1,171	1,187	1,197	1,209
HRSG Exhaust Temperature (°F)	177	177	177	177
HRSG Stack emission rate (lb/hr)- calculated	2.34	2.26	2.20	2.14
HRSG Stack emission rate (lb/hr)- provided	2.00	2.00	2.00	2.00
<u>Sulfuric Acid Mist</u>				
Sulfuric Acid Mist (lb/hr)= SO_2 emission (lb/hr) x Conversion to H_2SO_4 (% by weight)/100				
CT SO_2 emission rate (lb/hr) - provided	9.0	9.0	9.0	9.0
CT Conversion to H_2SO_4 (% by weight) - provided	10	10	10	10
DB SO_2 emission rate (lb/hr) - provided	0	0	0	0
DB Conversion to H_2SO_4 (%) - provided	20	20	20	20
HRSG Stack emission rate (lb/hr)- calculated	1.38	1.38	1.38	1.38
- provided	1.4	1.4	1.4	1.3
<u>Lead</u>				
Lead (lb/hr) = NA				
Emission Rate Basis	NA	NA	NA	NA
HRSG Stack emission rate (lb/hr)	NA	NA	NA	NA

Note: ppmvd= parts per million, volume dry; O_2= oxygen.

Source: MPS, 2005; CT Performance Data; Golder, 2005.

Table A-MPS-7. Design Information and Stack Parameters for the West County Energy Center Project
MPS 501G CT, Dry Low NO_x Combustor, Distillate Oil, Base Load

Parameter	Turbine Inlet Temperature			
	35 °F Case 28	59 °F Case 26	75 °F Case 24	95 °F Case 22
Combustion Turbine Performance				
Net power output (MW)	239.1	221.8	209.8	194.5
Net heat rate (Btu/kWh, LHV)	9,410	9,550	9,690	9,900
(Btu/kWh, HHV)	9,975	10,123	10,271	10,494
Heat Input (MMBtu/hr, LHV)	2,248	2,117	2,030	1,923
(MMBtu/hr, HHV)	2,383	2,244	2,152	2,038
Relative Humidity (%)	60	60	60	50
Fuel heating value (Btu/lb, LHV)	18,387	18,387	18,387	18,387
(Btu/lb, HHV)	19,490	19,490	19,490	19,490
(HHV/LHV)	1.060	1.060	1.060	1.060
CT Exhaust Flow				
Mass Flow (lb/hr)- provided	5,092,000	4,850,000	4,677,000	4,460,000
Temperature (°F) - assumed	982	995	1,006	1,021
Moisture (% Vol.)	7.3	7.9	8.49	9.41
Oxygen (% Vol.)	12.80	12.70	12.59	12.50
Molecular Weight	28.67	28.60	28.55	28.43
Fuel Usage				
Fuel usage (lb/hr) = Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu (Fuel Heat Content, Btu/lb (LHV))				
Heat input (MMBtu/hr, LHV)	2,248	2,117	2,030	1,923
Heat content (Btu/lb, LHV)	18,387	18,387	18,387	18,387
Fuel usage (lb/hr)- calculated	122,260	115,136	110,404	104,585
HRSG Stack				
HRSG - Stack Height (ft)	149	149	149	149
Diameter (ft)	22	22	22	22
HRSG Stack Flow Conditions				
Velocity (ft/sec) = Volume flow (acfm) / [((diameter)² /4) x 3.14159] / 60 sec/min				
Mass flow (lb/hr) - provided	5,092,000	4,850,000	4,677,000	4,460,000
HRSG Stack Temperature (°F)	292	293	294	294
Molecular weight	28.67	28.60	28.55	28.43
CT volume flow (acfm)	1,624,985	1,553,502	1,502,785	1,438,739
(ft^3/s)- calculated	27,083	25,892	25,046	23,979
Diameter (ft)	22	22	22	22
Velocity (ft/sec)- calculated	71.2	68.1	65.9	63.1

Note: Universal gas constant = 1,545 ft-lb(force)/°R; atmospheric pressure = 2,116.8 lb(force)/ft²; 14.7 lb/ft.

Source: MPS, 2005; CT Performance Data; Golder, 2005.

Table A-MPS-8. Maximum Emissions for Criteria Pollutants for the West County Energy Center Project
MPS 501G CT, Dry Low-NO$_x$ Combustor, Distillate Oil, Base Load

Parameter	Turbine Inlet Temperature			
	35 °F Case 28	59 °F Case 26	75 °F Case 24	95 °F Case 22
Particulate from CT and SCR				
Total PM_{10} = PM_{10} (front half) + PM_{10} ($(NH_4)_2SO_4$) from SCR only				
a. PM_{10} (front half) (lb/hr)				
CT- provided	37.0	35.0	34.0	32.0
b. PM_{10} ($(NH_4)_2SO_4$) from SCR only = Sulfur trioxide from conversion of SO_2 converts to ammonium sulfate (= PM_{10})				
Particulate from conversion of SO_2 = SO_2 emissions (lb/hr) x conversion of SO_2 to SO_3 x lb SO_3/lb SO_2 x conversion of SO_3 to $(NH_4)_2SO_4$ x lb $(NH_4)_2SO_4$/ lb SO_3				
SO_2 emission rate (lb/hr)- calculated	3.7	3.5	3.3	3.1
Conversion (%) from SO_2 to SO_3	9.8	9.8	9.8	9.8
MW SO_3/ SO_2 (80/64)	1.3	1.3	1.3	1.3
Conversion (%) from SO_3 to $(NH_4)_2(SO_4)$	100	100	100	100
MW $(NH_4)_2$ SO_4/ SO_3 (132/80)	1.7	1.7	1.7	1.7
SCR Particulate (lb/hr)- calculated	0.74	0.70	0.67	0.63
CT emission rate (lb/hr) [a]	37.0	35.0	34.0	32.0
Total HRSG stack emission rate (lb/hr) [a + b]	37.7	35.7	34.7	32.6
(lb/mmBtu, HHV)	NA	NA	NA	NA
Total CT emission rate (lb/hr) provided	38.0	36.0	35.0	32.0
Sulfur Dioxide				
SO_2 (lb/hr)= Fuel oil (lb/hr) x sulfur content(% weight) x (lb SO_2 /lb S) /100				
Fuel oil Sulfur Content	0.0015%	0.0015%	0.0015%	0.0015%
Fuel oil use (lb/hr)	122,260	115,136	110,404	104,585
lb SO2 / lb S (64/32)	2	2	2	2
HRSG Stack emission rate (lb/hr)- calculated	3.7	3.5	3.3	3.1
HRSG Stack emission rate (lb/hr)- provided	3.60	3.40	3.30	3.10
Nitrogen Oxides				
NOx (lb/hr) = NOx (ppmvd@ 15% O_2) x {[20.9 x (1-Moisture (%)/100] - Oxygen, dry(%)} x 2116.8 lb/ft^2 x Volume flow (acfm) x 46 (mole. wgt NOx) x 60 min/hr / [1545 x (CT temp.(°F) + 460) x (20.9-15) x 1,000,000 (adj. for ppm)]				
CT/DB, ppmvd @15% O_2	42	42	42	42
Moisture (%)	7.3	7.9	8.49	9.41
Oxygen (%)	12.80	12.70	12.59	12.50
Turbine Flow (acfm)	3,115,995	3,001,787	2,921,860	2,825,958
Turbine Exhaust Temperature (°F)	982	995	1,006	1,021
CT/DB Emission rate (lb/hr)	382.4	363.7	350.6	330.4
CT emission rate (lb/hr)(provided)	394.0	367.0	352.0	334.0
HRSG Stack emission rate, ppmvd @ 15% O_2	10	10	10.0	10.0
HRSG Stack emission rate (lb/hr)	91.1	86.6	83.5	78.7
HRSG Stack emission rate (lb/hr)(provided)	93.8	87.4	83.8	79.5
Carbon Monoxide				
CO (lb/hr) = CO(ppm) x [1 - Moisture(%)/100] x 2116.8 lb/ft^2 x Volume flow (acfm) x 28 (mole. wgt CO) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]				
Basis, ppmvw	9.62	9.64	9.68	9.63
Basis, ppmvd @ 15% O2 - provided	8	8	8	8
Moisture (%)	7.3	7.9	8.49	9.41
Basis, ppmvd @ 15% O_2	8.00	8.00	8.00	8.00
Turbine Flow (acfm)	3,115,995	3,001,787	2,921,860	2,825,958
Turbine Exhaust Temperature (°F)	982	995	1,006	1,021
HRSG Exhaust Temperature (°F)	292	293	294	294
HRSG Stack emission rate (lb/hr)	44.3	42.2	40.7	38.3
HRSG Stack emission rate (lb/hr)- provided	45.0	42.0	41.0	38.0

Table A-MPS-8. Maximum Emissions for Criteria Pollutants for the West County Energy Center Project
MPS 501G CT, Dry Low-NO_x Combustor, Distillate Oil, Base Load

Parameter	Turbine Inlet Temperature			
	35 °F Case 28	59 °F Case 26	75 °F Case 24	95 °F Case 22
Volatile Organic Compounds				
VOCs (lb/hr) = VOC(ppmvd) x 2116.8 lb/ft^2 x Volume flow (acfm) x 16 (mole. wgt as methane) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]				
Basis, ppmvw	7.21	7.23	7.26	7.22
Basis, ppmvd @ 15% O2 - provided	6.00	6.00	6.00	6.00
Moisture (%)	7.30	7.90	8.49	9.41
Oxygen (%)	12.80	12.70	12.59	12.50
Oxygen (%-dry)	13.81	13.79	13.76	13.80
Turbine Flow (acfm)	3,115,995	3,001,787	2,921,860	2,825,958
Turbine Exhaust Temperature (°F)	982	995	1,006	1,021
HRSG Stack emission rate (lb/hr)	20.50	19.62	19.04	18.13
HRSG Stack emission rate (lb/hr)- provided	20.00	18.00	18.00	17.00
Sulfuric Acid Mist				
Sulfuric Acid Mist (lb/hr)= SO_2 emission (lb/hr) x Conversion to H_2SO_4 (% by weight)/100				
CT SO_2 emission rate (lb/hr) - provided	3.7	3.5	3.3	3.1
CT Conversion to H_2SO_4 (% by weight) - provided	20	20	20	20
DB SO_2 emission rate (lb/hr) - provided	0	0	0	0
DB Conversion to H_2SO_4 (%) - provided	20	20	20	20
HRSG Stack emission rate (lb/hr)- calculated	1.12	1.06	1.01	0.96
- provided	1.2	1.1	1	.1
Lead				
Lead (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu				
Emission Rate Basis (lb/10^{12} Btu)	14	14	14	14
HRSG Stack emission rate (lb/hr)- calculated	0.0315	0.0296	0.0284	0.0269

Note: ppmvd= parts per million, volume dry; O_2= oxygen.

Source: MPS, 2005; CT Performance Data; Golder, 2005.

Table A-MPS-9. Design Information and Stack Parameters for the West County Energy Center Project
MPS 501G CT, Dry Low-NO_x Combustor, Distillate Oil, 75% Load

Parameter	Turbine Inlet Temperature 35 °F Case 32	59 °F Case 31	75 °F Case 30	95 °F Case 29
Combustion Turbine Performance				
Net power output (MW)	179.1	166.1	157.1	145.6
Net heat rate (Btu/kWh, LHV)	9,830	10,060	10,260	10,550
(Btu/kWh, HHV)	10,420	10,664	10,876	11,183
Heat Input (MMBtu/hr, LHV)	1,759	1,670	1,610	1,536
(MMBtu/hr, HHV)	1,865	1,770	1,707	1,628
Relative Humidity (%)	60	60	60	50
Fuel heating value (Btu/lb, LHV)	18,387	18,387	18,387	18,387
(Btu/lb, HHV)	19,490	19,490	19,490	19,490
(HHV/LHV)	1.060	1.060	1.060	1.060
CT Exhaust Flow				
Mass Flow (lb/hr)- with no margin	4,946,000	4,757,000	4,619,000	4,426,000
- provided	NA	NA	NA	NA
Temperature (°F) - assumed	832	847	859	878
Moisture (% Vol.)	5.9	6.5	7.2	8.2
Oxygen (% Vol.)	14.30	14.20	14.20	14.00
Molecular Weight	28.78	28.71	28.58	28.46
Fuel Usage				
Fuel usage (lb/hr) = Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu (Fuel Heat Content, Btu/lb (LHV))				
Heat input (MMBtu/hr, LHV)	1,759	1,670	1,610	1,536
Heat content (Btu/lb, LHV)	18,387	18,387	18,387	18,387
Fuel usage (lb/hr)- calculated	95,665	90,825	87,562	83,537
HRSG Stack				
HRSG - Stack Height (ft)	149	149	149	149
Diameter (ft)	22	22	22	22
HRSG Stack Flow Conditions				
Velocity (ft/sec) = Volume flow (acfm) / [((diameter)² /4) x 3.14159] / 60 sec/min				
Mass flow (lb/hr)	4,946,000	4,757,000	4,619,000	4,426,000
HRSG Stack Temperature (°F)	271	274	276	278
Molecular weight	28.78	28.71	28.58	28.46
CT volume flow (acfm)	1,528,167	1,479,100	1,447,033	1,395,249
Diameter (ft)	22	22	22	22
Velocity (ft/sec)- calculated	67.0	64.9	63.4	61.2
Velocity (ft/sec)- provided	55	53	52	50

Note: Universal gas constant = 1,545 ft-lb(force)/°R; atmospheric pressure = 2,116.8 lb(force)/ft²; 14.7 lb/ft².

Source: MPS, 2005; CT Performance Data; Golder, 2005.

Table A-MPS-10. Maximum Emissions for Criteria Pollutants for the West County Energy Center Project
MPS 501G CT, Dry Low-NO_x Combustor, Distillate Oil, 75% Load

Parameter	Turbine Inlet Temperature			
	35 °F Case 32	59 °F Case 31	75 °F Case 30	95 °F Case 29
Particulate from CT and SCR				
Total PM_{10} = PM_{10} (front half) + PM_{10} ($(NH_4)_2SO_4$) from SCR only				
a. PM_{10} (front half) (lb/hr)				
CT- provided	36.0	35.0	34.0	32.0
b. PM_{10} ($(NH_4)_2SO_4$) from SCR only = Sulfur trioxide from conversion of SO_2 converts to ammonium sulfate (= PM_{10})				
Particulate from conversion of SO_2 = SO_2 emissions (lb/hr) x conversion of SO_2 to SO_3 x lb SO_3/lb SO_2 x conversion of SO_3 to $(NH_4)_2SO_4$ x lb $(NH_4)_2SO_4$/ lb SO_3				
SO_2 emission rate (lb/hr)- calculated	2.9	2.7	2.6	2.5
Conversion (%) from SO_2 to SO_3	9.8	9.8	9.8	9.8
MW SO_3/ SO_2 (80/64)	1.3	1.3	1.3	1.3
Conversion (%) from SO_3 to $(NH_4)_2(SO_4)$	100	100	100	100
MW $(NH_4)_2SO_4$/ SO_3 (132/80)	1.7	1.7	1.7	1.7
SCR Particulate (lb/hr)- calculated	0.58	0.55	0.53	0.51
CT emission rate (lb/hr) [a]	36.0	35.0	34.0	32.0
Total HRSG stack emission rate (lb/hr) [a + b]	36.6	35.6	34.5	32.5
(lb/mmBtu, HHV)	NA	NA	NA	NA
Total CT emission rate (lb/hr) provided	37.0	36.0	34.0	33.0
Sulfur Dioxide				
SO_2 (lb/hr)= Fuel oil (lb/hr) x sulfur content(% weight) x (lb SO_2 /lb S) /100				
Fuel oil Sulfur Content	0.0015%	0.0015%	0.0015%	0.0015%
Fuel oil use (lb/hr)	95,665	90,825	87,562	83,537
lb SO2 / lb S (64/32)	2	2	2	2
HRSG Stack emission rate (lb/hr)- calculated	2.9	2.7	2.6	2.5
HRSG Stack emission rate (lb/hr)- provided	2.8	2.7	2.6	2.5
Nitrogen Oxides				
NOx (lb/hr) = NOx (ppmvd@ 15% O_2) x {[20.9 x (1-Moisture (%)/100] - Oxygen, dry(%)} x 2116.8 lb/ft^2 x Volume flow (acfm) x 46 (mole. wgt NOx) x 60 min/hr / [1545 x (CT temp.(°F) + 460) x (20.9-15) x 1,000,000 (adj. for ppm)]				
CT/DB, ppmvd @15% O_2	42	42	42	42
Moisture (%)	5.9	6.5	7.2	8.2
Oxygen (%)	14.30	14.20	14.20	14.00
Turbine Flow (acfm)	2,701,316	2,634,484	2,593,256	2,531,312
Turbine Exhaust Temperature (°F)	832	847	859	878
CT emission rate (lb/hr)	302.1	289.8	275.0	264.1
CT emission rate (lb/hr)(provided)	304.0	294.0	283.0	270.0
HRSG Stack, ppmvd @ 15% O_2	10	10	10.0	10.0
HRSG Stack emission rate (lb/hr)- calculated	72.4	70.0	67.4	64.3
HRSG Stack emission rate (lb/hr)- provided	85.0	80.0	77.0	73.0
Carbon Monoxide				
CO (lb/hr) = CO(ppm) x [1 - Moisture(%)/100] x 2116.8 lb/ft^2 x Volume flow (acfm) x 28 (mole. wgt CO) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]				
Basis, ppmvw	48.33	48.41	47.44	47.88
Basis, ppmvd @ 15% O2 - provided	50	50	50	50
Moisture (%)	5.9	6.5	7.2	8.2
Turbine Flow (acfm)	2,701,316	2,634,484	2,593,256	2,531,312
Turbine Exhaust Temperature (°F)	832	847	859	878
HRSG Exhaust Temperature (°F)	271	274	276	278
HRSG Stack emission rate (lb/hr)	218.9	210.0	199.2	191.4
HRSG Stack emission rate (lb/hr)- provided	219.0	210.0	201.0	192.0

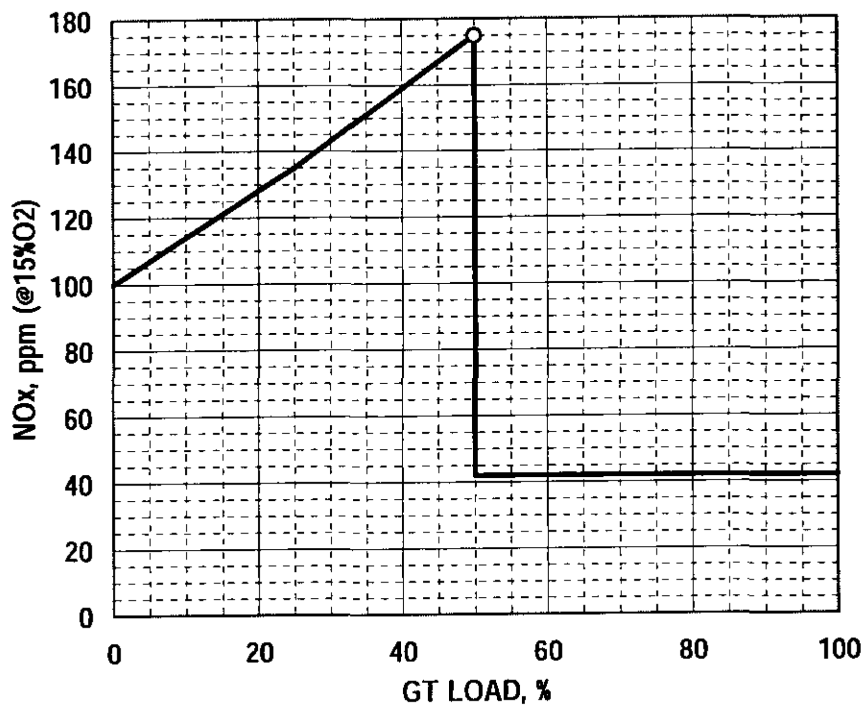
Attachment 3

West County Energy Center

NOx and CO Emission Curves and Tables

EXPECTED NOx EMISSION vs GT LOAD

GT MODEL	:M501G1
TYPE OF COMBUSTOR	:Dry Low NOx
TYPE OF FUEL	:FUEL OIL as per Mitsubishi Liquid Fuel Specification (E00-02646 R0)
NOx CONTROL	:Water Injection



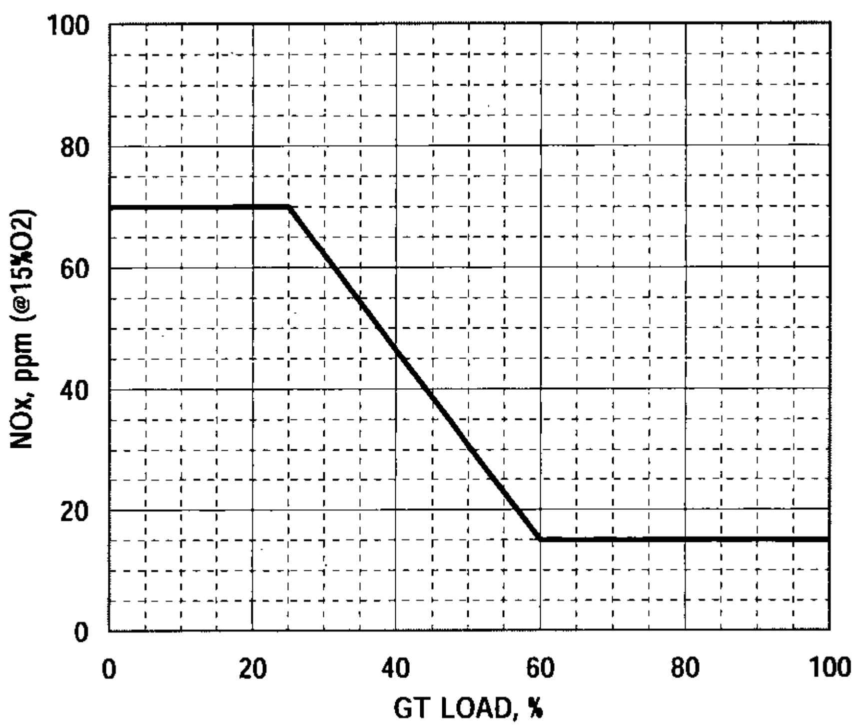
GT LOAD	%	0	5	10	15	20	25	30	35	40	45	50
NOx	ppm,15%O2	100	107	114	121	128	135	143	151	159	167	175

GT LOAD	%	50	55	60	65	70	75	80	85	90	95	100
NOx	ppm,15%O2	42	42	42	42	42	42	42	42	42	42	42

REMARKS :Values given are based on 0.015wt% of Fuel Bound Nitrogen in the Fuel

EXPECTED NOx EMISSION vs GT LOAD

GT MODEL : M501G1
TYPE OF COMBUSTOR : Dry Low NOx
TYPE OF FUEL : NATURAL GAS as per Mitsubishi Gas Fuel Specification (E00-01170 R5)



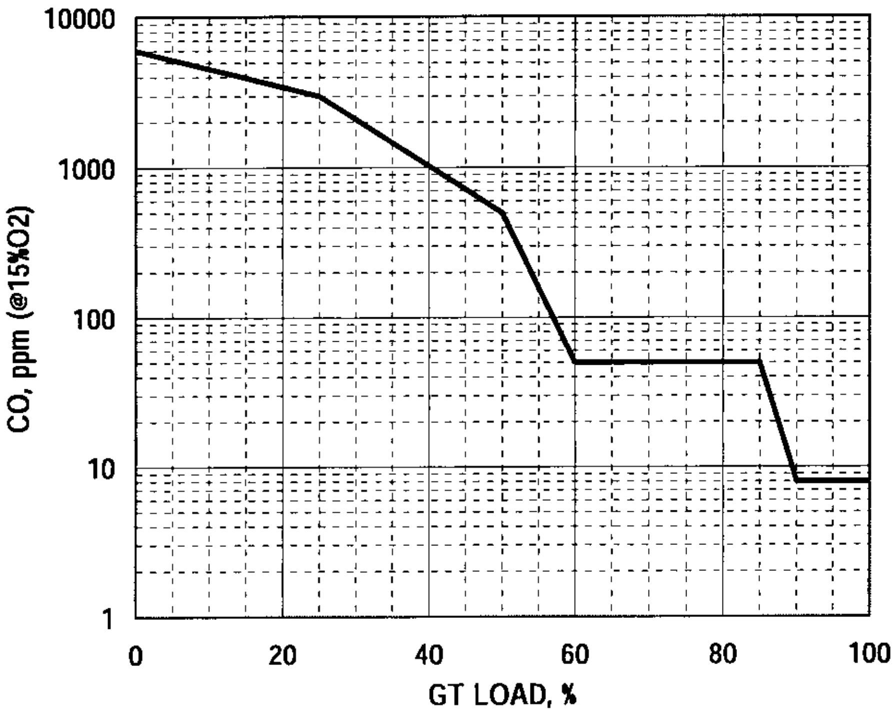
GT LOAD	%	0	5	10	15	20	25	30	35	40	45
NOx	ppm,15%O2	70	70	70	70	70	70	62.2	54.3	46.5	38.6

GT LOAD	%	50	55	60	65	70	75	80	85	90	95	100
NOx	ppm,15%O2	30.8	22.9	15	15	15	15	15	15	15	15	15

REMARKS : Values given are based on no Fuel Bound Nitrogen in the Fuel

EXPECTED CO EMISSION vs GT LOAD

GT MODEL : M501G1
TYPE OF COMBUSTOR : Dry Low NOx
TYPE OF FUEL : FUEL OIL as per Mitsubishi Liquid Fuel Specification (E00-02646 R0)
NOx CONTROL : Water Injection

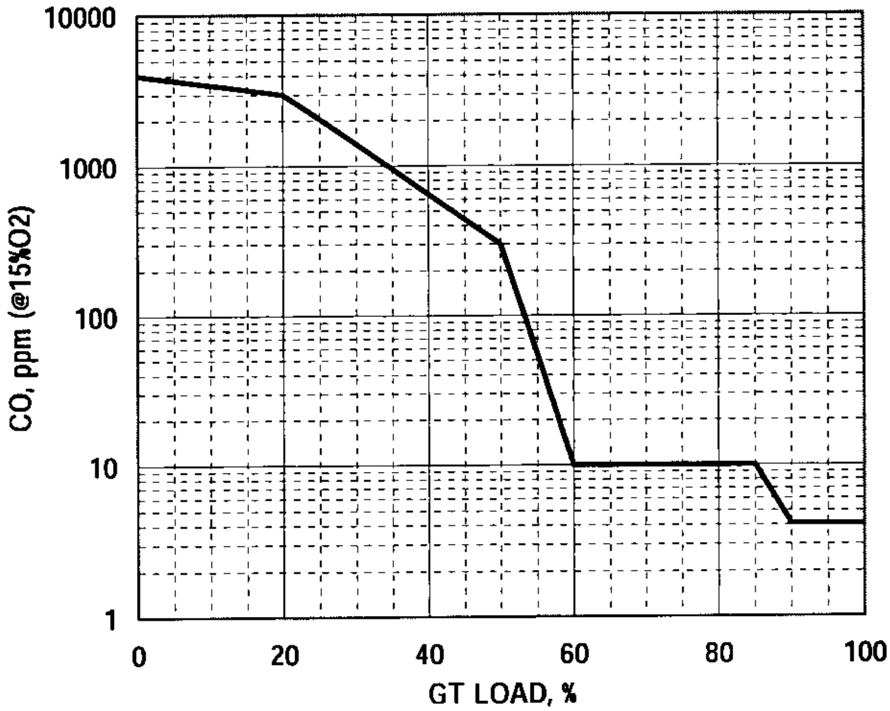


GT LOAD	%	0	5	10	15	20	25	30	35	40	45
CO	ppm,15%O2	6000	5224	4548	3959	3447	3000	2097	1466	1024	716

GT LOAD	%	50	55	60	65	70	75	80	85	90	95	100
CO	ppm,15%O2	500	159	50	50	50	50	50	50	8	8	8

EXPECTED CO EMISSION vs GT LOAD

GT MODEL	:M501G1
TYPE OF COMBUSTOR	:Dry Low NOx
TYPE OF FUEL	:NATURAL GAS as per Mitsubishi Gas Fuel Specification (E00-01170 R5)



GT LOAD	%	0	5	10	15	20	25	30	35	40	45
CO	ppm,15%O2	4000	3723	3465	3224	3000	2044	1393	949	647	441

GT LOAD	%	50	55	60	65	70	75	80	85	90	95	100
CO	ppm,15%O2	300	54.8	10	10	10	10	10	10	4.1	4.1	4.1

Attachment 4

West County Energy Center

Comparison of WCEC to other Projects

(Tables 1a, 1b, 2a through 2c)

Table 1a. Comparison of the NOx Emissions for WCEC, TCEC, HPB4 and TP5 Projects

	WCEC	TCEC	HPB4	TP5
Turbine Inlet Temperature:	75 °F	73 °F	75 °F	75 °F
NOx Limit (ppmvd at 15% oxygen) - unfired	2.5	2	2.5	2
NOx Limit (ppmvd at 15% oxygen) - fired	2.5	2	NA	2
NOx Control Efficiency-Unfired	83.33%	77.72%	72.25%	77.80%
NOx Control Efficiency-Fired	84.91%	83.63%		80.87%
Overall Net Heat Rate (Btu/kWhr) - unfired	6,483	6,900	6,830	6,760
Overall Net Heat Rate (Btu/kWhr) - fired	6,644	7,350	NA	6,903
Difference from WCEC in Heat Rate-Unfired		6.43%	5.35%	4.27%
Difference from WCEC in Heat Rate-Fired		10.63%		3.90%
Equivalent NOx Limit based on Efficiency-fired	2.5	2.17	2.60	2.06
Equivalent NOx Limit based on Efficiency-unfired	2.5	2.28	NA	2.10

Note: See Tables 2a through 2c for detailed information.

Table 1b. Comparison of the CO Emissions for WCEC, TCEC, HPB4 and TP5 Projects

	WCEC	TCEC	HPB4	TP5
Turbine Inlet Temperature:	75 °F	73 °F	75 °F	75 °F
CO Limit (ppmvd at 15% oxygen) - unfired	4.1	4.1	8	4.1
CO Limit (ppmvd at 15% oxygen) - fired	7.6	7.6		7.6
CO Emissions (lb/MW-hr) - unfired	0.059	0.062	0.119	0.061
CO Emissions (lb/MW-hr) - fired	0.108	0.122	NA	0.113
Difference from WCEC (lb/MW-hr) - Unfired		5.86%	103.77%	3.36%
Difference from WCEC (lb/MW-hr) - Fired		13.22%		4.51%
Overall Net Heat Rate (Btu/kWhr) - unfired	6,483	6,900	6,830	6,760
Overall Net Heat Rate (Btu/kWhr) - fired	6,644	7,350	NA	6,903
Difference from WCEC in Heat Rate-Unfired		6.43%	5.35%	4.27%
Difference from WCEC in Heat Rate-Fired		10.63%		3.90%

Note: See Tables 2a through 2c for detailed information.

Table 2a. Comparison of WCEC and TCEC Projects

Parameter	TCEC	WCEC	Difference	Data Source	
Turbine Inlet Temperature:	73 °F	75 °F	from WCEC	TCEC	WCEC
CTG Heat Input (MMBtu/hr-HHV)	1,722.50	7,641.50		Application Appendix B	Gate Cycle
Heat Rate (Btu/kWhr-HHV)	10,516	9,911		Application Appendix B	Gate Cycle
CTG Power (MW) Gross	163.79802	771		Application Appendix B	Gate Cycle
HRSG Duct Firing (MMBtu/hr-HHV)	545.4	799.2		Application Appendix B	Gate Cycle
STG Power (MW) unfired	92.40	430.1		Gate Cycle Estimate	Gate Cycle
STG Power (MW) fired	153.80	523.1		Gate Cycle Estimate	Gate Cycle
Total Power (MW) - unfired	256.20	1201.10		CTG plus STG	Gate Cycle
Total Power (MW) - fired	317.60	1294.10		CTG plus STG	Gate Cycle
Overall Net Heat Rate (Btu/kWhr) - unfired	6,900.0	6,483.0	6.43%	Gate Cycle Estimate	Gate Cycle
Overall Net Heat Rate (Btu/kWhr) - fired	7,350.0	6,644.0	10.63%	Gate Cycle Estimate	Gate Cycle
PER CT:					
CO Limit (ppmvd at 15% oxygen) - unfired	4.1	4.1		Proposed FDEP Permit Limits	FPL Proposed Permit Limits
CO Limit (ppmvd at 15% oxygen) - fired	7.6	7.6		Proposed FDEP Permit Limits	FPL Proposed Permit Limits
CO Emissions (lb/hr) - unfired	15.47	23		Application Appendix B	MPS Performance Data
CO Emissions (lb/hr) - fired	37.70	45.7		Application Appendix B	MPS Performance Data
CO Emissions (lb/MMBtu) - unfired	0.009	0.009			
CO Emissions (lb/MMBtu) - fired	0.017	0.016			
CO Emissions (lb/MW-hr) - unfired	0.062	0.059	5.86%	Emissions/Generation	Emissions/Generation
CO Emissions (lb/MW-hr) - fired	0.122	0.108	13.22%	Emissions/Generation	Emissions/Generation
Equivalent CO Limit based on Efficiency-fired	4.340				
Equivalent CO Limit based on Efficiency-unfired	8.604				
PER CT:					
NOx Limit (ppmvd at 15% oxygen) - unfired	2	2.5	20.00%	Proposed FDEP Permit Limits	FPL Proposed Permit Limits
NOx Limit (ppmvd at 15% oxygen) - fired	2	2.5	20.00%	Proposed FDEP Permit Limits	FPL Proposed Permit Limits
NOx Emissions (lb/hr) - unfired	12.70	23		Application Appendix B	MPS Performance Data
NOx Emissions (lb/hr) - fired	16.50	24.8		Application Appendix B	MPS Performance Data
NOx Emissions (lb/MMBtu) - unfired	0.0074	0.0090296			
NOx Emissions (lb/MMBtu) - fired	0.0073	0.0088144			
NOx Emissions (lb/MW-hr) - unfired	0.051	0.059	-13.09%	Emissions/Generation	Emissions/Generation
NOx Emissions (lb/MW-hr) - fired	0.053	0.059	-8.69%	Emissions/Generation	Emissions/Generation
Equivalent NOx Limit based on Efficiency-fired	2.173				Corrected for lb/MW-hr
Equivalent NOx Limit based on Efficiency-unfired	2.283				Corrected for lb/MW-hr
PER CT:					
Uncontrolled:					
NOx Emissions (lb/hr) - unfired	57	138		Application Appendix B	MPS Performance Data
NOx Emissions (lb/hr) - fired	100.8	164.3		Application Appendix B	MPS Performance Data
NOx Control - unfired	77.72%	83.33%		Calculated	Calculated
NOx Control - fired	83.63%	84.91%		Calculated	Calculated

Note: Gate Cycle is a propriety program to determine performance. Heat rates based on new and clean condition.

Table 2b. Comparison of WCEC and Turkey Point Unit 5 (TP5) Projects

Parameter	TP5	WCEC	Difference	Data Source	
Turbine Inlet Temperature:	75 °F	75 °F	from WCEC	TP5	WCEC
CTG Heat Input (MMBtu/hr-HHV)	7,016.00	7,641.50		Gate Cycle	Gate Cycle
Heat Rate (Btu/kWhr-HHV)	10,276	9,911		Gate Cycle	Gate Cycle
CTG Power (MW) Gross	682.75594	771		Gate Cycle	Gate Cycle
HRSG Duct Firing (MMBtu/hr-HHV)	842.8	799.2		Gate Cycle	Gate Cycle
STG Power (MW) unfired	383.75	430.1		Gate Cycle	Gate Cycle
STG Power (MW) fired	485.93	523.1		Gate Cycle	Gate Cycle
Total Power (MW) - unfired	1066.51	1201.10		Gate Cycle	Gate Cycle
Total Power (MW) - fired	1168.69	1294.10		Gate Cycle	Gate Cycle
Overall Net Heat Rate (Btu/kWhr) - unfired	6,760.0	6,483.0	4.27%	Gate Cycle	Gate Cycle
Overall Net Heat Rate (Btu/kWhr) - fired	6,903.0	6,644.0	3.90%	Gate Cycle	Gate Cycle
PER CT:					
CO Limit (ppmvd at 15% oxygen) - unfired	4.1	4.1		Permit Limits	FPL Proposed Permit Limits
CO Limit (ppmvd at 15% oxygen) - fired	7.6	7.6		Permit Limits	FPL Proposed Permit Limits
CO Emissions (lb/hr) - unfired	15.70	23		Application Appendix A-updated	MPS Performance Data
CO Emissions (lb/hr) - fired	32.10	45.7		Application Appendix A-updated	MPS Performance Data
CO Emissions (lb/MMBtu) - unfired	0.009	0.009			
CO Emissions (lb/MMBtu) - fired	0.016	0.016			
CO Emissions (lb/MW-hr) - unfired	0.061	0.059	3.36%	Emissions/Generation	Emissions/Generation
CO Emissions (lb/MW-hr) - fired	0.113	0.108	4.51%	Emissions/Generation	Emissions/Generation
Equivalent CO Limit based on Efficiency-fired	4.238				
Equivalent CO Limit based on Efficiency-unfired	7.943				
PER CT:					
NOx Limit (ppmvd at 15% oxygen) - unfired	2	2.5	20.00%	Permit Limits	FPL Proposed Permit Limits
NOx Limit (ppmvd at 15% oxygen) - fired	2	2.5	20.00%	Permit Limits	FPL Proposed Permit Limits
NOx Emissions (lb/hr) - unfired	12.50	23		Application Appendix A-updated	MPS Performance Data
NOx Emissions (lb/hr) - fired	14.00	24.8		Application Appendix A-updated	MPS Performance Data
NOx Emissions (lb/MMBtu) - unfired	0.0071	0.0090296			
NOx Emissions (lb/MMBtu) - fired	0.0071	0.0088144			
NOx Emissions (lb/MW-hr) - unfired	0.048	0.059	-17.70%	Emissions/Generation	Emissions/Generation
NOx Emissions (lb/MW-hr) - fired	0.049	0.059	-16.01%	Emissions/Generation	Emissions/Generation
Equivalent CO Limit based on Efficiency-fired	2.057				Corrected for lb/MW-hr
Equivalent CO Limit based on Efficiency-unfired	2.100				Corrected for lb/MW-hr
PER CT:					
Uncontrolled:					
NOx Emissions (lb/hr) - unfired	56.3	138		Application Appendix B	MPS Performance Data
NOx Emissions (lb/hr) - fired	73.2	164.3		Application Appendix B	MPS Performance Data
NOx Control - unfired	77.80%	83.33%		Calculated	Calculated
NOx Control - fired	80.87%	84.91%		Calculated	Calculated

Note: Gate Cycle is a propriety program to determine performance. Heat rates based on new and clean condition.

Table 2c. Comparison of WCEC and Hines Power Block 4 (HPB4) Projects

Parameter	HPB4	WCEC	Difference	Data Source	
Turbine Inlet Temperature:	75 °F	75 °F	from WCEC	HPB4	WCEC
CTG Heat Input (MMBtu/hr-HHV)	3,508.00	7,641.50		Gate Cycle	Gate Cycle
Heat Rate (Btu/kWhr-HHV)	10,276	9,911		Gate Cycle	Gate Cycle
CTG Power (MW) Gross	341.37797	771		Gate Cycle	Gate Cycle
HRSG Duct Firing (MMBtu/hr-HHV)	NA	799.2			Gate Cycle
STG Power (MW) unfired	191.88	430.1		Gate Cycle	Gate Cycle
STG Power (MW) fired	NA	523.1			Gate Cycle
Total Power (MW) - unfired	533.25	1201.10		Gate Cycle	Gate Cycle
Total Power (MW) - fired	NA	1294.10			Gate Cycle
Overall Net Heat Rate (Btu/kWhr) - unfired	6,830.0	6,483.0	5.35%	Estimated	Gate Cycle
Overall Net Heat Rate (Btu/kWhr) - fired	NA	6,644.0			Gate Cycle
PER CT:					
CO Limit (ppmvd at 15% oxygen) - unfired	8	4.1		Final Permit Limits	FPL Proposed Permit Limits
CO Limit (ppmvd at 15% oxygen) - fired	NA	7.6		Final Permit Limits	FPL Proposed Permit Limits
CO Emissions (lb/hr) - unfired	30.63	23		Application	MPS Performance Data
CO Emissions (lb/hr) - fired	NA	45.7			MPS Performance Data
CO Emissions (lb/MMBtu) - unfired	0.017	0.009			
CO Emissions (lb/MMBtu) - fired	NA	0.016			
CO Emissions (lb/MW-hr) - unfired	0.119	0.059	103.77%	Emissions/Generation	Emissions/Generation
CO Emissions (lb/MW-hr) - fired	NA	0.108		Emissions/Generation	Emissions/Generation
Equivalent CO Limit based on Efficiency-fired	3.892				
Equivalent CO Limit based on Efficiency-unfired	NA				
PER CT:					
NOx Limit (ppmvd at 15% oxygen) - unfired	2.5	2.5	0.00%	Final Permit Limits	FPL Proposed Permit Limits
NOx Limit (ppmvd at 15% oxygen) - fired	NA	2.5		Permit Limits	FPL Proposed Permit Limits
NOx Emissions (lb/hr) - unfired	15.63	23		Application	MPS Performance Data
NOx Emissions (lb/hr) - fired	NA	24.8			MPS Performance Data
NOx Emissions (lb/MMBtu) - unfired	0.0089	0.0090296			
NOx Emissions (lb/MMBtu) - fired	NA	0.0088144			
NOx Emissions (lb/MW-hr) - unfired	0.061	0.059	3.94%	Emissions/Generation	Emissions/Generation
NOx Emissions (lb/MW-hr) - fired	NA	0.059			Emissions/Generation
Equivalent CO Limit based on Efficiency-fired	2.598				Corrected for lb/MW-hr
Equivalent CO Limit based on Efficiency-unfired	NA				Corrected for lb/MW-hr
PER CT:					
Uncontrolled:					
NOx Emissions (lb/hr) - unfired	56.3	138		Application	MPS Performance Data
NOx Emissions (lb/hr) - fired	NA	164.3			MPS Performance Data
NOx Control - unfired	72.25%	83.33%		Calculated	Calculated
NOx Control - fired	NA	84.91%			Calculated

Note: Gate Cycle is a propriety program to determine performance. Heat rates based on new and clean condition.

Attachment 5

West County Energy Center

Ecology Information

West County Energy Center
Site Certification Application
April 14, 2005

Volume 1, Chapter 2
Section 2.3.6 Ecology

2.3.6 ECOLOGY

2.3.6.1 Species-Environmental Relationships

The following subsections include descriptions of important flora and fauna within the Site and the surrounding vicinity. This discussion includes information related to the abundance of important species found and the value of the habitats present. Representative photographs of vegetative communities within the Site and vicinity are found in Appendix 10.5.1.

Terrestrial Ecology Systems—Flora

The following descriptions of the flora and fauna at or near the site follow the FLUCFCS-Level III codes.

Open Land (FLUCFCS Code 190)

The entire Site has been cleared of vegetation during historical agricultural and mining activities, graded, and filled to an elevation of approximately 23 ft NGVD with clean shelly sand fill (Appendix 10.5.1 – Photographs 1 and 2). No vegetative communities have become established on the cleared Site. Almost the entire Site is classified as Open Land.

Vegetative Communities Adjacent to the Site

Outside of the Site, the surrounding vicinity includes improved pasture (FLUCFCS Code 211), the existing FPL Corbett Substation (FLUCFCS Code 831), canals (FLUCFCS Code 510), ditches (FLUCFCS Code 511), Brazilian pepper (FLUCFCS Code 422), and herbaceous wetlands (FLUCFCS Code 641). Dominant species and quality of each vegetative community/land use type are described below. Beyond the immediate vicinity of the Project, the dominant land use is agriculture, specifically sugar cane.

Improved Pasture (FLUCFCS 211)

Improved pasture is located to the west of the Site, within the transmission line right-of-way (ROW) (Appendix 10.5.1, Photograph 3). Portions of the pasture are actively utilized for cattle grazing. The vegetation is dominated by bahia grass (*Paspalum notatum*), Bermuda grass (*Cynodon dactylon*), with occasional Brazilian pepper (*Schinus terebinthifolius*) and agricultural weeds, including ragweed (*Ambrosia artemisiifolia*) and shrubby false buttonweed (*Spermacoce verticillata*).

Canals (FLUCFCS 510)

The SFWMD L-10/L-12 canal is located immediately south of State Road 80 (Appendix 10.5.1, Photograph 4). Vegetation along the banks of the canal include cabbage palm (*Sabal palmetto*), Brazilian pepper, elderberry (*Sambucus canadensis*), torpedo grass (*Panicum repens*), and common reed (*Phragmites australis*).

Ditches (FLUCFCS 511)

Man-made drainage ditches are found on the western boundary of the filled Site (Appendix 10.5.1, Photograph 5) and within the cattle pasture located within the transmission line ROW west of the substation access road (Appendix 10.5.1, Photograph 6).

Vegetation occurring in these areas include Brazilian pepper, leather fern (*Acrostichum danaeifolium*), sedges (*Cyperus* spp.), common reed, elderberry, cabbage palm, maidenhair sedge (*Eleocharis* sp.), paragrass (*Urochloa mutica*), primrose willow (*Ludwigia peruviana* and *L. octovalvis*), and maidencane (*Panicum hemitomon*).

Brazilian Pepper (FLUCFCS 422)

The disturbed area between the filled Site and the FPL Corbett Substation access road contains the exotic invasive species Brazilian pepper (Appendix 10.5.1, Photograph 7), as well as a variety of weedy species including ragweed, shrubby false buttonweed, dogfennel (*Eupatorium capillifolium*), groundsel tree (*Baccharis halimifolia*), sandmat (*Chamaesyce* sp.), Juba's bush (*Iresine diffusa*), and beggarticks (*Bidens alba*).

Herbaceous Wetland (FLUCFCS 641)

Disturbed, low-quality herbaceous wetland areas are found between the filled Site and the FPL Corbett Substation access road (Appendix 10.5.1, Photograph 8). Although no standing water was present and soils are disturbed, these areas support wetland vegetation dominated by common reed, elderberry, maidencane, and primrose willow, with subdominant species including cattail (*Typha latifolia*), leather fern, Brazilian pepper, climbing hempvine (*Mikania scandens*), and bushy bluestem (*Andropogon glomeratus*).

Electrical Utilities (FLKUCFCS 831)

The existing FPL Corbett Substation is located north of the Site and includes transformers and switch gear for the 230- and 500-kV transmission systems.

Terrestrial Ecology Systems—Fauna

The wildlife habitat within the Site has been severely altered by past agricultural, mining excavation and filling activities. Vegetation within the Site has been cleared and the entire Site covered with fill material to an elevation of approximately 23 ft and about 15 ft above the surrounding vicinity, which does not provide suitable habitat for wildlife. Vegetative communities in the vicinity of the Site are also disturbed and do not provide quality wildlife habitat. Species observed within the vicinity of the Site are described below.

Common avian species were observed within the improved pasture and Brazilian pepper area west of the Site. These include cattle egret, eastern meadowlark (*Sturnella magna*), killdeer (*Charadrius vociferous*), yellow-rumped warbler (*Dendroica coronata*), and mourning dove (*Zenaida macroura*). Ditches associated with the improved pasture area, while containing no canopy component, still do provide foraging areas for wading birds. Species observed on the banks of these man-made ditches include little blue heron (*Egretta caerulea*) and great blue heron (*Ardea herodias*). Although not observed during the field reconnaissance, it is expected that the L10/L12 Canal is utilized by wading birds for foraging and also provides habitat for the American alligator (*Alligator mississippiensis*).

Threatened and Endangered Species—Flora and Fauna

Plant and animal species designated by the U.S. Fish and Wildlife Service (USFWS), the Florida Fish and Wildlife Conservation Commission (FWCC), and the Florida Department of Agriculture and Consumer Services (FDACS) as endangered, threatened, species of special concern, commercially exploited, or under review, were included in this category.

No threatened or endangered species were observed or are expected to utilize the cleared and filled Site. A number of wetland dependent animal species (e.g., wading birds) have the potential to use the drainage ditches and canals in the vicinity of the Site for resting and feeding. These species are common to the area and use other similar habitats that are found throughout the surrounding region.

Threatened and Endangered Species—Methodology

Prior to the field surveys, literature and agency surveys were undertaken to determine the species that could potentially be present in the habitats found on the Site. Primary sources of information are the Florida Natural Areas Inventory (FNAI) database (1997); Florida Committee on Rare and Endangered Plants and Animals (FCREPA) reports; Preservation of Native Flora of Florida Law, Rule Chapter 5B-40, F.A.C.; the Regulated Plant Index (5B-40.0055); and Notes on Florida's Endangered and Threatened Plants, FDACS, Division of Plant Industry, Bureau of Entomology, Nematology and Plant Pathology - Botany Section, Contribution No. 38, Addition 2, Gainesville. In addition, previous reports of surveys conducted in and near the Site were reviewed.

Plant and Animal Surveys

Because of the rareness and seasonality of threatened and endangered species, either multiseason surveys or an evaluation of threatened and endangered species habitat conditions are necessary to determine their presence or absence on the Site. For this study, an evaluation of the habitat conditions was used to determine the presence or absence of threatened and endangered species. Based on the literature review, federally and state listed species whose ranges include the Site were identified.

Flora—Threatened, endangered, and/or plant species of special concern that occur within Palm Beach County are listed in Table 2.3.6-1. Due to the impacted nature of the Site, no suitable habitat for listed plant species exists within the Site. The FNAI database review did not result in any occurrences of listed plant species in the vicinity of the Site.

Fauna—Threatened, endangered, and/or animal species of special concern that occur within Palm Beach County are listed in Table 2.3.6-1. No unique habitats for threatened and endangered species occur on the Site. The surrounding improved pasture and associated ditches provide low-quality, but suitable habitat for wading birds, including the little blue heron, which is not listed federally by the USFWS but is classified as a species of special concern by the FFWCC. In addition to the little blue heron, it is likely that other wading birds classified by the State as species of special concern may occasionally utilize the pasture ditches and canal to forage, including the white ibis (*Eudocimus alba*), snowy egret (*Egretta thula*), and tricolor heron (*Egretta tricolor*). The L10/L12 Canal provides suitable habitat for the American alligator, classified by the FFWCC as a species of special concern and classified as threatened by the USFWS due to similarity in appearance with the federally endangered American crocodile (*Crocodylus acutus*).

The FNAI database review did not result in any occurrences of listed animal species at the Site. However, several documented occurrences of listed species were noted in the vicinity of the Site. The closest documented occurrence of listed species according to the FNAI database is approximately 3 miles to the west on the north side of State Road 80, where a colony of wading birds was identified by the FFWCC Breeding Bird Atlas Project during 1986-1991. The Project will not adversely impact any listed species in the vicinity of the Site.

2.3.6.2 Pre-Existing Stresses

Terrestrial Systems

The greatest pre-existing stress to terrestrial systems of the Site and surrounding area is the result of past agricultural and mining activities. The natural topography, soils, and hydrology of the Site are extensively altered as a result of the addition of fill material and topographic grading. The natural ecosystems and wildlife habitat previously located at the Site have been lost, and natural drainage features have been modified.

Aquatic Systems

Aquatic systems in the vicinity of the Site are subjected to stress from numerous sources. Pre-existing stresses include:

1. Channelization and dredging,
2. Water management practices for the L10/L12 Canal,
3. Agricultural development,
4. Mining, and
5. Highway construction and operation.

Historical agricultural and mining activities in the area have resulted in the loss of wetlands through ditching and dewatering.

2.3.6.3 <u>Measurement Programs</u>

Terrestrial Ecology

Terrestrial ecological resources were evaluated through Site reconnaissance, agency review, previous studies, and literature searches. Vegetative communities, wildlife utilization, and potential for threatened and endangered wildlife occurrence were addressed during the Site reconnaissance conducted in 2004 and 2005.

<u>Threatened and Endangered Species–Methodology</u>

Prior to the field surveys, literature and agency surveys were undertaken to determine the species that could potentially be present in the habitats found on the Site. Primary sources of information are the FNAI database, FCREPA reports, Preservation of Native Flora of Florida Law, Rule Chapter 5B-40, F.A.C., the Regulated Plant Index (5B-40.0055), and Notes on Florida's Endangered and Threatened Plants, FDACS.

<u>Wetland Methodology</u>

Three agencies, USACE, FDEP, and SWFMD have rules that apply to wetlands. To be jurisdictional, a wetland must ascribe to three characteristics defined by rule: presence of vegetation listed as belonging in wetlands, having a certain defined hydrology, and the presence of hydric soils. The applicable characteristics for wetland determination as prescribed by the regulatory agencies were used.

Hopping Green & Sams

Attorneys and Counselors

December 2, 2005

Al Linero, Bureau of Air Regulation
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399

Re: Florida Power & Light Co.
West County Energy Center
Application for PSD Permit, PSD FPL-FL-354
Application for Site Certification PA-05-47

Dear Mr. Linero:

By letter dated November 9, 2005, Florida Power & Light Co. (FPL), the applicant, waived the deadline for the Department to issue its preliminary determination on the referenced application until December 14, 2005. Representatives of FPL subsequently met with staff of the Department's Bureau of Air Regulation to discuss this matter. In order to allow the opportunity for FPL to submit additional information and for further discussion between staff of the Department's Bureau of Air Regulation and FPL representatives, FPL agrees to waive the deadline for issuance of the Department's preliminary determination under Section 403.507(3), Florida Statutes, and Rule 62-17.135(1)(b), Florida Administrative Code, until January 25, 2006.

The undersigned is authorized to make this waiver on behalf of the applicant. Should you have any questions, please contact me or Barbara Linkiewicz at 561-691-7518.

Sincerely,

Peter C. Cunningham
Attorney for Florida Power & Light Co.

cc: Scott Goorland, Esq., FDEP, OGC
Steve Palmer, FDEP, SCO

Hopping Green & Sams

Attorneys and Counselors

November 9, 2005

Al Linero, Bureau of Air Regulation
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399

Re: Florida Power & Light Co.
West County Energy Center
Application for PSD Permit, PSD FPL-FL-354
Application for Site Certification PA-05-47

Dear Mr. Linero:

Florida Power & Light Co. (FPL), the applicant, hereby waives the deadline for the Department to issue its preliminary determination on the referenced application under Section 403.507(3), Florida Statutes, and Rule 62-17.135(1)(b), Florida Administrative Code. In order to allow the opportunity for further discussion between staff of the Department's Bureau of Air Regulation and FPL representatives, FPL agrees to waive the deadline for issuance of the Department's preliminary determination until December 14, 2005.

The undersigned is authorized to make this waiver on behalf of the applicant. Should you have any questions, please contact me or Barbara Linkiewicz at 561-691-7518.

Sincerely,

Peter C. Cunningham
Attorney for Florida Power & Light Co.

cc: Scott Goorland, Esq., FDEP, OGC
Steve Palmer, FDEP, SCO

Post Office Box 6526 Tallahassee, Florida 32314 123 South Calhoun Street (32301) 850.222.7500 850.224.8551 fax www.hgslaw.com