BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 070098-EI

In the Matter of:

PETITION FOR DETERMINATION OF NEED FOR GLADES POWER PARK UNITS 1 AND 2 ELECTRICAL POWER PLANTS IN GLADES COUNTY, BY FLORIDA POWER & LIGHT COMPANY.

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VOLUME 6

Pages 741 through 861 0

CLK note: The last page of this transcript is actually page 860. — Ann Cole 7/18/11

PROCEEDINGS: HEARING

BEFORE: CHAIRMAN LISA POLAK EDGAR
COMMISSIONER MATTHEW M. CARTER, II
COMMISSIONER KATRINA J. MCMURRIAN

DATE: Wednesday, April 25, 2007

TIME: Commenced at 9:45 a.m.

PLACE: Betty Easley Conference Center
Room 148
4075 Esplanade Way
Tallahassee, Florida

REPORTED BY: LINDA BOLES, RPR, CRR
JANE FAUROT, RPR
Official FPSC Reporters
(850) 413-6734/(850) 413-6732

APPEARANCES: (As heretofore noted.)

I N D E X

WITNESSES

EXHIBITS

P R O C E E D I N G S

(Transcript continues in sequence from Volume 5.)

CHAIRMAN EDGAR: Good morning. We will get started here in just a moment. And I will call this hearing to order, continuation of the hearing.

Before I ask for preliminary matters, I see that we do have some new faces that are joining us since, since we were all gathered together last week. It was last week. It seems like only yesterday. Okay. So let's go ahead, if we can, and start by taking appearances again. That will be a duplicate for some of you and maybe some new names so I can help keep track, and for the court reporter as well. We will begin with you.

MR. ANDERSON: Good morning. My name is Bryan Anderson. I'd like to enter the appearances, please, of Wade Litchfield, Natalie Smith and myself on behalf of Florida Power & Light Company, 700 Universe Boulevard, Juno Beach, Florida 33408.

CHAIRMAN EDGAR: Thank you.

MS. PERDUE: Tamela Ivey Perdue with the law firm of Stiles, Taylor & Grace on behalf of Intervenor Associated Industries of Florida.

CHAIRMAN EDGAR: Thank you.

MR. GUEST: David Guest and Monica Reimer, R-E-I-M-E-R, representing the environmental intervenors. Our law firm's address is 111 South Martin Luther King Boulevard, Tallahassee, 32301.

CHAIRMAN EDGAR: Thank you.

MR. BECK: Good morning, Madam Chairman and Commissioners. Charlie Beck and Steve Burgess, Office of Public Counsel, on behalf of Florida's citizens.

CHAIRMAN EDGAR: Thank you.

MR. KRASOWSKI: Good morning, Commissioners. My name is Bob Krasowski. I'm here representing myself and my wife Jan as ratepayers and customers of FP&L, and also as interested people who have an interest in the environmental economic aspect of this hearing.

CHAIRMAN EDGAR: Thank you. And staff.

MS. BRUBAKER: And for the Commission, Jennifer Brubaker, Katherine Fleming, Lorena Holley and Larry Harris.

CHAIRMAN EDGAR: Thank you all.

And, Ms. Brubaker, preliminary matters.

MS. BRUBAKER: Staff is aware of really none to speak of. I would note that there was discussion since the continuation of the last hearing date about witnesses, and my understanding is that everybody is in agreement that we will simply resume examination of witnesses in the order in which they appear on the prehearing order beginning on Page 4. By my count we would begin with Mr. Hicks this morning. It's also my understanding that FPL Witness Mr. Yeager can be taken, his rebuttal and direct together. And to the extent FPL is able to make that accommodation with any other witnesses, we'll simply let them address it as they're able to make that accommodation. And with that, staff --

CHAIRMAN EDGAR: No other matters?

MS. BRUBAKER: -- has no further matters.

CHAIRMAN EDGAR: Okay. Before we call the next witness, any matters to be raised by any of the parties? No? Ready to get started.

Okay. Just a very few brief comments. As you recall, because we have, because the hearing has covered a number of days and travel schedules and all we did not swear the witnesses in as a group. So if your witness has been sworn, let me know that, please. And remind your witnesses that they have been sworn. And for those who have not, we will do that individually as they get settled in.

And as always, would ask that we recognize the time frames that we have and that we cooperate together to get through everything that we need to do. And with that, it is your witness.

MR. ANDERSON: Thank you. If the Chair wishes, there are three witnesses you could swear at once, the next three people.

CHAIRMAN EDGAR: Okay. We can do that. And that would be Mr. Hicks, Mr. Jenkins and Mr. Kosky?

MR. ANDERSON: That's exactly right.

CHAIRMAN EDGAR: Okay. If the three of you gentlemen will stand with me, raise your right hand, and we will do this, the three, together.

(Witnesses collectively sworn.)

DAVID HICKS

was called as a witness on behalf of Florida Power & Light Company, and, having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. ANDERSON:

Q Good morning, Mr. Hicks.

A Good morning.

Q Would you please tell us your name and your business address.

A David Hicks, 700 Universe Boulevard, Juno Beach, Florida 33408.

Q By whom are you employed and in what capacity?

A I'm employed by Florida Power & Light as the Senior Director of Project Development.

Q Have you prepared and caused to be filed 28 pages of prefiled direct testimony in this proceeding?

A Yes, I have.

Q Did you also cause to be filed errata to your direct testimony on April 13th, 2007?

A Yes, I have.

Q Do you have any further changes or revisions to your prefiled direct testimony?

A No, I do not.

Q With the changes in your errata, if I asked you the same questions contained in your prefiled direct testimony, would your answers be the same?

A Yes, they would.

MR. ANDERSON: FPL asks that Mr. Hicks' prefiled direct testimony be inserted into the record as though read.

CHAIRMAN EDGAR: The prefiled direct testimony with the errata will be entered into the record as though read.

BY MR. ANDERSON:

Q Are you sponsoring any exhibits to your direct testimony?

A Yes, I am.

Q Those are documents DNH-1 through DNH-14?

A Yes, they are.

MR. ANDERSON: Madam Chairman, I'd note that Mr. Hicks' exhibits have been premarked for identification as 25 through 38.

CHAIRMAN EDGAR: Thank you.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

FLORIDA POWER & LIGHT COMPANY

DIRECT TESTIMONY OF DAVID N. HICKS

DOCKET NO. 07____-EI

JANUARY 29, 2007

Q. Please state your name and business address.

A. My name is David N. Hicks. My business address is Florida Power & Light, 700 Universe Boulevard, Juno Beach, Florida 33408.

Q. By whom are you employed and what is your position?

A. I am employed by Florida Power & Light Company ("FPL" or the "Company") as a Senior Director of Project Development. In my position at FPL, I have responsibility for the development of power generation projects to meet the needs of FPL's customers.

Q. Please describe your duties and responsibilities with regard to the development of solid fuel generation to meet FPL customer needs.

A. Commencing in the summer of 2003, I was assigned the responsibility for leading the investigation into the potential of adding new solid fuel generation to FPL's system, and the subsequent development of new solid fuel generation additions to FPL's power generation fleet. I was responsible for the development and permitting team for the Southwest St. Lucie Power Park ("SWLPP"). I am currently leading the development and permitting team for the FPL Glades Power Park ("FGPP").

Q. Please describe your education and professional experience.

A. I received a Bachelor of Economics degree from the University of Hawaii-Manoa in 1983 and a Masters of Economics degree from the University of California-Santa Barbara in 1987. I have over 18 years experience in the power generation industry, including power plant asset management, power plant development due diligence, power plant site development and permitting, and utility system modeling.

Q. Are you sponsoring an exhibit in this case?

A. Yes. I am sponsoring an exhibit that consists of the following documents:

Document No. DNH-1	FPL's Report on Clean Coal Generation, March 2005
Document No. DNH-2	Clean Coal Technology Selection Study
Document No. DNH-3	FGPP Development Milestones
Document No. DNH-4	FGPP Vicinity Map
Document No. DNH-5	FGPP Project Boundary Aerial
Document No. DNH-6	FGPP Process Diagram Overview
Document No. DNH-7	FGPP Process Diagram Coal Handling System
Document No. DNH-8	FGPP Process Diagram Limestone Handling System
Document No. DHN-9	FGPP Process Diagram Byproduct Handling System
Document No. DNH-10	FGPP Site Plan Overall

Document No. DNH-11	FGPP Site Plan Power Island
Document No. DNH-12	FGPP Site Plan Typical Elevations
Document No. DNH-13	FGPP Fact Sheet
Document No. DNH-14	FGPP Overall Water Balance

Q. What is the purpose of your testimony in this proceeding?

A. My testimony provides an overview of the technology and site selection processes used by FPL in arriving at its proposed generating plant contained in the Need Application submitted to the Florida Public Service Commission (the "FPSC" or "Commission") in this proceeding. My testimony describes the specific site and unit characteristics for the ultra-supercritical pulverized coal ("advanced technology coal" or "USCPC") plant proposed for the FGPP site, including the size, number and type of units, the heat rate and operating characteristics (i.e., equivalent availability factor, equivalent forced outage rate, capacity factor, and operating costs), emissions control equipment, and the fuel types that will be utilized in the plant.

Q. Please summarize your testimony.

A. Beginning in the summer of 2003, FPL conducted an extensive investigation of the potential of adding solid fuel generation to its resource mix. After a careful and thorough analysis of available technology options and fuel supply issues, and after conducting a comprehensive siting study, FPL concluded that the addition of a USCPC plant, augmented with a complete suite of state-of-the-art emissions control equipment, and plant design that will allow for the recycling of combustion and pollution control byproducts into useful commercial products, will provide FPL's customers reliable, cost-effective fuel diversity employing proven, state-of-the-art generation and pollution control technology.

I. OVERVIEW AND TECHNOLOGY SELECTION

Q. Please summarize FPL's actions since 2003 regarding the potential addition of solid fuel generation to FPL's generation resource portfolio.

A. FPL's actions since the summer of 2003 have been directed towards (1) analyzing the conditions under which the addition of solid fuel generation would be beneficial to FPL's customers, (2) refining the solid fuel addition strategy to enhance the benefits and reduce risks to its customers, and (3) implementing that addition as early as is reasonably possible.

FPL's substantive actions towards bringing solid fuel generation into its system include:

- FPL conducted and disseminated a comprehensive study on current opportunities and issues regarding solid fuel generation (***FPL's Report on Clean Coal Generation, March 2005***). This study was the result of over a year of engineering due diligence, commercial negotiation, and analytical review.
- A dedicated team was staffed to develop all necessary aspects of FPL's future advanced technology coal projects including: local approvals and

public outreach, environmental issues and concerns, and a considerable effort to obtain competitive rail transport and coal terminal agreements.

- FPL contracted with Sargent & Lundy to develop conceptual power plant designs.
- FPL contracted with Worley-Parsons to develop detailed design engineering plans.
- FPL has initiated procurement of major equipment, which includes the boilers, steam turbines and the pollution control equipment. In addition, FPL has secured engineering, procurement and construction pricing for FGPP.

Q. Please summarize FPL's primary conclusion regarding available solid fuel generation technologies.

A. After a careful evaluation of the current state of solid fuel generation technology design and air quality control systems, FPL concluded that significant improvements had been made in solid fuel generation, emissions control technologies, and plant design such that FPL had a number of technology options, all of which would provide fuel diversity while maintaining FPL's leadership position as an environmental steward by being protective of the environment.

Q. What technologies provided FPL options for new solid fuel generation additions?

A. The potential technologies included sub-critical pulverized coal ("SPC"), USCPC, circulating fluidized bed ("CFB"), and integrated gasification combined cycle ("IGCC"). A discussion of each of these technologies is included in ***FPL's Report on Clean Coal Generation, March 2005***, a copy of which is attached as Document No. DNH-1.

Q. Which technology did FPL ultimately select?

A. FPL selected USCPC, an advanced form of the supercritical technology.

Q. Please describe the evaluation process that led to the selection of the USCPC technology.

A. Initially, basic configurations were developed for each of the potential technologies for a target level of 1,200 to 1,700 MW of new solid fuel fossil generation. Each of the technologies was reviewed and the configurations developed in a scaled-up size consistent with commercial availability. For the USCPC steam generator technology, unit sizes selected were 600 and 850 MW, which were unit sizes already commercially available at the time of the initial analysis. In the case of less mature technologies, CFB and IGCC, unit sizes were configured to account for risk due to scale-up. In the case of the CFB technology, each unit was configured as a 2x300 MW boiler providing steam to a single steam turbine. The IGCC configuration was a unit with a 2-on-1 combined cycle configuration with an output of 600 MW.[1] For each of the alternatives, estimates were developed for unit output, heat rate,

[1] A combined cycle unit is a combination of combustion turbines (CTs), heat recovery steam generators (HRSGs), and a steam-driven turbine generator (STG). Each of the combustion turbines produce electricity. The exhaust gas produced by each turbine, is passed through a HRSG before exiting the stack. The energy extracted by the HRSG produces steam, which is used to drive a STG. Each CT/HRSG combination is called a "train." Therefore, a combined cycle plant with two trains and one steam turbine would be called a "two on one" (2x1) combined cycle plant.

availability, capital cost, fixed and variable O&M costs, capital replacement costs, and emissions rates. This information was provided to FPL's Resource Assessment and Planning Group, which conducted an economic evaluation analyzing each technology option over a multi-decade period. This long-term economic evaluation, combined with the engineering evaluation of the technologies, identified the USCPC technology as the best coal technology option.

Q. Since deciding on the use of USCPC technology, has FPL continued to study alternative coal technologies?

A. Yes. FPL has continued to closely monitor continuing developments across the country and around the world with respect to solid fuel technology. For example, as part of its efforts to test and verify that its analysis of alternative solid fuel technologies was correct and reasonable, in 2006 FPL retained the Black & Veatch engineering firm to work with the Company to prepare a detailed Clean Coal Technology Selection Study. The purpose of the study was to incorporate the most up-to-date information available in the industry concerning each technology into FPL's technology assessment. Accordingly, each technology scenario involved consideration of the advantages and disadvantages with respect to each technology for the addition of a nominal 2,000 MW of capacity. The study compared SPC, USCPC, CFB, and IGCC technologies for consideration to meet FPL's generation needs in the 2012 to 2014 timeframe. The study uses 2012 as the reference year for cost comparisons between the different technologies. I served as FPL's project lead for the study, and am a co-author of the study. A copy is attached as Document No. DNH-2.

In addition, FPL conducted its own economic analysis of these four coal technologies. Dr. Sim addresses this analysis in his testimony.

Q. Please summarize FPL's conclusions based on the study jointly conducted by FPL and Black & Veatch.

A. Based on the assumptions, conditions, and engineering estimates made in this study jointly conducted by FPL and Black & Veatch, FPL concluded that the USCPC option, by a large and significant margin, is the preferred technology selection for the addition of a nominal 2,000 MW net output at the FGPP site.

For example, the busbar cost of the USCPC case is nearly 10 percent less than SPC, which is the second lowest busbar cost case. USCPC will have good environmental performance because of its high efficiency. Emissions of NOx and PM will be very similar across all technologies. Sulfur emissions would be slightly lower for IGCC than the PC and CFB options, although start-up and shutdown flaring will reduce the potential benefit of IGCC. The lower expected reliability of IGCC, particularly in the first years of operation, could compromise FPL's ability to meet baseload generation requirements and require FPL to run existing units at higher capacity factors.

For the 2012 through 2014 planning time period, USCPC will be the best technical and economic choice for the installation of 2,000 MW of capacity at the Glades site.

Q. **IGCC technology, in particular, has garnered significant recent interest in the United States. Please describe FPL's efforts to ensure that it has obtained and relied on the most current and accurate industry information concerning this technology.**

A. FPL selected Black & Veatch, a global engineering and construction company, as the co-author of the joint study, in part due to its extensive experience with IGCC, in order to help ensure that FPL has access to the most current industry information in considering and supporting its technology choice for FGPP. FPL is aware of and valued that Black & Veatch is currently providing a wide range of IGCC and gasification engineering services to entities investigating its potential use. Black & Veatch is also a joint venture partner with Uhde, who has a technology agreement with Shell. The purpose of this joint venture is to market IGCC solutions to potential customers. The Clean Coal Technology Selection Study leveraged Black & Veatch's considerable knowledge and expertise in IGCC, and its recent experience in developing life cycle IGCC cost estimates for various customers. For similar reasons, FPL retained Stephen D. Jenkins of URS Corporation, who is an expert in and advocate for IGCC technology, to submit testimony in this proceeding in order to provide the Commission, and the public, with the most current and accurate information concerning IGCC technology.

Q. Please describe the IGCC process.

A. IGCC produces power by converting a solid fuel such as coal into a synthetic combustible gas which is burned in a combustion turbine that is part of a combined cycle power plant. The coal is placed in a gasifier vessel (or reactor) where it is partially combusted in a controlled environment. The combustion exhaust from the gasifier vessel is a combustible gas commonly referred to as "syngas." The syngas is then passed through a clean-up process where particulates, sulfur and other impurities are removed and then it is used as the fuel for a combustion turbine.

"Integration" refers to the interconnection of the gasification and combined cycle parts of the IGCC power plant. For example, heat produced in the gasifier is converted to steam which is routed to and mixed with steam produced in the combined cycle heat recovery system and then the combined steam product is used to drive the steam turbine which produces power. "Gasified" refers to the process whereby the coal is broken down into multiple constituent parts, one of which is the syngas that is used as a fuel to generate power. "Combined Cycle" refers to the process of combining a primary heat source with a heat recovery system to more efficiently use a fuel source to generate power.

Q. Why did FPL choose the USCPC technology over IGCC?

A. FPL determined that USCPC technology will materially outperform all available alternative coal electric generation technologies, including IGCC.

At the most basic level, USCPC technology is proven and reliable in large scale utility applications. In contrast, IGCC is not proven and reliable in large scale utility applications. This is demonstrated by the fact that there are only four operating coal-fired IGCC plants in the world, two of which are in the U.S. Unlike existing USCPC units, existing IGCC units are small (less than 300 MW), and are demonstration projects. USCPC units have been built commercially and have satisfied projections of cost, efficiency, reliability, and environmental performance. In contrast, existing IGCC units have not been built commercially, and despite the economic advantage of receiving substantial government funding have not met projections of cost, efficiency, reliability, and environmental performance. The "next generation" IGCC plants expected to be operational in the 2011-2015 period will be in the 600 MW range. None of the next generation IGCC units have been built; therefore such units have not been proven to be cost-effective, reliable, and to deliver acceptable environmental performance. For all of these reasons, both the current and next generation of IGCC plants are insufficient to meet the fuel diversity goals of FPL for its customers. These points are discussed in greater detail by Mr. Jenkins.

FPL specifically chose the USCPC technology over IGCC for an approximately 2,000 MW solid fuel addition at a new site that would be required to produce reliable, cost-effective baseload power for the following reasons:

(1) USCPC is more reliable than IGCC. USCPC technology has a proven performance record of 90% or greater reliability. In comparison, existing IGCC plants fueled by coal have been able to reach approximately 80% reliability, at best, after five to ten years of operation. In addition, the complexity of an IGCC plant, specifically the complex integration involved in an IGCC design, has limited its performance.

(2) The USCPC emissions profile is generally similar to IGCC, and the lower reliability of IGCC creates higher emissions from restarts and replacement power while the IGCC is restarting. The USCPC technology, coupled with an initial extensive array of pollution control equipment, will produce an emissions profile as good as, if not better than, that of the "next generation" IGCC plant. FPL's USCPC plant will achieve a 90% mercury removal rate, which is on par with "next generation" IGCC. USCPC plants can be built with a footprint allowing more advanced emissions control equipment when it becomes commercially viable.

(3) USCPC technology is more efficient than IGCC. USCPC technology is highly efficient, meaning substantially less coal is used to produce the

same amount of electricity with fewer emissions than older, conventional coal plants. USCPC is more efficient than existing and next generation IGCC plants (i.e. USCPC uses less coal to produce the same amount of electricity).

(4) Life cycle costs of the USCPC technology are substantially lower than those of IGCC technology. As demonstrated in the joint study, the lifecycle levelized delivered busbar cost of an IGCC plant is more than 40% higher than that for a similarly sized USCPC plant. Cost differences are even greater when comparing the "next generation" 600 MW IGCC reference plants being developed to the commercially available 980 MW USCPC sizing chosen by FPL.

II. SITE SELECTION

Q. Please describe FPL's work to obtain an acceptable site for its proposed coal-fueled units.

A. FPL performed an independent analysis of the local permitting requirements in the most likely candidate counties for development, conducted meetings with local leadership committees, and performed other information-gathering activities designed to ascertain the level of receptivity of those counties to the economic benefits associated with the construction and operation of an advanced technology coal-fired electric power plant.

The effort also included a comprehensive study of potential sites, based on the following six criteria:

(1) Rail access that would foster coal transportation competition at origin and destination for the delivery of domestic and foreign coal and petroleum coke;

(2) Adequate property to site a large coal-fired power plant, and required support facilities;

(3) Adequate water supplies;

(4) Location of property considering transmission proximity to FPL's major load centers;

(5) Location of property allowing feasible transmission interconnection and integration; and

(6) Site selection considering the goal of minimizing the environmental impediments to permitting (e.g., wetlands, threatened and endangered species, contamination, etc.).

Applying the six key criteria discussed above, FPL chose its proposed site in Glades County. My testimony below provides a detailed description of the proposed FGPP site.

To date, FPL has obtained Glades County site plan approval, and resolutions of support from five different groups including government agencies and economic development. Groups that have passed resolutions include: the

Moore Haven City Council, the Glades County Commission, the Glades County Economic Development Council, the School Board of Glades County and Florida's Heartland Rural Economic Development Initiative.

Q. **Was the Glades site the first site proposed by FPL?**

A. No. Prior to the selection of the Glades site, FPL selected a site in St. Lucie County. The St. Lucie County Commission did not approve the required rezoning and conditional use application necessary to complete development of this site.

Q. **Please provide an overview of the major development milestones for FGPP.**

A. It is important to note that FPL must overcome a number of significant challenges before it can proceed to construct a coal-fueled unit. It must obtain local zoning, permits and/or authorizations for the new site. In addition, once the coal-fueled addition is granted a determination of need, approval by Florida's Power Plant Siting Board is required. Obtaining all the numerous governmental approvals in a timely manner is not assured. A schedule of the important development milestones for the FGPP is contained in Document No. DNH-3.

III. OVERVIEW OF PROPOSED FPL GLADES POWER PARK

Q. Please provide an overview of FGPP.

A. The FGPP project involves the proposed construction of FGPP 1 and 2. Each unit will be a solid fuel-fired coal generating unit with a nominal net electrical output of 980 MW. FGPP will be located on an approximately 4,900-acre property located in unincorporated Glades County. The advanced coal technology design selected by FPL is a USCPC steam-electric generating station designed for baseload operation. Bituminous coal, both domestic and foreign supply, will be the primary fuel with the use of up to 20% petroleum coke. The site has direct rail access to the South Central Florida Express, which is connected to two major rail carriers for the delivery of bituminous coal and petroleum coke. The rail access can also be used for delivery of bulk materials such as ammonia and limestone and for the off-site shipment of byproducts such as gypsum and ash. Common associated facilities will include fuel handling and storage facilities for fuel, limestone and ammonia along with handling and storage facilities for byproducts such as gypsum and ash.

Q. Please describe the location of the FGPP site.

A. The site is located approximately four miles Northwest of the town of Moore Haven in an unincorporated area of Glades County. Site access will be from State Road 78, which is approximately one mile to the East of the site.

Document No. DNH-4 is a vicinity map of the area surrounding the site, showing various roads and the town of Moore Haven.

Q. What are some of the surrounding land uses and features of the site?

A. Document No. DNH-5 is an aerial photo of the site, showing the property boundary along with other surrounding features. The general area surrounding the site consists of undeveloped land currently owned by private landowners, generally to the North and West, and agricultural land, generally to the East and South. The town of Moore Haven is to the Southeast. Lake Okeechobee is located East of the site. The site has direct rail access, which abuts the entire Southern boundary of the site.

IV. DESIGN

Q Please describe the proposed electric generation technology for FGPP.

A. Each unit will consist of a supercritical steam generator (boiler), one steam turbine generator ("STG"), a mechanical draft cooling tower and a suite of back-end pollution control equipment. The term "supercritical" in the context of a boiler refers to higher steam operating temperatures and pressures than conventional (sub-critical) boiler designs and results in much greater efficiency of the plant. A boiler which produces steam at pressures less than 3,208 psia is sub-critical in design. Boilers which produce steam at pressures greater than 3,208 psia are classified as supercritical. For FGPP, the operating pressure and temperature will be approximately 3,700 psia and 1,130°F which would classify it as a supercritical boiler. An ultra-supercritical design, as classified by the Department of Energy, is when the pressure is greater than 3,600 psia with temperatures exceeding 1,100°F. Because the proposed FGPP meets the definition of ultra-supercritical, FPL refers to the FGPP technology as ultra-supercritical.

Q. Please describe the facilities that are proposed for FGPP.

A. Document No. DNH-6 shows an overall process diagram of FGPP. As I just discussed, each unit's power island will consist of a supercritical pulverized coal steam generator, a steam turbine generator, a mechanical draft cooling tower, and a suite of pollution control equipment. Coal and petroleum coke will be delivered to the site via rail cars that will be unloaded and transferred to either an active or inactive storage pile. The active storage area will be designed to hold approximately three-days of fuel supply while the inactive storage area will have the ability to store up to 60-days of fuel.

Fuel will be reclaimed from the active storage area and conveyed to a crusher tower were the fuel is processed by crushing it to a specified grain size. The crushed fuel will then be transferred to fuel storage silos that will feed the coal into the boiler for combustion. Document No. DNH-7 shows a more detailed process flow diagram of the coal handling system.

Another significant material delivery and storage feature of the facility will be for limestone, which will be used as part of pollution control equipment, more specifically the Wet Flue Gas Desulphurization ("WFGD") system. The limestone will also be delivered by rail to the site, and will be unloaded and transferred to a covered storage area. The limestone will be reclaimed and transferred to a preparation building prior to use in the WFGD system. Document No. DNH-8 shows a more detailed process flow diagram of the limestone handling system.

Byproduct handling and storage for FGPP would include facilities for fly ash, bottom ash, and gypsum. These are byproducts from either the combustion process (ash) or from the removal of sulfur dioxide from the flue gas. In all three cases, the byproducts are collected and processed for off-site recycling. In addition, a permanent long term byproduct storage area will be provided for off-specification material and for use in the event that recycling opportunities are interrupted or otherwise unavailable. Document No. DNH-9 shows a more detailed process flow diagram for the ash and gypsum byproduct facilities.

Q. How will the site be configured with all the various facilities that you have generally described?

A. As shown in Document No. DNH-10, the power plant has been located essentially in the center of the proposed 4,900 acre site. This will provide FPL with the maximum separation distance from the power plant to the property boundaries, helping minimize impact on off-site land uses and plant visibility. Document No. DNH-11 shows a more detailed plan view of the two power islands.

Other prominent power-island related features of the site are shown in Document No. DNH-10. These include the byproduct and material delivery, handling and storage facilities to the North of the power islands, long term byproduct storage facilities to the Northeast, water storage ponds to the East, electrical interconnection and heat dissipation systems to the South, and temporary construction areas to the West.

Document No. DNH-12 shows typical elevation views of the various facilities that I have described.

Q. What are the expected operating characteristics of FGPP 1 and 2?

A. The units are being designed with state-of-the-art performance features, including an extremely efficient power generation cycle design. The projected output of 980 MW per unit with an average predicted heat rate of 8,800 Btu/kWh over the useful life of FGPP will make it among the most efficient coal-fired electric generating facilities in the United States. The ultra-supercritical technology that FPL will be applying is proven, having been applied at facilities in Japan and Europe. Document No. DNH-13 provides a summary of the projected performance characteristics for FGPP.

Q. Please describe the types of fuel the FGPP units will be able to use, including any fuels for start-up.

A. FGPP will be able to use domestic and foreign bituminous coal, as well as petroleum coke, as fuel during power production operations. Low sulfur fuel oil will be used as the startup fuel.

Q. Please describe how the fuels will be delivered to the site, off-loaded and stored.

A. The fuels will be delivered to the site by train, off-loaded mechanically, and stored in both short-term and long-term coal storage facilities.

Q. What environmental controls will be installed as part of FGPP?

A. Environmental compliance is important to FPL's business, both as an environmental steward and because FPL is required to comply with applicable environmental laws and regulations. Other federal and state agencies will fully review the environmental compliance of FGPP. However, in this filing, FPL has included information with respect to environmental compliance in order to provide assurance to the Commission that these, as well as other legal and regulatory requirements, will be satisfied through FPL's construction of FGPP, and so that the Commission is informed concerning the expected costs of environmental compliance. To this end, FPL will install and operate those environmental controls necessary to comply with all applicable environmental laws and regulations.

For example, from an air emissions compliance perspective, environmental controls will be installed to control emissions of nitrogen oxides (NOx), sulfur oxides (SO_2 and SO_3), mercury and particulate matter. Sources of air emissions consist of FGPP's two supercritical boilers, two mechanical draft-cooling towers, two emergency generators, the auxiliary boiler, and the material handling facilities. FPL's witness Mr. Ken Kosky discusses FGPP's environmental compliance in further detail.

Q. Please describe environmental control processes that will be used to control NOx emissions from FGPP.

A. NOx is a chemical byproduct formed by the combustion of fossil fuels such as oil, natural gas, and coal. NOx formation in the two supercritical boilers will be minimized through application of good combustion controls, particularly by controlling combustion temperatures and by properly staging combustion. The boilers will minimize NOx production by using low-NOx burners ("LNB") and over-fire air ("OFA"). Additional environmental controls for NOx will include a post-combustion environmental control process further reducing NOx emissions. The post-combustion technology being proposed for FGPP is Selective Catalytic Reduction ("SCR"). SCR technology is a proven and widely used post-combustion NOx-control technology that utilizes the selective reaction of ammonia with NOx in the presence of a catalyst. In the process, ammonia is injected into the flue gas upstream of a catalyst. The selective reduction reactions occur on the surface of the catalyst to transform nitrogen oxides into water and nitrogen. Overall, the removal efficiency of the NOx environmental controls will be greater than 90%.

Q. What environmental controls will be installed to control SO_2 and SO_3?

A. The primary source of sulfur compounds from the combustion of fossil fuels comes from the fuel itself, with very minimal contribution from the air being introduced into the boiler. It is for this reason that the application of good combustion controls will not significantly minimize the formation of sulfur dioxides. For pulverized coal-fired utility boilers, SO_2 emission reduction is accomplished by treating the post-combustion flue gas. The technology being proposed for FGPP will involve the use of a WFGD process. The wet scrubbing process involves a reaction in which the SO_2 is transferred to a scrubbing liquid, which, in this case, is a calcium-based wet limestone. The resulting byproduct of the process after further oxidation is a marketable byproduct known as gypsum, which is used in the manufacturing of building materials such as wallboard. Overall, the removal efficiency of the SO_2 environmental controls will be greater than 98.5%.

SO_3 produced through the combustion process is condensed into an aerosol in the flue gas desulfurization system. The technology being proposed for FGPP will involve the use of a Wet Electric Static Precipitator ("WESP"). This technology utilizes an electric field which imparts an electric charge to the aerosol particles in the flue gas. These particles are attracted to collector plates. Water is used to wash the particles from the collector plates and out of the flue gas stream. Overall, the removal efficiency of SO_3 achieved through environmental controls will be greater than 90%.

Q. Please describe the environmental controls that will be installed for the control of particulate matter.

A. The primary sources of particulate matter emissions from the facility will be from the combustion of the fossil fuel in the boiler, emissions from the mechanical draft cooling towers, and fugitive emissions from the handling facilities associated with bulk materials such as fuel, limestone and byproducts.

With respect to the cooling towers, water droplets exhausted into the atmosphere as part of the cooling process contain dissolved solids and chemical impurities which come from the original make-up water supply. In order to minimize the release of these water droplets into the atmosphere, thus minimizing particle matter carry over, drift eliminators will be installed to remove the water droplets from the air stream exhausting from the cooling towers.

Fugitive particulate emissions from bulk material handling and storage facilities will be minimized by equipment design and operating procedures. Materials such as fuel and limestone will be unloaded into bottom dump underground hoppers, which will be protected from wind and which will minimize the generation of fugitive dust. Dust that does get generated from unloading operations will be further controlled using dust collection and suppression systems. Conveyors used for transfer of the bulk materials will be enclosed for minimizing wind-borne fugitive dust. Conveyance points will be designed with either telescoping chutes for stock piling into storage piles, or will be provided with dust collection and suppression systems at the points of on-loading into enclosed hoppers, silos or staging areas for storage. All conveyor transfer points will have a dust collection system.

The major source of particulate matter from FGPP will be from combusting coal in the boiler. Combusting coal and petroleum coke in a pulverized coal-fired boiler produces ash, which is the non-combustible portion of the fuel. Ash is solid and is therefore classified as particulate matter. About 20% of the ash falls to the bottom of the boiler as bottom ash and is removed by the bottom ash system. The remaining 80% of the ash, which does not fall to the bottom of the boiler, is called "fly ash" and is entrained by the flue gases leaving the boiler. The two most commonly used particulate matter environmental controls technologies being used in the industry today are electric static precipitators ("ESP") and fabric filters. ESP technology uses an electric field to impart an electric charge to particles in the flue gas. Particles are magnetically attracted to collector plates. Rapping mechanisms, that are operated intermittently, dislodge the collected particles, which subsequently fall into a hopper for collection and disposal. Fabric filter technology, in contrast, removes particulate matter from the flue gas as it passes through a fabric filter media, such as woven cloths or felts. The filters are arranged as a number of cylinders or tubes (commonly referred to as "bags") through which the flue gas is directed. Cleaning of the bags in the fabric filter usually involves shaking, pulse-jet or reverse-air methods. Dislodged particulates subsequently fall into a hopper for collection and disposal. Both technologies are highly efficient, providing up to 99.9% removal efficiency. The selected technology for FGPP is a fabric filter.

Q. Please describe the environmental controls that will reduce emissions of trace amounts of metals which are released when coal is combusted, such as mercury.

A. Trace amounts of metals are released in the combustion process, which are collected using a combination of pollution controls of the types I have already described in order to achieve compliance with applicable environmental regulations. As an example, the combination of controls is especially important for mercury, one of the trace elements in coal. Mercury removal is enhanced by the SCR where elemental mercury is oxidized into a form that can be readily collected by the particulate and sulfur control systems. Additionally, FGPP will include a sorbent injection system specifically for the control of mercury emissions. The sorbent injection system will oxidize the mercury, further enhancing its collection in the particulate and sulfur removal control systems.

Q. What are the water requirements for FGPP and how will they be met?

A. The primary water requirements for FGPP include make-up water to the heat dissipation system, which would consist of mechanical draft cooling towers, water for the WFGD system, process water for cycle make-up into the steam cycle, service water for general maintenance, fire protection water, waste treatment systems, byproduct handling, and fugitive emissions control for material handling operations.

Water for the plant will be from a combination of sources which include Upper Floridan aquifer wells, recycled water from onsite water storage ponds and excess water from adjacent South Florida Water Management District controlled canals. Document No. DNH-14 shows a typical annual water balance with the various sources and usage of the water at FGPP.

Q. Are the pollution control systems proposed to be installed at FGPP representative of the state-of-the-art in emissions control equipment?

A. Yes. FPL is proposing to install a complete suite of state-of-the-art, emissions control technology that meets or exceeds the Best Available Control Technology Standard set by the federal Environmental Protection Agency. FPL's witness, Mr. Kosky provides detailed information with respect to these matters in his testimony.

The inclusion of this equipment, along with the plant design to allow for recycling of the byproducts from the combustion and emissions control processes, sets a new standard of excellence for coal-fired electric generating stations in the United States.

Q. Does this conclude your direct testimony?

A. Yes.

In re: Florida Power & Light Company's Petition to Determine Need for FPL Glades Power Park Units 1 and 2 Electrical Power Plant)))

Docket No: 070098-EI

ERRATA SHEET

DIRECT TESTIMONY OF DAVID N. HICKS

PAGE #	LINE #	CORRECTION
18	**3**	**Change "exceeding" to "approaching"**
14	**22**	**Change "five" to "seven"**
15	**3**	**Delete "and"; Add after Initiative "Hendry County Economic Development Council, and Highlands Economic Development Council"**

BY MR. ANDERSON:

Q Have you prepared a summary of your testimony?

A Yes, I have.

Q Please provide your summary to the Commission.

A Good morning, Chairman Edgar and Commissioners. As the Senior Director of Project Development I am responsible for the development of power generation projects to meet the needs of FPL's customers.

Beginning in 2003, FPL conducted a thorough and extensive investigation into the potential for adding solid fuel generation to its resource mix and concluded that significant improvements had been made in solid fuel technology, emissions control technologies and plant designs such that FPL had a number of technology options, all of which would provide fuel diversity to FPL's system.

After a detailed analysis of the available technology options, we determined that the addition of an ultra-supercritical pulverized coal plant augmented with a complete suite of state-of-the-art emissions control equipment will best meet the power generation needs identified in the 2012 to 2014 period and provide FPL's customers reliable, cost-effective and environmentally sensitive fuel to pursue.

In March of 2005, FPL filed with this Commission the Report on Clean Coal Generation, a comprehensive study on current opportunities and issues regarding solid fuel generation. In 2006, we developed the FPL Glades Power Park, including site selection, engineering and plant layout, and the negotiation of construction and major equipment contracts. In January 2007, we completed the Clean Coal Technology Selection Study incorporating the most current information available in the industry concerning solid fuel generating technology. As a result of this study, FPL reconfirmed that ultra-supercritical technology will materially outperform all available alternative coal generation technologies including integrated gasification combined cycle or IGCC.

When comparing technologies, it's important to look at seven factors: Technological maturity, reliability, construction risk, life cycle costs, generation efficiency, environmental performance and CO2 emissions.

As summarized on these charts, the ultra-supercritical plant proposed for FPL Glades Power Park is superior to IGCC in six of the categories. And in terms of environmental performance, the next-generation IGCC plants will have roughly the same emissions profile as the Glades Power Park if the IGCC plants achieve their projected environmental performance.

By the United States Department of Energy definition of ultra-supercritical pulverized coal there are over 30 ultra-supercritical units in commercial operation and construction. In contrast, there are only four relatively small coal-to-electricity IGCC demonstration plants in operation, each delivering less than 300 megawatts, which all required large government subsidies without which they would not have been built. Ultra-supercritical plants have a proven track record of greater than 90 percent availability. In contrast, three of the four IGCC coal-to-electricity plants have never achieved the lower 80 percent availability level and the fourth has barely met that lower level of performance. In large part, due to its technological maturity and proven performance, FPL has been able to negotiate an engineering procurement and construction or EPC contract and major equipment supplier contracts with guarantees on performance, schedule and cost. In contrast, IGCC developers have yet to secure a viable EPC contract.

Life cycle costs for ultra-supercritical plants are significantly lower than IGCC due to much lower capital costs, lower operations and maintenance costs and higher efficiency. The ultra-supercritical generation efficiency at the Glades Power Park will exceed both current IGCC performance and the projected, but as yet unrealized, generation efficiency for next-generation IGCC plants. This means that FPL's Glades Power Park will use less coal to deliver electricity to FPL's customers.

The guaranteed environmental performance of the FPL Glades Power Park, which will be protective of human health and the environment, exceeds today's IGCC plants and will be similar to next-generation IGCC, if next-generation IGCC operates as projected. It should be noted, however, that the significant efficiency advantage of Glades Power Park over IGCC will result in lower CO_2 emissions for the Glades Power Park.

In summary, the FPL Glades Power Park employing ultra-supercritical generating technology, a complete suite of state-of-the-art emissions control equipment and incorporating a plant design that will allow for the recycling of the by-products from the combustion emissions control processes sets a new standard of excellence for coal-fired electric generating stations in the United States. The FPL Glades Power Park will meet the need requirements for the 2012 to 2014 time period, providing FPL's customers with reliable, cost-effective and environmentally sensitive fuel-diverse electric power. Thank you.

MR. ANDERSON: Mr. Hicks is available for cross-examination.

CHAIRMAN EDGAR: Thank you.

Ms. Perdue, any questions?

MS. PERDUE: No.

CHAIRMAN EDGAR: No questions.

Mr. Beck?

MR. BECK: No questions.

CHAIRMAN EDGAR: Mr. Guest.

MR. GUEST: Thank you, Madam Chairman.

CROSS EXAMINATION

BY MR. GUEST:

Q Good morning, Mr. Hicks. I'd like to just ask a few questions to get some clarification on some of these items that you've testified about.

CHAIRMAN EDGAR: I need you to pull the microphone closer or make sure it's on.

MR. GUEST: Okay. It's on. Well, I think that -- is that right?

CHAIRMAN EDGAR: That's better.

MR. GUEST: Okay. May I bellow, Madam Chairman?

CHAIRMAN EDGAR: You may bellow. We want to make sure that we all hear you clearly.

BY MR. GUEST:

Q Good morning, Mr. Hicks.

A Good morning.

Q I'd like to just go through and get some clarification on some items on your chart back there. The first item I see here is that you refer to USCPC. That stands for ultra-supercritical pulverized coal.

A That is correct.

Q And the concept of ultra-supercritical means that it's extremely efficient; isn't that right?

A Ultra-supercritical pulverized coal uses advanced engineering techniques and advanced metals to burn coal and produce steam at much higher efficiencies, much higher pressures and steam temperatures to result in a much more efficient production of electricity.

Q And the concept here is that by having very, very high pressure in the boiler, you have a higher fraction of water as compared to steam so that you get higher conductivity and you're able to extract more of the heat and thus become more efficient; isn't that the concept?

A That's, that's a good summary of it.

I would mention that the Japanese have done a considerable amount of research on this issue both in terms of pressure and temperature, and what they have found is that temperature incrementally -- increases in temperature incrementally have a much greater impact on efficiency than pressure.

Let's take a 2,400-pound pressure subcritical unit operating at 1,000 degrees Farenheit. What they found was by -- if you increase that pressure from 2,400 pounds to 4,500 pounds, an increase of about 75 percent, you get about a 2.5 percent incremental increase in efficiency. Contrast to that, if you took the 2,400-pound pressure and the 1,000-pound temperature and increased the temperature by 10 percent to 1,100 degrees, that would actually get about a 4.5 percent increase in efficiency. So they have focused a lot on temperature.

Q Now I think that you testified previously that the proposed Glades coal plant would operate at 3,700 pounds per square inch; is that correct?

A That is correct.

Q And that, that would produce an efficiency of about 38 or so percent, 39?

A The combination -- as I stated before, it's both pressure and temperature. The combination of the 3,700-pound pressure and the 1,112, 1,130-degree Fahrenheit temperature would produce an average annual heat rate over the life of the facility of 8,800 Btus per kWh.

Q And that translates to an efficiency rate of about 38.8 percent?

A Roughly, yes.

Q Okay. So you say that those characteristics show that this is an ultra-supercritical state-of-the-art coal-fired power plant; is that correct?

A The U.S. Department of Energy defines ultra-supercritical as temperature -- pressures above 3,600 pounds, 3,600 pounds or greater, and temperatures approaching 1,100 degrees Fahrenheit. By that definition this is an ultra-supercritical pulverized coal plant.

Q You're familiar, are you not, with the National Energy Technology Laboratory at the Department of Energy?

A I'm aware of them. Yes, I am.

Q And they're an authoritative source on matters like this.

A They are a source of information on coal technology, yes.

Q An authoritative source.

A I don't know, I don't know how you're defining "authoritative," so I can't comment on that.

Q Well, it's the National Environmental -- National Energy Technology Laboratory at the Department of Energy.

A It's a government agency that does work on coal plants. Yes.

Q Okay. I have to -- I would like to show you a, a document from the National Energy Technology Laboratory at the Department of Energy, and it's called the Materials Research Program.

I'd like to distribute it, if I may, to various people.

CHAIRMAN EDGAR: You may. Obviously, yes, to our staff, to the Commissioners, to the court reporter and to the other attorneys. Should we go ahead and mark this? Are you going to want to --

MR. GUEST: I'm just going to ask him some questions on it.

CHAIRMAN EDGAR: Okay.

MR. ANDERSON: May I have a copy?

CHAIRMAN EDGAR: You may. We'll give it a minute to have it distributed.

Ms. Brubaker.

MS. BRUBAKER: Just if it's going to be identified, I think we are at Number 166.

CHAIRMAN EDGAR: We are at Number 166. Should we go ahead and do that for clarify? We will do that for clarity. We will number this one 166 and label it NETL Materials Research Program. And once that is passed out, then, Mr. Guest, when you are ready. I'll guess we'll give it a minute.

MR. GUEST: Everybody has it.

(Exhibit 166 marked for identification.)

BY MR. GUEST:

Q Mr. Hicks, would you be so kind as to turn to the one, two, three, four, five, six, seven, eighth page. It's the chart that looks like this. Can everyone see it? This is the chart.

Have you had an opportunity to review that, Mr. Hicks?

A I just looked at it. Yes, I did.

Q Okay. So now what this chart from the National Energy Technology Laboratory indicates is that ultra-supercritical has an efficiency rate of 47 to 49 percent, almost 10 percent higher than what you're calling ultra-supercritical; isn't that right?

A This chart right here is not indicative of the general consensus with regard to ultra-supercritical technology. The United States Department of Energy, of which NETL is a part of that, defines ultra-supercritical as temperatures above or approaching 1,100 degrees and pressures at 3,600 pounds or greater.

In addition, the Japanese, who also build ultra-supercritical plants, use as a bright white (phonetic) line 1,100 degrees Fahrenheit. It is a general consensus in this industry that the pressures and temperatures of this plant represent ultra-supercritical technology.

It should also be -- it's also important to realize in terms of efficiency and in terms of heat rate average degraded over the life of the plant you have to take into consideration degradation, you have to take into consideration ambient air temperatures, et cetera.

So this plant represents a -- the efficiency that's calculated for this plant represents an average degraded heat rate over the life of the plant, which is important to customers, but also represents the ambient air temperatures that are consistent in South Florida.

Q Okay. Looking, continuing on this same page, I see that it's got -- in addition to an efficiency rate for ultra-supercritical, this chart shows that the psi is 4,500, which is by my count 800 psi higher than what you're talking about for the proposed Glades plant; is that right?

A I see that on this chart, yes. But, once again, I would comment that the United States Department of Energy explicitly defines ultra-supercritical as 3,600 pounds pressure greater, temperatures approaching 1,100 degrees Fahrenheit, and the general consensus in this industry is that this is an ultra-supercritical plant.

I'm not denying that if you went to these much higher temperatures and pressures, you would still be ultra-supercritical. But the plant that we're proposing for Glades County is an ultra-supercritical plant.

Q Okay. Now --

CHAIRMAN EDGAR: Mr. Guest, excuse me. I'm sorry to interrupt. But one of the copies that was distributed up here does not have this page, and so I need to ask you if you have -- I'm sure it was just collating. But if you have another copy available, that would be useful to us.

MR. GUEST: You know, I'll just stick it in my -- that's great.

CHAIRMAN EDGAR: Okay. Thank you.

MR. GUEST: That's a collating error. I actually, I could blame it on someone else.

CHAIRMAN EDGAR: There's no need to blame anyone at all. Thank you. Go right ahead.

(Laughter.)

BY MR. GUEST:

Q Now continuing to look at this page, Mr. Hicks, from the National Energy Technology Laboratory, you're looking -- if you look at the front page, this is from the Department of Energy; correct?

A Yes.

Q Okay. And so we're looking at this page. And now if you look at the middle box, it has pressures greater than 3,500 psi and efficiencies of 41 to 45 percent. So using this page from the National Environmental Technology Laboratory -- you know, I always say environmental, I mean energy -- and the 41 to 45 percent, that's really, according to this document, what the proposed Glades Power Plant is is actually supercritical according to this document.

A No, I would disagree with that. This plant, the Glades Power Park has a pressure of 3,700 pounds per square inch, temperatures of 1,112 degrees and 1,130 degrees Fahrenheit. With South Florida conditions, average degraded heat rate over the life of the plant, it's around 38.8 percent efficiency. That is recognized by the industry as an ultra-supercritical pulverized coal plant.

Q Okay. And I would note just to -- if you would look at that center box under supercritical, you see the bird's mouth that indicates greater than, greater than 3,500 psi, and that also applies to 41 to 45 percent efficiency.

A Uh-huh.

Q Okay. So let me turn to another document which we're going to hand out.

CHAIRMAN EDGAR: Okay. While that's distributed, we will go ahead and mark, and it will be Number 167. And, Mr. Guest, can you give me a title?

MR. GUEST: This is the United -- this is a document by the EPA, Federal Environmental Protection Agency. It's called Final Report, Environmental Footprints and Costs of Coal-Based Integrated Gasification Combined Cycle and Pulverized Coal Technologies dated July 2006.

CHAIRMAN EDGAR: Okay. And for, for my listing I'm going to abbreviate to EPA Final Report, Environmental Footprints and Costs, IGCC.

MR. GUEST: Well, what they mean is IGCC versus PC. I mean, that's what that's a comparison of.

CHAIRMAN EDGAR: Versus PC. We can do that. Okay.

(Exhibit 167 marked for identification.)

BY MR. GUEST:

Q And I would -- just a very simple point, Mr. Hicks. If you turn to the second page of this document, at the very bottom line it reads, "PC plants." That means pulverized coal plants; right?

A That's correct.

Q "With ultra-supercritical steam conditions of 4,500 psi and 1,100 to 1,100 °F double reheat," is the description of ultra-supercritical.

A Yes. And that is consistent, once again, with the U.S. Department of Energy definition, which is plants that have steam pressures 3,600 psi or greater and temperatures approaching 1,100 degrees Fahrenheit, those plants are ultra-supercritical. This plant would be an ultra-supercritical under that definition.

Q Okay. So but you're 800 psi short and you're not anywhere close to the 45 percent efficiency that you'd get for ultra-supercritical.

A No. This, this plant represents a, a combination of temperature and pressure that is unique, would be unique for the United States. It represents the cutting edge of ultra-supercritical technology in the world. It is state of the art and meets the definition of ultra-supercritical technology.

Q Now FP&L hired a consulting firm called Black & Veatch, V-E-A-T-C-H; is that correct?

A We hired Black & Veatch as a, to assist us in preparing the Clean Coal Technology Selection Study.

Q And do you know a person named Mr. Ron Ott, O-T-T?

A I'm familiar with him, yes.

Q Could you tell us who he is?

A He's an employee of Black & Veatch or was an employee of Black & Veatch as of two years ago when I last talked to him.

Q Was he the Senior Vice President and Coal Program Director?

A I'm not sure.

MR. GUEST: Okay. I'd like to show you a document which is a presentation by your consultants, Black & Veatch.

CHAIRMAN EDGAR: Okay. We will mark 168, Black & Veatch Supercritical Plant Technology Overview.

(Exhibit 168 marked for identification.)

MR. GUEST: Does everybody have one? Okay.

BY MR. GUEST:

Q Do you have it?

A Yes, I do.

Q I would like to turn first to the -- let's just go from backwards here. It would be the third last page of this document. But before I do that, does it reflect your recollection seeing the front page of it that says Mr. Ott is the Senior Vice President and the Coal Program Director?

A It doesn't, doesn't refresh my memory. I know of a gentleman named Ron Ott that worked at Black & Veatch a couple of years ago. I have not had discussions with him since then.

Q Okay. And I would turn now to the third page from the beginning. Are you with me?

A Yes.

Q And the title is Thermal Generation Technology Spectrum. Are you on that page with me?

A Yes.

Q And if we turn to the bottom of that page under the description of ultra-supercritical, it shows a net plant efficiency of 44 percent; is that correct?

A It does. I'm not -- you know, once again, you have to look at ambient air temperatures, what is the -- what efficiency are you looking at, are you looking at design efficiency, are you looking at initial test efficiency, are you looking at efficiency over the life of the plant?

What we're reporting for this plant is the efficiency over the life of the plant, including degradation, including forced outages, et cetera.

Q And when you look to the item that's called supercritical, which is two above that, it identifies the net plant efficiency at 38 percent.

A I see that on the page. Yes, sir.

Q And that's very close to the 38.8 that you testified to.

A It is close to the 38.8. But, once again, I'll say it again, the 38.8 that we are representing is an average degraded efficiency over the life of the plant. It is not indicated here what this efficiency represents.

Q And it also refers to -- I'm still on the same page. Under supercritical it refers to a pressure of 3,500 psi; correct?

A It does on this page, yes.

Q Which is close to your 3,700 psi; correct?

A I would not necessarily say it's close to the 3,700. It's approximately 200 psi lower.

MR. GUEST: May I have a moment?

CHAIRMAN EDGAR: Yes.

MR. GUEST: This came up just at the last moment, Madam Chairman, so I don't have copies for everybody, but this is already in the record. Maybe he'll recall this so we don't have to fool around with it.

BY MR. GUEST:

Q I'm on the determination of needs, the needs study that was actually filed with the petition. And on Page 22 at the top under the diagram Figure III.A.5 it reads, underneath that is B, and it's Unit 1 and 2 design, and the first line reads, "Each unit will consist of a supercritical steam generator." Does that refresh your recollection?

A I'd have to see it. I don't have the document with me. It would be helpful if I could see the document.

CHAIRMAN EDGAR: Mr. Guest, why don't you approach and let the witness -- and actually why don't you start with Mr. Anderson so that he is sure of --

(Pause.)

BY MR. GUEST:

Q Have you had an opportunity to look at that, Mr. Hicks?

A Yes, I have.

Q So the description of this plant in the needs determination was that it was supercritical; is that correct?

A The boiler was supercritical. The plant is ultra-supercritical because a supercritical boiler is a boiler that's above, has a pressure above 3,208. Ultra-supercritical as defined by the Department of Energy, which is the definition we used for this plant, is pressures above 3,600 pounds psi or above and temperatures approaching 1,100 degrees Fahrenheit.

Q Did FP&L do any internal studies that examined the matter of whether this was critical or ultra-supercritical?

A FPL examined various technologies, invited vendors to meet with us, went through various technology assessments with those vendors, did internal studies, negotiated the contracts, and this plant, as a result of all that analysis, internal analysis and external work, this plant as defined by the Department of Energy is an ultra-supercritical pulverized coal plant that will bring levels of pressure and temperature unique to the United States that will result in, when looking at the plant over the life of the plant, the heat rate of the plant, the life of the plant, including forced outages, et cetera, would be the most efficient coal plant in the United States, meeting the definition for ultra-supercritical.

Q The question was whether or not FP&L had hired consultants to examine the issue.

A Yes. We internally looked at that issue also.

MR. GUEST: Okay. May I have a moment, Your Honor? I'm sorry. Madam Chairman is what I mean.

CHAIRMAN EDGAR: Yes.

(Pause.)

MR. GUEST: Madam Chairman, there's a confidential document that was produced in discovery. We did not anticipate having a need to use it. What we've made a decision to do is work with counsel to come up with a way to work through that so that the parts that are trade secrets or whatever else can be kind of separated and just this issue can be isolated and presented somehow. So we'll move on from there.

CHAIRMAN EDGAR: Mr. Anderson.

MR. ANDERSON: In fact, if counsel just wants to give us the page he's interested in, we can look at it on the side while he continues to interrogate so we can continue moving on.

BY MR. GUEST:

Q Okay. Let's press on.

The next item you have on your, on your demonstrative exhibit over here after you -- I guess the first item is technological maturity. Let me jump over from that to the reliability issue.

Now we have a number of different terms that are used here. Availability means the percent of time that the plant is capable of producing electricity; is that correct?

A Yes.

Q And then reliability goes to unplanned outages; correct?

A Reliability is also another, another way of defining availability. Yes.

Q Okay. And so availability together really is planned plus unplanned outages.

A Yes.

Q Okay. And the capacity factor, excuse me, is the time plant -- the time the plant can operate at its maximum output.

A The capacity factor is the, is the, taking the total amount of generation divided by the total potential amount of generation from the plant over the course of a year.

Q Thank you. I'd like to return now to the document that we talked about earlier by the consulting firm hired by FP&L, Black & Veatch, that we previously identified as Exhibit Number -- or you gave it a number of 168. And I think this time I would like to go -- I think I want to go three pages from the back this time. Yes. Three pages from the back, three pages from the end, the third last page. And I see here -- are you with me?

A Could you tell me which page exactly you're on?

Q It's the one that reads Supercritical Versus -- "Subcritical versus Supercritical Technology."

A Yes. I see that.

Q And I see that, if you go down to the column under "Supercritical" and the row that reads "Availability Factor," the availability factor for supercritical plants is 83.2 percent; is that correct?

A That's using NERC GADS data for 1994 to 1998. That would include supercritical plants that could have been built as early as 1957.

Q I'd like to turn now to a new document -- may I have a moment?

CHAIRMAN EDGAR: Yes.

MR. GUEST: This document is the Ten-Year Site Plan for Electrical Generating Facilities and Associated Transmission Lines, January 2006 to December 2015, from TECO. It's dated -- Tampa Electric Company, dated April 1, 2006.

CHAIRMAN EDGAR: Okay. Is this already in the record?

MR. GUEST: I don't believe so. Oh, wait a minute. Yes, it is. No. No.

CHAIRMAN EDGAR: No. Okay. And Ms. Brubaker concurs that it is not, so we will mark it 169.

(Exhibit 169 marked for identification.)

MR. GUEST: This is 169; is that correct?

CHAIRMAN EDGAR: Yes, sir.

BY MR. GUEST:

Q Have you had an opportunity to review that?

A Yes, I have.

Q I'm turning to the second page and I'm looking under the number 12. Do you see the 12 in the columns on the left?

A Yes, I do.

Q It's under the group called projected unit performance data. And I see that it has a -- the second last line under number 12 is resulting capacity factor of 87 percent and an equivalent availability factor of 85.07 percent; is that correct?

A Yes, I do. I see those.

Q And that's for an IGCC plant.

A And let me mention that is an IGCC plant that would be used in baseload, as a baseload plant in the TECO system.

The FPL facility, the FPL Glades Power Park will be a baseload facility in the FPL system. Our internal analysis and also our hands-on external review of ultra-supercritical plants in Japan has led us to project with great confidence that we will have a 92 percent capacity factor at our plant, at the FPL Glades Power Park.

I think it's also important to look at the next line which has an arrow next to it, and that arrow says average net operating heat rate of 9,306. That average net operating heat rate is 506 Btus higher than the ultra-supercritical plant proposed for Glades Power Park.

But what's also very important, and this goes to what I had discussed earlier, is there is a footnote, footnote number one. And footnote number 1 says, "Based on in-service year." So that's the average annual heat rate for the first year of the plant, not the average annual heat rate over the life of the plant. Due to degradation in the performance and the equipment one would expect a higher average heat rate over the life of the plant.

In fact, our own internal analysis and the analysis of Black & Veatch has demonstrated that an IGCC plant would incur average degradation over the life of the plant of about 2.5 percent.

What's interesting about this number right here is if you take this number, 9,306, and you multiply by 1.025, which is the average degradation rate, you get an average annual heat rate over the life of the plant of 9,538. What's interesting about it is AEP, American Electric Power, filed air permit applications for two IGCC plants, 600-megawatt demonstration plants or 600-megawatt plants, one in Ohio and one in West Virginia. In those air permit filings the calculated heat rate using the same technology that TECO is proposing for this plant is 9,538, exactly the same number as taking this number and multiplying by 1.025. That leads me to believe that the average annual heat rate over the life of this TECO plant will be 9,538, 738 Btus higher than the average annual heat rate for the FPL Glades Power Park, approximately 10 percent less efficient. That means 10 percent more coal burned to produce the same amount of electricity and more CO_2 emissions.

MR. GUEST: May I have a moment, Your Honor, or Madam Chairman?

MR. ANDERSON: While counsel is looking, just to close the loop on the confidential point, I brought over to counsel the portion of the prehearing order that lays out the instructions for how confidential things are handled at the Commission with envelopes and things. And if those are complied with, we're fine, but we don't know that the materials are had by Intervenors here.

CHAIRMAN EDGAR: Mr. Guest, why don't we go ahead and take ten minutes, and, and during that time maybe you could get with our staff and with Mr. Anderson and work through the confidentiality issue as well. And we'll come back ten minutes from now.

MR. GUEST: Thank you, Madam Chairman.

CHAIRMAN EDGAR: Thank you.

(Recess taken.)

CHAIRMAN EDGAR: We will get started again.

Mr. Guest.

MR. GUEST: I think we've reached an intelligent stipulation here to deal with the matter of the confidential study by reading only a couple of sentences. One of them might be two sentences, and then not putting the document in. We have a stipulation to do that.

CHAIRMAN EDGAR: Mr. Anderson.

MR. ANDERSON: That's acceptable, and we recognize that that couple of sentences will be in the public record. We've reviewed it and it is acceptable.

CHAIRMAN EDGAR: All right. Then thank you for the cooperation on both parts. And we are ready to go forward.

MR. GUEST: Thank you.

BY MR. GUEST:

Q Mr. Hicks, there was a confidential study in April 2006 prepared by M.J. Bradley and Associates on behalf of Florida Power and Light concerning the proposed power plant?

A Yes, a confidential study done by M.J. Bradley and Associates, an environmental consulting firm.

Q And the study has in it a statement that FPL is continuing to evaluate the efficacy of pursuing a new supercritical PC plant in Florida, and this was dated April 2006?

A I don't have it in front of me, so I'll accept your reading.

Q Turning now to the matter of efficiency. You agree, do you not, that IGCC plants can achieve an efficiency of 90 to 94 percent?

A No, I don't agree that they can achieve an efficiency of 90 to 94 percent.

Q I'd like to show you -- we are going to hand this out.

MR. GUEST: I will identify it for the record, if I might. This is an article in Gas Turbine World, and it's entitled, "Refinery IGCC Plants are Exceeding 90 Percent Capacity Factor After Three Years."

CHAIRMAN EDGAR: Okay. And this will be Number 170.

(Exhibit 170 marked for identification.)

MR. GUEST: Just for the record, I see my document here has, also, that notation "Supplemental Exhibit RCF-29" on it, which means that it's going to bounce in under Mr. Rich Furman's testimony.

BY MR. GUEST:

Q Mr. Hicks, do you have that before you?

A Yes, I do.

Q And I would like to direct your attention to the first page of this document, and you see there's three boxes there in the left column after the second paragraph, three boxed paragraphs, do you see those?

A Yes, I see those.

Q And the first one is in the first year of commercial operation syngas, it was 93 percent. Do you see that one? That is ISAB Energy.

A I see that, yes.

Q And the next one is Sarlux Saras has a 90 percent efficiency. And then the third one is that Api Energia has 94 percent efficiency.

A I don't think those are efficiencies. I think what they are referring to there is capacity factors, and that is different from efficiency. And I also note that the three facilities that are on this page are not coal-based IGCC plants. They are asphalt residues, and residues. There is a substantial difference between IGCC plants that run on asphalt, residue, et cetera. No one is proposing to do those in the United States. Mr. Jenkins, who is our expert, our retained expert on IGCC, can provide you greater detail about the differences between the two.

So I think, Counsel, you are confusing efficiency and capacity factor, first of all, in your question to me; and, second of all, you are making an apples-to-oranges comparison by pulling up this document, which I would mention is not a document that is peer reviewed. It's this gentleman's opinion.

But, most importantly, Mr. Jenkins can provide the Commissioners detail with regard to why comparing IGCC plants that run on such feed stocks as asphalt and residues should not be compared to coal-based IGCC plants.

Q Well, IGCC plants run on a diverse array of fuels, do they not?

A I would disagree with that. IGCC plants, just like pulverized coal plants, you design that plant for a specific type of fuel type. If you deviate from that fuel type, that can cause considerable problems. It's called a design point. So, for example, there is two design points for the pulverized coal plant at the FPL Glades Power Park. One design point is bituminous coal. The second design point is bituminous coal with 20 percent petroleum coke. That gives us great fuel flexibility in sourcing bituminous coals and petroleum cokes throughout the United States and also throughout the world.

Now, we can run that plant on other types of fuel, such as subbituminous coals. We would take a slight derate on capacity or a slight derate on efficiency, but we can run on other fuels. But we have designed that plant for certain types of fuel. It's the same thing with IGCC. You design it for a specific type of fuel. If you deviate from that fuel, that can cause considerable problems.

Mr. Jenkins, once again, can provide additional detail on the issues associating with designing an IGCC for a particular type of fuel and then deviating from those fuels and the impacts on the IGCC operation. But it's not a correct statement to say that an IGCC plant can run on a diverse set of fuels.

Q Well, we have IGCC plants that run on coals of all types, is that right?

A They are designed for specific types of coals, but they can be designed to run on different types of coals, correct. Just like a PC plant can be designed to run on different types of coals.

Q And they can run on petcoke?

A They can run on petcoke. If designed specifically to run on petcoke, they can run on petcoke. Just like a PC plant, such as FGPP, can be designed to run on petroleum coke as a portion of the overall fuel mix.

Q The maximum amount of petcoke that can be used in the Glades proposed coal plant is 20 percent?

A It is 20 percent based upon an average weighted sulfur content of two percent for the total fuel supply. I would mention to you that we have done feasibility studies on IGCC plants and the standard reference plant, particularly with one vendor that we are working with, that plant has a maximum sulfur content that is allowable in the design point of 4 percent, which does not allow it to be run on 100 percent petroleum coke. We could design that plant to run on 100 percent petroleum coke as a design point, but it would cost substantially more to do so in terms of capital cost.

Q And in addition to petroleum coke, or petcoke -- just while we're talking about petcoke, we will come to this probably several times in this hearing. Now, as I understand it, petcoke is a waste product from the process of refining crude oil where you take the aromatic bottoms that are below asphalt, and then crack them through a chemical process where you add hydrogen molecules and make them as a waste product that has some energy source value, is that the case?

A That's generally the case. It is also considered to be an opportunity fuel in the sense that it's virtually impossible to contract for it on a long-term basis. Because it is a waste product from the refinery process, refiners are reluctant to sign long-term contracts for it. We looked at the petroleum coke market and determined that because it is an opportunity fuel, because it is a fuel that doesn't have the capability for long-term contracting, we considered it an opportunity fuel and that although it is an opportunity fuel, we include it as part of the plant design.

Q What fraction of petcoke does the TECO plant run on?

A I'm not sure.

Q Does 60 percent sound right?

A I'm not sure.

Q The TECO plant could run on 100 percent petcoke?

A Mr. Jenkins is actually the deputy project manager for TECO, and he can provide you additional information on that.

Q Okay. So an IGCC plant could run on all type of coal and on petcoke. Biomass?

A Pulverized coal plants can also --

MR. ANDERSON: We object to form. The witness very clearly said that that wasn't so.

MR. GUEST: Well, let me just get some clarification, then.

BY MR. GUEST:

Q Do you know whether an IGCC plant could run on biomass?

A An IGCC plant can be designed, if you put it into the original design, it can be designed to co-fire for some portion of the fuel on biomass. Similarly, a pulverized coal plant can be designed to run on biomass, co-fire with biomass.

Q And an IGCC plant can run on natural gas?

A No, an IGCC plant cannot run on natural gas. An IGCC plant, if you were to eliminate the IGCC function and just concentrate on the combined cycle portion of it, it can run on natural gas. But I have to mention that when an IGCC plant, a plant that is designed to be an IGCC plant is shifted over to natural gas, then the efficiency suffers versus a dedicated combined cycle plant.

Q So just to be clear here, you're saying that if you have got natural gas as a back-up to run the turbine and the steam boiler at an IGCC plant that you get a lower heat efficiency by switching to natural gas rather than the syngas produced by the IGCC, is that your testimony?

A When you design an IGCC plant, and that IGCC plant doesn't run on syngas, but runs on natural gas, it will be less efficient than a dedicated combined cycle facility. Now, one has to note that if you design an IGCC plant to have natural gas backup, you have to pay the costs associated with that. For example, let's say that FPL were to design an IGCC plant at the FPL Glades Power Park site. The situation that we would be faced with is both gas pipelines, both major gas pipelines come into the state after FPL signed the gas contract for West County. Both of those pipelines are fully allocated, there's no firm capacity left.

In order to get natural gas backup, we would have to contract for an upgrade of that pipeline. In order to contract, you would have to contract under a long-term take-or-pay agreement. In other words, that firm gas supply we would have to either take it or pay for it.

So to try to compensate for the deficiency in overall availability between an IGCC plant and the ultra-supercritical plant, one way of doing that would be to put in natural gas backup, but that would be at a substantial additional cost to the facility. The IGCC without natural gas backup is significantly more expensive in terms of life-cycle cost. Adding natural gas backup to try to make up for that deficiency in availability would only exacerbate that delta in terms of life-cycle costs.

Q Now, let we continue on the fuel issue. I think we talked about biomass, natural gas, petcoke, coal of all types. I take it you are familiar with the new IGCC plant in the Netherlands that uses 40 percent wood waste?

A I'm aware of an IGCC plant in the Netherlands that was not originally designed for biomass, but has made charges so that it can burn some biomass, yes. That plant -- by the way, that plant has a very low average annual availability factor. It has suffered through significant forced outages, and it has never met an average annual availability of 80 percent.

Q We'll deal with that issue separately, too. Now, diesel fuel, that's another available fuel for an IGCC plant?

A An IGCC plant, you can design it to run on syngas or natural gas as a back-up; you could design it to run on syngas and fuel oil as a back-up, but you couldn't design it to run on all three.

Q Asphalt, can they run on asphalt?

A You could design an IGCC plant to run on asphalt as the design point. If you deviated from that feedstock, there would be significant penalties. And Mr. Jenkins can provide you additional information on the issues associated with that.

Q And they could also run on tar?

A You could design -- I'm not aware of a tar-based IGCC plant. Mr. Jenkins could provide you additional information, once again, with regard to designing a plant to run on different types of feedstocks or a different type of feedstock and the implications for that in terms of fuel supply.

Q A lot of the products that I listed there that we have been through are waste materials, are they not?

A It depends on whose perspective you are looking at. It could be characterized as a waste material.

Q Well, the one in the Netherlands is using wood waste. That's waste, isn't it?

A It could be characterized as a waste material.

Q Let's turn directly to the matter of petcoke. And, you know, do you not, that the Polk Plant, the TECO Polk Plant uses a high fraction of petcoke in addition to coal?

A Once again, with regard to the fuel type for the TECO plant, I think that question is best addressed to Mr. Jenkins who was a deputy project manager of the facility.

Q Do you know anything about petcoke at all?

A I'm aware of petcoke. I'm aware of it as an opportunity fuel, where it comes from, the economics of it and the fact that it is an opportunity fuel.

Q It is a whole lot cheaper than coal, isn't it?

A Not necessarily. In fact, FPL in conjunction with the Jacksonville Electric Authority sometimes uses petroleum coke at the power park that we have in Jacksonville. And, in fact, over the last year or so FPL and Jacksonville Electric Authority have actually cut back on petroleum coke because the price has either met or exceeded the price of coal, and I believe Mr. Schwartz actually has this in his testimony.

Q Yes. So let's -- I'm going to show you a piece, an exhibit from Mr. Schwartz' testimony which we are distributing here. I believe this is in evidence. It's identified as SS-19.

CHAIRMAN EDGAR: Okay. And SS-19, which was labeled 91 in the comprehensive exhibit.

MR. GUEST: Thank you, Madam Chairman.

BY MR. GUEST:

Q Have you had an opportunity to review this document, Mr. Hicks?

A I looked at it just now, yes.

Q This was an exhibit to Mr. Schwartz' testimony. You see there that the dotted line at the bottom represents Florida Power and Light's medium case forecast of delivered coal prices, and this dotted line is the medium case forecast of delivered petcoke prices, correct?

A Yes.

Q And what it shows, also, is that the solid line is the Central Appalachian coal that FPL proposes to use at the proposed Glades coal plant?

A FPL proposes to use, as a base combination, 40 percent Central Appalachian, 40 percent foreign, and 20 percent petroleum coke, and did an economic analysis based upon that. In addition, we did economic analysis, both FPL and through the clean coal technology selection study looking at use of petroleum coke both for the PC technology, the ultra-supercritical technology, and IGCC technology. The results were that the IGCC -- delivered cost of IGCC power was greater than 40 percent over the life of the plant versus an ultra-supercritical pulverized coal plant. And that's contained in the clean coal technology selection study, both in the summary and in the text of the document.

And that delta in terms of significantly higher delivered cost over the life of the plant for an IGCC plant that's burning 50 percent petroleum coke was consistent, including without emissions, with emissions, with degradation on heat rate, and also with CO_2 emissions.

Q Well, the big picture that you see from Exhibit 91 is that petcoke per million Btu is consistently a dollar or two or perhaps even three cheaper than your coal source, isn't that right?

A Not necessarily. Because, once again, the coal source that is assumed for FPL Glades Power Park includes petroleum coke. It includes petroleum coke, foreign coal, and Central Appalachian coal. Once again, it has to be -- this document also has to be, it has to be understood that petroleum coke is an opportunity fuel. It's not a fuel that one can sign long-term contracts for. And because it is an opportunity fuel, you need to be careful about the usage of that fuel when you look at your fuel mix.

Q There's a 20 percent limit on how much you can put in the proposed Glades coal plant?

A That is correct.

Q For petcoke. And this document, Exhibit 91, has the projected price, correct?

A Yes, it does.

Q And you have no reason to think that price is wrong, do you?

A It's a projection. It's a projection of future prices.

MR. GUEST: Let's turn to the matter of, you know, I'm going through the items on your benefits list here, let's turn to the matter of capital cost of building the proposed Glades pulverized coal plant. I think it might be useful at this juncture to compare some very gross numbers from the petition to do a comparison. So we're going to hand out Page 10, I think, of the petition so we can look at some base numbers. Should this be separately marked as an exhibit even though it's Page 10 of the petition?

MS. BRUBAKER: I don't believe it needs to be separately marked. And, actually, on that note, I would note that what has been identified as Exhibit 170 has actually been marked as Exhibit 121, it's Mr. Furman's Supplemental Exhibit RCF-29. The only difference, that we can tell, is that it is in color. If that's significant, we can certainly leave it marked as 170. If it's not --

MR. GUEST: We would prefer to leave it in color.

MS. BRUBAKER: That's fine. I just wanted that clarification. Thank you.

MR. GUEST: Is everyone together here with us?

BY MR. GUEST:

Q Now, Mr. Hicks, we start with a total estimated cost of 5.7 billion, is that correct?

A That is correct, in 2014 dollars.

Q And then you could take out some numbers, $125 million for land acquisition for the site and 73 million for transmission line land. That is about 200 million, right?

A The document that I have before me says that there is 125 million for land acquisition, which is correct, and 73 million for land acquisition for off-site transmission systems, included in the 5.7 billion.

Q Right. So if you wanted to take out land acquisition costs, you would take out about 200 million?

A Correct.

Q So that would leave you at about 5.5 billion, is that right?

A In 2014 dollars, yes.

Q And so, you have 18, I'm sorry, 1960 kilowatt hour, megawatt capacity -- pardon me for garbling this story -- and so if you take that 5.5 billion, and divide it by 1960, your cost per kilowatt hour comes out to $2,704.

A No, that's not correct. The cost per kilowatt hour would not be $2,704.

Q I'm sorry, the cost per kilowatt.

A The cost per kilowatt installed, yes, in 2004 dollars. And I don't have a calculator in front of me, so I don't have a way of verifying your --

Q Well, let me supply you with a state-of-the-art calculator. It may take a minute, because that is a solar-powered calculator just to conserve energy.

A What was the number you came up with?

Q 2,704, $2,704.

A In 2014 dollars?

Q Yes.

A At the summer-rated capacity of the unit, 1,960 megawatts.

Q That's it. And if you were to compare that to a document we used a few moments ago, Number 169, do you have that with you?

A Yes, I do.

Q Under Number 13, the third line, this is for the TECO Polk Unit Plan, the new one that's going to come on-line in 2013, the third line shows the total installed cost is $2,626.70.

A I see that, but I believe that calculation is done on the winter capacity and not the summer capacity. There is nothing in here that indicates it is done on summer capacity. Second of all, it is a 2013 number rather than a 2014 number. Number three, it fails to account for the delta in terms of transmission upgrades necessary. A proper comparison would be for an IGCC plant that's is built at the Glades Power Park site and has an equivalent amount of transmission costs.

Now, we did that analysis for the FPL clean coal technology selection study. And what we found was that the capital cost of a similarly sized IGCC unit would be 36.8 percent higher in same year dollars.

The other important thing to understand here is that this is a 2006 document, and what it represents is an estimate before feasibility and frontend engineering and design studies are done. The way an IGCC plant is developed is you single source it. There's about six different developers out there, but you single source with a vendor. You pick a vendor, and you engage that vendor in a contract and they do a feasibility study for you, and that takes up to a year. At the end of that feasibility study period, you get a cost with a very wide, a very large error factor in it. Then you do what's called a frontend engineering and design study, which is a much more detailed study to come up with a much more detailed cost.

This does not represent -- what's in this document does not represent the results of a frontend engineering and design study analysis. And what is very important about that is what we're seeing over and over again is when the frontend engineering design study is completed, the costs rise dramatically.

And there's a number of examples of that over the last four months. The first example is American Electric Power. They are proposing a 600-megawatt IGCC plant in Ohio and one in West Virginia. When they proposed the plant cost early in that process similar to this, they proposed a cost of about 1.1 billion. Then they worked on the frontend engineering and design study with GE and Bechtel. In December of 2006, they were scheduled to file, make a filing with the Ohio Public Utilities Commission on the cost of the plant. Their goal was to get the cost of that 600-megawatt IGCC plant to within 20 percent of a similarly sized pulverized coal plant.

Now, should we mention that going from a 600-megawatt pulverized coal unit to a 980-megawatt unit, which is the size of one of the two at FPL Glades Power Park, there's economies of scale there, coal technologies and economies of scale technologies. The larger you build it, the smaller the capital cost per kilowatt hour installed.

So moving from a 600-megawatt pulverized coal unit to a 980-megawatt pulverized coal unit you get about a 15 percent decrease in cost per kW installed. So if AEP was able to achieve its goal of being within 20 percent of a similarly sized pulverized coal unit, they would be about 35 percent more expensive on a dollars per kW basis versus a 980-megawatt unit. At the end of December, they made a filing with the Ohio Public Utilities Commission saying that they were going to have to delay their filing on cost to the late summer to early fall of 2007 because they were unable to achieve their stated goal of 20 percent.

The second example of the rising costs with respect to IGCC capital costs as you move down the engineering path, was a filing made on April 2nd, 2007 by Duke Indiana before the Indiana Utilities Regulatory Commission. On April 2nd, they filed the results of their frontend engineering design study. They stated that that feed study took 13 months, 11 full-time employees, 15 part-time employees, and 30,000 man hours.

As a result of that study, the cost that they reported to the Indiana Utilities Regulatory Commission had risen to $2 billion in 2011 dollars. Escalating that to 2014 puts it at about $3,500 a kW, which is very similar to the price, the cost that we had in the FPL Clean Coal Technology

Selection Study.

In addition to that, another data point was the Masaba Project (phonetic), which is a 600-megawatt IGCC project proposed for Minnesota. The Masaba Project filed for tax credits under the Energy Policy Act of 2006, and there is a DOE document associated with that on the award of those tax credits. The cost, the estimated cost of the plant in the spring of 2006 was $2,155,000,000 for a 600-megawatt plant. Over $3,500 per kilowatt installed in 2011 dollars, once again.

It should be mentioned that 12 days ago, April 12th, two administrative law judges in the state of Minnesota after hearing testimony on the Masaba Project recommended that the Minnesota Public Utilities Commission deny the Masaba Project's contract or proposed contract with Excel because it was not in the best interest of the customers of Minnesota in great part because the costs were unreasonable.

So when you look at IGCC projects, it's very important to understand the delta between the original estimates, feasibility study estimates and when you go through that feasibility and more detailed engineering analysis and how those costs rise. If you look at what happened with AEP, you look at what happened with Duke Indiana, and you look at the actual numbers, the proposed numbers for the Masaba Project, those numbers are consistent with the numbers that are in the FPL Clean Coal Technology Study, which indicate a cost premium, a capital cost premium of about 37 percent for an IGCC plant.

Q Tampa Electric Company had actually constructed an IGCC plant in 1996.

A Yes, they did. And the original cost of that plant -- the original projected cost of that plant was $303 million of which 50 percent of it was funded by the DOE. The actual cost of the plant as reported by the DOE was $606 million, double the original projected cost.

Q And based on the experience that TECO has had, they are building another one.

A They are proposing to build a 600-megawatt unit, a coal-to-electricity 600-megawatt IGCC plant that has never been built before, and they have not completed the feasibility and feed study analysis to the best of my knowledge.

Q Now, let's turn to another item on your list here. We have dealt already with the fuel costs, petcoke, et cetera, petcoke and coal. Let's turn to -- we dealt with reliability. Let's turn to technological maturity and construction risk.

Now, it's your testimony -- well, first, let me ask a basic background question. It's true, isn't it, that electrical powered utilities tend to be risk averse? Is that right?

A I don't think that's a good question to ask me. I can't really comment on that, whether they are risk averse or not risk averse. I think, generally, utilities have a mandate to produce reliable cost-effective power for their customers, and they take actions to produce that type of power for their customers. Your characterization of risk averse is one that I can't really comment on.

Q You have testified that IGCC is not really commercially available, is that right?

A No. What I have testified is that IGCC plants, there have been four coal-based IGCC plants built in the world, relatively small, government subsidized, and that the next wave of IGCC plants in the 600-megawatt range have not been built yet. So are they commercially available? You could design and build one if you wanted to, if that was your choice, if that was the utility's choice, but those plants are not in operation today.

Q The earliest one is actually 13 years ago.

A That was a demonstration. Actually the earliest IGCC plant that I am aware of is the Coolwater Facility (phonetic), which was constructed in Southern California. It operated for a few years, had significant problems, and then was torn down.

There were four coal-based IGCC plants, relatively small demonstration projects built in the early 1990s. Actually, I correct myself. There was actually five built, three in the United States and two in Europe. One of the three in the United States, Pinyon Pine (phonetic), was constructed by Sierra Pacific Power with a grant from the Department of

Energy. It was a complete failure. It never operated. The gasifier was never able to operate, so it was shut down. So there was actually five built, four in operation.

MR. GUEST: I would like to ask the witness some questions about a document that has been previously admitted as Staff Exhibit Number 2, composite exhibit, and the Bates stamp, which I think is the exhibit number, or the subnumber is 313. Those being the last three digits. And 314, it is two pages.

CHAIRMAN EDGAR: Ms. Brubaker.

MS. BRUBAKER: Madam Chairman, if I could just actually step back a second. Earlier a couple of pages from FPL's petition was handed out. At the time the document was being identified verbally, I misunderstood what was being described. If Sierra Club wishes, I think it would be appropriate to identify that document separately. And, if so, that would be 171.

CHAIRMAN EDGAR: Okay. For clarity we can go ahead and do that.

MR. GUEST: Certainly. 171 is the first page and Page 10 of the petition by FPL.

MS. BRUBAKER: Which would have us at Number 172 for the document just handed out. Just for clarity, this is straight from the staff exhibit. You do wish it separately identified?

MR. GUEST: For simplicity, yes.

CHAIRMAN EDGAR: Okay. Thank you.

(Exhibit 171 and 172 marked for identification.)

BY MR. GUEST:

Q Have you had an opportunity to review this exhibit, Mr. Hicks?

A I am looking at it right now. Yes, I have looked at the document.

Q Let's start with the total number of coal plants. There is the one in Nuon in the Netherlands from 1994 that runs on coal and biomass, correct?

A I see a Nuon (Demkolec), 253-megawatt net rating of power from coal and biomass, yes.

Q And below that is the Wabash unit in Indiana from 1995 that runs on coal?

A Yes. One of the four coal-to-electricity plants that are in operation, IGCC plants.

Q The third one is the TECO 1996 plant.

A Yes. I would note that the TECO, this line for the TECO plant has an inaccurate capital cost number. It has the original projected cost of 303 million, which was 50 percent funded by the DOE. The actual cost of the plant reported by the DOE was 606 million, double the original projected cost.

Q The next one is the Czech Republic plant, which is coal and coke from 1996. That is coal and coke. I'm just going through the coal plants first. Do you see that one?

A Yes, I see that one.

Q Now we are up to four. Then you have got the one in Spain, three down from that.

A And, you know, one thing I would caution you on is Mr. Jenkins has a greater knowledge of some of these other plants, such as the Czech Republic plant, et cetera, and how much of those plants are actually operating on steam.

Q Well, we're just counting them right now. And then we have -- you actually have the Schwarze plant that operates on lignite and waste. Lignite is a kind of coal, is that right?

A It's a very small plant, a 40-megawatt plant, and my understanding of it, it produces mainly methanol.

Q But the question was is lignite a kind of coal?

A Yes, it is.

Q And then we have two plants at the end of this second page in China that run on coal.

A I don't know. Once again, I don't have any verification that these plants are actually in operation. I don't know from this document whether those two Chinese plants are in operation. One appears to be a 2007. I don't know whether they are announced in operation and construction, don't have any verification on that.

Q So what we have on this list is eight plants that are IGCC plants that are operating partly or entirely on coal.

A And may or may not be producing power at all or relatively small, yes.

Q And then if you look at the total number of operating IGCC facilities, which is what this document is, the total number is 17.

A And it includes various fuels. As I stated earlier, there is a significant difference between operating on coal to produce power versus other types of fuels. Once again, Mr. Jenkins can provide you greater detail on that.

Q And now turning to plants that are in the works, I would like to refer to Staff Exhibit Number 2 at Bates stamp Pages 309 to 11, which we are fixing to distribute here.

MR. ANDERSON: Just as a suggestion as things are being passed out, Mr. Jenkins is probably the witness for all the international projects if you have questions, but however you want to proceed.

MR. GUEST: I think we can just make a couple of quick points here.

CHAIRMAN EDGAR: Okay. So I'm on 173, proposed projects IGCC and polygeneration in North America?

MR. GUEST: Right.

(Exhibit 173 marked for identification.)

BY MR. GUEST:

Q And I would like you to either count them or assume that I am correctly counting that there is 39 plants in the works in North America that are IGCC plants.

A I think you are mischaracterizing by calling them "in the works". I think those are proposed plants. Many of those plants you can see the start up here is not available. There is a big difference between a proposed plant and one that actually gets built. For example, there is over -- I believe over 150 pulverized coal plants proposed for the United States. It's clear to us that many of those will not be built.

There are literally thousands of pulverized coal plants proposed in the world, many of those will not be built. This type of difference between proposed and actual built is something that we have seen over and over again. Many, many, many gas-fired combined cycles were proposed during the gas bubble in the late part of the last decade, early part of this decade. The overwhelming majority of those have never been built.

I would also mention that some of these are, for example, you have the TXU 2014 Colorado City and Henderson plants, those are announcements that they are looking at the possibility of building those plants. So saying those plants are in the works is, I think, a mischaracterization of those facilities, many of which are proposed or announcements of potential plants.

Q Well, with that correction, you would agree with me then that there is about 39 proposed IGCC plants in the United

States?

A It appears to be somewhere around 35 to 40 proposed facilities in the United States. Many of them appear to not be producing power, to be producing other types of chemicals.

Q And almost all of these are operating on some kind of coal or coal waste. That's the proposal, isn't that correct?

A That's the listed fuel on this sheet.

Q Now, I would like to turn on this issue lastly to Staff Exhibit Number 2, Page 316 and 317, which will be following our numbers, 174.

CHAIRMAN EDGAR: Yes.

MR. GUEST: Which is Proposed IGCC Plants Other Than in North America.

CHAIRMAN EDGAR: Thank you.

(Exhibit 174 marked for identification.)

BY MR. GUEST:

Q Have you had an opportunity to review that?

A Yes, I have.

Q So we have about another 27 proposed plants?

A Proposed, yes. And I don't know what state they are in, how much is behind them, are they just an initial announcement, et cetera. As a sort of point on this, if you look at Germany's long-run supply plan through the year 2020, they propose 37,150 megawatts of coal-fired power plants. Of those 37,150 in their official supply plan about

36,700 megawatts are pulverized coal and circulating fluidized bed and only 450 in their official plan is IGCC. Once again, what information proposed really gives you is rather nebulous, because many proposed plants are never built.

Q And most of the ones on this list are coal or coal waste?

A Yes.

Q So if you put together that 27 and the 39 proposed for the United States, we have 66 around the world, and presumably they are basing their proposals on the experience of the 17 existing plants that have been in service for up to 13 years, is that correct?

A I have no evidence to support whether or not they are based on the operations of existing plants or not. One thing I would note is each one of these plants with the exception of the Nuon plant in the Netherlands, which is mischaracterized as a 1200-megawatt plant, that's actually a 600-megawatt IGCC and a 600-megawatt combined cycle, that all of those plants are less than -- appear to be less than 600 megawatts.

Q Now, continuing on our comparison of benefits of the proposed Glades plant versus IGCC, let's turn to carbon capture costs under the assumption that there will be some sort of regulatory system or tax or cap and trade or something that will provide an incentive in the future to capture and sequester carbon dioxide.

MR. GUEST: And in that connection, I think I would like to hand out and show the witness a Department of Energy exhibit from the National Energy Technology Laboratory at the Department of Energy.

CHAIRMAN EDGAR: Okay. 175, Cost of Electricity Comparison.

(Exhibit 175 marked for identification.)

BY MR. GUEST:

Q Have you had an opportunity to review this, Mr. Hicks?

A I am currently looking at it. I note it says, "Note: Preliminary results as of September 2006. Final report release date January 2007." It does not say where these plants are located, it does not give any backup with regard to how these costs were calculated.

Q Okay. I would like to note that this is also listed as RCF-7, just for the record. And I guess this is Number --

CHAIRMAN EDGAR: 175.

BY MR. GUEST:

Q So let's just look at a comparison of the carbon capture costs that you can infer from this bar graph, starting with the tan bars, the two of them on the far left. Do you see those?

A Yes, I do.

Q And you see that by having carbon dioxide capture you add an additional 1.58 cents to the cost per kilowatt hour. Do you see that?

A I'm not sure how that's calculated, what the basis for that is, what type of plant they are looking at, what type of carbon capture system they are using, et cetera. So it shows that. What value that has without looking at the backup to that you just can't make a determination of what the value of that is.

Q But you agree with me that the difference is 1.58 cents?

A On this diagram, yes, 1.58 cents.

Q Per kilowatt hour. And let's assume that we have 800 -- I'm sorry, 8,760 hours in a year, because there is 24 hours in a day and 365 days in a year. And further that you will operate the plant at 90 percent of the time at its capacity of 1960 megawatts.

I don't see you working the calculator, Mr. Hicks.

A Yes, because there is nothing in here that says this is a 1960-megawatt plant, nothing in here that indicates to me what the -- where these costs were derived from. We know from our own analysis the NETL capital costs and operating costs that they are significantly below the industry. They are as much as 100 percent below the recent indications of costs that I mentioned to the Commission, et cetera.

Q Just let's continue with this calculation. I understand the point that you have made. Using the Department of Energy document here, and applying the 1.58 cents to the number of hours in the year to the capacity of the plant assuming it's on line 90 percent of the time, you come up with a carbon capture cost for IGCC estimated at about $241 million per year. Is that correct?

A Without sitting down and doing the calculation, I can't verify that.

Q Well, you have got a calculator right next to you. I gave it to you.

A But I would prefer to take my time and do the calculation rather than --

MR. GUEST: Okay. Well, maybe what we can do is I would like the record to reflect that that is what I have done, and give the witness an opportunity after a break to correct the error if there is one. May we do that?

CHAIRMAN EDGAR: Mr. Anderson.

MR. ANDERSON: No, we don't agree with that. We think it is an entirely inappropriate comparison. It is well known this document is based upon -- I think it was a generic midwest plant. The witness has testified numerous bases why there is really no foundation for this type of computation. If counsel's client wishes to introduce a computation, they should do it with their own witness.

MR. GUEST: This is something that one can take official recognition of because this is the communicative property of multiplication. That is all this is. My point is very simple, is that 1.58 cents applied to the number of kilowatt hours being generated at 90 percent capacity produces a cost of 244 million. That's multiplication, that's all. It is another way of expressing 1.58 cents.

CHAIRMAN EDGAR: Ms. Brubaker.

MS. BRUBAKER: It seems to me that we are kind of talking past each other. The pure math, I don't think anyone is disputing. I think what the witness is disputing is the underlying facts and assumptions which he doesn't actually have available to him. Even if he did, I suppose he might take still some exception to those underlying assumptions. The math is what it is. With that understanding, can you rephrase the question, or --

MR. GUEST: Well, all I'm trying to do is, I'm making one very narrow point, which is that a difference of 1.58 cents translates, if that were correct, would translate to a difference of about $244 million a year. That's all.

CHAIRMAN EDGAR: Do you have further questions?

MR. GUEST: Yes. Then I want to compare to supercritical, the right set of green bars.

BY MR. GUEST:

Q And, if you look at those, Mr. Hicks, you see that that is comparing 8.35 cents 4.97 cents, which gives you a difference of 3.38 cents. Is that correct?

A That is what it says on this document, yes. But, once again, you don't know where this plant was built, you don't know what the basis for the capital costs are, you don't know what the basis is for the carbon capture system that's on here. Is this an MEA system; is it an ammonia chill system? So without having that knowledge and being able to comment on that, I can't comment on the veracity of these numbers whether they make any sense or not.

Q Well, my point very simply is that using the Department of Energy document that we have before us, you would agree with me that 3.38 cents per kilowatt hour translates to an additional cost of $522 million per year. Those are equivalent numbers.

A That is your calculation. I will agree that is your calculation.

Q Okay. And I can assure you that I did it several times. And then the last issue is that if this is correct, based on this issue, and if those numbers are correct, and I assure you they are, the difference in carbon capture costs is a quarter of a billion dollars every year, if this is right?

A And I would say from what we know of NETL, that that NETL analysis is not correct, and does not include the most up to date carbon capture systems.

Q Now, our previous stipulation that we reached was the confidential study for Florida Power and Light by M.J. Bradley and Associates, that we agreed to read a sentence into the record and ask the question of the witness but not introduce the document. And so here we have this. Let me see if it actually is -- it is actually two sentences. And it is IGCC versus supercritical PC comparison, that is what it is under. And it reads, "Generally speaking, IGCC plants are viewed as cleaner than conventional PC plants in that they have equal or lower emissions of conventional and hazardous air pollutants, use less water, and produce smaller amounts of solid wastes. IGCC plants are also generally more efficient than PC plants, and perhaps, more importantly, they have the ability to capture and collect CO2 much more cost-effectively than PC plants."

Do you disagree with the conclusions of these consultants?

A Yes, I do. I disagree with those conclusions. That is an environmental consulting firm. That is a firm that has never designed a coal power plant of any technology. Never built one, never operated one. That an opinion of an environmental consulting firm. And there is ample evidence that indicates that many of those conclusions are incorrect.

MR. GUEST: May I have a moment? May we have a couple of minutes? I'm having trouble making a conversion.

CHAIRMAN EDGAR: Take five in place. Everybody stay close.

(Brief recess.)

CHAIRMAN EDGAR: Okay. We are going to go back on the record from break.

Mr. Guest.

MR. GUEST: We have reached an agreement where what we are going to do is I'm going to read a sentence or two of the same confidential report to the witness, but he's going have an opportunity to review the preceding pages and think about it before he answers. That's our compromise.

CHAIRMAN EDGAR: Mr. Anderson.

MR. ANDERSON: Yes. We just wanted the witness to have the context of the sentence or two he is looking at.

BY MR. GUEST:

Q Do you have it, Mr. Hicks?

A I have two pages in front of me. One that's labeled 5-3 in the bottom right corner and one that is labeled 5-2 in the bottom right corner.

Q Would you be kind enough to review those two pages, and when you have reviewed them I may ask you a question or two.

A Okay. I have looked through them.

Q This is yet another excerpt from the confidential Bradley study of the proposed Glades coal plant, and on one of the pages it reads --

MR. ANDERSON: If we might pause for a moment. I don't think that is the right characterization of the document.

MR. GUEST: Go ahead. Maybe we can --

MR. ANDERSON: Do you have the first page? Just tell us the title of the document, because I think it was pre-FGPP.

MR. GUEST: Okay. Assessment of future environmental liabilities --

MR. ANDERSON: Right. Thank you.

MR. GUEST: -- facing a new coal-fired power plant in Florida, April 2006 Report Update prepared by M.J. Bradley and Associates on behalf of Florida Power and Light.

MR. ANDERSON: Thank you for being clear. That was exactly my point that it wasn't FGPP specific.

CHAIRMAN EDGAR: Okay. Thank you, Mr. Anderson.

Mr. Guest.

BY MR. GUEST:

Q And on one of the pages, the second one that you have, it reads, "The avoided cost of carbon dioxide from the IGCC is less than half that from the PC plant. Similar studies by EPRI and others have produced similar results."

And my question is I just showed you a set of computations that showed that according to the Department of Energy, Number 175, according to the Department of Energy National Energy Technology Laboratory Report, the cost would be about double. Isn't it true that the confidential report that says about half, one, in the first sentence, and, two, the similar studies by EPRI and others, are all consistent with that finding that the cost for IGCC of carbon capture is about half?

A No, I would not agree with that, and let me give you some more clarity, some more color on that. Many of these studies, and this is an example of it, were done on older types of carbon capture systems. If I were to come before the Commission two months ago, I would have told you there's about 25 different R&D programs out there for carbon capture from pulverized coal plants. Today I can come here and tell you there is well over 30 because of the concentration now on carbon capture.

One of the most promising examples of carbon capture for pulverized coal plants is a system being developed by Alstom (phonetic) called an ammonia chill system. That ammonia chill system has been recognized by many as being a quantum leap in technology with regard to carbon capture for pulverized coal systems. One indication of that is in the second paragraph of Page 5-2, where it talks about the volume of syngas being an issue.

One of the challenges for IGCC is that about 20 percent of the total amount of electricity produced by IGCC plants is actually burned up inside the plant to keep the plant running. For a PC plant, about 6.5 to 7 percent is actually used up. So it is a big advantage for a PC plant.

One way of substantially reducing the cost of CO2 capture for a PC plant is to chill or bring down the temperature of the flue gas. By bringing down the temperature of the flue gas from 120 to 140 degrees down to about 35 degrees Fahrenheit, the volume of that flue gas is dramatically reduced, dramatically reducing the cost of subsequent capture. This ammonia chill process has actually been embraced by several utilities, including We Energies (phonetic), which now is a 5-megawatt test pilot at their Pleasant Prairie project, and by AEP. AEP is doing a 30-megawatt project in West Virginia and then following up with a much larger project that will commercially demonstrate this technology.

So things are changing very rapidly with regard to carbon dioxide capture. So these type of statements based upon older obsolete technologies may or may not be true, particularly when you look at the differences between a 600-megawatt IGCC plant updated for those feed costs, those more robust costs that come from going through the feasibility and frontend engineering design analysis versus a 980-megawatt or 2000-megawatt plant at the FGPP site.

It is fairly widely recognized by many that the costs for carbon capture for both IGCC and PC will converge over time. This study mentions an EPRI study. There is a recent EPRI study done for CPS in Texas looking at the comparison between an ultra-supercritical plant and an IGCC plant. The conclusion is both with and without capture, the cost of electricity from the ultra-supercritical plant is less.

Also, the MIT study that recently came out in March, a well-received MIT study stated that they also anticipated the cost for the two types of capture systems to converge. And given the uncertainty of future costs, it makes a very primary, a first and very primary recommendation. The first and primary recommendation of the MIT study is that entities such as utilities that are designing and building coal-fired power plants today, that they design those plants to be as efficient as economically justifiable. And by doing so you reduce the amount of CO_2 that has to be dealt with no matter what regime or what control mechanism is employed.

With FGP, with the Glades Power Park, that is exactly what FPL is doing. It is building the most efficient coal-fired power plant ever proposed for the United States, and that coal-fired power plant will be advantaged versus every other type of coal plant. Just during this cross-examination, I showed you that the next generation TECO proposed IGCC plant was almost 10 percent less efficient, meaning almost 10 percent more CO_2 that is going to have to be captured at a later date. So, I don't agree with what is in this thing because technology is changing rapidly.

Q Just one final follow-up. A second to final follow-up apparently, is you do agree that the quantity of flue gases pouring out of the smoke stack, if you will, in your pulverized coal plant is 160 times larger?

A No, I don't. That depends on the type of IGCC technology that's employed. The amount of flue gas volume coming out of a PC plant versus an oxygen-blown IGCC plant is different than a comparison of volume between a pulverized coal plant and an air-blown IGCC plant.

Q Okay. I want the comparison to be syngas, like the TECO plant, versus a supercritical pulverized coal plant. That is 160 to one, isn't it?

A I don't know whether it is 160 or not. I do know the volume is higher, but as I mentioned earlier, with the ammonia chill process for a very small penalty it terms of parasitic load, or the energy that is used up inside the plant, you can dramatically reduce that volume of flue gas that needs to be treated for CO2 emissions.

Remember I said earlier, an IGCC plant, about 20 percent of the gross power from that plant is used up internally to run the plant versus about 6.5 percent for pulverized coal plant. For a penalty of only about a percent or two more you can dramatically reduce the volume of flue gas that needs to be treated in a pulverized coal plant by chilling that, and that is exactly what this Alstom ammonia chill program is addressing.

Q That is not part of this plant, is it?

A This plant can be readily modified to include a wide variety of carbon capture, carbon conversion, and advanced combustion techniques. This plant is on a site that is 4,900 acres, of which 4,000 will be on the plant side, and we are leaving space in the design to allow this plant to be readily upgraded to include carbon capture systems when and if they are needed.

Q So what you have now is basically a footprint. Does it have grass on it?

A We have a footprint, we have a design for the plant, and that is very similar to IGCC plants. IGCC plants from the major vendors are leaving a space for carbon capture in the plant design similar to what is being done with the FPL Glades Power Park. In fact, General Electric will tell you that they are leaving a space that is 500 feet by 500 feet in the design for potential future carbon capture.

Q That's about four acres of grass, right?

A It about four acres. It may have grass on it or not. I would mention that most of this site is in sugarcane production right now.

MR. GUEST: Okay. No further questions at this time.

CHAIRMAN EDGAR: Mr. Krasowski, do you have questions on cross for this witness?

MR. KRASOWSKI: Yes, I have a few, Madam Chair.

Thank you.

CROSS EXAMINATION

BY MR. KRASOWSKI:

Q Hello, Mr. Hicks.

A Hello.

Q Mr. Hicks, I noticed in your testimony that you are -- let's see, you're in charge specifically of the -- you head up this project, the development of this specific project?

A Yes, I am. I am the senior director of project development. I have direct responsibility for the FPL Glades Power Park.

Q So in doing so, you are specifically focussed on this project. Have you done an evaluation or been involved in the evaluation of alternatives or energy efficient programs?

A Prior to about May of 2006, I was the development group at FPL, and I had responsibility for the -- well, I was the Director of Project Development responsible for the West County Energy Center, which was granted a site certificate in December. I was in charge of the nuclear development. I was in charge of coal-fired development.

I have also worked on the wind demonstration project that FPL is working on in the state of Florida. I would say around the late fall of 2005, I commissioned a study, a mapping of the state of Florida with regard to potential wind generation. And we used a firm called Wind Logics, which is a firm that we use on the FPL Energy side. And I know that being a customer of FPL that you are probably aware that FPL Energy competes with a utility out of Spain of being the largest developer of wind turbines in the world.

So we employed Wind Logics to do wind mapping of the state of Florida, and there are three conclusions that came out of that wind mapping. Number one, the State of Florida is a relatively poor state with regard to wind resources. It doesn't have the type of wind energy necessary to make wind generation commercially viable, particularly with regard to independent power development.

Number two, the wind that is available in the state is really concentrated on the coastline between South Hutchinson Island in St. Lucie County up to Jacksonville on the east coast of the state and sort of around the horn between Sarasota and Naples on the west coast.

The maximum capacity factors, or availability factors for wind in those areas range between 15 to 20 percent. As a rule of thumb, a typical capacity factor that one needs with production tax credits to make wind viable is about 33 percent.

And then the third conclusion we came to was that wind is a seasonal resource in the state of Florida. Really what you see is that what wind there is is really concentrated between October through April of the next year.

Given that set of data, I then commissioned two additional studies. One that focussed just on the east coast of Florida from South Hutchinson Island up to Jacksonville and one from Sarasota down to Naples. And those were concentrated studies in those areas. And what we found, the conclusion we found is if you are right on the coastline, you can get a 15 to 20 percent availability factor. If you move even a half a mile inland, it drops to about 5 percent.

With that information in tow, we attempted to build or attempted to permit a wind demonstration project of about ten megawatts. And that ten megawatt facility, we are actually on our fifth site right now. The first site was in New Smyrna. I got voted down by the city commission there four-to-one.

We then went to Cape Canaveral. Cape Canaveral juts out. It is part of the development business. You don't always get your first one, so you pick up the pieces and you move on. So then we moved on to Cape Canaveral. And if you look at the geography of the state, Cape Canaveral sort of juts out and gets natural wind. We looked both at the Cape Canaveral Air Force Station, and were rejected there by the Air Force, and then we went to NASA.

Now, we learned something new when we went to NASA. That north/south access along the east coast of the state, that's where you get a lot of bird migration. In fact, one of the largest bird refuges in the state is just north of Cape Canaveral. Well, NASA was very keen on employing this technology, but Fish and Wildlife won out at the end of the day.

Then we went to Sarasota. We got rejected there.

And we are on our fifth site that we are working on right now. So, we have looked at renewables.

We also looked at solar. We looked at commercial solar. FPL Energy, our subsidiary, is one of the largest solar developers in the world, and has the largest plant in the Mojave Desert. And a couple of conclusions we came to by levering their expertise is solar in the state of Florida, you are looking at about a 15 to 20 percent, or 15 to 17 percent availability factor and very high costs.

So, yes, we have looked at renewables. I have not looked at energy efficiency and demand-side management. That is the purview of others within our company.

Q All right. Thank you. I wasn't expecting such a long answer, but I appreciate it. It's good to know these things.

Let me ask you, earlier you said something about the difference between a proposed plant and one that will actually be built. What is the status of this FGPP plant, is it proposed, as well?

A It is a proposed facility.

Q Okay. Thank you. That's good enough. I mean, I just wanted to make that point. If you don't mind, I don't want to take too much time. I'm not an expert lawyer, so I don't want to be burdened with delaying everyone else. Okay. If we can keep it brief and to the question.

Now, this plant, as you specified, is very important and has been designed for bituminous coal. Is that Appalachian coal?

A It has been designed with two design points. One is for bituminous coal.

Q Exactly.

A And the second design point is bituminous coal and petroleum coke.

Q Is the bituminous coal Appalachian coal?

A It could be Appalachian coal, it could be western coal, it could be foreign coals. This plant could also, with derates also burn subbituminous coal. So, you could source coal, bituminous coals domestically and foreign coals.

Q Do you have any concern with the fact that the Peabody Coal Company has pulled out of Kentucky and Appalachia?

A They have not pulled out of Kentucky and Appalachia. What they have done is it looks like what they are going to do is spin-off their Central Appalachian facilities. I don't view it as a concern. I view it as an opportunity to potentially maybe through an equity investment or some other vehicle gain long-term very good long-term pricing for our customers.

Q Are you aware of the recent determination in the Ohio

Valley Environmental Coalition versus the United States Army Corps of Engineers --

A I'm not aware of that. I think Mr. Schwartz was aware of that.

Q Okay. Are you concerned that this case shows that there is a large community effort to restrict the use of mountaintop removal and other practices?

A I'm not aware of that.

Q Now, you said if the Commission would have asked you two months ago about sequestration technologies that you would have been able to tell them about 25 methods?

A About 25 R&D programs, yes.

Q Now we are up to 30?

A Well over 30, yes.

Q How many opportunities will there be in a year or two? How many opportunities for sequestration, or different technologies, or methods do you think there will be in a year from now?

A What I was discussing was carbon capture. Carbon capture and sequestration is a sort of horse and cart issue. Where the horse is sequestration, the cart is carbon capture. Without sequestration it doesn't matter what the carbon capture system is. But nevertheless, there are a number of carbon capture programs in place.

In terms of sequestration, one of the primary potential sequestration types, or sequestration areas, potential sequestration areas is deep saline aquifers. The estimated total capacity of deep saline aquifers in the world is about 9,600 gigatons. A gigaton is about a billion tons. About 40 percent of that world potential capacity is in the United States.

FPL has a service territory of about 27,650 square miles. Of that 27,650 square miles, virtually all of it is characterized geologically by deep saline aquifers. In addition, there was oil drilling that occurred about 75 miles southwest of the plant. That has left depleted oil well fields which is also a potential reservoir for carbon sequestration. So there is another option there available, also.

Last of all, there has been discussion or there has been research into using the different levels of the sea to capture carbon, and the Gulf of Mexico is within striking distance of this plant. So there is a number of different options out there available for sequestration.

Once again, the MIT study recognizes that not a lot has been done in the United States. Not in the United States, but in the world, not a lot has been done in terms of sequestration. And it recommends, given that lack of uncertainty, and it makes recommendations with how to address it, but given that lack of uncertainty, coal plant developers should build their plants as efficient as economically justifiable.

Q Now, why would you capture the carbon and what would you do with it if you weren't going to sequester it?

A There are other potential things that can be done with carbon. For example, enhanced oil recovery is generically a way of doing it. Now, there isn't enhanced oil recovery fields field close and in Florida, but that is another option available.

Q Okay. And there is a lot of debate and analysis as to how effective or what amount of sequestration could occur with that, and what is the cost/benefit of doing that in the oil that you then reclaim and then the pollution associated with the oil that you burn after you go through the effort of bringing it out of the ground and how much pollution that creates.

A I wouldn't necessarily characterize it as a lot of debate. I think that, you know, enhanced oil recovery is one option. And there is a lot of work that's going to be done on that and other sequestration efforts in the country and around the world.

Q Are you familiar with the Department of Energy -- they are participating in a project near Orlando for IGCC? Is that what you referred to earlier when you said -- when you mentioned something about the DOE having a project in --

A DOE is cofunding a number of projects. One of them in the Stanton B project, which is a 283-megawatt IGCC project in which they provided about $230 million of funding. That project appears to be going forward in Orlando. I would mention that the emissions profile of that plant is significantly worse than the emissions profile for the FPL Glades Power Park, particularly with regard to nitrogen oxide and mercury.

Q And when will the study associated with that project, when will the results be understood for analysis?

A I believe that that is a -- it is a project to demonstrate the ability of IGCC to operate on Powder River Basin. That is my understanding of it. And I believe it is a four year -- it is projected to come on-line in 2011 and be a four-year demonstration of whether or not that technology actually works.

That technology has never been built greater than, I believe, four or six megawatts. So you are scaling that technology up about 50 to 60 times. So there is a question about whether or not the technology would actually work, and it is a demonstration to see if that technological works, and particularly if that technology can work with Powder River Basin.

Q Being that the ratepayers, and if certain laws are passed, being that the ratepayers will pay one way or the other for this plant that you propose to build, how does the cost compare between IGCC and what's proposed now, whether it is ultra-supercritical, the plant you are proposing to build?

A I think Mr. Sim actually did an analysis on that and he is going to testify, and you can ask him that question. But it is a substantially higher present value of revenue requirements for an IGCC plant at the site versus an ultra-supercritical plant.

Q I have just a few more questions. How does the requirement to use lower level aquifer waters impact the cost being that the lower level waters -- because there is a drought now, and there is a discussion with the South Florida Water Management District, okay, as far as what waters you will be able to access. If you have to go lower, how will that impact the cost of the plant?

A The water supply plan for the project involves four types of water. Number one is what we call the Upper Floridan, which is a nonpotable or non-drinking water source that has saline qualities to it. The operations and maintenance costs associated with using that are in the project budget.

The second type of water resource is what we call excess stormwater. There are discharges from the lake every year. Those discharges cause environmental issues both in the St. Lucie estuary and in the Fort Myers area. Under the supply plan that we have proposed that we are working with with the South Florida Water Management District, they would notify us when we should use that excess stormwater to better utilize that water.

Number three, this is a 5,000 acre site. We are going to have significant catchment ponds, or water storage on the site, so we will use that as a third water supply. Last of all --

Q Mr. Hicks, could you just stick to my question, which was how --

CHAIRMAN EDGAR: Mr. Krasowski, let me do that, okay?

MR. KRASOWSKI: Yes, ma'am. I was trying to focus. I'm sorry. My apologies. I didn't mean to offend you.

CHAIRMAN EDGAR: We have been trying to focus for a couple of days actually. But, why don't you pose your question to the witness.

MR. KRASOWSKI: Yes.

BY MR. KRASOWSKI:

Q The question is how will the need, if necessary, if it is necessary to draw from a lower aquifer impact the cost of operating the plant, whether it be IGCC or the plant you propose, given that that lower material is understood to require more treatment for it to be used in the method you want to use it?

A If you could clarify your question. We are using one of the four water sources, the Upper Floridan. Are you talking about the Upper Floridan?

Q Well, that is the one that there is a problem with because of the drought.

A No, we have not got an indication from the South Florida Water Management District that there is a problem with that.

Q Oh, really?

A No.

Q You are not aware that they have issued a declaration that they will no longer be permitting extractions from the Everglades Water Basin to build homes or businesses?

A No, I'm not aware that. In fact, we are in constant communication with them. We have had on-going meetings, and they have not expressed, to my knowledge, any reticence with regard to our drawing from the Upper Floridan.

The water supply plan we are for FPL Glades Power Park is very similar to the water supply plan that the South Florida Water Management District approved for the West County Energy Center.

Q Okay. Have you identified your fly ash and bottom ash and other byproduct buyers?

A Yes. We have had on-going discussions with a number of buyers. One buyer -- I could sign contracts for both fly ash and the bottom ash and the synthetic gypsum. Synthetic gypsum is a direct result of the flue gas desulphurization process. Limestone is used in that flue gas desulphurization process, and the byproduct is synthetic gypsum which is actually of a higher quality gypsum than naturally occurring gypsum for the use in wallboard. And I could sign contracts very quickly for 100 percent of all of those resources. In fact, one wallboard manufacturer is very keen to get access to this because they claim that if they could gain access to this synthetic gypsum they could control the wallboard market south of Orlando. So very keen interest.

One opportunity that I'm pursuing on that is an overall opportunity that would involve getting limestone from a limestone supplier for free and then providing them the byproducts and they would take the byproducts. So from a plant perspective, the plant manager would not have to worry about either limestone supply or dealing with the byproducts themselves. So, a number of different options available to us.

Q What are you going to do with the ash if it becomes -- if it has to be held on-site?

A If it had to be held on-site, it would be landfilled in a double-lined landfill that meets all federal and state requirements.

Q And where is that, on-site?

A It would be on-site, yes, sir.

Q And how much of a capacity do you have on-site for the ash byproduct?

A We have ample capacity on-site. Even though it appears that all of those byproducts will be sold, we have ample capacity on-site for the entire life of the plant.

Q Really. And who was responsible for, or will it be included in your costs, the train, the repair or bringing up to standards the train tracks? I understand they are not in any shape to be taking these coal shipments.

A No, that is not correct. This site is advantaged in the sense that the southern boundary of the site is the South Central Florida Express. The South Central Florida Express connects to two major networks, the Northfolk Southern and the CSX. That gives us rail competition, origin and destination, foreign and domestic. Very important for the life-cycle economics of a power plant.

The South Central Florida Express, and I think this is what you are alluding to, has signed two agreements with the DOT. In those two agreements, the DOT is funding 75 percent of the total upgrades necessary to bring those lines up to a status that will allow heavy trains such as the coal trains and heavy equipment trains to access the site. The first contract is from Lakeport, which is a town on the south side of the lake, to Morehaven, which is in Glades County. That upgrade has already been completed.

The second contract has already been let out, and that upgrade will be completed by the Spring of 2008, in time for us to start construction and reduce the transportation cost for major equipment to the site. So, those issues have been resolved. Those issues would have been resolved whether or not we built the plant.

Q So it is not a cost to you?

A We have a contract with the South Central Florida Express for the life of the plant, and that's about 99 percent completed. But the costs associated with those upgrades, they were funded 75 percent DOT, 25 percent South Central Florida Express. They would have been completed regardless of whether or not this plant is actually built.

Q 75 percent was funded by the DOT?

A Florida Department of Transportation, yes, sir.

Q Florida Department of Transportation. And I assume that is taxpayer money?

A I don't know where that money comes from.

Q They don't print it, right? Okay. You don't know.

And my last question is how does the close proximity to the Everglades National Park and the monies dedicated to the Lake Okeechobee cleanup enter into the appropriateness of your site selection for this FGPP project?

A FPL takes its responsibility as an environmental steward very, very seriously. And we have designed this plant with six separate pollution control devices, almost a billion dollars worth. Four of those pollution control devices -- all of those pollution control devices are wrapped under a single air quality control system contract where the supplier guarantees the emissions control. Four of those are proven technologies in operation, state of the art. Two are next generation technologies. With all of those pollution control technologies this project will be very environmentally sensitive for its location. I should mention that there is a landfill to the east of the site, and a state penitentiary to the south, and it's in an agriculture area, so it is well suited. It also provides a substantial economic benefit to the people of Glades County and surrounding areas.

Q One more last question if, I may. I apologize. What is the cost to the DOT for their participation in the rail contract?

A They are not participating in the rail contract. They have two separate -- before we even got involved with them, the DOT and South Central Florida Express put together a package to upgrade those rail lines. So DOT is not part of the contract for rail service between the South Central Florida Express and FPL. Those upgrades would have been completed whether or not the power plant was built there.

The contract we have is with the South Central Florida Express for transportation to pick up trains from CSX at Sebring, bring them to the plant site, pick up trains from the Northfolk Southern FEC at Fort Pierce and bring them to the plant site.

Q So I suppose I should ask DOT what that cost was? I mean you, are not involved in that?

A That's not my bailiwick, no.

MR. KRASOWSKI: Okay. Thank you very much, Mr. Hicks.

THE WITNESS: You're very welcome.

MR. KRASOWSKI: Thank you, Madam Chair.

CHAIRMAN EDGAR: Thank you.

Are there questions from staff for this witness?

MS. BRUBAKER: Yes.

CHAIRMAN EDGAR: Any idea of how long?

MS. BRUBAKER: I would say about ten or fifteen minutes, depending on the length of the answers.

CHAIRMAN EDGAR: Okay. Why don't we go ahead and, Commissioner McMurrian, I will give you the option. Would you like to ask your questions now or go on lunch break and you can start then? You're fine either way? Okay. Commissioner Carter, your preference?

I'm hungry, so let's take a lunch break and we will come back at 2:00 o'clock. And we will continue with this witness at that time.

Thank you.

(Transcript continues in sequence with Volume 7.)

STATE OF FLORIDA)

: CERTIFICATE OF REPORTERS

COUNTY OF LEON)

WE, JANE FAUROT, RPR, and LINDA BOLES, RPR, CRR, Official Commission Reporters, do hereby certify that the foregoing proceeding was heard at the time and place herein stated.

IT IS FURTHER CERTIFIED that we stenographically reported the said proceedings; that the same has been transcribed under our direct supervision; and that this transcript constitutes a true transcription of our notes of said proceedings.

WE FURTHER CERTIFY that we are not a relative, employee, attorney or counsel of any of the parties, nor are we a relative or employee of any of the parties' attorneys or counsel connected with the action, nor are we financially interested in the action.

DATED THIS 25TH DAY OF APRIL, 2007.

JANE FAUROT, RPR
FPSC Official Commission Reporter
(850) 413-6732

LINDA BOLES, RPR, CRR
FPSC Official Commission Reporter
(850) 413-6734