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 10

Pages 1385 through 1625

PROCEEDINGS:	HEARING
BEFORE:	CHAIRMAN LISA POLAK EDGAR COMMISSIONER MATTHEW M. CARTER, II COMMISSIONER KATRINA J. McMURRIAN
DATE:	Thursday, April 26, 2007
TIME:	Commenced at 9:30 a.m. Recessed at 5:34 p.m.
PLACE:	Betty Easley Conference Center Room 148 4075 Esplanade Way Tallahassee, Florida
REPORTED BY:	MARY ALLEN NEEL, RPR, FPR
APPEARANCES:	(As heretofore noted.)

I N D E X

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P R O C E E D I N G S

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CHAIRMAN EDGAR: We will go back on the record from lunch break.

And I am a little confused, because I thought that we were going to take up Mr. Plunkett and work through his testimony.

MR. GUEST: Well, the practical problem, Madam Chairman, is that his son is by himself in Vermont, and he's got to get out of Dodge. We had anticipated based on what we heard yesterday that he would be able to do that. He has to absolutely catch his flight. We anticipate that we'll be -- now we're running so late that there's, I don't think, much possibility -- we probably aren't even going to get done with Mr. Furman now, and he's the next guy in the batting order. So Mr. Plunkett has been kind enough to say that he'll make himself available whenever the next date is, and we'll keep the batting order.

CHAIRMAN EDGAR: Okay. So what you're proposing is to take up Mr. Furman now and then go on to rebuttal and come back to Mr. Plunkett on Monday? Is that your proposal?

MR. GUEST: No. I think actually -- my

belief, based on the way things have been going, is that we're not going to get through Mr. Furman today. We might, but I'm guessing no. I mean, we had anticipated 20 minutes or so for Mr. Sim, and --

CHAIRMAN EDGAR: Okay. I understand. You've raised that a number of times, but this is where we are now. So again, what you are requesting is to take up Mr. Furman and then move to Mr. Hicks after that and to take up Mr. Plunkett at some point on Monday; is that --

MR. GUEST: If it's necessary, yes. If the cards play that way, yes, but -- I mean, if that's --

CHAIRMAN EDGAR: Well, I think that that -- Mr. Anderson, do you have an alternate proposal or request or not?

MR. ANDERSON: Yes, we do. Yes, we do, Chairman Edgar. Florida Power & Light Company is prepared to examine Mr. Plunkett. It would not be very extensive, perhaps 20 minutes. That would be one choice.

Another choice would be, if he needs to go, which that's fine, we are willing to accept a stipulation of his deposition into the record, and respecting that, in our view, he could go.

CHAIRMAN EDGAR: Mr. Krasowski, I'm sorry. I may have asked you this already, and I apologize if I

have. So either for the first time or the second time, let me pose this question to you. Do you have questions for Mr. Plunkett?

MR. KRASOWSKI: Yes. I have quite a few questions.

CHAIRMAN EDGAR: And that is what I asked previously, isn't it?

MR. KRASOWSKI: That's right.

CHAIRMAN EDGAR: And I apologize to both gentlemen --

MR. KRASOWSKI: Well, I volunteered that for you.

CHAIRMAN EDGAR: -- for confusing Furman and Plunkett occasionally in my mind. My apologies to both of them.

Okay. Then what I would like to do is take up Mr. Plunkett and let's see if we can move through it and see where we are. I also have been trying to rearrange things, and I can stay later than I had said yesterday, which is an inconvenience to me as well. However, in the abundance of all of us trying to work together and move through what we need to in an orderly way, that is my request.

MR. GUEST: May I add an additional fact to the mix, Madam Chairman? I think he has to leave for

his plane at 2:30, which is 40 minutes from now.

CHAIRMAN EDGAR: Mr. Guest, we are all trying to work together. There are numerous planes out of Tallahassee.

MR. GUEST: The first thing we did was check, and that is the last one that gets him home, and his 12-year-old is home alone.

CHAIRMAN EDGAR: He should have brought him.

MR. GUEST: You know, that would have been a great idea, and we should have. And I'm feeling remorse that my son is not here, frankly.

CHAIRMAN EDGAR: I did say earlier in the proceeding that anybody was welcome to bring their children, please note, and we would have welcomed both of them, I assure you.

MR. KRASOWSKI: Madam Chair.

CHAIRMAN EDGAR: Mr. Krasowski. You could have brought your children too.

MR. KRASOWSKI: I wish I would have brought my son.

CHAIRMAN EDGAR: Me too.

MR. KRASOWSKI: He's probably just hanging around at home doing nothing. He's in college. Aside from that, though -- and I sincerely wish I did.

I think Mr. Plunkett is a very important

witness, and I wouldn't want to see his cross-examination and comments being abbreviated due to his urgency to get home or whatever, so I would certainly favor having him come back and deal with Mr. Furman if that's at all possible.

CHAIRMAN EDGAR: I understand. Thank you, Mr. Krasowski.

All right. My preference, quite frankly, would be to take up Mr. Plunkett as I have expressed. However, we do try to recognize all needs and the whole person here, truly. So I will expect to see Mr. Plunkett on Monday.

MR. GUEST: All right.

CHAIRMAN EDGAR: Mr. Plunkett?

MR. GUEST: Okay. So we'll just do both.

(Counsel conferring.)

MS. SMITH: Can we just try to get through it, Madam Chairman? We have very, very little. We can move very quickly.

MR. KRASOWSKI: And they said they had -- excuse me, Madam Chairman. FPL said they had 20 minutes, and I have some questions, and I suppose others might. You'll ask. And you might have questions for Mr. Plunkett. And if he has to leave at 2:30, I mean, we don't have time to do that properly. And he has a

lot to say. Well --

MR. GUEST: Let me see if I can buy some more time.

MS. SMITH: Madam Chairman.

CHAIRMAN EDGAR: Yes, ma'am.

MS. SMITH: I would ask that we learn how much of the examination by Mr. Krasowski is friendly cross-examination as opposed to inquiring about Mr. Plunkett's testimony. Mr. Guest did tell us during the lunch break that he was working with Mr. Krasowski to try and limit what he called Mr. Krasowski's redirect of Mr. Plunkett. Certainly friendly cross-examination would be irrelevant, immaterial, and unduly repetitious evidence, and therefore immaterial -- inadmissible, sorry, under the APA.

MR. KRASOWSKI: Madam Chair, may I speak?

CHAIRMAN EDGAR: Actually, truthfully, I think it's best if we all not right now.

I will point out that Mr. Krasowski is here pro se, that as such, there is some latitude in his questioning. However, I will also point out that as with every proceeding, and this one is certainly no exception, I have made the request to limit friendly cross, and if that will not be done mutually by the parties, then it will be done by me.

Now, Mr. Guest, we are all glad that Mr. Plunkett has joined us. I have, as you may all know, a special place in my heart for children not being left alone without their parents. I am trying to work with you and accommodate. However, it does seem to be a moving target a bit. So what do we need to do?

MR. GUEST: Well, I would propose let's just give it a whirl, and when we get to the time where he's got to bolt off to his plane, let's address whatever needs to be addressed then, and we'll do the best we can.

CHAIRMAN EDGAR: We'll give it a try. Mr. Plunkett, thank you for bearing with us, and please join us.

MR. KRASOWSKI: Madam Chair.

CHAIRMAN EDGAR: Yes, sir.

MR. KRASOWSKI: Madam Chair, I want to express this in appropriate terms, but I do not identify whatsoever with the accusation that I am being managed to any degree by Mr. Guest or anybody in his party. My being here is a direct result of the way they're approaching this case and the things they're advocating for. So Mr. Plunkett is not a friendly witness, but he is someone who -- through his testimony is identified as somebody who might be knowledgeable and able to

illuminate what we've not been able to uncover yet far, so far. So thank you, Madam Chair.

CHAIRMAN EDGAR: Thank you. I appreciate your comments, and I note them for the record.

MS. PERDUE: Madam Chair, just so you know also, we have questions for this witness as well.

CHAIRMAN EDGAR: Thank you.

Okay. Mr. Plunkett, you need to be sworn, so when you are settled in, if you would, stand with me and raise your right hand. Thank you.

MR. GROSS: I just want to say good afternoon, Madam Chair and Commissioners Carter and McMurrian.

Thereupon,

JOHN J. PLUNKETT

was called as a witness on behalf of The Sierra Club, Inc., et al. and, having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. GROSS:

Q. Mr. Plunkett, will you please state your full name and business address.

A. John J. Plunkett. I'm a partner in Green Energy Economics Group. My business address is 1002 Jerusalem Road, Bristol, Vermont.

Q. And on whose behalf are you here to testify

today?

A. I'm here on behalf of The Sierra Club, Save Our Creeks, Florida Wildlife Federation, Environmental Confederation of Southwest Florida, and Ellen Peterson.

MR. GROSS: I just want to add that we also have been retained by the NRDC, who intervened late in the proceeding.

BY MR. GROSS:

Q. Did you cause to be filed direct testimony on March 16th, including exhibits JJP-1 through 4, in this docket?

A. Yes.

Q. Do you have any questions -- any corrections or revisions to your testimony?

A. Yes, one. On page 7, line 6, there is an extra zero in 20011. That should be 20 -- 2011, not 20011.

Q. Okay. If I asked you the very same questions posed in your testimony today, would your answers be the same?

A. Yes, they would.

MR. GROSS: I would request that Mr. Plunkett's testimony be inserted into the record as though read.

CHAIRMAN EDGAR: The prefiled direct testimony

will be entered into the record as though read, with the correction noted by the witness.

BY MR. GROSS:

Q. Mr. Plunkett, did you sponsor any exhibits with your testimony?

A. Yes, 1 through 4.

Q. Was that JJP-1 through 4?

A. Correct.

MR. GROSS: Those exhibits have been premarked as 122 through 125.

Q: State your name, occupation and business address.

A: I am John J. Plunkett, a partner in Green Energy Economics Group. My address is 1002 Jerusalem Road, Bristol, VT 05443.

Q: Summarize your education and professional experience.

A: I graduated Phi Beta Kappa with a B.A. in Economics, with Distinction, from Swarthmore College. I have twenty-eight years of experience in energy utility planning, concentrating on demand-side management as a resource and business strategy for electric and gas service providers. I recently co-founded Green Energy Economics Group, a consultancy specializing in energy efficiency and renewable resource economics, with Francis Wyatt, my colleague since 1992. We provide technical and strategic assistance with energy-efficiency and distributed generation portfolio development, design, analysis, planning, administration, implementation management support, oversight, performance verification and evaluation, performance incentive mechanisms, and regulatory and ratemaking treatment.

I have testified as an expert witness on energy efficiency as an electricity and gas supply alternative in regulatory proceedings in the U.S. and Canada, including New York, New Jersey, Connecticut, Indiana, Florida, Ontario and Quebec. I have led several major studies of economically achievable efficiency potential, including New York, Vermont, and Maine. I have also led collaborative teams in the estimation of electric, economic, and environmental impacts of energy-efficiency portfolios, including New Jersey, Maryland, and two Chinese provinces.

For the past six years I have served on the senior management team of Efficiency Vermont, the nation's first statewide electric efficiency utility, which

has been responsible for managing Vermont's $70 million efficiency portfolio through 2005 since its inception in 2000. Efficiency Vermont has exceeded its energy and economic performance goals on or under budget during both its three-year contracts, and has just entered a third contract through 2008. We are in the midst of planning how to invest the 75% increase in annual efficiency investment recently announced by the Public Service Board in 2007 and 2008.

Since July 2003 I have led the Natural Resources Defense Council consulting team working with China's Jiangsu province to develop and implement energy-efficiency programs as "Energy-Efficiency Power Plants" ("EPP"). I am currently leading an Asian Development Bank consulting team to analyze the energy, economic, financial, and environmental prospects of launching an EPP in Guangdong province in 2007 funded through a $100 million, 24-year loan to finance efficiency retrofit investments by nonresidential customers.

Since April 2005, I have been leading the assessment and development of demand-side alternatives to transmission and distribution investments in Vermont's "southern loop" on behalf of Vermont Electric Power Company and Central Vermont Public Service. In parallel, I am leading the development of first-stage implementation plans for deployment of targeted demand-side management programs on behalf of CVPS. In 2003 I led an analysis of economically deliverable demand-side transmission capacity, submitted by the Vermont Electric Power Company in its application for approval of a major transmission upgrade, and testified in support of this analysis in 2004.

Over the last year and a half I submitted testimony before the Pennsylvania Public Utilities Commission recommending energy-efficiency

portfolio investment and savings targets for three utilities in three proceedings. I testified in January before the British Columbia Utilities Commission regarding appropriate DSM spending and savings for BC Hydro's long-term resource planning.

I testified in 2005 before the New York Public Service Commission supporting the economic achievability of Con Edison's proposed $250 million investment in targeted DSM. In 2004 I testified on behalf of a variety of environmental groups before the Quebec Energy Board on the potential for energy efficiency to help displace the need for a planned combined-cycle generating facility, and again in 2005 on ways for Hydro Quebec to increase its acquisition of energy-efficiency resources. I was lead author and witness in support of a comprehensive assessment of utility administration of Connecticut's Conservation and Load Management program on behalf of the Office of Consumer Counsel in 2003-2004.

I led the economic analysis of the $150 million, five-year Clean Energy Initiative on behalf of the Long Island Power Authority in 1999; since 2002 I have advised LIPA on future energy-efficiency spending and performance goals, most recently involving long-term spending and savings goals for the next ten years.

I have served as an economic advisor to Northeast Energy Efficiency Partnerships since 1998, for which I have led several analyses of a variety of regional utility energy-efficiency initiatives. In 2005 I served as NEEP's technical advisor on regional protocols for interstate Energy-Efficiency portfolio comparison. I have also been an economic advisor to the non-utility parties engaged in energy-efficiency collaboratives with Massachusetts electric and gas

utilities since 1999, in New Jersey from 1996-2002, and in Maryland from 1990-1997.

Exhibit JJP-1 provides my full resume.

Q: In what area of expertise do you offer testimony in this case?

A: I testify as an expert on energy-efficiency portfolio design, planning, costs and performance.

Q: Have you testified before this Commission previously?

A: Yes. In 1992 I testified in Docket No. 920520-EG, In Re: Joint Petition of Florida Power and Light and Cypress Energy Partners, Limited Partnership for Determination of Need.

I. Introduction and Summary

Q: On whose behalf are you testifying?

A: My testimony is sponsored by the Sierra Club, Inc., Florida Wildlife Federation (FWF), Save Our Creeks (SOC), the Environmental Confederation of Southwest Florida (ECOSWF), and Ellen Peterson.

Q: What is the purpose of your direct testimony?

A: I have been asked by my clients to assess the extent to which increased energy-efficiency investments could affect the need for the Glades coal-fired generating units.

Q: What issues do you address?

A: I address issues 1 through 6 regarding the need for the Glades generating units from FP&L's preliminary list of issues in this case, dated March 12, 2007.

Q: How does your testimony address the need for the proposed facility?

A: My testimony addresses the amounts and costs of additional cost-effective demand-side management ("DSM") resources that FP&L could be expected to acquire if the Company intensified, expanded and accelerated its planned energy-efficiency portfolio. After reviewing energy-efficiency spending and savings among northeastern utilities, I use recent experience of Massachusetts utilities to scale up FP&L residential and nonresidential efficiency savings by roughly half. I also use recent actual and planned expenditures and savings by Pacific Gas and Electric ("PG&E") to project annual budgets and electricity savings if FP&L replicated its performance with and commitment to acquiring all cost-effective DSM. Doing so would more than triple the peak-demand reductions FP&L plans to realize over the long term from its DSM portfolio.

Q: How would greater amounts of DSM affect the need for the Glades units?

A: I found that increased DSM could defer the need for the two units. By cutting load growth beyond what FP&L plans, additional DSM postpones the date at which peak load reaches the level FP&L now forecasts for the in-service date of the proposed Glades units. The greater the increase in DSM savings, the farther into the future additional DSM postpones the need date.

If FP&L exhibited the same spending depth (dollar of program expenditure per kWh sold) and savings yield (kWh per dollar of portfolio expenditure) as Massachusetts did between 2002 and 2004, it would defer the need date for both units by one year. If, however, FP&L were to follow in PG&E's footsteps and tripled its annual savings, additional DSM would postpone the need date beyond 2023. (See Exh. JJP-4 for details.)

Q: What about the cost-effectiveness of these additional energy-efficiency resources relative to the proposed Glades generating units?

A: These additional efficiency savings would cost significantly less than the levelized (life-cycle) costs of the units. For example, Massachusetts and PG&E residential efficiency programs cost or are expected to cost between 5 and 6 cents/kWh; commercial/industrial savings cost in the range of 3 to 4 cents/kWh levelized. By comparison, the Company projects that the Glades units will cost between 8 and 10 cents/kWh, depending on the scenario.[1]

II. Energy-Efficiency and the Need for the Glades Generating Units

Q: What materials did you review to prepare this testimony?

A: I reviewed the following:

- Florida Power & Light Company's Petition to Determine Need for FPL Glades Power Park Units 1 and 2 Electrical Power Plant, February 1, 2007
- FPL's Need Study for Electrical Power
- Appendix D to FPL's Need Study for Electrical Power.
- Appendix G to FPL's Need Study for Electrical Power.
- Appendix L to FPL's Need Study for Electrical Power.
- Portions of Appendix M to FPL's Need Study for Electrical Power.
- Direct Testimony & Exhibit of: Leonardo E. Greenowing.

A. FP&L's Planned DSM Savings

Q: By how much does FP&L plan to reduce system peak load with DSM?

[1] From FPL Need Study for Electrical Power, Appendix M, p. 7-6.

A: The Company plans to acquire roughly 120 MW each year between 2007 and 2020.[2] I understand that FP&L intends to pursue these savings in parallel with the construction of the Glades units.

Q: Are FP&L's planned DSM savings significant?

A: Yes. Were it not for these planned savings, FP&L would reach between 2010 and ~~2001~~ 2011 the 24,391 peak load it forecasts for 2013 with its planned DSM. In effect, FP&L's planned DSM will defer the need for the capacity from the new units by 2-3 years. In fact, the Company's planned DSM savings add up to more than FP&L's share of statewide efficiency potential recently estimated by the American Council for an Energy-Efficient Economy.[3]

B. Energy-Efficiency Portfolios in Other Jurisdictions

Q: Why did you look to energy-efficiency portfolios in other jurisdictions to project additional DSM savings for FP&L?

A: Some states have acquired and/or plan to acquire far less DSM savings (on a proportional basis) than FP&L does. Others have a long track record of acquiring considerably more. States in the Northeast and California both fall into this latter category. Thus, they offer a basis for projecting additional DSM spending and savings for FP&L based on actual spending depth and savings yield achieved by DSM program administrators over the past few years.

Some states recently have made plans to increase DSM spending over the next three years. Vermont regulators recently raised Efficiency Vermont's annual portfolio budget by 75%. California utilities are in some cases tripling their

[2] From FPL Need Study for Electrical Power, p. 12, Table II.B.3.1.
[3] I was unable to locate program budgets associated with DSM savings FP&L plans to achieve.

DSM investment to comply with state regulators' "first-order loading" imperative for cost-effective DSM before pursuing more expensive supply. These plans offer a basis for projecting spending and savings for FP&L

Q: How can you reasonably compare spending and performance between jurisdictions?

A: DSM spending divided by electricity sales indicates the relative depth of DSM investment. DSM savings divided by program expenditures indicates the kWh yield per dollar invested. Because of diminishing returns, increasing spending depth corresponds with decreasing yield.

Both figures of merit adjust for differences in scale between utilities or jurisdictions. Calculating these values and making comparisons at the sector – residential vs. nonresidential – level allows adjustment for differences in customer mixes between utilities or jurisdictions when projecting total spending and savings for FP&L.

Q: What do the Northeastern states show in terms of actual DSM spending and savings?

A: Results for 7 states are presented in Exh. JJP-2. Page 1 provides data for residential programs; page 2 provides comparable information on nonresidential programs. Massachusetts and Vermont are at the upper end of the range for residential DSM spending ($3.3 and $3.6 per retail MWh, respectively); they also achieved similar yields per dollar spent. Massachusetts stands out with the deepest nonresidential spending ($3.4 per MWh of nonresidential sales) and the deepest savings as a percent of sales. Massachusetts makes the best choice for projecting additional spending and savings from the Northeast experience for FP&L.

Q: What is the levelized cost of electricity saved from the Massachusetts portfolio?

A: The answer depends on the average measure life for the yield in each sector. It also depends on the discount rate. Assuming 10 years for residential and 15 years for nonresidential measure lives and the 10.05% nominal cost of capital FP&L uses, levelized costs of saved electric energy from residential customers has been 5.7 cents/kWh, and 4.2 cents/kWh (allowing for 2 years' inflation at 2.5% to adjust the 2005 constant dollars in the table).

Q: Have some Northeastern states been saving less on a proportional basis than FP&L plans to accomplish?

A: Yes. Adjusting for differences in size, FP&L's 120 MW/year of planned DSM savings is more than would be projected by applying New Jersey's spending and savings for 2002-2004.

Q: What do you find from reviewing DSM spending and savings plans in California?

A: Exh. JJP-3 presents spending and savings information from Pacific Gas & Electric, including actual expenditures and savings for 2004 and projected values for 2006-2008. Notice that PG&E plans to more than triple its $107 million 2004 spending to $332 million by 2008. These growing investments are projected to acquire progressively deeper savings (e.g., from 1.2% in annual residential savings in 2004 up to 2.7% of residential sales in 2008). Associated with these deeper investments are significant declines in yield.

PG&E offers a good basis for projecting FP&L's performance if it matched one of the industry's leaders.

Q: What are the levelized costs for PG&E's historic and planned expansion in DSM?

A: Making the same assumptions as I did for the Massachusetts calculations, levelized costs (in current dollars) per kWh saved in the residential sector will rise from 3.5 cents/kWh in 2004 to 5.4 cents/kWh in 2008. In the nonresidential sector, levelized costs would climb from 2.2 cents/kWh saved in 2004 to 3.4 cents/kWh by 2008.

C. Additional Energy-Efficiency Resources for FP&L

Q: How did you estimate additional DSM procurement for FP&L?

A: I applied the sectoral spending depths and savings yields from Massachusetts and PG&E to FP&L's forecast residential and nonresidential sales to scale sectoral DSM spending and savings for FP&L. I used Massachusetts historical spending and performance over 2002-2004 to project scaled savings and spending for FP&L. I used PG&E's 2006-2008 projected spending and savings, incorporating planned substantial declines in savings yields accompanying the deepening spending. The results of these calculations are presented in Exhibit JJP-4.

Q: How much more peak reduction would the Massachusetts and PG&E scaled savings provide by 2013?

A: Assuming FP&L begins in 2008 to acquire additional energy-efficiency, a Massachusetts-scaled portfolio could be expected to produce an additional 445 MW (beyond the 1,199 MW FP&L plans to realize by 2013. PG&E-scaled efforts would be expected to yield an additional 1,616 MW between 2008 and 2013.

Q: Why should this Commission rely on DSM data from distant regions with completely different climates, demographics, and economies to form expectations about FP&L's future DSM savings?

A: Absent detailed study of maximum efficiency potential or actual experience with aggressive programs in Florida, mature DSM portfolio performance elsewhere is the best information available for gauging how much more FP&L could accomplish and how much this would cost.

Of course the efficiency opportunities in FP&L territory will vary widely from those in Massachusetts and northern California. These differences do not necessarily introduce bias into the comparisons or projections based on them. For example, the saturation and annual hourly usage of air-conditioning is the most obvious difference between Florida and these regions. Potential savings from high-efficiency air-conditioning should be greater and more cost-effective in FP&L territory than in Massachusetts or PG&E territory.

While I would not recommend that the Commission or FP&L use these projections as the basis for DSM investment planning, they are sufficient for establishing a credible if rough idea of how much DSM FP&L could be expected to achieve if it pursued a more ambitious DSM portfolio.

D. Effect of Additional FP&L Energy-Efficiency on the Need for the Glades Units

Q: What effect would the additional DSM you examined have on the need for the Glades generating units?

A: If FP&L were to scale its DSM spending and savings to what Massachusetts electric utilities were achieving between 2002 and 2004, system load would not

reach the 24,391 MW that FP&L forecasts for 2013, the in-service date of the first Glades unit, until sometime between 2014 and 2015. But with DSM scaled according to PG&E's 2006-2008 DSM plans, FP&L's load would not reach 24,391 MW at any time during the planning horizon (through 2023). For example, FP&L summer peak load would only reach 23,777 MW by 2020 under a PG&E-scaled DSM portfolio. In effect, such ambitious DSM would displace the need for the capacity of the Glades units, at least as indicated by the system load coinciding with Company's planned in-service date for the first unit.

Q: Must FP&L commit to a PG&E-scaled DSM portfolio to substantially defer the need for the Glades units?

A: No. A portfolio scaled quite a bit smaller than PG&E's would be sufficient to defer the need date by 5 years, for example.

Q: Wouldn't FP&L need to establish through experience how much DSM it could really acquire in its territory before deciding how long the Glades units or other generation additions can be deferred?

A: Yes. Gaining experience with best practices used in the most aggressive DSM portfolios will enable FP&L to make more precise estimates of the future costs and savings of additional DSM investment.

Q: Earlier you testified that the additional DSM savings would be cost-effective compared to the Glades units. Is that true under the Rate Impact Measure (RIM) test for DSM as adopted by this Commission?

A: I doubt it. I understand that FP&L's planned DSM does pass the RIM test. I surmise that this is because levelized program costs must be less than the difference between long-run avoided costs and marginal retail rates. The

levelized costs of PG&E and Massachusetts DSM portfolios almost certainly exceed the difference between FP&L's avoided costs and rates.

Q: Does this change your testimony about the relative cost-effectiveness of additional DSM compared to the Glades units?

A: No, it does not. The RIM (also known as the non-participant and no-losers) test is a rough and inaccurate indicator of distributional equity between groups of ratepayers. It is not a valid indicator of economic efficiency. If FP&L can truly achieve additional DSM savings at half the costs of the Glades units, then the Company's ratepayers and the economy in which they live and do business will be far better off. While I am not an attorney, as an economist I can say that such significant cost savings between one resource and another is the meaning of "cost-effective" as I read it in Section 403.519, Florida Statutes.

III. Conclusions and Recommendations

Q: What do you conclude about the need for the Glades units?

A: I conclude that the Glades units are most probably not needed because of the likely availability of additional DSM that would be cost-effective compared to building and operating them. I base this conclusion on the well-established track records and plans of some of the nation's leading energy-efficiency portfolio managers.

Q: Based on this conclusion, what are your recommendations?

A: I recommend that the Commission not approve FP&L's application as filed. Instead, I recommend that the Commission deny the Company's application. In this case, I recommend that the Commission direct the Company to conduct a thorough study of the economically achievable potential for energy-efficiency

investments in its territory based on best practices in program design and implementation followed by the managers of the most aggressive U.S. DSM portfolios. I further recommend that the Commission direct FP&L to proceed on a parallel path to design and develop an aggressive DSM portfolio capable of deferring the need for additional generation by at least five years (2018). This will buy time for the Company and the Commission to develop and evaluate a wider range of demand-side and supply-side alternatives to the proposed units. The Company should be directed to include a revised DSM plan based on these parallel DSM efforts with any future application submitted to this Commission for a need determination for new generation resources. Such a resubmission should constitute one of the conditions the Commission should impose if it decides not to deny the application outright.

Q: Does this complete your direct testimony?

A: Yes, it does.

MR. GROSS: May I proceed?

CHAIRMAN EDGAR: I'm sorry. Yes.

BY MR. GROSS:

Q. Do you have a summary of your testimony, Mr. Plunkett?

A. I do.

Q. Could you go ahead and give that summary, please?

A. Yes. Florida Power & Light has undertaken in the past and committed in the future to significant acquisitions of energy efficiency resources from its customers. The company's current DSM plans are responsible for postponing the need date for new capacity. But additional DSM savings beyond FPL's current plans can slow peak demand growth, thereby postponing the need date for new capacity.

Utilities in other jurisdictions have been and are pursuing proportionally greater investment in energy saving demand-side management. These demand-side management resources are costing somewhere between 3 and 6 cents a kilowatt-hour saved, that is, about 30 to 60 percent of the life cycle or all-in costs of the Glades units, as I understand them. FPL could postpone the need date for new generating capacity if it broadened, deepened, and accelerated its current DSM

plans.

I'm sorry. I lost my place.

Additional cost-effective energy savings could be realized if FP&L offered more aggressive programs targeting areas and measures and deeper market penetration in some of the markets that they have been involved in, in particular, comprehensive efficiency improvements in new building construction and design, residential lighting products, high efficiency equipment purchases by businesses, including motors, drives, refrigeration, and HVAC, as well as comprehensive retrofits in existing businesses, just to mention a few areas.

If Florida Power & Light followed the lead of what some consider to be the leading energy efficiency practitioner in the country in terms of scale and scope and comprehensiveness, it could postpone the need date for the Glades units beyond 2023. Such deferral would be cost-effective under the total resource cost test, though unlikely so under the rate impact measure, which counts the cost of lost sales revenue as a cost. I note that Florida is the only jurisdiction that I know of that uses this test for distributional equity to preclude DSM that would otherwise lower total resource cost test -- total resource costs, that is, improve

economic efficiency.

MS. SMITH: Madam Chairman, I hate to interrupt, but Mr. Plunkett is exceeding the scope of his direct testimony. This isn't a summary.

CHAIRMAN EDGAR: Ms. Brubaker?

MS. BRUBAKER: I have to agree.

MR. GROSS: Well, his direct testimony has specific reference to the RIM test, and it was responded to by the rebuttal testimony of FPL witnesses. I don't know if that's what you're objecting to, but if that is it, that is specifically referenced in his direct testimony, his prefiled testimony.

MS. BRUBAKER: Perhaps you could identify page and line numbers. It just seems to me it's going above and beyond the scope of what he actually testified to.

CHAIRMAN EDGAR: Thank you, Ms. Brubaker. Can you point us? I think we all have copies with us.

MR. GUEST: I can do it.

MR. GROSS: We have it.

CHAIRMAN EDGAR: Would you like to confer with your witness for a moment?

MS. BRUBAKER: As a further matter of clarification, this is direct testimony, so I don't think it would be appropriate for him to be rebutting -- is it rebutting rebuttal or -- to me, this is your case

in chief. You don't necessarily --

MR. GROSS: He's not rebutting. If one just simply reads page 12, lines 19 through 24, and page 13, lines 1 through 12, he talks at length about the RIM test, and he critiques, vigorously critiques the RIM test.

MS. SMITH: If I may, there's absolutely no mention of the total resource cost test, which is what Mr. Plunkett is addressing right now.

MS. BRUBAKER: I have to agree.

THE WITNESS: I did mention it.

MR. GROSS: I believe he does mention the total resource cost test.

MS. SMITH: Madam Chairman, I'll withdraw my objection in the interest of moving things along.

CHAIRMAN EDGAR: Okay.

THE WITNESS: That was all I was going to say about the RIM test.

CHAIRMAN EDGAR: Mr. Plunkett, if you would, continue with your summary, please.

THE WITNESS: Yes. Finally, matching PG&E's commitments on a proportional basis is not necessary to defer the need for the unit significantly. As I say in my testimony, lesser amounts would be sufficient to postpone the need for the unit cost-effectively within

the planning horizon.

So in conclusion, I recommend that the PSC not approve FP&L's application based on the high likelihood that the company could slow demand growth and postpone the need with far less costly energy efficiency.

That concludes my summary.

CHAIRMAN EDGAR: Thank you.

MR. GROSS: We offer Mr. Plunkett for cross.

CHAIRMAN EDGAR: Thank you. Mr. Beck, any questions?

Mr. Krasowski.

CROSS-EXAMINATION

BY MR. KRASOWSKI:

Q. Good afternoon, Mr. Plunkett.

A. Hello.

Q. Mr. Plunkett, in your testimony you mention PG&E in California. Could you explain what above and beyond DSM practices the State of California has to maximize efficiency and reduce the need for new power plants?

A. Beyond energy efficiency?

Q. Beyond --

A. Or beyond demand-side management?

Q. Beyond demand-side management. Well, maybe I could rephrase that and make it a little easier going

one step at a time.

Are you familiar with the demand-side management practices of FP&L?

A. I have some knowledge of FP&L's demand-side management efforts, their accomplishments. It's been a little hard to get my hands on all the moving parts, but I have a pretty good idea of the programs they're running and the savings they are claiming from them.

Q. Now, you've suggested in your testimony that this power park, the Glades Power Park, the need for it could be totally eliminated by increased demand-side management and other efficiency efforts.

A. I've testified that there's enough energy efficiency and demand-side management potential out there in the service territory to allow the company to postpone the date at which it would hit a system peak of 24,391 megawatts, which is the peak load forecast by the company by 2013, and that -- I'm hesitating at the word "eliminate." What I'm saying is that it can postpone that need past 2020, past 2023, if it went as far as PG&E did on a proportional basis.

Q. Okay. Yes, I accept what you're saying as far as you didn't say eliminate, but to postpone it to that late date.

With your understanding of what is FP&L's

demand-side management program, what about the PG&E demand-side management program is different that allows PG&E to have such greater effect?

MS. SMITH: Madam Chairman.

CHAIRMAN EDGAR: Yes, ma'am.

MS. SMITH: I have to object to the form. This is not an adverse witness to Mr. Krasowski, and he is asking Mr. Plunkett leading questions.

MR. KRASOWSKI: Ma'am, I --

CHAIRMAN EDGAR: More direct questions, please.

MR. KRASOWSKI: A more direct question. Okay. And, Madam Chair, I don't perceive this witness to be any less friendly to me than anybody else I've talked to.

CHAIRMAN EDGAR: Sometimes I feel the same way.

MR. GUEST: Madam Chairman, would it be appropriate for me to help Mr. Krasowski?

CHAIRMAN EDGAR: I think he's doing all right. Let's let him --

MR. GUEST: I mean to get past the objections.

CHAIRMAN EDGAR: Let's let him give it another try.

MR. KRASOWSKI: I would rather fly on my own

as long as possible.

CHAIRMAN EDGAR: I understand.

MR. KRASOWSKI: I can just read it now, how the Sierra Club, and whatever.

BY MR. KRASOWSKI:

Q. But, Mr. Plunkett, I'm trying here to phrase my questions so they can illuminate truth, and I don't care who it serves. As I stated, will you please explain the difference between demand-side management at PG&E and demand-side management in Florida?

A. Yes. The demand-side management planned and practiced by PG&E and the other California utilities basically involves a lot deeper investment in the markets that they're involved in and a deeper involvement in all -- in a broader set of markets using much more aggressive strategies than are currently in place by Florida Power & Light's programs.

Now, there's nothing wrong with Florida Power & Light's programs as they exist now. They look to be cost-effective. What happens is, when you are trying to acquire all the savings, you go deeper.

And so, for example -- I'll give you a good example on their commercial new construction. They make it so that an architect, an owner, an engineer, a developer of a new commercial space is facing

practically no incremental cost to go with higher efficient design and construction and choice of equipment, because these are considered lost opportunities. They last for a long time, and so a lot of effort is put into making sure that they get maximum market penetration.

Another example is, they have programs for small commercial customers that are not just energy audits and suggestions, but literally targeted town by town, where they come in and recommend -- do an inspection, recommend a set of energy efficiency measures that would be cost-effective as retrofits. That means early retirement of existing lights and air conditioning, as well as the addition of various controls, and offers to install them at little or no cost to the customer. And they know from this experience that they can get something like an 80 to 90 percent participation rate as opposed to the 20 percent participation rate that you can get over time with less aggressive strategies.

So these are just two examples of their involvement in intervention in the markets to secure greater savings, that is, acquire all the savings that can be gotten for less than the cost of -- less than the avoided cost of new supply.

Q. Mr. Plunkett, as you describe in California, the situation there, where does the money come from that pays for the replacement of these appliances that are part of that program?

A. Two sources. One is, they have what's called a public goods charge or PGC which funds basically statewide programs. It recognizes that, for example, a lot of markets are basically not specific to utility service territories, and that funds sort of, I would say in rough terms, for what they're planning from 2006 to 2008, about half of what they're spending.

In addition, they spend more money, come up with more funding based on procurement. In other words, they procure additional resources as their needs demand for new resources. And they're under regulatory obligation to pursue all of those resource. All those resources must be exhausted before they can get approval for additional supply-side resources that would cost more than the energy efficiency resources that they can acquire.

Q. Do you know what type of budget they're working with that covers the 2006-2008 time period?

A. I do for PG&E, and I have it in my -- I hope I have it in one of my exhibits. I do know that like the three investor-owned utilities last time I saw were

looking at about $2 billion over the -- I believe it was the next five years. But just looking at PG&E's plans alone, 2006 through 2008, it looks to be -- it's 237 million in 2006, 270 million in 2007, and 332 million in 2008.

Q. And that was just for PG&E?

A. That is just for Pacific Gas & Electric, yes.

Q. Do you know what their customer base is, the size of their --

A. Not off the top of my head. They used to be the biggest or one of the biggest utilities in the country. They've been surpassed by -- well, FPL for starters. But they have a big mix of commercial, industrial, agricultural, residential customers. It's quite a different service territory, though, from FP&L's, as I point out in my testimony.

Q. Mr. Plunkett -- and you might not be able to answer this, but if we took the $5.5 billion that the ratepayers in Florida are being asked to spend minus -- and this is aside from the land costs on this project. What could we expect in terms of deferred -- or efficiencies if we were to do what they do in California?

A. I'm sorry. I don't know the answer to the question as you've posed it. I have got in my exhibit a

number, a set of numbers, the budgets that would be required to replicate the depth and breadth of spending and savings by PG&E starting in 2008, and I didn't add it up. One, two and a half -- so by 2000 -- give me a second. It's about 5 billion, just from my eye, by 2016. And so the answer to my question is -- to your question is basically, you can pick it right off this exhibit in terms of when you hit 5 billion, and then I show up here what the DSM megawatts would be under PGE-scaled DSM. And unless you want me to sit here and punch the calculator buttons --

Q. No, that's okay. But that's in your testimony?

A. You could do that yourself from Exhibit JJP-4.

MS. SMITH: Madam Chairman, frankly, most of these questions, if not all, are covering subjects that are already addressed in Mr. Plunkett's prefiled direct testimony. It's already in the record. At this point, this is just duplicative of information that's already in the record.

MR. KRASOWSKI: Madam Chair, the reason I'm asking these questions is because Mr. Plunkett's testimony was very vague, not very specific, and it was torn apart by the FP&L people due to his reference to the ACEEE group's report too. So I don't think there's

much basis of anything as far as substantial support for DSM in any of these documents.

MS. SMITH: Then, Madam Chairman, if I may, in that case, this is eliciting essentially surrebuttal testimony, which is procedurally improper at this point. The opportunity to file testimony by the intervenors came and went. I believe it was March 30th. And at this point, again, it's procedurally improper.

MR. KRASOWSKI: Madam Chair, I thought it -- okay.

CHAIRMAN EDGAR: Ms. Brubaker.

MS. BRUBAKER: I suppose where I come to it is, if Mr. Krasowski is looking for clarification or impeaching the testimony of Mr. Plunkett, it is -- I think a certain amount of allowance should be granted.

I'm really at a loss as to what else to add. Mr. Harris, if you have anything, but to me -- well, I suppose it just hadn't come to my mind yet that we're at the point where I would recommend the objection be sustained. I do think Mr. Krasowski's questions do tend to track Mr. Plunkett's testimony.

CHAIRMAN EDGAR: Mr. Harris, do you have additional comments?

MR. HARRIS: I cannot be -- I cannot say that I'm overly familiar with his direct testimony. I would

say the purpose of cross, as I understand it, is to test the fundamentals in the direct testimony. If the questions are designed to elicit the basis for the testimony, I think they're appropriate. If they're designed simply to reiterate information that's in the record without any new information or testing those assumptions or facts or premises, then I would think it would be probably impermissible.

MS. BRUBAKER: If I may also, I mean, to the extent Mr. Krasowski's questions were putting into the record facts, events, matters that were not previously identified in Mr. Plunkett's testimony, I think it would be more appropriate for him to ask very pointed, concise questions. But again, that would be my only direction. Again, I suppose in my mind, I just haven't heard anything to this point which would lead me to recommend sustaining the objection.

CHAIRMAN EDGAR: All right. Thank you, Counsel.

Mr. Krasowski, I stopped you. Do you have additional response or comment?

MR. KRASOWSKI: To Mr. Plunkett?

CHAIRMAN EDGAR: No, to what you have just heard, to the objection that was raised and the advice of counsel.

MR. KRASOWSKI: Well, basically, I think staff is on the right track and FP&L is way out of line. But I would like to continue, please.

CHAIRMAN EDGAR: Yes. I'm going to allow you to continue. But again, keep in mind, as always, time frames and direct and concise questioning to the best of your ability, and all the rest of ours as well.

MR. KRASOWSKI: Thank you, ma'am.

BY MR. KRASOWSKI:

Q. Mr. Plunkett, in your testimony you made reference to general law that deals with efficiency, and you did touch on it a minute ago when you mentioned how some of the DSM programs in California were a little stricter. So my question to you would be, Mr. Plunkett, could you please mention an example of a law in California that mandates a certain efficiency?

A. I'm not a lawyer, and I believe that this mandate that has come down for the utilities has actually come from the Public Utilities Commission of California. Now, there may be some statute behind that, but I don't know about it.

That said, they do have some laws in California, particularly very tight building efficiency standards known as Title 24 that they use in concert with their energy efficiency programs. They basically

use the programs to soften the market, if you will, so that they can basically motivate early compliance with future standards, which then allows them to tighten up the standards again. But it's a matter of regulatory policy, to my understanding, that has led to this, partly based on their experience from 2001, when they basically used conservation and efficiency and load management together to help avert a repeat of the 2000 blackouts.

Q. So, Mr. Plunkett, is there a difference between the DSM -- any other differences between the DSM program of FP&L and PG&E?

A. Well, there are many. You know, again, it's partly a matter of policy. I mention in my direct testimony and my summary that one of the restraints that Florida puts on the amount of DSM that can be considered economic is the use of this rate impact measure test. And I even say that it's doubtful that the additional efficiency that I recommend, if it followed some of the designs and practices of Pacific Gas & Electric, would pass the RIM test. I don't think it would pass the RIM test in California either. So that is a law or -- it's a policy decision that is hampering or impeding the amount of efficiency that Florida Power & Light can actually pursue.

Q. Mr. Plunkett, you identify the report generated by the American Council for an Energy Efficient Economy briefly and ever so slightly in your testimony. Who are other organizations outside of the industry who might perform an analysis of the Florida Power & Light system as to opportunities for efficiency?

A. Well, there are lots of consulting organizations out there. I've worked with ACEEE on a potential study in New York state, very comprehensive, for example. There are firms like Quantum Consulting that I think is based in California. Kema/Xenergy -- that's K-e-m-a, slash, X-e-n-e-r-g-y. These are a couple of, I think, what people consider to be the best, but there are a lot of them out there, people that do this kind of work.

Q. You recommend to the Commission to charge FP&L with the task of doing a reanalysis of their DSM programs. Did you make that recommendation with the full knowledge that an analysis had just recently been completed in concert with the PSC staff to do just that?

A. I'm aware of the goal-setting process. I actually was involved in Florida DSM in the early '90s and am aware of how the current system shook out, if you will, and I've seen some of their analysis.

Again, nowhere in my testimony have I said the

company has done bad analysis or that it's wrong. I think it doesn't get at all the potential, however. Sometimes it's how you do these things, and there's a connection between the design you assume that you're willing to use, the program design, the strategies, and what you'll see as a reasonable participation rate, for example.

So I think that -- these are often called program potential studies, where instead of these theoretical, technical, economic potential studies, which again I've had to do myself, it's much more helpful if you visualize a set of programs aimed at very specific markets, everything from equipment to new construction to existing housing, and bundle these measures in in these marketplaces -- excuse me, markets with very aggressive program designs, and they will let you -- enable you to better project what you can accomplish, what's realistic to accomplish, and then to decide whether it's economic.

Again, I think it would require -- let me put it this way. It wouldn't be worth doing over again if the Commission sticks with the RIM test as the guiding economic principle, because that would be the limiting factor. And they could do all the analysis in the world, but my suspicion is that it would -- all the

increases would probably fail the RIM test.

Q. Do you see a role for the Florida Legislature in improving efficiencies?

A. Sure.

CHAIRMAN EDGAR: Mr. Krasowski, I think we've gone a bit far afield.

MR. KRASOWSKI: Okay. If I could ask just some questions on the Florida Solar Energy Center.

CHAIRMAN EDGAR: If they pertain to the issues in the case.

MR. KRASOWSKI: Yes. Well, this speaks specifically to efficiency.

BY MR. KRASOWSKI:

Q. Are you familiar with -- Mr. Plunkett, are you familiar with the Florida Solar Energy Center?

A. Familiar wouldn't be the right word. I know of them and have admired them from afar for a long time.

MS. SMITH: Madam Chairman, excuse me. There's no reference to the Florida Solar Energy Center in Mr. Plunkett's testimony, so I think again this is beyond the scope.

MR. KRASOWSKI: I'll withdraw my question on that.

CHAIRMAN EDGAR: Thank you.

BY MR. KRASOWSKI:

Q. Just a couple more questions, Mr. Plunkett. Do you still hold your position that there are efficiencies out there that would allow the deferral of this project?

A. Yes. I believe market barriers apply in many markets throughout Florida and that these strategies that have worked elsewhere would work here as well, even though the technologies and the performance of any opportunities would be quite different.

MR. KRASOWSKI: Madam Chair, is Mr. Plunkett going to be available for questions in the future?

CHAIRMAN EDGAR: No.

MR. KRASOWSKI: No? This is it?

CHAIRMAN EDGAR: That is my understanding. I mean, he's not scheduled to be back before us after the finish of his cross and redirect today at this time.

MR. KRASOWSKI: Well, thank you, Mr. Plunkett. I think, other than just having an open conversation about your testimony, I don't know what to do now. But I hope I haven't sold the people of Florida short. So thank you very much. Thank you, Madam Chair.

CHAIRMAN EDGAR: Thank you.

MR. KRASOWSKI: Apologies for the --

CHAIRMAN EDGAR: No, that's fine.

Okay. Ms. Perdue.

MS. PERDUE: Thank you, Madam Chair.

CROSS-EXAMINATION

BY MS. PERDUE:

Q. Good afternoon.

A. Hi.

Q. I think we've already established that you do not live in the State of Florida; is that correct?

A. That's correct. I visit occasionally. My parents do.

Q. I'm sorry?

A. My parents live here. I visit occasionally.

Q. Okay. Have you ever lived here?

A. No.

Q. In your analysis that is in your direct testimony, did you review any federal census data relative to Florida's population?

A. No.

Q. Did you review any state data regarding Florida's population growth?

A. No. I reviewed load forecast information and anything that might have been related to that.

Q. Did you review any state or federal data regarding job or economic growth in the State of Florida?

A. No.

Q. Did you conduct any studies yourself regarding population growth in the State of Florida?

A. No, because I didn't think it was necessary to estimate this.

Q. Did you conduct any studies yourself regarding job growth in Florida?

A. No, again, for the same reason.

Q. Did you conduct any studies yourself in the State of Florida regarding housing starts?

A. No, only insofar as they're reflected in the company's load forecast, which I assume there's plenty of that.

Q. And so you accept the company's load forecast as correct in your analysis?

A. Absolutely. I do not question the company's load forecast at all. And housing starts present a major opportunity for efficiency improvement.

Q. Does your opinion and direct testimony and your underlying analysis of that testimony consider Florida's position as both a national and international competitor with an expanding population and expanding economic base and business community?

A. Oh, yes. I think that cost-effective energy efficiency would improve California -- sorry, Florida's, not California's, competitive position by reducing the

cost of doing business and making firms either more profitable or more competitive or both.

Q. Do you agree that an adequate infrastructure, including available and reliable electric services, is a vital requirement for the State of Florida in competing with other states and other countries in attracting businesses to the state?

A. I do.

Q. Isn't it true that reduced peak demand is what actually defers or reduces the need for power plants?

A. Actually, reduced peak demand reduces the need for capacity that's designed to meet system peak. If you mean -- there's also energy requirements that need to be met. In fact, the proposed units are not peaking facilities. They're base load facilities. So reducing the peak demand may or may not reduce the need or the economic need for base load generation.

But the way the company has presented its case, it looks like peak demand -- lowering peak demand will reduce the need for the peaking capacity that they seek to obtain from the Glades units.

Q. If FPL increased its conservation spending, as your testimony suggests that it should or that it might, there's no proof -- or is there any proof that any such efforts would reduce peak demand in FPL's service

territory?

A. I believe there's evidence that it would. If the company did more of what it's already doing to reduce peak demand, I don't know why you wouldn't believe you would reduce peak demand. If you put in high efficiency air conditioners, why wouldn't that reduce peak demand?

Q. Well, if the company did more, then does your opinion -- I don't see in your direct testimony any specific conservation measures or programs that would defer the need for the Glades unit. Is there something that I missed in your testimony?

A. I did not make an application here for approval of any particular programs. I did recommend that the company develop these programs to achieve these savings, but I didn't develop any myself, no.

Q. Okay. But you basically have asserted the position that FP&L should spend more on conservation measures; is that true?

A. I said that the company should acquire more, and it costs money to acquire these savings. And so I've recommended a budget that if they -- I believe it has been proven in California and elsewhere that one can invest proportionally more and get deeper savings. So based on that, I believe -- I see no reason why Florida

Power & Light couldn't as well.

Q. Do you know -- and I don't see in your direct testimony where you've stated that you do, but do you know what the impact on FP&L's customer rates would be if they increased the spending as you've suggested?

A. I did not make those calculations.

Q. So your analysis of increased conservation spending does not encompass customer rates, is that correct, or the impact on customer rates?

A. What mine covers is the effect on total revenue requirements and total bills. I did not look at the effect on units costs, that is, the average cost per kilowatt hour sold, no.

Q. In your direct testimony on page 13 at line 15, you stated that you believe the Glades units are, and this is the quote, most probably not needed, end quote. Is that your testimony?

A. Yes.

Q. So you are not stating for sure or for certain that the Glades units are not needed; correct?

A. I made a -- I'm not saying with 100 percent certainty, no. I --

Q. Okay. Thank you.

MR. GUEST: Can he finish his response?

CHAIRMAN EDGAR: Did you have additional

response to that question?

THE WITNESS: I think it is extremely unlikely that they're needed if, and only if, the company does something else. Something is needed if nothing else happens. I believe the company's load forecasts and resource posture speaks for itself.

Whether a coal plant is needed or not is another matter, but some new capacity from some source would be needed to meet their reserve requirements by the in-service date for this unit.

BY MS. PERDUE:

Q. I understand, and I'm going to ask you if you agree, that FPL is ranked number one nationally in conservation management. Do you have any reason to disagree with that?

A. It depends on what you mean. Sure, they're the biggest, so I have no doubt that -- and I've seen the numbers myself in the Energy Information Administration that shows on an absolute basis, their kW reductions are the biggest. However, size matters, and on a proportional basis, they're nowhere near the biggest. In other words, if you divide the peak demand savings they're realizing into their total peak demand, it's quite a bit smaller, and they would be ranked well, well behind the first and probably pretty far down the

page.

Q. But you do agree that currently they are the largest conservation manager in the country? That's what you just said.

A. No. I said that they can show that the cumulative peak demand reductions that they've achieved from both load management and energy efficiency is in absolute terms the highest number. That doesn't mean they're the biggest saver of energy. In fact, Vermont probably is on a proportional basis.

Q. What's Vermont's population?

A. 600,000.

Q. So it's much smaller than Florida's.

A. And it makes it really, really hard to do efficiency when you've got mountains and an agricultural population. So again, you need to -- you have to scale this thing when you made these comparisons.

Q. So the Vermont to Florida comparison would be apples to oranges?

A. No. I'm telling you that if you want to compare Vermont's megawatts with FP&L's megawatts, you would have to do it on a relative basis and adjust for the different sizes, that's all.

Q. And the different population needs and the different climate and other things like that as well?

A. No. If you're going to look at everybody -- there's nothing wrong with comparing everybody, relatively speaking. You know that their populations are different. You know their appliance mixes are different. It just means they have different opportunities. But when it's all said and done, how deep is the savings potential? We don't have any air conditioning in Vermont to speak of, for example, so we don't get much of our savings from air conditioning. Florida has a lot, and you can get a lot.

Q. Another witness earlier in this proceeding, Mr. Brandt, testified. Are you familiar with his testimony?

A. Some of it, yes.

Q. He testified that FPL is ranked number four nationally in load management. Do you have any reason to disagree with that?

A. No. I would still want to make it a fair comparison. You would want to scale it. But I -- just for the record here, I'm not actually recommending that they pursue any additional load management.

Q. Okay. In your testimony -- actually, attached to your direct testimony -- I'm referring to Exhibit JJP-2, and specifically page 2 of 2.

A. I have it.

Q. And the title of that is "Energy Efficiency Portfolio Performance Comparison." And this particular chart deals with nonresidential customers; is that correct?

A. Yes.

Q. And what is your reason for including this chart with your direct testimony?

A. I wanted to show it on a sector basis. This is nonresidential. The page before it is residential. And this is one of those things you can adjust for between utilities, because this is the thing that often varies the most, the proportion of residential to nonresidential.

So the purpose of this was to show in relative terms what these utilities have been -- how deep their investment has been in terms of spending, what the yield is that they've been getting in terms of kilowatt-hours per dollar spent, as well as the depth of the savings -- that's what those columns 1, 2, and 3 are -- throughout the northeastern region where these programs have been going on for the last -- well, at least back to 2001, and use this as a basis, if you will, to sort of find the ones that would be most aggressive that would make sense to help me project and scale savings if FP&L replicated this kind of performance from any one of

these places.

Q. So am I correct in concluding that you are suggesting that FP&L model its efforts after the states that you have listed on this chart?

A. No. I said that it should model its expectations on how much it could save. And the program designs that they're using are also probably worth picking up, but there would need to be modifications to handle the differences, the different opportunities that Florida has.

Q. And are there any other states that you've included besides what are listed here, which are Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, Vermont, and the two -- there's a Long Island and a New York State, which I believe are both in New York.

A. Yes.

Q. Would you agree with me that those states are primarily manufacturing economies rather than service or tourism economies like Florida's?

A. No. They're different. They're way different. You know, you could pick one of these out. I mean, Vermont is kind of touristy, because people go there for the opposite reason they come to Florida. They're just not primarily manufacturing. I think

there's a lot of service.

Q. Would you agree with me that none of these are the tourism industry state that Florida's economy is?

A. I would agree with that.

MS. PERDUE: Those are all the questions I have, Madam Chair.

CHAIRMAN EDGAR: Thank you. Ms. Smith.

MS. SMITH: Madam Chairman, I would ask that we mark for identification Mr. Plunkett's -- the deposition transcript of our deposition of Mr. Plunkett taken March 23rd, 2007. I will say that by stipulation of the parties, we've agreed that that can go into the record. I think we're up to 190. We're handing out copies of that deposition transcript now.

MR. GUEST: Madam Chairman.

CHAIRMAN EDGAR: Mr. Guest.

MR. GUEST: Mr. Plunkett's plane leaves in an hour now, so I think we could stipulate to put the deposition in. I think we talked about doing that. And I'll forgo redirect. We could forgo redirect, and your plan will have worked.

MS. SMITH: And before we get to that, I will say also that I have no questions, given that the deposition transcript is going into the record.

CHAIRMAN EDGAR: Are there questions or

comments from staff?

MS. BRUBAKER: No questions from staff.

CHAIRMAN EDGAR: No questions from staff. Okay. So we are going to enter the deposition into the record. And just let me make sure I haven't missed something. Which will be 190.

(Exhibit 190 marked for identification and admitted into the record.)

CHAIRMAN EDGAR: I generally prefer it if you let me excuse the witness before they disappear, quite frankly.

MR. GUEST: I apologize.

CHAIRMAN EDGAR: And I did ask for just a moment also just to make sure we were in order.

Okay. So we will enter the deposition, and then we will need to take up the exhibits, 122 through 125.

(Exhibits 122 through 125 admitted into the record.)

CHAIRMAN EDGAR: Ms. Brubaker, is there anything else we need to do before we lose Mr. Plunkett?

MS. BRUBAKER: I'm aware of nothing.

CHAIRMAN EDGAR: Okay. All right. Thank you, Mr. Plunkett.

MR. GUEST: I apologize, Madam Chairman.

Are we ready, Madam Chairman?

CHAIRMAN EDGAR: I am.

MR. GUEST: Good afternoon, Mr. Furman.

CHAIRMAN EDGAR: We need to swear Mr. Furman. That's actually what I was waiting for. Are we on the same --

MR. GUEST: That was my next question.

CHAIRMAN EDGAR: We're on the same track. Okay.

MR. GUEST: My first question is have you been sworn.

CHAIRMAN EDGAR: Thank you.

Thereupon,

RICHARD C. FURMAN

was called as a witness on behalf of The Sierra Club, Inc., et al. and, having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. GUEST:

Q. Could you please state your name and business address.

A. Richard Furman, 10404 Southwest 128th Terrace, Perrine, Florida.

Q. By whom are you employed and in what capacity?

A. I'm a retired engineer. I'm being retained in

this case by The Sierra Club, Save Our Creeks, Florida Wildlife Federation, Environmental Confederation of Southwest Florida, Ellen Peterson, and NRDC.

Q. Have you prepared and caused to be filed 29 pages of prefiled direct testimony?

A. Yes, I have.

Q. Have you also prepared and caused to be filed 25 pages of prefiled supplemental direct testimony?

A. Yes, I have.

Q. Do you have any changes or revisions to this testimony?

A. Yes. I have a few minor changes.

Q. Can you first give us a quick characterization of what these changes are and why you need them?

A. Yes. On page 5 of my testimony, line 6, I listed at the time the Department of Energy's list of proposed IGCC projects, which at the time that I prepared that was 28. Then when I prepared my answers to interrogatories, the number had gone up to 32, and I presented that number. And more recently, when I last checked a week or so ago, that number had gone up to 34. Those would be the only -- that would be the update that I would give. And then in my Exhibit Number 2 that I provided as an answer to interrogatories to PSC staff when they asked for a more complete listing and

characteristics of those plants, we were able to come up with 39 IGCC plants and a total of 45 if you include polygeneration.

Q. With those changes made, if I asked you those questions today, would your answers be same as in your prefiled testimony as revised as you just told us?

A. There's one other correction. On page 20 of my testimony, line 12, I had indicated a Department of Energy document that showed 14 operating IGCC plants. Then in my answers to interrogatories, I provided a more updated list which included 17 operating IGCC plants. That would be Exhibit Number 4 in my answer to interrogatories.

Q. So with those three changes, would your answers be the same as in your prefiled testimony?

A. Yes.

MR. GUEST: Madam Chairwoman, I ask that the prefiled testimony be entered into the record as though read with the changes noted.

CHAIRMAN EDGAR: The prefiled direct testimony of the witness will be entered into the record as though read with the changes noted by the witness.

BY MR. GUEST:

Q. Do you have -- are you sponsoring any exhibits with your prefiled testimony?

A. Yes, I am.

Q. What are those?

A. They are copies of the posters that I'm going to be talking from for my summary.

MR. GUEST: We have them listed as Exhibits 93 through 121.

CHAIRMAN EDGAR: Okay. I have 122 to 125.

MR. GUEST: Well, let me hand this problem over to someone who knows what they're doing.

Our list shows 93 to 121.

MS. BRUBAKER: Madam Chairman, if I may.

CHAIRMAN EDGAR: Please.

MS. BRUBAKER: 122 through 125 are Mr. Plunkett's exhibits.

CHAIRMAN EDGAR: Okay. My apologies.

MS. BRUBAKER: And up through 121 --

CHAIRMAN EDGAR: And apologies again for confusing the two names, which I have done a couple of times today, and I do apologize. Thank you.

MR. GUEST: Thank, Madam Chairman.

I. BACKGROUND AND WORK EXPERIENCE

Q. Please State Your Name and Address for the Record.

A: My name is Richard C. Furman. My address is 10404 S.W. 128 Terrace, Perrine, Florida 33176.

Q: What Is Your Occupation?

A: I am a retired consulting engineer, and I volunteer my time to advise utilities, government agencies, environmental groups and the public about the potential benefits of using coal gasification technologies. I have testified in previous permit hearings for proposed coal plants concerning emission control technologies, applicable emission regulations and alternative technologies concerning Mercury, NO_x, SO_2, particulate and CO_2 emissions and their associated costs.

Q: How Long Have You Been Retired?

A: Since February 2003.

Q: What Was Your Occupation Before You Retired?

A: During my entire engineering career, I have worked on new energy technologies, alternative fuels for power plants, and pollution control for power plants. Prior to my retirement, I was an independent consulting engineer for 22 years to various utility companies, government agencies, process developers and research organizations on the development, technical feasibility and application of new energy technologies and alternative fuels for power plants.

Q: What Did You Do Before You Were An Independent Consulting Engineer?

A: Prior to my work as a consulting engineer, I managed Florida Power & Light's coal conversion program and fuels research and development program, which

included the first conversion of a 400 megawatt (400MW) power plant from oil to a coal-oil mixture to reduce oil consumption after the second oil embargo. Prior to this, I directed the engineering study for the conversion of New England Electric's Brayton Point Power Plant, which was the first major conversion of a power plant from oil to coal after the first oil embargo.

My first engineering job was working for Southern California Edison Company to modify their power plants for two-stage combustion to reduce nitrogen oxide emissions in 1969.

Q: Please Summarize Your Formal Education.

A: I received my B.S. in Chemical Engineering from Worcester Polytechnic Institute in 1969 and a M.S. in Chemical Engineering from Massachusetts Institute of Technology in 1972. I was a researcher at MIT for the book entitled New Energy Technologies by Hottel and Howard. After researching for this book, I decided to do my Master's thesis on coal gasification because of its potential as a future energy source and its environmental benefits. My Master's thesis at MIT was entitled Technical and Economic Evaluation of Coal Gasification Processes. I was also a teaching assistant at MIT for the courses of Principles of Combustion and Air Pollution and Seminar in Air Pollution Control. A copy of my resume is attached as Exhibit RCF-1.

Q: How Does Your Education and Experience Prepare You to Provide Expert Testimony in this Case?

A: Both my education and work have required an in-depth understanding of past, present and new forms of energy technologies that can be used for power plants. My education and work experiences also involved an in-depth understanding of all the various fuels for power plants including the different types of coals, fuel

oils, natural gas, petroleum coke, synthesis gas, biomass and refinery wastes. My graduate education and subsequent work experiences have provided me with a detailed understanding of the techniques and costs for controlling power plant pollution including mercury, NO_x, SO_2, CO, particulate matter and CO_2 emissions. My prior work for 3 major electric utililty companies allowed me to make use of this knowledge to help develop and utilize new fuels and emission control technologies for power plants. My current volunteer experience allows me to keep informed about the latest developments in new energy technologies, coal gasification technologies, fuels for power plants, techniques for controlling power plant emissions, costs associated with the application of these technologies for power plants and the development of new technologies that may be applicable to power plants.

II. SUMMARY OF TESTIMONY

Q: What Is Your Expert Opinion About the Proposed Plant?

A: My testimony shows that an IGCC plant in Florida can provide electricity at a lower cost than the proposed ultra-supercritical pulverized coal plant. Many utilities around the country are choosing IGCC plants due to IGCC's much lower emissions of all pollutants and its capability to capture CO_2. My testimony shows that an IGCC plant can eliminate between 50 – 90 % of the air pollution that the proposed plant will emit. Various studies have shown that IGCC plants can capture CO_2 at much lower costs than pulverized coal plants. Comparisons of recent permit applications for IGCC plants versus the proposed plant show significantly lower emissions for the IGCC plants. The Clean Air Act specifies that gasification should be evaluated to determine the Best Available Control Technology (BACT).

The additional value of an IGCC plant is its ability to use various fuels including coal, petroleum coke, natural gas, biomass and waste materials. This will enable IGCC plants to respond to future changes in fuel costs and changes in environmental regulations. This will provide significant cost savings during the life of the IGCC plants. The modular design of IGCC plants provides additional system reliability, increased efficiencies, fuel flexibility and any possible size.

Commercial IGCC plants have been in operation in the U.S. for more than 10 years. Tampa Electric Company has announced that they will build an additional 630 MW IGCC plant for operation in 2013. Chuck Black, the president of Tampa Electric Company, was quoted in Time Magazine (November 2006) as saying "it's our least cost-generating resources, so we count on it and use it every day as part of our system". Today there are approximately 130 gasification plants worldwide that produce fertilizers, fuels, steam, hydrogen and other chemicals, and electricity. Of these 130 plants, fourteen are IGCC plants. These IGCC plants have a capacity of 3,880 MW(net) and have almost one million hours of operation..

The 510 MW and 545 MW IGCC plants that started operation in Italy in 2000 and 2001 have demonstrated that IGCC plants can be built with more than one gasifier and operate with more than 90% availability without a spare gasifier. All 4 of GE's coal gasification plants that where recently built in China have been operating at greater than 90% reliability for the past 3 years. These examples demonstrate that IGCC plants can operate at the 90% availability level required by electric utilities for base load plants.

Large size IGCC plants can be built by using multiple gasifiers. This improves system reliability, increases efficiencies and provides fuel flexibility. The Nuon utility in The Netherlands and Hunton Energy Group in Texas have announced plans to build 1200 MW IGCC plants using multiple gasification "trains" and multiple combined-cycle units.

A recent DOE report lists ~~28~~ 32, 34, 39, 45 IGCC projects that are planned in the U.S. by utilities and independent power producers.

The Great Plains Synfuels Plant has been gasifying coal since 1984 to produce synthetic natural gas. It produces enough synthetic natural gas to be able to supply the fuel for 1000 MW of combined-cycle power plants. Since 2000 this gasification plant has been capturing its CO_2 and transporting it 205 miles by a new pipeline where it is sequestered underground and used for enhanced oil recovery. This demonstrates that CO_2 can be captured, transported and sequestered from a commercial gasification plant. No method of CO_2 capture is commercially available or economically viable for the proposed pulverized coal power plant.

The Eastman Chemical Company has been removing the mercury from their gasification plant for more than 20 years. Recent testing indicates that the mercury levels in the cleaned gas are at non-detectable levels.

IGCC plants produce much less solid wastes and less potential for ground water contamination than the proposed pulverized coal plant.

IGCC plants use 30% to 40% less water than pulverized coal plants.

III. PULVERIZED COAL COMBUSTION AND GASIFICATION TECHNOLOGIES

Q. What are the Differences Between Combustion and Gasification?

A: It is important to understand the difference between combustion which is used in a coal power plant and coal gasification which is used in an IGCC plant. Exhibit RCF-2 shows the differences between combustion and gasification. The coal boiler operates at 1800 F and atmospheric pressure. The coal gasifier operates at 2600 F and 40 atmospheres pressure. The flow meters show the pounds of material that need to be processed for the same amount of electricity. Prior to gasification the nitrogen is separated from the air and the oxygen alone is used in the gasifier. Therefore for the same amount of electricity the gasifier produces 173 pound of synthesis gas versus 1000 pounds of exhaust gas from the boiler. Since the gasifier operates at higher pressure there is also a much smaller volume of gas that needs to be treated for pollutants and therefore the size of the equipment and capital cost is much smaller. The exhaust gas volume that needs to be treated from a coal boiler is 160 times larger than the volume of the synthesis gas that can also be cleaned of pollutants. The form of the pollutants from the gasifier makes it possible for very efficient recovery of potential pollutants using proven commercially available equipment that is operating in the natural gas and petrochemical industries. Proven commercially available technologies are <u>not</u> presently available for the proposed new coal boilers for mercury and CO_2. This is one of the main reasons that we need to use gasification.

Q. What Is Integrated Gasification Combined Cycle (IGCC)?

A. Integrated Gasification Combined Cycle (IGCC) is the efficient integration of the coal gasification process with the pre-combustion removal of pollutants and the generation of electricity using a combined cycle power plant. Due to the high pressure and low volume of the concentrated synthesis gas that is produced

it is capable of higher levels of pollutant removal at lower costs than pulverized coal (PC) combustion.

Exhibit RCF-3 shows the various parts of an IGCC plant that will be described.

IGCC is a method of producing electricity from coal and other fuels. In an IGCC plant, coal is first converted to synthesis gas (also called syngas) composed primarily of hydrogen, carbon monoxide and carbon dioxide. After removing particulate matter, sulfur, mercury and other pollutants, the cleaned syngas is combusted in a combined-cycle power plant to produce electricity.

In the first step of the IGCC process, coal is slurried with either water or nitrogen and enters the gasifier. It is mixed with oxygen, not air, which is provided to the gasifier from an air separation unit. The coal is partially oxidized at high temperature and pressure to form syngas. The syngas leaves the gasifier, while the solids are removed from the bottom of the gasifier. The operating conditions in the gasifier vitrify the solids. In other words, the solids are encased in a glass-like substance that makes them less likely to leach into groundwater when disposed of in a landfill as compared to solid wastes from a conventional coal plant.

After leaving the gasifier, the syngas undergoes several clean-up operations. Particulate matter is removed. Next, a carbon bed can be used to take out mercury. Finally, sulfur (in the form of H2S) is removed from the syngas in a combination of steps that usually involve hydrolysis followed by an adsorption operation using MDEA (methyldiethanolamine) or Selexol. The H2S that is removed from the syngas is usually converted into elemental commercial-grade sulfur using a Clauss plant.

The clean syngas enters a combustion turbine where it is burned to produce electricity. The heat from the exhaust gases is captured in a heat recovery steam generator (HRSG) and the resulting steam is used to produce more electricity. The combustion turbine, combined with the HRSG, is the same configuration commonly used for natural gas combined cycle (NGCC) plants. In Europe and Japan, some IGCC units have installed selective catalytic reduction (SCR) to control nitrous oxides (NO_x) emissions from the turbine, but in the United States, NO_x emissions at existing IGCC plants have been reduced with diluent injection only.

Q: What are the Other Advantages of Using Gasification Plants?

A: Gasification, which is also called Partial Oxidation, can use a wide range of fuels and can produce a wide range of products as shown in Exhibit RCF-4.

The fuel flexibility of gasification is demonstrated by its ability to use all types of coal, petroleum coke, biomass, refinery wastes, and waste materials. The synthesis gas that is produced consists of mainly carbon monoxide (CO) and hydrogen (H2) which are used as the raw materials to produce (or synthesis) a wide range of chemicals. This synthesis gas can also be used as fuel directly for a combined cycle power plant called an IGCC (Integrated Gasification Combined Cycle) plant. It can be further processed in a shift reactor to produce hydrogen and carbon dioxide (CO_2). The hydrogen can be used as a fuel or used to improve fuel quality in a refinery. The CO_2 can be used for enhanced oil recovery to produce addition oil from aging oil fields. The CO and H2 can also be further processed by the Fischer-Tropsch Process to produce liquid fuels. This demonstrates the wide range of products that can be produced by gasification. The production of multiple products from a single plant is called

polygeneration. Economic analyses have indicated that polygeneration of fuels, chemicals and electricity improves the profitability of gasification plants.

IV. COST OF ELECTRICITY FROM PULVERIZED COAL AND IGCC PLANTS

Q. Did You Compare the Cost Of Electricity Produced from a New IGCC Plant in Florida With the Cost Of Electricity from a New Ultra-Super Critical Pulverized Coal Plant in Florida?

A. Yes.

Exhibit RCF-5 shows that the costs of electricity for the three types of proposed Pulverized Coal (PC) Plants are higher than the cost of electricity for an IGCC plant using Petroleum Coke (PetCoke) in Florida. Although the IGCC plant has a higher capital cost than the PC plants it has a significantly lower fuel cost when using petcoke. The U.S. petroleum refineries in the Gulf coast produce over 25 million tons per year of fuel-grade petcoke that can be used by IGCC plants. This petcoke can provide over 10,000 MW of new generating capacity in the U.S. At the present time almost all of this petcoke is exported to other countries that allow the higher emissions of SO_2 that petcoke produces. The use of petcoke in the U.S. requires the installation of additional FGD systems to PC plants which is usually cost prohibitive. IGCC plants can effectively remove the sulfur from petcoke and sell it as a value added product. Florida's proximity to the Gulf coast refineries enables Florida's utilities to make use of this waste material while reducing emissions and lowering their cost of electricity. Therefore the lowest cost alternative for Florida is the use of IGCC plants utilizing petcoke. Three companies have recently announced that they plan to build petcoke IGCC plants in the U.S. For the past 10 years Tampa

Electric has been using petcoke in their 250 MW IGCC plant and have recently announced that they will build an additional 630 MW IGCC plant for operation in 2013. Tampa Electric's President Chuck Black was recently quoted as saying: "it's our least cost-generating resource, so we count on it and use it every day as part of our system" in the November 2006 issue of Time Magazine, Inside Business.

The sources of data for Exhibit RCF-5 - Cost of Electricity Comparison Chart for Florida are:

1. Capital, O&M and all non-fuel costs are based upon: Department of Energy/NETL Presentation, Federal IGCC R&D: Coal's Pathway to the Future, by Juli Klara, presented at GTC, Oct. 4, 2006.

2. Efficiencies and fuel consumption calculations are based upon: EPA Final Report, Environmental Footprints and Costs of Coal-Based Integrated Gasification Combined Cycle and Pulverized Coal Technologies, July 2006.

3. Fuel costs are based upon: Department of Energy, Energy Information Administration, Average Delivered Cost of Coal and Petroleum Coke to Electric Utilities in Florida, 2005 and 2004.

Q: What are the Additional Costs for Capturing CO_2 from Pulverized Coal and IGCC Plants?

A: IGCC plants are capable of capturing CO_2 at much lower costs than pulverized coal plants. The capture, transporting and sequestering of CO_2 is being done on a commercial scale at the Great Plains Synfuels Plant which will be described in later testimony. Studies performed by the DOE, American Electric Power

(AEP), GE and others all show that IGCC plants will be more cost effective than pulverized coal plants when carbon reductions are required.

Exhibit RCF-6 by GE shows the additional cost that must be added to super-critical pulverized coal (SCPC) plants and IGCC plants for CO_2 capture. The table shows the energy penalty and added capital costs for CO_2 capture. The use of a cost for carbon emissions in planning is reasonable given the high likelihood that carbon will be regulated in the future. This exhibit shows the Cost of Energy (COE) for plants designed with the capability to remove CO_2. The COE with CO_2 capture for PC plants will be an unacceptable 8.29 cents/kwh compared to the COE with CO_2 capture for IGCC plants of 6.90 cents/kwh. This is a 66% increase for PC plants compared to a 25% increase for IGCC plants.

Q. Do the Other Studies Confirm these Results of Significantly Lower Costs for Capturing CO_2 in IGCC Plants?

A. Yes.

Exhibit RCF-7 is from a recent U.S. Dept. Of Energy (DOE) Presentation that shows significantly lower future electric costs for IGCC plants than pulverized coal plants. It is important to note that this study was for a mid-west location and petcoke was not included as a potential fuel for the IGCC plant.

This DOE study shows a 30% increase in COE for IGCC with CO_2 capture versus a 68% increase in COE for PC with CO_2 capture. This confirms the GE results which show a 25% increase in COE for IGCC with CO_2 capture versus a 66% increase in COE for PC with CO_2 capture.

This exhibit shows that the cost of electricity from an IGCC plant using coal and located in the midwest is 5.26 cents per kilowatt-hour compared to 4.97 cents per kilowatt-hour for the Pulverized Coal (PC) plant. Therefore the significant emission reductions by using IGCC will only increase the cost of electricity by 0.29 cent per kilowatt-hour. This chart also shows that with future requirements to reduce carbon dioxide (CO_2) emissions the cost of electricity for PC plants will increase to 8.35 cents per kilowatt-hour while only increasing to 6.84 cents per kilowatt-hour for the IGCC plant. That amounts to an increase in the cost of electricity of 3.38 cents per kilowatt-hour for the PC plant. Therefore the IGCC plants will be less expensive to operate in the future. The net result is much cleaner air now and lower cost electricity in the future.

V. AIR POLLUTANT EMISSIONS FROM PULVERIZED COAL AND IGCC PLANTS

Q: Are the Emissions from Ultra Super-critical Pulverized Coal (USPC) Plants Significantly Higher Than IGCC Plants? If So, Explain.

A: Yes.

Exhibit RCF-8 shows the much lower emissions that are produced from Integrated Gasification Combined Cycle (IGCC) plants than Ultra Super-critical Pulverized Coal (USPC) plants. I prepared this exhibit to show that by using IGCC plants to produce the same amount of electricity as USPC plants will dramatically reduce emissions. The use of IGCC plants will produce:

- 84% less smog forming gases (NO_x)
- 88% less acid rain gases (SO_2)
- 42% less soot or fine particulate (PM10)

- 65% less brain damaging mercury (Hg) and the potential for
- 90% less global warming gases (CO_2)

The potential for future electric cost increases due to future environmental regulations is less for IGCC because IGCC plants can control all emissions more economically than PC plants.

I prepared these emission calculations based upon:

1. The best available control technology as reported in EPA Final Report, Environmental Footprints and Costs of Coal-Based Integrated Gasification Combined Cycle and Pulverized Coal Technologies, July 2006;

2. DOE Final Report, Major Environmental Aspects of Gasification-Based Power Generation Technologies, Dec. 2002 and

3. Test results from Eastman's gasification process using activated carbon beds for mercury removal.

Q: The EPA Report that you used for your Comparison of Emissions is Based upon a Standard USPC Plant with Emission Levels Slightly Different than the Emission Levels Proposed for the FGPP Plant. How do the Emission Levels of the Proposed FGPP Plant Compare with an IGCC Plant?

A: Exhibit RCF-9 shows the tons per year (or pounds per year) of emissions for the proposed FGPP plant and an IGCC plant producing the same amount of electricity.

This chart shows that an IGCC plant producing the same amount of electricity as the proposed FGPP plant will dramatically reduce emissions. The use of IGCC plants will produce:

- 84% less smog forming gases (NO_x)

- 79% less acid rain gases (SO_2)
- 56% less soot or fine particulate (PM10)
- 67% less brain damaging mercury (Hg) and the potential for
- 90% less global warming gases (CO_2)

I prepared these emission calculations based upon:

1. The emissions data from the Permit Application for FPL Glades Power Park, Dec. 2006;

2. The best available control technology as reported in EPA Final Report, Environmental Footprints and Costs of Coal-Based Integrated Gasification Combined Cycle and Pulverized Coal Technologies, July 2006;

3. DOE Final Report, Major Environmental Aspects of Gasification-Based Power Generation Technologies, Dec. 2002 and

4. Test results from Eastman's gasification process using activated carbon beds for mercury removal.

Q. Do Recent IGCC Plants' Permit Levels and Proposed Permit Levels Confirm that these Significantly Lower Levels of Emissions Provided in these Studies can be Produced in Actual Plants?

A. Yes.

Exhibit RCF-10 shows a summary of emissions from recent IGCC permits and proposed permit levels. This table summarizes proposed emission levels from IGCC plants that have recently received or applied for air permits. The majority of IGCC plants proposed in the last 12 months have sought to control sulfur using Selexol, a more effective control strategy than MDEA. These plants include, AEP in Ohio and West Virginia, Northwest Energy,

Tondu, Duke, ERORA (Illinois and Kentucky). Only one air permit application filed in the last 12 months, Mesaba (filed June 2006) uses the less effective MDEA. Selexol effectively removes sulfur levels to between 0.0117 to 0.019 lb/MMBtu heat input into the gasifier.

As this table shows, a majority of IGCC plants that have filed applications in the last 12 months include SCRs to control NOx. These include, Northwest Energy, Tondu, ERORA in Illinois and Kentucky, and Duke in Indiana (The Duke plant includes and SCR, but bases reductions on diluent injection only). The NO_x emission rates for SCR controlled IGCC plants is 0.012 - 0.025 lb/MMBtu based upon heat into the gasifier.

These trends toward Selexol and SCR adoption are occurring faster than EPA predicted in its July 2006 report, Environmental Footprints and Costs of Coal-Based Integrated Gasification Combined Cycle and Pulverized Coal Technologies. The July 2006 EPA report assumed that MDEA and diluent injection would be BACT for the near-term. This report was based upon a "snap shot" of IGCC permits that is out of date. As this table shows, the market has responded with technology faster than the EPA report anticipated.

In deciding which emission rates to compare to the FGPP plant's proposed emission rates, the highest weight should be placed on recently proposed IGCC plants because they represent the most current view of IGCC permit levels. The least weight should be placed on existing IGCC plants and IGCC plants with permits issued prior to 2003 because they do not represent the capabilities of current IGCC technology.

Q. What are the Emission Rates from the Proposed FGPP Plant and How do they Compare with Recent IGCC Permit Applications?

A. Exhibit RCF-11 summarizes the range of recently filed air permits for IGCC plants (filed in the last 12 months) and compares them to the proposed emission levels for the FGPP plant. An IGCC plant would have significantly lower emissions of all pollutants than the proposed FGPP plant.

Exhibit RCF-11 shows that:

An IGCC plant with the Selexol process would emit only 29% to 47% of the sulfur dioxide of the proposed FGPP plant.

An IGCC plant with the SCR process would only emit 24% to 50% of the nitrogen oxides of the proposed FGPP plant.

An IGCC plant would only emit 48% of the particulate mater of the proposed FGPP plant.

An IGCC plant would only emit 16% to 46% of the mercury of the proposed FGPP plant.

An IGCC plant would also be expected to emit about three-quarters less CO and significantly less sulfuric acid mist and VOCs than the proposed FGPP plant.

VI. THE CLEAN AIR ACT AND BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

Q. Should IGCC Technology be Evaluated as Part of the BACT Analysis for a New Power Plant?

A. Yes.

Exhibit RCF-12 shows the definition of BACT that is included in the Clean Air Act. Exhibit RCF-12 also shows why Senator Huddleston proposed the amendment that included the words "innovative fuel combustion techniques for

control of each pollutant" to The Clean Air Act's definition of BACT. Senator's Huddleston words from the Congressional Record are:

- "And I believe it is likely that the concept of BACT is intended to include such technologies as low Btu gasification and fluidized bed combustion. But, this intention is not explicitly spelled out, and I am concerned that without clarification, the possibility of misinterpretation would remain.
- It is the purpose of this amendment to leave no doubt that in determining best available control technology, all actions taken by the fuel user are to be taken into account – . . [including] gasification, or liquefaction . . . which specifically reduce emissions."

Senator Huddleston's amendment was accepted as part of the definition of BACT in The Clean Air Act. Therefore IGCC technology should by law be evaluated as part of the BACT analysis for a new power plant.

VII. TAMPA ELECTRIC COMPANY (TECO) AND IGCC

Q. How Long have Commercial Size IGCC Plants been in Operation in the U.S.?

A. Commercial IGCC plants have been in operation for more than 10 years in the U.S.

Exhibit RCF-13 shows the Polk Power Plant near Tampa, FL which is a greenfield site and the Wabash Power Plant in Indiana which is a conversion of an existing plant.

Tampa Electric Company's (TECO) Polk Power Station began operation in 1996. It produces 250 MW (net) of electricity. It uses a Texaco (now GE) oxygen-blown gasification system. Power comes from a GE 107FA combined

cycle system. During the summer peak power months, availability is greater than 90 percent when using back-up fuel.

The Wabash River Coal Gasification Repowering Project in Indiana began operation in November 1995. It demonstrated the repowering of an existing coal plant to IGCC. The plant uses an "E-Gas" oxygen-blown gasification system which is sold by ConocoPhillips.

For larger size plants, multiple units are being proposed which will improve system availability and reduce costs by making use of standard, modular designs.

Q. Have the Utilities Involved with these IGCC Plants Announced Plans to Build Other IGCC Plant?

A. Yes.

Tampa Electric Company has announced that they will build an additional 630 MW IGCC plant at the Polk Power Plant for operation in 2013. Tampa Electric started operation of its existing 315 MW(gross)/250MW(net) IGCC plant in October, 1996 and has recently celebrated its 10th year anniversary. It is the lowest cost plant to operate on Tampa Electric's System and has won numerous environmental awards.

Cinergy was the utility partner that was part of the Wabash IGCC plant. Cinergy has now merged with Duke Energy. Duke Energy has announced that they will build a 630 MW IGCC plant to be built at their Edwardsport Generating Station in Edwardsport, Indiana.

There are at least twenty-eight (28) IGCC plants being planned in the United States by utilities and independent power producers.

Q. Why are the Stacks of PC Plants So Much Taller Than

the Stacks of IGCC Plants?

A. A tall stack is required on all PC plants because the emissions are so high that a significant amount of dilution is required before the ground level emissions are within acceptable limits for people to breath. The proposed FGPP plant is designed with a 500 foot stack compared to the 120 foot stack at Tampa Electric's IGCC plant. Exhibit RCF-14 is a picture that demonstrates the significantly lower emissions from IGCC plants by the facts that the IGCC stack is clear and that there is no need for a tall stack. The much taller PC stack also decreases property values in a much larger surrounding area. This IGCC plant was designed about 15 years ago. Since then significant improvements have been made in IGCC emissions control which enable much lower emission levels than what was required for this IGCC plant 15 years ago. Therefore any emissions comparison should be based upon the best available control technologies (BACT) for PC and IGCC plants that are currently being built.

VIII. REFERENCES TO CONTACT FOR PC AND IGCC PLANTS

Q. What Government Officials and Power Plant Managers are the Most Informed about the Advantages and Disadvantages of Using PC and IGCC Technologies for New Power Plants?

A. Exhibit RCF-15 shows references that I recommend to be contacted prior to anyone making a decision on which technology to use for a new power plant. Each of them have agreed to be contacted to provide their advise concerning their decision process in evaluating PC and IGCC plants.

IX. COMMERCIALLY OPERATING AND PLANNED IGCC PLANTS

Q. Please Describe the Types and Number of Commercially Operating Gasification Plants.

A. Exhibit RCF-16 shows the results of the 2004 world survey of operating gasification plants prepared by the Gasification Technologies Council for the Department of Energy.

Gasification dates back to the 18th century, when "town gas" was produced using fairly simple coal-based gasification plants. But what we think of as modern gasification technology dates back to the 1930's when gasification was developed for chemicals and fuels production. Today (2007), there are around 130 gasification plants worldwide that produce fertilizers, fuels, steam, hydrogen and other chemicals, and electricity. Of these 130 plants, fourteen are IGCC plants.

Q. How Many Commercially Operating IGCC Plants Are There?

A. Exhibit RCF-17 from a Department of Energy presentation shows ~~fourteen (14)~~ 17 commercially operating IGCC plants. Together, these plants have a capacity of 3,880 MW(net) and have almost one million hours of operation on syngas.

These plants use a variety of fuels including coal, petroleum coke, biomass, and refinery residues.

Four IGCC plants tend to be the focus of utility interest because they were designed to use coal: 1) Wabash, Indiana, 2) Polk, Florida, 3) Nuon, Netherlands, and 4) Elcogas, Spain. These four commercial IGCC plants have been operating from 10 to 13 years. They have successfully integrated the gasification process with the combined cycle power plant to enable more efficient use of coal while significantly reducing emissions. These plants range in size from 250 to 320 MW per unit.

A second set of plants built after Wabash, Polk, Nuon, and Elcogas are also important in the progression of IGCC. These plants operate at refineries in

Italy. They are: Sarlux 545 MW, Sardinia; ISAB Energy 510 MW, Sicily; Api Energia 280 MW, Falconara; and Eni Power 250 MW, Ferrera. The first two demonstrate that IGCC plants can be built at a scale above 500 MW. Three of the plants were built using non-recourse project financing provided by over 60 banks and other lending institutions. They show that IGCC can be a commercially bankable technology.

Both the Salux and ISAB Energy plants use more than one gasification "train" and operate with more than 90 percent availability without a spare gasifier. The Italian experience with IGCC, while using refinery residues as fuel, is relevant to discussions of coal-fired or petcoke-fired IGCC, because essentially the same equipment is utilized in both instances, differing only in the feed preparation and how solids are removed.

The first commercial-scale demonstration IGCC plant in the United States was Southern California Edison's Cool Water Plant located at Barstow, California. It operated between 1984 and 1989. The plant successfully utilized a variety of coals, both subbituminous and bituminous, and had a feed of about 1,200 tons/day. The project used an oxygen-blown Texaco gasifier with full heat recovery using both radiant and convective syngas coolers.

Q. Can You Describe the Types of IGCC Projects being Developed in the U.S.?

A. Exhibit RCF-18 shows some of the publicly announced IGCC and gasification projects in the U.S.

The range of IGCC projects under development in the United States includes proposals that would be fueled with petroleum coke, bituminous coal, subbituminous coal, and lignite. For example, the Department of Energy

announced in August 2006 that it had received tax credit applications under the Energy Policy Act of 2005 from 18 IGCC projects-- 10 using bituminous coal, six using subbituminous coal, and two that would use lignite. The source of this data is from the Department of Energy, Fossil Energy Techline, issued August 14, 2006, Tax Credit Programs Promote Coal-Based Power Generation Technologies.

IGCC technology is commercially available from five major companies: GE, ConocoPhillips, Siemens, Shell and Mitsubishi Heavy Industries (MHI). The gasification industry has undergone many changes in the past few years that have given confidence to industry and lenders that IGCC can obtain sufficient performance warranties to build new IGCC plants. GE, a major company in the power field, has purchased ChevronTexaco's gasification business, and has partnered with Bechtel to offer fully warranted IGCC plants. ConocoPhillips has purchased the E-Gas technology from Global Energy. Siemens has purchased the German gasification technology formerly offered by Future Energy. Shell has partnered with Udhe and Black and Veatch.

Q. Is there a List of the IGCC Projects that are Presently Under Development in the U.S.?

A. Yes.

Exhibit RCF-19 is a recent list presented by DOE that shows some of the gasification projects that are being developed in the U.S.

A recent DOE Report lists 28 IGCC projects that are planned in the U.S. by utilities and independent power producers. This Department of Energy Report is Tracking New Coal-Fired Power Plants, by Scott Klara and Eric Shuster, September 29, 2006.

X. SIZE AND AVAILABILITY OF NEW IGCC PLANTS

Q. Is it Possible to Build the Large Size IGCC Plants that are Needed for the FGPP Plant?

A. Yes.

Large size plants are being built using modular designs that improve system reliability, increase efficiencies and provide fuel flexibility.

The Nuon Utility in the Netherlands, Belgium and Germany has been successfully operating an IGCC plant on coal and biomass for the past 12 years at about 253 MW. Nuon recently announced that they are building a 1200 MW plant which will consist of four 300 MW units. This design shown in Exhibit RCF-20 requires no additional scale-up from the design of their existing plant and makes use of readily available combined-cycle plants that have been used with natural gas. This modular design provides additional system reliability, increased efficiencies, fuel flexibility and any possible size.

The standard IGCC unit is now 300 MW. Most manufacturers are supplying 600 MW plants which consist of two 300 MW units. This is due to the fact that the gasifiers have been sized to produce the amount of synthesis gas needed for the 300 MW combined-cycle plants that are already in-service using natural gas. Therefore the 630 MW unit that Tampa Electric is building for operation in 2013 consists of two units the same size as their existing unit that has been operating for the past 10 years. Therefore there is no additional scale-up required. Any large size plant can be built by using additional 300 MW units. Three manufacturers have 300 MW IGCC units that have been operating successfully for the last 10 to 13 years. GE states that "IGCC technology can

satisfy output requirements from 10 MW to more than 1500 MW, and can be applied in almost any new or repowering project where solid and heavy fuels are available." The source of this quote is from: www.gepower.com/prod_serv/products/gas_turbines_cc/en/igcc/index)

Q. Have Recent Coal Gasification Plants and IGCC Plants Demonstrated Reliabilities Above 90% Required by the Utility Industry?

A. Yes.

Now GE offers to take on responsibility for everything "From Coal off the Coal Pile to Electrons on the Grid" by Ed Lowe, GE General Manager of Gasification from Time Magazine, Inside Business, November, 2006.

Exhibit RCF-21 is a chart by GE which shows that their 4 new coal gasification plants that have been operating in China for the past 3 years have been operating at greater than 90 % reliability.

An additional advantage of an IGCC plant is that it can operate on various fuels. If the gasifier is out-of service for maintanence the power plant can still operate on natural gas or diesel fuel. This is not possible with a PC plant which is usually designed for one type of coal. Older IGCC plants built in the early 1990s such as Polk and Wabash that operate without a spare gasifier have demonstrated availabilities above 85%.

A recent Gas Turbine World article reported on the capacity factors of the more recently built IGCC plants in Italy that utilize refinery waste such as asphalt as a fuel. As the report notes, the availability of these plants are between 90% and 94%. The source of this data is from Refinery IGCC plants are exceeding 90% capacity factor after 3 years, by Harry Jaeger, Gas Turbine World, January-February 2006.

Major vendors of IGCC plants such as GE, Shell and ConocoPhillips will warrant that new IGCC plants will achieve greater than 90% availability with a spare gasifier. The economic comparisons conducted for Tampa Electric's IGCC plant indicate that it is more cost effective to operate on natural gas or diesel fuel than to build a spare gasifier to increase plant availability. Tampa Electric's IGCC plant has demonstrated reliability to produce electricity of 95% with their dual fuel capability. This is greater than PC plants that do not have dual fuel capability. The source of this data is from Tampa Electric's Presentation of Operating Results, by Mark Hornick, Plant Manager, presented during plant tours.

Therefore IGCC plants are being built without a spare gasifier. They will be able to operate above 90% availability by using their back-up fuel of either natural gas or diesel.

Reliability and availability are measures of the time a plant is capable of producing electricity. Reliability takes into account the amount of time when a plant is not capable of producing electricity because of unplanned outages. Availability takes into account the time when a plant is not capable of producing electricity because of planned and unplanned outages.

XI. THE GREAT PLAINS SYNFUELS PLANT

Q. Are There Any Commercially Operating Gasification Plants That Are Capturing CO_2?

A. Yes.

Exhibit RCF-22 shows the Great Plains Synfuels Plant in Beulah, North Dakota which is a good example of a commercial gasification plant. It began operating in 1984 and today produces more than 54 billion cubic feet of

Synthetic Natural Gas (SNG) from 6 million tons of coal per year. If the SNG from this one plant were used in combined-cycle power plants there would be enough fuel for more than 1,000MW of generating capacity.

Adjacent to the Great Plains Synfuels Plant is the Antelope Valley Station which consists of two 440 MW lignite coal power plants that also started operation on lignite in the early 1980s.

Both plants are owned by the Basin Electric Power Cooperative. Al Lukes, Senior Vice President and COO of the Dakota Gasification Company, presented a paper at the 2005 Gasification Technologies Conference entitled Experience with Gasifying Low Rank Coals which showed the significantly lower emissions from the coal gasification plant than the coal-fired power plant. I recently asked Al Lukes which technology he would select today for a power plant, and he said "definitely the gasification technology".

Q. Has the Great Plains Synfuels Plant been Able to Commercially Demonstrate that the CO_2 from this Coal Gasification Plant can be Economically Captured and Sequestered?

A. Yes.

Carbon dioxide capture, transportation and sequestration has been operating commercially since 2000 at the Great Plains Synfuels Plant. In 2000, the Great Plains Synfuels Plant added a CO_2 recovery process to capture the CO_2. It transports the CO_2 by pipeline 205 miles, as shown in Exhibit RCF-23, to the Weyburn oil fields where it is used for enhanced oil recovery (EOR). In this way, the CO_2 does not become a global warming emission source but is sold as a useful byproduct to recover additional oil from depleted oil fields and the CO_2 is sequestered underground. This CO_2 recovery process is expected to

help extract 130 million extra barrels of oil from this oil field. This demonstrates the ability to efficiently capture and sequester the CO2 from the gasification process.

XII. ENVIRONMENTAL IMPACT COMPARISONS OF PC AND IGCC PLANTS

Q: What Mercury Control Technology is Used With IGCC Plants that Can Remove So Much More Mercury Than What can be Removed from the Proposed FGPP Plant?

A: The efficient mercury removal process that will be used for IGCC plants has been commercially operating for more than 21 years.

The plant shown in Exhibit RCF-24 uses activated carbon beds for removing more than 94% of the mercury from the synthesis gas of this coal gasification plant. Mercury testing has indicated non-detectable mercury levels in the synthesis gas. However it is not economically possible to use this efficient mercury removal process for conventional Pulverized Coal (PC) plants due to the much larger quantities of stack gas in a PC plant. The stack gas (also called flue gas) from proposed PC plants will be 160 times the volume of the synthesis gas that will be treated in an IGCC plant. It is not economically feasible to treat this much larger volume of stack gas using this much more efficient process. Therefore FPL has proposed the much less expensive and much less efficient technology of activated carbon injection (ACI) that has not underdone long term testing at the commercial scale that should be required for these plants. Therefore a recent Electric Power Research Institute (EPRI) Journal article titled Mercury Control for Coal-Fired Power Plants, Summer 2005, page 19 states:

"No technology designed specifically to control mercury in coal plants is in use anywhere in the world, or has even undergone long term testing."

What this means is that the proposed technology of activated carbon injection (ACI) that FPL has proposed has not underdone long term testing at the commercial scale that should be required for these plants. Therefore there is a significant risk that the proposed mercury control system for the FGPP plant will not meet their proposed emission levels for mercury.

Q. Are there Less Solid Wastes Produced from IGCC Plants?

A. Yes.

Exhibit RCF-25 shows the significantly less solid waste that is produced by IGCC plants. Instead of large quantities of scrubber sludge to dispose from the proposed FGPP plant an IGCC plant produces useful sulfur byproduct. Leachable ash and scrubber sludge from the PC plants can cause ground water contamination. Instead of a leachable fly ash to dispose of IGCC produces a non-leachable slag that can be used in asphalt. The higher temperatures for gasification than combustion has a benefit because coal ash has a softening temperature of about 2250 F. Therefore, the coal ash goes through a molten state when gasified then cools to become an inert, vitrified slag that can be sold as a byproduct or disposed of as a non-leachable material.

Q. Do IGCC Plants Use Less Water than the Proposed PC Plant?

A. Yes.

Exhibit RCF-26 shows that IGCC plants use 30% to 40% less water than a PC plant.

The 30 to 40 % less water usage for an IGCC plant is due mostly to the fact that a combined cycle power plant is being used which requires less cooling tower water. A combined cycle power plant consists of both a gas turbine and a steam turbine for power generation. The gas turbine portion of the power generation cycle does not require the large quantities of water for cooling that are needed for the steam turbine cycle. Since a PC plant generates all of its electricity from the steam turbine cycle it requires larger amounts of water.

Combined cycle plants are more energy efficient but require a clean fuel such as natural gas, diesel, or synthesis gas. The older, less efficient technology uses only a steam turbine, which must be used for PC plants due to the contaminants in the combustion products.

XIII. THE BENEFITS OF FUEL FLEXIBILIY FOR POWER PLANTS

Q: What are the Benefits of a Power Plant being Able to Use Different Fuels?

A: The 1200 MW IGCC Plant to be built by the Nuon Utility in The Netherlands is a good example of a multi-fuel power plant. This plant is shown in Exhibit RCF-20. It will have the capability of using coal, petcoke, biomass and natural gas. This plant will be able to respond to changing fuel prices and availability of these alternative fuels. The coal, petcoke and biomass can all be gasified to produce syngas for the combined-cycle power plants. The biomass capability enables IGCC plants to use various renewable energy sources that will reduce the emissions of CO_2. Biomass is available in Florida as a byproduct of the sugarcane and pulp industries and then renewable energy crops can be developed as a new industry in Florida. The disadvantage of PC plants is that they are only capable of using coal. Therefore PC plants can not respond to changing market conditions or changing emission standards.

I. BACKGROUND AND WORK EXPERIENCE

Q. Please State Your Name and Address for the Record.

A: My name is Richard C. Furman. My address is 10404 S.W. 128 Terrace, Perrine, Florida 33176.

Q: What Is Your Occupation?

A: I am a retired consulting engineer, and I volunteer my time to advise utilities, government agencies, environmental groups and the public about the potential benefits of using coal gasification technologies. I have testified in previous permit hearings for proposed coal plants concerning emission control technologies, applicable emission regulations and alternative technologies concerning Mercury, NO_x, SO_2, particulate and CO_2 emissions and their associated costs.

Q: How Long Have You Been Retired?

A: Since February 2003.

Q: What Was Your Occupation Before You Retired?

A: During my entire engineering career, I have worked on new energy technologies, alternative fuels for power plants, and pollution control for power plants. Prior to my retirement, I was an independent consulting engineer for 22 years to various utility companies, government agencies, process developers and research organizations on the development, technical feasibility and application of new energy technologies and alternative fuels for power plants.

Q: What Did You Do Before You Were An Independent Consulting Engineer?

A: Prior to my work as a consulting engineer, I managed Florida Power & Light's coal conversion program and fuels research and development program, which

included the first conversion of a 400 megawatt (400MW) power plant from oil to a coal-oil mixture to reduce oil consumption after the second oil embargo. Prior to this, I directed the engineering study for the conversion of New England Electric's Brayton Point Power Plant, which was the first major conversion of a power plant from oil to coal after the first oil embargo.

My first engineering job was working for Southern California Edison Company to modify their power plants for two-stage combustion to reduce nitrogen oxide emissions in 1969.

Q: Please Summarize Your Formal Education.

A: I received my B.S. in Chemical Engineering from Worcester Polytechnic Institute in 1969 and a M.S. in Chemical Engineering from Massachusetts Institute of Technology in 1972. I was a researcher at MIT for the book entitled New Energy Technologies by Hottel and Howard. After researching for this book, I decided to do my Master's thesis on coal gasification because of its potential as a future energy source and its environmental benefits. My Master's thesis at MIT was entitled Technical and Economic Evaluation of Coal Gasification Processes. I was also a teaching assistant at MIT for the courses of Principles of Combustion and Air Pollution and Seminar in Air Pollution Control. My resume was attached to my original testimony as Exhibit RCF-1.

Q: How Does Your Education and Experience Prepare You to Provide Expert Testimony in this Case?

A: Both my education and work have required an in-depth understanding of past, present and new forms of energy technologies that can be used for power plants. My education and work experiences also involved an in-depth understanding of all the various fuels for power plants including the different types of coals, fuel

oils, natural gas, petroleum coke, synthesis gas, biomass, and refinery wastes. My graduate education and subsequent work experiences have provided me with a detailed understanding of the techniques and costs for controlling power plant pollution including mercury, NO_x, SO_2, CO, particulate matter and CO_2 emissions. My prior work for 3 major electric utility companies allowed me to make use of this knowledge to help develop and utilize new fuels and emission control technologies for power plants. My current volunteer experience allows me to keep informed about the latest developments in new energy technologies, coal gasification technologies, fuels for power plants, techniques for controlling power plant emissions, costs associated with the application of these technologies for power plants and the development of new technologies that may be applicable to power plants.

Q: On whose behalf are you testifying?

A: My testimony is sponsored by the Sierra Club, Inc., Florida Wildlife Federation (FWF), Save Our Creeks (SOC), the Environmental Confederation of Southwest Florida (ECOSWF) and Ellen Peterson.

II. SUMMARY OF TESTIMONY

Q: What Is Your Expert Opinion About the Testimonies Submitted by FPL?

A: I was not allowed sufficient time for the preparation of my testimony and to review and prepare responses to the Petitioner's testimonies. I did not have sufficient time to review the testimony of Mr. Hicks and others.

It is essential to be able to determine the **wide differences** that exist between the Black & Veatch Report that was prepared for FPL, Clean Coal Technology Selection Study, Final Report, dated January, 2007, submitted as Document No. DNH-2 and the U.S. Department of Energy Study, Federal IGCC

R&D: Coal's Pathway to the Future, by Juli Klara, presented at GTC, Oct. 4, 2006 which I used for my Exhibits RCF-5 and RCF-7. Since the conclusions reached by each of these studies are so dramatically different **it is necessary to evaluate the various input assumptions** that were used for both of these studies to determine what created the opposite conclusions. This evaluation would be prudent before a final decision is made for this FGPP plant.

I have shown that coal gasification offers opportunities to significantly reduce emissions and provide lower cost electricity for the future. I would like you to consider all of these facts before you make a decision on the proposed FGPP plant that will increase the cost of electricity, cause increased health problems and damage the environment.

My supplemental testimony shows that Mr. Jenkins has selectively picked information that does not accurately represent the current status of gasification technology and commercial IGCC plants.

Mr. Jenkins has presented a very narrow view of gasification technology and IGCC plants by specifying only four coal-based IGCC plants. In my original testimony, Exhibits RCF-16 and RCF-17, I presented the widely accepted data by the Department of Energy that the 2004 World Survey of Gasification showed 117 operating gasification plants with 385 gasifiers and that there are 14 commercially operating IGCC plants.

The commercial IGCC plants that have been operating for more than 10 years are about 300 MW each and consist of a single gasifier and a single gas turbine. To provide larger size plants multiple units of this same 300 MW size are already in commercial use. The Salux and ISAB Energy plants in Italy as described in Exhibit RCF-17 are multiple unit IGCC plants of more than 500

MW and operating at greater than 90% availability. The use of multiple units has already been demonstrated successfully. Therefore any size IGCC plant can now be built as shown in my Exhibit RCF-20. This exhibit shows the 1200 MW IGCC plant that has been announced by Nuon, in The Netherlands. This utility has been operating a 300 MW IGCC unit for more than 10 years with coal and biomass. Nuon's new 1200 MW plant will have the flexibility to use coal, biomass and natural gas and will consist of four 300 MW units. Therefore scale-up of equipment is not required. Nuon will be using the same size of equipment that they have been operating for more than 10 years. This significantly reduces any risks. The Hunton Energy Group plans to build a 1200 MW IGCC plant in Texas that will use petroleum coke and consist of four 300MW units.

The standard industry practice is to use multiple gas turbine units to achieve the large plant sizes required. As an example the new FPL West County Energy Center in Palm Beach County will consist of 6 gas turbines, 6 HRSG and 2 steam turbines to provide 2400 MW of capacity. The proposed capacity of 1960 MW for the FGPP plant can be matched approximately with three 630 MW IGCC units for a total of 1890 MW which would consist of 6 gas turbines. These multiple unit IGCC plants improve system reliability, increase efficiencies and provide fuel diversity.

Tampa Electric Company's (TECO) IGCC unit has been operating for more than 10 years. Its primary purpose was to demonstrate the technical and economic feasibility of an IGCC unit at full commercial scale. TECO's IGCC unit is now the lowest incremental cost unit and dispatched first. Mr. Jenkins

testimony does not completely or accurately represent this very successful commercial demonstration of an IGCC plant.

The development of Super-Critical Pulverized Coal (SCPC) plants had a more difficult track record and took longer to work out the "bugs." My concern is that FPL is proposing to use the **more advanced** technology of Ultra Super-critical Pulverized Coal (USPC) and there are no other USPC plants operating in the U.S. Supplemental Exhibit RCF-27 shows that there are only 4 USPC plants to be built in the U.S. compared to 32 IGCC plants. The source of this Exhibit is a DOE Report, Tracking New Coal-Fired Power Plants, dated Jan. 24, 2007, page 24, available at: http://www.netl.doe.gov/coal/refshelf/ncp.pdf

If the track record of these new USPC plants follows that of SCPC plants then the additional costs for the proposed FGPP plant will be much greater than the IGCC alternative. If the future costs of additional emission controls or purchase of emissions credits are also factored into the FGPP plant, then the result will be higher electric rates. These appear to be excessive and unnecessary risks associated with the present design of the FGPP plant.

Mr. Jenkins would have one believe that by operating with syngas, there is additional rotational stress that has negative impacts on gas turbine reliability. This is not the case, and his testimony is misleading. The control system protects the gas turbine from operating at a condition where the rotor torque limit might be exceeded and impact on its reliability.

Mr. Jenkins is correct in saying that there were issues with rotor reliability at Polk and Wabash IGCC plants, but what he didn't say was that these issues also were faced by owners of the GE Frame 7F all over the world, regardless of the fuel being used. Supplemental Exhibit RCF-28 shows the

power output vs. ambient temperature curves for the GE Frame 7FA and 7FB models.

By inferring that these issues were related to the use of syngas, and not mentioning that GE had a generic rotor design problem, he misrepresented the data and detracted seriously from the credibility of his "expert" testimony. Similarly, by not pointing out that most of the unavailability experienced by the operating IGCC plants was due to problems with the power block (i.e. conventional combined cycle equipment) and not to the gasification block, Jenkins' was not being forthright in his testimony.

The operation of IGCC units with backup fuel is as reliable as Natural Gas Combined Cycle (NGCC) units. Reliability for IGCC plants with backup fuel is in the mid 90%. Supplemental Exhibit RCF-29 is a recent Gas Turbine World article titled, Refinery IGCC Plants are Exceeding 90% Capacity Factor after 3 Years, dated Jan.-Feb. 2006, by Harry Jaeger. This article shows that the availabilities of three IGCC plants are 93%, 90% and 94% availability. These availabilities are without a spare gasifier and without a backup fuel.

CO_2 capture is being done commercially at many coal gasification plants around the world on coal-derived syngas. Examples of this in the U.S are the Great Plains Synfuels Plant in North Dakota, the Coffeyville Fertilizer Plant in Kansas and the Eastman Chemical Plant in Tennessee. In my original testimony on pages 25-27, I presented information on the Great Plains Synfuels Plant. Exhibit RCF-22 shows this plant. Carbon dioxide capture, transportation and sequestration have been operating commercially since 2000 at the Great Plains Synfuels Plant. In 2000, the Great Plains Synfuels Plant added a CO_2 recovery process to capture the CO_2. It transports the CO_2 by pipeline 205 miles, as

shown in Exhibit RCF-23, to the Weyburn oil fields where it is used for enhanced oil recovery (EOR).

This demonstrates that CO_2 capture is being done on a commercial basis from coal gasification plants. CO_2 capture is not being done presently on any IGCC plants because the process of generating power does not require it to be removed and CO_2 regulations have not been promulgated yet. The other coal gasification applications have demonstrated that CO_2 capture is commercially available.

III. SCHEDULE ERRORS FOR SUBMITTAL OF TESTIMONIES

Q. Were you allowed sufficient time for the preparation of your testimony and to review and prepare responses to the Petitioner's testimonies? If no, please explain.

A: No. The Order Establishing Procedure set forth March 21, 2007, as the date for filing rebuttal testimony and exhibits. I had arranged my schedule to accommodate this limited response time for the large volume of testimony submitted by the petitioner. However, due to a scrivener's error, the Order incorrectly designated that **all** parties may file rebuttal testimony and exhibits, rather than designating that only the Applicant has the ability to do so, which was the intent. After my testimony was submitted on March 7th the corrective order was established that would only allow until March 16 to submit supplemental testimony or corrected testimony by the interveners. The limited amount of time that I have been given to prepare responses to the Petitioner's testimony did not allow me sufficient time to prepare responses to all of the testimonies. Therefore this supplemental testimony is limited by the schedule that was imposed.

IV. COMMENTS ON THE TESTIMONY OF STEVE JENKINS

Q. Where you able to review the testimony of Steve Jenkins?

A: Yes.

Q. Do you think that it accurately represents the current status of IGCC technology?

A. No.

Q: On Page 7, line 8 of Mr. Jenkins testimony the following Question was asked: "Please describe some of the currently existing IGCC plants in the United States and around the world." And Mr. Jenkins replied: "There are four coal-based IGCC plants in operation worldwide." Does this accurately represent the current commercial status of IGCC Plants? If no, please explain.

A: No. Mr. Jenkins has presented a very narrow view of gasification technology and IGCC plants by specifying only four coal-based IGCC plants. In my testimony, Exhibits RCF-16 and RCF-17, I presented the widely accepted data by the Department of Energy that the 2004 World Survey of Gasification showed 117 operating gasification plants with 385 gasifiers and that there are 14 commercially operating IGCC plants. The fact that gasifiers are using all different types of coal, petroleum coke, heavy oils, asphalt, refinery residues, biomass, and waste materials on a commercial scale should indicate the wide flexibility of gasification to use all types of liquid and solid fuels. To narrow his answer to only 4 coal-based IGCC plants is a misleading representation of the current state of this technology.

Q: On Page 8, line 3 of Mr. Jenkins testimony the following Question was asked: "What is the largest size IGCC plant that is commercially

available?" and Mr. Jenkins replied "The largest size being commercially available is called the 600 MW net "reference plant."...It will first be very important to prove the coal gasification technology at this larger scale." Does this accurately represent the current commercial status of IGCC Plants? If no, please explain.

A: No. The commercial IGCC plants that have been operating for more than 10 years are about 300 MW each and consist of a single gasifier and a single gas turbine. To provide larger size plants multiple units of this same 300 MW size are already in commercial use. The Salux and ISAB Energy plants in Italy as described in Exhibit RCF-17 are multiple unit IGCC plants of more than 500 MW and operating at greater than 90% availability. The use of multiple units has already been demonstrated successfully. Therefore any size IGCC plant can now be built as shown in my Exhibit RCF-20. This exhibit shows the 1200 MW IGCC plant that has been announced by Nuon, in The Netherlands. This utility has been operating a 300 MW IGCC unit for more than 10 years with coal and biomass. Nuon's new 1200 MW plant will have the flexibility to use coal, biomass and natural gas and will consist of four 300 MW units. Therefore scale-up of equipment is not required. Nuon will be using the same size of equipment that they have been operating for more than 10 years. This significantly reduces any risks. The Hunton Energy Group plans to build a 1200 MW IGCC plant in Texas that will use petroleum coke and consist of four 300MW units.

The standard industry practice is to use multiple gas turbine units to achieve the large plant sizes required. As an example the new FPL West County Energy Center in Palm Beach County will consist of 6 gas turbines, 6

HRSGs and 2 steam turbines to provide 2400 MW of capacity. The proposed capacity of 1960 MW for the FGPP plant can be matched approximately with three 630 MW IGCC units for a total of 1890 MW which would consist of 6 gas turbines, 6 HRSGs and 3 steam turbines. These multiple unit IGCC plants improve system reliability, increase efficiencies and provide fuel diversity.

Q: On Page 8, line 17 of Mr. Jenkins testimony the following Question was asked: "Have the current IGCC facilities been funded by their governments?" and Mr. Jenkins replied "Yes. All four of the operating plants received significant amounts of co-funding from their respective federal governments...In the case of the Polk Power Station, the DOE funded 20-25% of the capital cost". Is this a complete and accurate representation of the commercial viability of IGCC plants? If no, please explain.

A: No. Polk Power Station's IGCC unit has been operating for more than 10 years. Its primary purpose was to demonstrate the technical and economic feasibility of an IGCC unit at full commercial scale. Another objective of this demonstration project was to improve the technology by testing new process steps that increase efficiencies and reduce emissions. Therefore much of the government funding was specifically used to demonstrate these improvements. An example of the type of improvement that was tested at the Polk Plant was hot gas clean-up which is no longer in service. The Polk IGCC unit is now the lowest incremental cost unit and dispatched first. Mr. Jenkins testimony does not completely or accurately represent this very successful commercial demonstration of an IGCC plant.

Q: On Page 9, line 1 of Mr. Jenkins testimony the following Question was asked: "What has been the track record of these facilities?" and Mr. Jenkins response was: "The initial start-up at all of these plants was very difficult and the overall plant availability for each of these plants was low for the first several years. Since then, many operational problems have been solved, some equipment has been removed or modified, and many of the "bugs" have been worked out." Does this accurately represent the track record of IGCC Plants? Please explain this in relation to the development of other new power plant technologies.

A: Yes. This statement is true. But it is also true that this track record is typical of new power plant technologies. The development of Super-Critical Pulverized Coal (SCPC) plants had a more difficult track record and took longer to work out the "bugs". My concern is that FPL is proposing to use the more advanced technology of Ultra Super-critical Pulverized Coal (USPC) and there are no other USPC plants operating in the U.S. Supplemental Exhibit RCF-27 shows that there are only 4 USPC plants to be built in the U.S. compared to 32 IGCC plants. The source of this Exhibit is a DOE Report, Tracking New Coal-Fired Power Plants, dated Jan. 24, 2007, page 24, available at http://www.netl.doe.gov/coal/refshelf/ncp.pdf .

If the track record of these new USPC plants follows that of SCPC plants then the additional costs for the proposed FGPP plant will be much greater than the IGCC alternative. If the future costs of additional emission controls or purchase of emissions credits are also factored into the FGPP plant, then the result will be higher electric rates. These appear to be excessive and unnecessary risks associated with the present design of the FGPP plant.

Q: On Page 10, line 5 of Mr. Jenkins testimony the following Question was asked: "Why do IGCC plants have problems with reliability?" and Mr. Jenkins replied: "The four IGCC plants all have single-train gasification islands. Whenever a single train is removed from service due to operational problems, there is no syngas available for combustion in the gas turbines. At that point, unless a backup fuel is used, the power plant must be shut down." Is this an accurate and complete Statement? If no, please explain.

A: No. This statement is true but not complete. If the two conditions occur at the same time, which are no syngas and no backup fuel, then the unit can not operate. However the probability of these two events occuring simultaneously is very small. That is why IGCC plants that have a backup fuel can have 95% availabilities. This is better than the proposed 92% availability that FPL is estimating for their USPC Plant. The 980 MW USPC units consist of a single boiler and a single steam turbine operating at conditions that have not been used before in the U.S. Therefore, a single failure in the boiler or the steam turbine can cause 980MW not to operate. This is not the case with IGCC units because they consist of multiple units. A single failure should only cause the loss of a 300MW unit. If that single failure occurs in the gasification part of the plant then the backup fuel can be used and there will be no significant loss of capacity. This is not the case with the proposed USPC plant. A coal supply interruption, such as a coal strike, can cause the loss of all 1960 MW because no backup fuel is available. The costs of using backup fuels for IGCC units will increase the cost of electricity and therefore needs to be considered. But the cost savings of higher availabilities more than offset these additional fuel costs.

Q: In response to the same question above Mr. Jenkins also stated on page 10, lines 15 - 20: "A reliability issue that is somewhat unique to syngas use relates to high rotor torque. Gas turbines are designed to handle the combustion of natural gas. Since syngas has a much lower heating value, a much greater amount of syngas is required to fully load the gas turbine. *This additional rotational stress has had negative impacts on syngas-fired gas turbine reliability.*" Is this a true fact? If no, please explain.

A: No. Since diluted syngas (i.e. syngas diluted with N_2 for NO_x control) has a heating value of only about 1/8 of natural gas, there is a lot more fuel mass required to reach full operating conditions than with natural gas. This affects the amount of power that the same piece of equipment will generate (proportional to mass flow and other conditions, such as pressure and temperature, at the turbine section inlet). Therefore, at a given ambient temperature, the syngas-fired gas turbine will produce more power than the same machine fired with natural gas.

Supplemental Exhibit RCF-28 shows the power output vs. ambient temperature curves for the GE Frame 7FA and 7FB models. Both the Polk and Wabash IGCC units use the earlier Frame 7F gas turbines. The "FA" and the "FB" models are updated versions of these gas turbines. As you can see, the normal performance characteristic of a gas turbine is that the power output increases with lowering ambient temperature. That is the basic physics of any air breathing engine since there is more mass taken in with a given volume at lower temperatures. There are two curves - one for natural gas, and one for diluted syngas.

Superimposed on the performance curves are the 'rotor torque limit curves'. These define the power limit that is imposed on the gas turbine for safe and reliable operation - **regardless of the fuel used**. You can see that the torque limit for the 7FB is slightly higher than that of the 7FA, allowing more power to be generated with the upgraded design.

Since the performance curve (power vs. temp) for the diluted syngas is generally higher than that for natural gas, it crosses the torque limit curve at a higher ambient temperature. That says that the power output is limited to that maximum value (i.e. where it crosses the torque limit curve) at around 85-90F. It is essentially the same limit that is reached in the natural-gas-fired case down around 20F. **This limit placed on the power output of the gas turbine means that it does not run at higher than its maximum design level of power output when burning syngas, as inferred by Mr. Jenkins.** It just means that it reaches its limit at a higher ambient temperature, so that the actual additional IGCC output (dark blue area) is less than it might be if no such rotor torque limit existed. **Mr. Jenkins would have one believe that by operating with syngas, there is additional rotational stress that has negative impacts on gas turbine reliability. This is not the case, and his testimony is misleading.**

At lower ambient temperatures, when the gas turbine might operate above the rotor torque limit, the control system adjusts the operating point of the gas turbine to limit its output. In other words, it is operating at part load (rather than at full load) at ambient temperatures below which the power output curve intersects the rotor torque limit curve. This prevents any overloading of

the gas turbine that might otherwise occur - and it is the exact same control whether operating on syngas or natural gas fuel.

The control system, thereby, protects the gas turbine from operating at a condition where the rotor torque limit might be exceeded and impact on its reliability. **Mr. Jenkins is correct in saying that there were issues with rotor reliability at Polk and Wabash IGCC plants, but what he didn't say was that these issues also were faced by owners of the GE Frame 7F all over the world, regardless of the fuel being used.**

By inferring that these issues were related to the use of syngas, and not mentioning that GE had a generic rotor design problem, he misrepresented the data and detracted seriously from the credibility of his "expert" testimony. Similarly, by not pointing out that most of the unavailability experienced by the operating IGCC plants was due to problems with the power block (i.e. conventional combined cycle equipment) and not to the gasification block, Jenkins' was not being forthright in his testimony.

In a recent presentation at the European Gasification Conference in Barcelona, an executive of the utility that operates the Puertollano IGCC plant in Spain showed the breakdown of causes of their availability issues. A large majority of these issues had to do with the gas turbine (in this case a Siemens advanced-design model) and not the gasification island. The source for this information is: Puertollano IGCC Plant. Present Position and Future Competitiveness, by Casero and Garcia-Pena of Elcogas S.A., presented at the 7th European Gasification Conference, Barcelona, Spain, April 25-27, 2006, pages 4&5.

Mr. Jenkins referred again to the poor availability performance of the Puertollano facility, (Mr. Jenkins testimony, page 10, line3) without mentioning that most of the problems were gas turbine related, and that the same problems were experienced by other owners of the same design gas turbine operating on natural gas, and consequently, Mr. Jenkins seriously reduced the credibility of his testimony.

Q: **In response to the same question above Mr. Jenkins also stated on page 11, lines 3 - 6: "Some of the successful gasifiers also use refinery bottoms, like asphalt, as a feedstock. Such liquid feedstocks require little handling and preparation, versus the coal handling and coal grinding systems required in a coal-based IGCC plant." Do you agree with this statement? If no, please explain.**

A: No. Mr. Jenkins should have also pointed out that coal-slurry-fed gasifiers (such as GE and ConocoPhillips) operate on a feedstock that is very much like a liquid feedstock in that powdered coal is first mixed with water to form a pumpable, liquid-like slurry. The GE and ConocoPhillips gasifiers, whether using coal-slurry or liquid fuels are proven to be highly reliable in numerous commercial installations around the world.

Q: **On Page 15, line 3 of Mr. Jenkins testimony the following Question was asked: "What are some of your concerns with the use of IGCC technology at the site?" and Mr. Jenkins responded: "First, I would be concerned with the potential for reliability problems. FGPP is being designed for 92% reliability, which is commercially available and proven with SCPC technology. As noted previously, such high reliability levels have not yet been demonstrated by existing IGCC power plants, and it will be six to**

eight years before the presently planned IGCC plants are able to prove whether the intended design enhancements can provide for improved reliability." Do you agree with these statements? If no, please explain.

A: No. As previously discussed in this supplemental testimony the operation of IGCC units with backup fuel are as reliable as Natural Gas Combined Cycle (NGCC) units. Reliability for IGCC plants with backup fuel is in the mid 90%. Supplemental Exhibit RCF-29 is a recent Gas Turbine World article titled, Refinery IGCC Plants are Exceeding 90% Capacity Factor after 3 Years, dated Jan.-Feb. 2006, by Harry Jaeger. This article shows that the availabilities of these three IGCC plants are 93%, 90% and 94% availability. These availabilities are without a spare gasifier and without a backup fuel. These IGCC plants were built using non-recourse project financing provided by over 60 banks, U.S. IPP developers and other lending institutions. They show that IGCC can be a commercially bankable technology.

Q: On page 13, line 12 Mr. Jenkins was asked "When do you think IGCC will be commercially available? and on page 13, line 21 thru page 14, line 8 Mr. Jenkins replied: "If IGCC technology were to be selected for this project, FPL would likely use the largest size plant available, in order to take advantage of economies of scale, just as it has already done in choosing large 980 MW (net) USCPC units. For IGCC, the closest match to meet the 1,960 MW (net) value would be to use a 3x3~1 configuration such as the one referenced in the study jointly conducted by FPL and Black & Veatch. This study is noted as Document No. DNH-2 in the testimony provided by Mr. Hicks of FPL. However, as I noted previously, the largest size IGCC facility that is being offered by the IGCC technology suppliers is the 600

MW (net) reference plant. ***Therefore, a non-standard 3x3~1 configuration, if commercially available, would take even longer to be designed and constructed."*** **Is this last statement by Mr. Jenkins correct? If no, please explain.**

A: No. This last statement is not true. Three of the "reference design" units of 630 MW each could provide 1890 MW using the standard configuration of 2 gas turbines and one steam turbine for each 630 MW unit. This would not require the non-standard configuration that Mr. Jenkins indicated that would take longer to design and construct.

Q: On page 17, line 6 Mr. Jenkins states: "Two of the IGCC plants being planned at this time for operation in the 2011 to 2012 timeframe have noted in their air permit applications the potential for over 60 startup and shutdown events per year, far more than what is normal for PC units." Is this typical of IGCC plants? If no, please explain.

A: No. This is the worst case scenario that is required for permitting application and does not represent normal operating experience.

Q: On page 22, line 3 Mr. Jenkins states: "When a PC power plant starts up, the boiler is fired with coal at a very low throughput, and then it gradually ramps up to a higher throughput." Is this statement true? If no, please explain.

A: No. PC plants start up on oil, not coal, and fire coal after they are on line.

Q: On page 22, line10 Mr. Jenkins states: "During the time a plant is starting up, coal is being consumed without any power generation, until steam conditions are right for sending it to the steam turbine." Is this statement true? If no, please explain.

A: No. Coal is not used to warm-up a PC boiler or a gasifier.

Q: On page 22, line 21 Mr. Jenkins states: "IGCC units have a different start-up profile. As noted previously, a cold start-up on an IGCC power plant can take several days. During this time, large amounts of coal can be consumed in the gasification process while the emission control systems are being started up. Clean or partially cleaned syngas is flared. Emissions from the flare can be substantial, depending on the state of operation of the emission control systems and the total time of flaring. Combining these technical issues with a somewhat lower reliability of IGCC versus PC technology, an IGCC plant could actually produce more emissions on an annual basis than a PC unit, even though it may have a lower emission rate on a lbNWh or pounds per million BTUs of heat input basis." Are these statements true? If not, please explain.

A: No. Gasifiers are preheated with natural gas or propane. Gasifiers are not preheated with coal. The flaring only occurs immediately after the gasifier light off for a short duration. It is true that these emissions are higher than normal operation, but they occur for short durations (minutes), not the days stated by Mr. Jenkins.

Q: On page 23, line 8 Mr. Jenkins was asked the Question: "Based on the technology today, do you believe that the emissions would be better for an IGCC facility versus the proposed FPL power plant?" and Mr. Jenkins reply consisted of the statement: "We saw that the emission rates for the IGCC units could actually be increased by an average of 38%, *if all of the potential startup and shutdown emissions are accounted for.*" Does this

accurately represent the operation of current IGCC plants? If no, please explain.

A: No. This analysis is based upon the sum of all of the worst case assumptions that could have been conceived. This does not accurately represent the operation of current IGCC plants including their normal startup and shutdown procedures. The last two sentences of Mr. Jenkins answer to this question are true when he stated: "The air permit applications were written in a way so as not to constrain the units' operation, **so that the number of start-up and shutdown cycles was maximized. For an actual comparison, each unit's characteristics would have to be analyzed to determine the overall impact of start-ups and shutdowns."**

Q: On page 24, line 16 Mr. Jenkins was asked: "What changes are needed to make an IGCC plant CO_2 capture ready?" and part of Mr. Jenkins response was: "The IGCC plant design must account for the addition of this water shift reactor and to have a proper place to route this low pressure steam." Is this statement true and is it a significant modification?

A: This statement is true but it is not a significant modification. This additional steam will be used for other processing applications in the IGCC plant.

Q: In response to the same question Mr. Jenkins also stated: "Then there must be room for the addition of a very large CO_2 capture/removal system. While the acid gas removal systems typically used for H2S removal can also be used to absorb some of the CO_2, they are much more selective for the H2S. This means that it is much more difficult to remove the CO_2 than the H2S from the syngas. The H2S removal system is much too small to also remove a large portion of the CO_2. It must be able to be scaled up

considerably, with much additional equipment required. The CO_2 removal system requires a significant amount of high pressure steam to strip (remove) the CO_2 from the solvent, so that it can be concentrated. Therefore, the steam turbine must be designed from day one with steam extractions at the right temperatures and pressures for CO_2 stripping." Is this the preferred method to add CO_2 capture to an existing IGCC plant? If no, please explain.

A: No. The preferred method would be to add a "sweet shift" downstream of the original Acid Gas Removal (AGR) process and then to add a second absorber for the CO_2 removal. This method would make use of the existing equipment and require much less new equipment. This would significantly reduce the capital costs for CO_2 capture. The operating costs can also be reduced because low pressure steam is used for stripping not the high pressure steam that Mr. Jenkins stated for stripping.

Q: In response to the same question Mr. Jenkins also stated: "Once the CO_2 is removed from the syngas, a hydrogen-rich syngas stream remains. While gas turbines have the ability to burn syngas and other fuels that contain some hydrogen, gas turbines for the combustion of concentrated hydrogen streams are *not yet commercially available at large scale.*" Is this statement true? If no, please explain.

A: No. Industrial gas turbines have been integrated into refineries, petrochemical plants and chemical manufacturing plants that operate on high hydrogen content fuels routinely.

Q: On page 26, line 11 Mr. Jenkins was asked: "Have CO_2 capture technologies been applied to IGCC?" and Mr. Jenkins responded: "Yes,

but only on a test basis." On page 26, line 13 Mr. Jenkins was asked: "Are EPRI and the DOE funding R&D on CO_2 capture technologies?" and Mr. Jenkins responded: "Yes. A significant amount of design development is underway, in order to qualify and quantify the modifications described previously. *CO_2 capture for IGCC is not yet a commercially available technology."* Are these accurate statements of the current commercial status of CO_2 capture from gasification plants? If no, please explain.

A: No. CO_2 capture is being done commercially at many coal gasification plants around the world on coal-derived syngas. Examples of this in the U.S are the Great Plains Synfuels Plant in North Dakota, the Coffeyville Fertilizer Plant in Kansas and the Eastman Chemical Plant in Tennessee. In my original testimony on pages 25-27, I presented information on the Great Plains Synfuels Plant. Exhibit RCF-22 shows this plant. Carbon dioxide capture, transportation and sequestration have been operating commercially since 2000 at the Great Plains Synfuels Plant. In 2000, the Great Plains Synfuels Plant added a CO_2 recovery process to capture the CO_2. It transports the CO_2 by pipeline 205 miles, as shown in Exhibit RCF-23, to the Weyburn oil fields where it is used for enhanced oil recovery (EOR). This demonstrates that CO_2 capture is being done on a commercial basis from coal gasification plants. CO_2 capture is not being done presently on any IGCC plants because the process of generating power does not require it to be removed and CO_2 regulations have not been promulgated yet. The other coal gasification applications have demonstrated that CO_2 capture is commercially available.

Q: **On page 28, line 1 Mr. Jenkins was asked: "Can you say that IGCC is 'CO_2 capture ready' today?" and Mr. Jenkins response was: *"It is not. Once the***

***R&D is completed over the next decade, as described previously, IGCC is expected to be CO_2 capture ready."* Is this an accurate statement? If no, please explain.**

A: No. The answer to my previous question clearly shows that CO_2 capture is being done on a commercial basis for syngas produced from coal gasification plants. The only difference is the final use of the syngas. It can be used for power generation in a combined- cycle IGCC plant, as a fuel to produce synthetic natural gas (SNG), and as a raw material to produce chemicals and fertilizers. The engineering companies and equipment suppliers are ready to provide CO_2 capture for commercial IGCC plants. They do not need a decade of R&D to build what is already commercially operating.

V. COMMENTS ON THE TESTIMONY OF DAVID HICKS

Q: Where you able to review the testimony of David Hicks?

A: No. I did not have sufficient time to review the testimony of Mr. Hicks. It is essential to be able to determine the **wide differences** that exist between the Black & Veatch Report that was prepared for FPL, Clean Coal Technology Selection Study, Final Report, dated January, 2007, submitted as Document No. DNH-2 and the U.S. Department of Energy Study, Federal IGCC R&D: Coal's Pathway to the Future, by Juli Klara, presented at GTC, Oct. 4, 2006 which I used for my Exhibits RCF-5 and RCF-7. Since the conclusions reached by each of these studies are so dramatically different it is necessary to evaluate the various input assumptions that were used for both of these studies to determine what created the opposite conclusions. This evaluation would be prudent before a final decision is made for this FGPP plant.

Q: Does this conclude your Supplemental Testimony?

A: Yes. I have prepared as much Supplemental Testimony as the schedule would allow me to prepare. More time is needed to do a more complete evaluation.

BY MR. GUEST:

Q. Do you have a summary of your prefiled testimony to share with us?

A. Yes, I do.

Q. Would you provide that summary, please.

A. Yes. The objective of my testimony is to present the most recent and unbiased information on pulverized coal and IGCC technology. The most common and unbiased source of this type of information is the Department of Energy's National Energy Technology Laboratory, Office of System Analysis and Planning. Much of the information included in my testimony is from the Department of Energy.

I would like to suggest that due to the importance of this discussion, additional time be granted to enable the PSC staff, the DOE staff, FPL, and me to conduct a team analysis. DOE's engineers and analysts are available to work with the Public Service Commission staff and utilities to evaluate site-specific alternatives. I've spoken with this DOE office, and they have agreed to work with Florida's PSC staff to provide the information and analyses that you need.

These are the types of analysis that I conducted when I worked for Florida Power & Light. I would like to volunteer my time to work with FPL's staff

and the PSC staff to conduct these analyses. The time that I was given did not allow me the opportunity to complete this type of analysis by the April 5th interrogatories deadline. The analysis that I have been able to present in my testimony indicates that an IGCC plant should be able to provide new base load capacity for FPL at a lower cost and with significantly lower emissions.

The costs and uncertainty about capturing CO_2 is also significantly less for the IGCC plant. Exhibit 7 in my testimony is from a recent DOE presentation that shows slightly higher electric costs today for this IGCC plant, but significantly lower future electric costs for IGCC plants than pulverized coal plants. It is important to note that this study was for a Midwest location, and petcoke was not included as a potential fuel for this IGCC plant. This DOE study shows a 30 percent increase in the cost of electricity for IGCC with CO_2 capture versus a 68 percent increase in the cost of electricity for PC with CO_2 capture.

Next slide. This confirms -- these numbers confirm the General Electric results, which show a 25 percent increase in the cost of electricity for IGCC with CO_2 capture versus a 66 percent increase in the cost of electricity for PC with CO_2 capture.

Next slide. I produced Exhibit 5 by taking the results of this DOE evaluation of pulverized coal versus IGCC for a Midwest plant location and replacing the delivered fuel cost with a delivered fuel cost for Florida's electric utilities. Exhibit 5 shows the costs of electricity for pulverized coal plants are higher than the costs of electricity for an IGCC plant using petroleum coke in Florida. Although the IGCC has a higher capital cost than the PC plant, it has a significantly lower fuel cost when using petroleum coke. Since the economics of IGCC are favorable at this initial level of evaluation, then the next step should be a more detailed, site-specific evaluation, including the requirements of the Glades site, but also other potential sites that might be more feasible.

Whenever possible in my testimony, I have presented two independent sources of unbiased and recent information. For comparing emission levels from the new PC and new IGCC plants, I prepared Exhibit 8, which shows the percentage of emissions that a new IGCC plant produces relative to the amount of emissions from a new ultra-supercritical pulverized coal plant. The data used for the preparation of this chart is from the July 2006 EPA final report called "Environmental Footprints and Costs of Coal-based Integrated Gasification Combined

Cycle and Pulverized Coal Technologies." For both new PC and new IGCC plants, I used the best available control technology as reported in this EPA report.

Next slide. For another independent comparison of emissions, I took the recent IGCC permit levels and proposed permit levels in applications for permits for new IGCC plants and compared these emission levels with the proposed permit levels for the Glades plant. This comparison is shown in Exhibit 11.

Based on both of these independent methods of comparison, the EPA report of best available control technology and the actual comparison of permit levels, the IGCC plant provided significantly lower emissions.

The other aspects that I would like to try to address by working together as a team is how we might be able to integrate this new plan alternative with other alternatives that have been talked about here today, like conservation and renewable energy. By working together as a team, I think we can dramatically reduce the size of the new plant required and the resources and environmental damages that can be created.

Thank you.

CHAIRMAN EDGAR: Mr. Beck, any questions?

Mr. Krasowski.

MR. KRASOWSKI: Yes, ma'am.

CROSS-EXAMINATION

BY MR. KRASOWSKI:

Q. So, Mr. Furman, you're here to promote IGCC?

A. No, no. IGCC is really a third option, in my mind. I think we need to do dramatically more with energy conservation.

Q. Do you have that in your testimony here, about energy conservation?

A. No, I do not. I did work for a period of my engineering career as an energy conservation engineer, so I do realize how poorly we're doing in Florida as far as energy conservation and how much more we can do.

And I think -- just common sense, I think we all know how much we waste energy. I've been trying to reduce energy on a personal level and have an electric bill that's half of what any of my neighbors' are. So I think we can go a long way, and I think we have to take it on as a personal responsibility and as a public responsibility. So I applaud the efforts --

CHAIRMAN EDGAR: Okay. Mr. Furman, I would like you to limit your answers to the specific question that has been asked, please. Thank you.

BY MR. KRASOWSKI:

Q. My next question is, if you're so concerned with energy conservation, why didn't you have it in your

testimony as opposed to your elaborations on the benefits of IGCC?

A. A great deal more of my engineering experience has been on power plants and gasification technologies.

Q. Are you familiar with the Joyce Foundation?

A. No, I'm not.

Q. Are you here on behalf of the NRDC?

A. Yes.

Q. Are you aware the NRDC are advocates for gasification, IGCC?

A. I'm not aware whether they're advocates or not.

Q. And I'm assuming -- I don't want to assume, so let me ask the question. So you're not aware that they're funded by the Joyce Foundation to promote IGCC?

A. I believe FPL in my deposition asked me that same question, so my only source of information on that is from the question in my deposition. They had indicated that they had donated -- the Joyce Foundation had donated some money to NRDC. That's my only knowledge.

MR. KRASOWSKI: Well, I have no further questions, being that this isn't my specific area of interest. I'm more into the alternatives in conservation. Thank you, Mr. Furman. Thank you, ma'am.

CHAIRMAN EDGAR: Thank you. Ms. Perdue, any questions?

MS. PERDUE: Just a few, Madam Chair. Thank you.

CROSS-EXAMINATION

BY MS. PERDUE:

Q. Mr. Furman, in your direct testimony that has been filed, you are assuming that -- and correct me if I'm wrong, but the proposed capacity of the FGPP plant is 1,916 megawatts; is that true?

A. Yes.

Q. And has there -- you've got these recommendations in your testimony that perhaps there should be an IGCC plant. Does an IGCC power plant exist at that capacity? Has one ever been built?

A. No.

MS. PERDUE: Thank you. That's all.

CHAIRMAN EDGAR: Mr. Anderson.

MR. ANDERSON: May I put up some exhibits very briefly?

CHAIRMAN EDGAR: You may.

MR. ANDERSON: May I proceed, please? Is he all set? May I proceed?

CHAIRMAN EDGAR: Yes, sir.

MR. ANDERSON: Thank you very much.

CROSS-EXAMINATION

BY MR. ANDERSON:

Q. Good afternoon, Mr. Furman.

A. Good afternoon.

Q. My name is Bryan Anderson. I'm an attorney for Florida Power & Light Company. I'll be asking you some questions today about your testimony.

Your testimony disagrees with FPL's selection of ultra-supercritical pulverized coal technology for its proposed FPL Glades Power Park Units 1 and 2; is that right?

A. Yes.

Q. You have never been responsible for development of a new electric generating plant; right?

A. Conversion of plants, yes.

Q. Never responsible for the development of a new electric generating plant. The answer is yes; right?

A. That's correct.

Q. You've not been responsible for obtaining environmental permits for any electric generating plant of any type; isn't that right?

A. That's correct.

Q. You have never signed and sealed as a professional engineer any application for environmental permits for any electric generating plant in Florida,

the United States, or any other country; right?

A. Yes.

Q. You have no experience in negotiating contracts for major equipment or construction for an IGCC plant?

A. No.

Q. Or a USCPC plant?

A. That's correct.

Q. Or any coal plant, or any power plant at all; right?

A. That's correct.

Q. You have never managed the design of an IGCC plant?

A. No.

Q. Or a USCPC plant?

A. No.

Q. Or any coal plant?

A. If I could explain, one of my jobs when I worked for Florida Power & Light was, I managed Florida Power & Light's coal conversion program. This was after the second oil embargo of '78 when I worked for Florida Power & Light.

And that was one of the reasons I was specifically hired, because I had just completed the engineering study for the conversion of the largest

power plant in New England, which was the Brayton Point Power Plant. That was after the first oil embargo of '73, when we got a team approach like I'm suggesting here. We got a team approach there consisting of the regulatory commissioners, the EPA, the business community, and the utility, and we figured out a way of how we could satisfy the needs of all of the group and come to a consensus on how we would convert that power plant from oil to coal. And that has been successfully converted, so I think I do have some experience.

And then I was hired by Florida Power & Light after the second oil embargo. Florida Power & Light was the largest oil-burning utility in the country at that time. We were being faced by mandatory conversion orders, because the plants were originally designed for coal, and FPL would have had to spend a lot of money to convert those plants from oil to coal. And we were concerned that we would get a mandatory conversion order, so what we did was, we tried a new technology called coal-oil mixtures. And we actually had the first conversion of a 400-megawatt power plant from oil to a coal-oil mixture, which was a successful conversion. And the Brayton Point Power Plant was really the first major conversion of a power plant from oil to coal in the United States.

My first engineering job was working for Southern California Edison Company, and my job there was more in the pollution control area, because --

MR. ANDERSON: Chairman Edgar, at this point, I think this is a bit beyond the question.

CHAIRMAN EDGAR: Actually, I tend to agree. And I do recognize that biographical resumé experience information, et cetera, is in the testimony and exhibits.

MR. ANDERSON: Thank you.

BY MR. ANDERSON:

Q. You've never managed the construction of an IGCC plant?

A. No.

Q. Or a USCPC plant?

A. No.

Q. Or any coal plant?

A. No.

Q. You've not managed the operations of an IGCC plant?

A. No.

Q. Or a USCPC plant?

A. That's correct.

Q. Your testimony describes and relies on 26 exhibits; is that right?

A. Twenty-six in the direct testimony; right.

CHAIRMAN EDGAR: Shall we mark? I'm on 191.

MR. ANDERSON: Yes, please. Thank you.

(Exhibit 191 marked for identification.)

BY MR. ANDERSON:

Q. You have before you what has been identified as Exhibit 191; is that right?

A. No. Actually, mine says Exhibit 82.

Q. Okay. For purposes of this hearing, the Chairman just identified this as Exhibit 191. Will you accept that?

A. Sure.

Q. Great. It's fair to say that you used essentially the same exhibits for your appearance as a public witness before the Commission in the Taylor Energy Center need proceeding as your exhibits in this case; right?

A. I've used some of them, yes.

Q. Of your 26 exhibits to your direct testimony, you told us at your deposition, I think, 23 are the same exhibits that you provided in the TEC case. Do you recall that?

A. I haven't counted them. I'll take your word for it. And I think as I stated in my summary remarks, I stated that I would like to volunteer my time to work

with FPL staff and Public Service Commission staff to conduct these analyses. These types of analysis could not be completed by my April 5th interrogatories deadline. There just wasn't enough -- there isn't enough time in the procedure to allow an individual to do that type of analysis. I was given a few weeks, and I believe FPL's resources are far greater than mine, and I believe you had years to compile your studies.

Q. Yes, the company had years to do its work; right? We had the benefit of an engineering staff; is that correct?

A. Yes.

Q. We had the benefit of outside expert consultants also?

A. That's right.

Q. Nearly all of the slides attached to your direct testimony come from other people's presentations; isn't that right?

A. Well, you also -- most of my time was devoted to answering the questions from staff interrogatories. And I think of the -- I've submitted three documents. You're referring to the first document, which I already had been compiling information on for public forum presentations on both the Taylor plant and the Glades plant. So I already had much of that information

available, and I was able to make use of it. Subsequent to that, I submitted supplemental direct testimony in response to the numerous witnesses that you had appear, and then subsequent to that, I entered the answers to interrogatories, which was a rather extensive data information source answering all of their questions.

Q. Mr. Furman, I was asking you about the slides attached to your direct testimony. Nearly all those came from other people's presentations?

A. Yes. And as I stated in my summary, the objective of my testimony is to present the most recent and unbiased information, and so what I'm -- I'm not having you rely on my word, but what I'm trying to do is present two or more sources of what I consider to be the most current and most unbiased sources of information. They weren't hired by me. They weren't paid by me. They were independent sources that aren't in favor of either pulverized coal or IGCC technology.

Q. Well, Mr. Furman, you have hundreds, even thousands of slides from other people's presentations in your collection, don't you?

A. Yes, I do.

Q. And you pick out the ones you want to put together your presentation; right?

A. No, that's not true.

Q. Somebody else picked them?

A. No, unlike Mr. Jenkins, who will pick out slides and argue the case for IGCC, for IGCC when he's talking to gasification people. Like when he gives his IGCC 101 presentation, he'll talk about the benefits of IGCC, and when he comes here, he'll talk about the benefits of ultra-supercritical pulverized coal. I find that morally repugnant. I've made my own determination as to which technology is best and which is in the best interests of our country, and I will stand by the data that I'm presenting and don't try to present both sides of the story.

Q. So you pick your selection of technology, and then you go through your hundreds or thousands of slides in your collection and put them together. And some you got at seminars; right?

A. Yes.

Q. Others you found on the Internet?

A. Yes, that's right.

Q. At your deposition, some of them, you didn't even recall where you got them from; isn't that right?

A. Which ones are you referring to?

Q. Do you have a copy of your deposition there?

A. No, I do not.

Q. Okay. Do you want to take a look at your

deposition? Do you not recall telling me that some of the slides, you didn't even remember where they came from?

A. If you could refresh my memory, I could corroborate that.

MR. GUEST: I think if there's an impeachment item underway, it might be useful to offer the deposition to the witness so he can review it.

CHAIRMAN EDGAR: Yes, I agree. We need to get a copy and -- okay. A copy for the witness. Mr. Guest, do you have a copy?

MR. GUEST: I do, somewhere. But I will trust the witness to read it accurately and respond reasonably.

CHAIRMAN EDGAR: Okay.

THE WITNESS: Yes, I have a copy.

BY MR. ANDERSON:

Q. Please look at page 37 of your deposition, and please look at line 14 through to line 23. Specifically, your document RCF-6 is referred to. Do you see that?

A. Yes. Let me just refer to the document.

Q. I asked you, "If you were not present at the presentation, how did you get the slide RCF-6?" Do you see that?

A. Yes.

Q. You said, "I have various sources of getting the full presentations, either directly from the author, from the power gen conference, or through the Internet, or from other IGCC experts as we exchange information." Do you see that?

A. Yes.

Q. And then you were asked this question and gave this answer. "Focusing on RCF-6 in particular, do you remember which of these methods you used to obtain this particular slide?"

And you answer, "No, I do not."

A. Okay. If could I explain, then you might get a perspective on the other questions that you've been asking also. I have talked and corresponded with probably ten different people at General Electric who are in charge of different aspects of developing their IGCC technology. One of them is Robert Rigdon. I have spoken to him. I do have a copy of his presentation. And whether I got it directly from him, whether I got it from the General Electric website or not, that particular slide has been presented at a number of conferences. I give the reference down there for the conference that it came from. The fact that I don't remember where I happened to first see that or get it I

think is immaterial.

Q. You talked a little while ago about some work you did. When did you leave Florida Power & Light Company?

A. It would be either '82 or '83.

Q. So that's 24 or 25 years ago?

A. Yes.

Q. The plant you referred to was the Sanford plant; is that right?

A. Yes.

Q. Isn't it correct that what you called a conversion was only a test for a number of weeks and was not implemented?

A. That's right. Actually, we ended up selling that technology to Mitsubishi.

Q. But the -- I'm sorry. Go ahead. The plant, the Sanford plant, though, continued to operate on oil until repowered to CC for gas in 2002; right?

A. Right.

CHAIRMAN EDGAR: Okay. Hold on, Mr. Furman. I'm sorry. Was that an objection?

MR. GUEST: Well, I think -- I'm not sure, but I think the witness may not have been finished answering the question before the next question. I wasn't sure.

CHAIRMAN EDGAR: Okay. I try to allow the

witnesses to finish the answer, so if you'll just bear with us. Mr. Furman, were you able to complete your answer?

THE WITNESS: I was just going to put it in perspective. The reason why the -- the technology was successful. We had a successful conversion of that plant at 400 megawatts. It was so technically successful that they asked me to go to Japan and to spend a week over there explaining the technology to Mitsubishi Company, who ultimately bought the technology and used it for some of their plants. And it was a technical success, which was my responsibility, part of my -- part of a team.

And after that, the price of oil came back down. As I think we all know, we've had spikes up and down. And with the price coming down, there was no need to make use of that technology. So just to put it in perspective, it wasn't that the technology wasn't used or couldn't be used. It was that the economics didn't require it.

CHAIRMAN EDGAR: Okay. Mr. Anderson.

MR. ANDERSON: Thank you.

BY MR. ANDERSON:

Q. I would like you to take a look at a slide we're going to exhibit on the right-hand side, the

right-hand easel, and we'll give you one to look at also.

MR. GUEST: Madam Chairman, we're missing -- we can't see the outer -- the left two feet of that.

MR. ANDERSON: Okay. Let's move the easel so everyone can read it.

By the way, this and the next slide Mr. Hicks spoke to, so people have copies. We have additional if people wish them.

CHAIRMAN EDGAR: Okay. This is the same that was passed out?

MR. ANDERSON: It's the same one.

CHAIRMAN EDGAR: Whichever day that was that this was passed out.

MR. ANDERSON: That's right. That's right.

BY MR. ANDERSON:

Q. Mr. Furman, we've indicated check marks on this yellow board which show FPL's position concerning important aspects of technology choice. Now, I'm not asking you to agree with FPL's position, but just to frame the balance of your examination this afternoon, I ask you to agree that the placement of the check marks in the various columns for the several factors reflects FPL's position in this proceeding. Why don't you take a look and see if you agree that that's right.

A. No, I would disagree.

Q. Okay. Well, you disagree that FPL believes USCPC is the correct technology choice?

A. Yes, I do.

Q. So it's your opinion that FPL actually would prefer IGCC?

A. Could you repeat that question?

Q. All we're trying to get at is, this particular slide characterizes, where the check marks are, FPL's position that USCPC, based on our analysis, is the preferred technology with respect to technological maturity, reliability, construction risk, life cycle costs, generation efficiency, and CO_2 emissions, that USCPC is at least as good as next generation IGCC from the perspective of environmental performance, or SO_2, nitrous oxide, and particulate matter. Do you understand that to be FPL's position in this case?

A. Yes.

Q. Good. Could you please take down the second slide?

A. Would you like me to explain why I would put the checks in a different place?

Q. No, thank you, because what we're going to do is explore each of these points, and I'll be asking you questions, and you're free to respond.

Let's talk about technological maturity. Do you agree that technological maturity of a generating technology is an important factor in selecting a technology?

A. Yes.

Q. And by technological maturity, we typically mean whether it's commercial, whether it's in demonstration, whether it's experimental; right?

A. Yes.

Q. You understand that by referring to ultra-supercritical pulverized coal technology, FPL refers to steam cycle operating pressures exceeding 3,600 PSIA and main superheat steam temperature approaching 1,100 degrees Fahrenheit? That's what Mr. Hicks was talking about yesterday as FPL's -- what FPL is looking to. You understood that and heard that testimony; right?

A. Yes, and I have concerns about that.

MR. GUEST: Your Honor, Madam Chairman.

CHAIRMAN EDGAR: Yes, sir.

MR. GUEST: I don't think this is proper cross. I think all he's getting him to do is to repeat what FPL has said. That doesn't tend to undermine his testimony. It's just repetition of what other people have said and repetition of what's on the board. I

think proper cross-examination is to take his testimony on direct and explore it, and I think we've seen some of that when examining qualifications and so forth, but I don't think this qualifies.

THE WITNESS: I would be glad to explain what my --

CHAIRMAN EDGAR: Mr. Furman, please, let me do something as long as I'm sitting here all day.

Okay. Mr. Anderson.

MR. ANDERSON: I believe the record shows that these are the various features that are important in selecting generation technology. One of the core elements in Mr. Furman's technology choice is asserting to the Commission that a different technology choice should be made, and he talks about the availability of different size gasifiers and all these types of things. And the heart of our case on this point is that our technology is well established at large commercial scale and been successfully operating. We're entitled to point that out and obtain this witness's agreement as to those points, and similarly, obtain his agreement that there's no such demonstration of those points for his technology. That's the heart of cross-examination.

THE WITNESS: Then I guess you would like me --

CHAIRMAN EDGAR: Mr. Furman, please, please. Okay. Thank you. And I note that Mr. Guest will have the opportunity to pose questions to you on redirect here shortly, so you will get another opportunity.

MR. GUEST: I think what I heard was that the question was, "Do you think these are the right factors?" And if that was the question, I wouldn't have objected. But what he's really asking is, "Is this what FP&L says," and I don't think that's really cross. The question is, is there another factor, or shouldn't it count or something? That's cross. And so it's improper cross.

CHAIRMAN EDGAR: Okay. I've decided that I'm going to implement personally the no joking rule, because I was about to make one, and I'm not going to. So, Mr. Anderson, in the interest of time, could you perhaps be more direct in your questions and let's see how that works?

MR. ANDERSON: That's fine.

BY MR. ANDERSON:

Q. FPL is proposing two USCPC units of 980 net megawatts each; right?

A. Yes.

Q. You are aware that ultra-supercritical pulverized coal units of 1,000 megawatts have been

designed, permitted, constructed, and are in commercial operation; right?

A. I'm also aware of the problems with those units, if you would let me explain why.

Q. I would suggest that would be appropriate redirect. But my point has been answered. Thank you.

For example, the Neiderausem, N-e-i-d-e-r-a-u-s-e-m, 1,027-megawatt unit, that's an example of a unit of roughly comparable size and type to what FPL is proposing; right?

A. Yes. And I'm also aware that very few of these plants have been built in the United States, and therefore, we have the question of how reliable will they be in the United States, because we have different building standards, different trades that we don't have in the other countries. And I'm also aware that this technology of these conditions was actually developed in the 1950s, and the utility industry decided not to make use of it. And therefore, it was developed in Germany and Japan, and we're now importing that technology back here.

So to assume that the utility industry will have the same performance with those units in this country under different building standards and conditions I think is making a great assumption that

you'll be able to get that 92 percent availability. And I have not seen any data to indicate that that will be the fact.

Q. So the laws of physics are a little different over there in Germany; is that right?

A. No, I --

MR. GUEST: Objection. Argumentative.

MR. ANDERSON: Well, he's saying that there's some difference on some other continent that accounts for why a technology successfully implemented in another country can't be here.

CHAIRMAN EDGAR: I understand. I'll tell you what. Let's take a 10-minute break. I would like to clear my cobwebs, so let's take a short break, 10 minutes, and we will come back. And, Mr. Furman, stay close, if you would.

(Short recess.)

CHAIRMAN EDGAR: Okay. We will go back on the record. Thank you. Mr. Anderson.

MR. ANDERSON: Thank you. Madam Chairman, in the interest of time management, we've been told that counsel for The Sierra Club, et al., have maybe only about 10 questions for Mr. Rose. Our thought, because we would like to see him get up and go, Mr. Rose, that is, also, is to complete our cross-examination, consider

it done at this time, and just move on.

CHAIRMAN EDGAR: Oh. Done at this time.

MR. ANDERSON: Right now.

CHAIRMAN EDGAR: Caught me by surprise.

MR. ANDERSON: We're done.

CHAIRMAN EDGAR: Are there questions from staff?

MS. BRUBAKER: Staff has no questions.

CHAIRMAN EDGAR: Commissioners? No questions. Okay. Mr. Guest.

REDIRECT EXAMINATION

BY MR. GUEST:

Q. Okay. Let me just start here with -- the question was raised that you can't get to -- or there aren't big IGCC plants that are as large as the proposed Glades plant. Do you know of any method that could or has been used to handle that problem?

A. Yes, I do. As a matter of fact, there's a number of utilities and companies that are planning on using that method. One is the Hunton Energy Group in Texas, which is doing pretty much what I had suggested in my analysis. They're proposing a 1,200-megawatt IGCC plant in Texas. I have a recent article on it if the Public Service Commissioners would like to see it.

But their plan is that they already have an

agreement with Valero Refinery on a long-term contract basis for the petroleum coke. They're going to be building this two-phase plant, 600 megawatts per unit. And they also are in negotiations, and they think they have a buyer for the carbon dioxide to be used in enhanced oil recovery in Texas also. So that's pretty much the scope that I was describing in the analysis that I did.

The plant at Polk Power Station is basically a 300-megawatt unit. If you put two of these together, which is what they're planning on doing on their next plant, then you get -- 630 megawatts will be the output capacity of that plant.

So all you have to do is basically the same thing that Florida Power & Light and other utilities have been building for the last 15 years, which is these combined cycle units in multiple modules. In this case, they'll be modules of 630 megawatts each. And if you put three of those together at the same site, you'll have about the same capacity that FPL says they need in the Glades location. It would actually come out to 1,890 megawatts.

I can give other examples if you would like.

Q. Is there anything in particular that you could do if you were to put them in that configuration that

would increase the availability?

MR. ANDERSON: Objection. Beyond the scope of cross-examination. I expressly didn't go into all the reliability and availability information.

MR. GUEST: Well, the issue here was would it be possible to build one that big, and the answer is yes, you could -- well, I better not say the answer, so I won't. But I think that it fairly opens the question of how would you do it. There's a "how would you do it" question here.

CHAIRMAN EDGAR: All right. I'll allow.

A. Yes, there's a lot of things, first of all, my suggestion on stepping back a minute and really looking at the wide range of alternatives that are available.

I think we've seen here today demonstrated that 1,960 megawatts may indeed not be totally the requirement. Therefore, there may actually be a smaller size, or maybe no size required. But if you do need to build a plant and it has to be that size, that can be done rather easily.

And actually, you can take advantage of the size of that plant, because right now, on the smaller size plants, it isn't really feasible to have a spare gasifier for just a single unit. But when you have multiple gasifiers -- in this case, in order to have the

capacity of the Glades plant, you would actually need six gasifiers to give you that capacity. And if you did that, what you could do is, you could afford a spare gasifier, and that spare gasifier could actually be producing methanol, which can be used as your backup fuel. It's also possible to use biomass and other alternative fuels which are less harmful to the environment. So there's a whole range of options that really haven't been evaluated as alternatives.

Another example, this plant that I mentioned in Texas, they're going to also produce -- since it's going to be a very clean plant, they're going to use a waste product, petroleum coke, which is normally exported outside of the country and burned without the regulations that we have in this country, so they actually create more pollution by exporting our waste materials. If we used that waste material here in this country and we control the emissions like they are in the Hunton plant and capture the CO_2 -- their plans are to also to generate synthetic natural gas. Well, we can see in Texas, they have some -- FP&L could look at joint ventures with companies like that where it is economic to make use of the petroleum coke close to the source, make use of the CO_2 waste product for enhanced oil recovery in Texas, which is where they need it, and

that's also where we get our natural gas from.

So it would be very nice to have a joint venture arrangement with a company like this Hunton Energy Group, where we would be buying the synthetic natural gas from them, making use of a waste product, sequestering the CO_2 economically, and we make use of the natural gas, buy the natural gas from them, and we continue building our combined cycle natural gas plants closer to our load centers, which is much more efficient, and we don't degrade the environment as much.

So there's a whole range of products, of alternatives that really should be looked at before any kind of a decision is made on this type of a plant.

Q. I have two very quick follow-up questions on that. Are there actually gasification plants around the world that produce methanol, and if so, could you just tell us yes or no and maybe where?

MR. ANDERSON: Objection. Beyond the scope of cross-examination.

MR. GUEST: It's just following up on whether methanol is -- that's really feasible, that's all.

CHAIRMAN EDGAR: I'll allow.

A. Yes. As a matter of fact, one of the pioneers in this country is Eastman Chemical Company in Tennessee, who has been operating for over 20 years a

gasification process, and their primary product is methanol, which they then go on and make into other chemicals.

Q. And why do you think that methanol could be used to run the combined cycle?

A. That's a fuel that's commonly used to run gas turbines. There's no problem with using it as a backup fuel.

Q. You were shown this exhibit over here?

A. Yes.

Q. And the question I think that was asked of you is are these -- well, may I have a moment?

May I have a moment? I'm really trying to shorten this thing.

CHAIRMAN EDGAR: I understand.

(Pause.)

BY MR. GUEST:

Q. In the interest of time, a lot of the witnesses have actually covered a lot of these items, so there's really no need to -- I mean through cross, so I think we can jump over the first three without asking any questions.

Do you agree with FPL's claim that IGCC has a significantly higher life cycle cost?

A. No, I do not.

Q. Can you briefly tell us why?

A. If you look at the two primary components of what goes into the cost of electricity, it's the capital costs and the fuel costs. I think we've shown that the costs for the Tampa Electric next plant, which should come online the same time as the Glades plant, has comparable capital costs, so the next item really becomes fuel costs. And I think by FPL's own expert witnesses, all of them indicated that there was a significant difference in the projected price of petroleum coke versus their combination of coals and petroleum coke.

So I think we can conclude from that -- and I think if we go back in history and we look at the last 20 years of the price of petcoke, it has averaged half of the price of coal. That, together with the projections, make me feel pretty comfortable that petcoke over the long term is going to be significantly lower. And I just did a quick calculation that, based on the number Steve Jenkins used in his presentation of a $1 per million Btu differential in the price between coal and petcoke, nets for this plant $120 million a year of fuel cost savings, which would move on directly as a savings to the consumer, because fuel costs are passed on directly.

The other life cycle cost component that we're going to have to consider is CO_2 costs, and FPL's testimony indicated they thought that they would probably have to pay about $28 per ton for CO_2 credits, that they wouldn't be able to capture the CO_2 from this plant, so they would have to pay for the credit for somebody else capturing the CO_2, since they won't be able to do it economically. And they came up with a number of about $28 per ton of CO_2. The IGCC plant and the DOE numbers indicated that $18 a ton would be the cost for capturing the CO_2 in an IGCC plant. So again, if you take the difference between those numbers, you come up with another $120 million a year of savings.

So I think there are significant life cycle cost savings that need to be looked at when you go to IGCC.

Q. Jumping back just for a second, I just would like a very brief answer to this if that's possible. Are there supplier guarantees available for IGCC?

A. Yes, and that was really the reason for --

MR. ANDERSON: Madam Chairman, I'm sorry, but we've forgone all of the examination on all these areas. We did not interrogate on any of these things. We're obviously prepared to demonstrate that there are no contracts in the industry signing up with such

guarantees. It's going far beyond the scope of the cross-examination, and we object.

CHAIRMAN EDGAR: I agree.

MR. GUEST: Okay. May I have a moment?

CHAIRMAN EDGAR: Yes.

BY MR. GUEST:

Q. In your direct testimony, you had a chart that showed relative emissions?

A. Yes.

Q. Is there an issue about higher emissions during startup?

MR. ANDERSON: FPL objects to this question. Again, we did not do the environmental performance cross-examination, and all this is additional direct exam.

CHAIRMAN EDGAR: I agree.

MR. GUEST: Well, I'll wrap up then.

BY MR. GUEST:

Q. Mr. Anderson referred to the plant proposed for Glades County as ultra-supercritical.

A. Yes.

Q. Is that true?

A. No, it is not. According to the numerous definitions from the EPA, from the Department of Energy, National Energy Technology Laboratory, and the industry

reference that we gave in cross-examination, I think we see that what has happened is that the true definition of ultra-supercritical -- and there was a reason for it -- is significantly higher pressures. And the reason for those higher conditions is to get higher efficiencies. The whole objective of that exercise of going to higher pressures and temperatures is to get higher efficiencies, and the plants are not able to obtain that.

And unless -- and they're really at the end of their development life as far as how far you can push this technology of boilers. And without materials that can operate under those temperatures and pressures, there's really no hope that we can ever get the boiler technology to obtain the efficiency levels that were shown for ultra-supercritical pulverized coal. So what has happened instead is, the industry has tried to save face by saying, "Okay. Well, we can't reach those conditions and we can't get to those efficiencies, but we've got this word, ultra-supercritical, so we'll try and make the most out of the word."

But what you have instead for the IGCC technology is, you have an operating plant. You have a technology that has been operating for 10 years by a utility in this state that has enough confidence in that

technology that they've selected it for their next unit.

There's no scale-up required in the technology to go from 300 megawatts on to any size you want, because they're all 300-megawatt modules. So there's very little risk I see in going with the IGCC technology, and therefore, I would move that check mark over, and I would say there's more risk associated with the supercritical technology, because there haven't been any built in this country, and no operating results for that.

And the other thing that I would like to mention is this chilled ammonia process.

CHAIRMAN EDGAR: Okay. Mr. Furman, I think we're going a little far afield. Do you have further questions?

MR. GUEST: Yes. I've got one or two.

CHAIRMAN EDGAR: Okay. Then let me say, Mr. Furman, if you could try to shorten your answers to the question being asked.

THE WITNESS: Okay.

CHAIRMAN EDGAR: Thank you.

BY MR. GUEST:

Q. A question was raised about you've got thousands of photographs. Is that true?

A. More like hundreds.

Q. I stand corrected.

A. It may be thousands.

Q. Okay. Is it important to have taken the photograph yourself?

A. No.

Q. Why not?

A. I think you rely upon the source of the information, the credibility of the source of that information.

Q. Is that what the experts in your field generally do?

A. Yes.

Q. Now, finally, a number of questions were asked of you about various things that you haven't done. Why is it that you feel comfortable in expressing these opinions to the Commission and sharing your opinion about the merits of these two different technologies? What's the basis for that?

A. The basis for that is that during my career, what I've devoted it to is energy technologies that I thought had a future. And so far, I've made some pretty good guesses, or educated guesses, or very educated guesses as to what technologies I thought would be answers to our energy problems.

At MIT, before the first oil embargo, I --

well, I guess to give the short answer, I've always devoted my career to doing the initial engineering studies to determine the feasibility of what technologies we should really spend our efforts on. I made that first determination 35 years ago when I selected coal gasification as the technology that I did my master's thesis on, and 25 years ago when I made my last presentation to the FPL executive board and I suggested to them at that time 25 years ago that they ought to build their plants in three phases.

Phase one is a gas turbine peaking plant, because that's always what you need first, is additional peaking capacity, but always have the plan in mind for phases two and three. And two would be the combined cycle unit, so you get greater efficiency and run at a higher capacity factor. And the third phase is always coal gasification, because you don't know if natural gas or oil or coal will be your cheapest source of fuel.

So I was very happy to learn after leaving Florida Power & Light for quite a long time that they actually listened to my recommendation, and they built the Martin plant that way. It's a combined -- it's a very large combined cycle plant, but the future technology that they had in mind and that they listened to my recommendation on was that they permitted it for

pulverized coal. They --

CHAIRMAN EDGAR: Mr. Furman, again, I think we've gone a little far from the question that was asked. And I think perhaps you and I have a different definition of shorter answers.

THE WITNESS: Okay. I just thought since you gave the courtesy to Mr. Hicks and Mr. Jenkins to ramble on that you would give it to the other witnesses.

CHAIRMAN EDGAR: And, Mr. Furman, I think I have done and continue to do so.

MR. GUEST: No further questions on redirect.

CHAIRMAN EDGAR: Okay. Exhibits.

MS. BRUBAKER: I show Mr. Furman's prefiled exhibits as numbers 93 and 121.

CHAIRMAN EDGAR: Okay.

MR. ANDERSON: FPL has no objection. We would also like to offer Mr. Furman's deposition. Exhibit 192, I think that would be the --

CHAIRMAN EDGAR: I think that's 190, but hold on just a second and let me get the paper that I need.

MR. GROSS: Madam Chair.

CHAIRMAN EDGAR: Mr. Gross.

MR. GROSS: Excuse me for interrupting, but I had communicated in writing to FPL objections to several questions posed at Mr. Furman's deposition, and --

CHAIRMAN EDGAR: Mr. Gross, I'm sorry. I need you to give me just a second --

MR. GROSS: Okay.

CHAIRMAN EDGAR: -- so I can do this, and then I can listen.

MS. BRUBAKER: Madam Chairman, for clarification --

CHAIRMAN EDGAR: No, no, no.

MS. BRUBAKER: I'm sorry --

CHAIRMAN EDGAR: Give me a moment. Thank you. I just need to get my thoughts in order here.

Okay. So we are admitting Exhibits 93 through 121, and then we have these last to take up. Ms. Brubaker, I'm sorry, but I'm now ready.

(Exhibits 93 through 121 admitted into the record.)

MS. BRUBAKER: I beg your pardon. I just wanted to clarify. Exhibit 190 was Mr. Plunkett's deposition. It has been entered into the record. So that would bring Mr. Furman's deposition being number 192.

CHAIRMAN EDGAR: Thank you. I appreciate that.

(Exhibit 192 marked for identification.)

MR. ANDERSON: FPL would also -- we have a

couple of other small exhibit matters that this would be a good time to consider perhaps.

CHAIRMAN EDGAR: Okay. Once again, just -- let me get there. I'm sorry. I'm getting tired, and my ability to multitask is diminishing, so just a moment.

Okay. Where next, Mr. Gross or Mr. Anderson? Mr. Gross.

MR. GROSS: It's my understanding, but I would like -- Mr. Anderson, do you have a response to the objections that we made to Mr. Furman's deposition?

MR. ANDERSON: Counsel indicated a few lines of the Furman deposition that he did not wish admitted into the record. We're fine with that, and if the page and lines numbers are recited, or whatever is best, we're perfectly fine with that.

Before talking about that further, just to kind of set a little agenda, I think that would bring up -- Mr. Schlissel's deposition I think is 193. He has -- there were Exhibits 1, 2, and 3 to his deposition also, which I don't know if it's your practice to label those separately or just consider them part of the Schlissel deposition.

(Exhibit 193 marked for identification.)

CHAIRMAN EDGAR: Okay. So we have the -- we still have 191, 192, then we have the Schlissel, which I

still cannot do properly, deposition and exhibits, and the question about Mr. Furman's deposition, and potentially a small deletion, so to speak.

Okay. Ms. Brubaker, help me work through this.

MS. BRUBAKER: Certainly. With regard to Mr. Furman's deposition, we can handle those lines to be excised in one of two ways. We can either as part of Exhibit 191 include a page showing which portion should be excised, or if it's the preference of the parties, we can simply enter a redacted version with those passages physically struck by permanent marker or what have you. I have no preference myself. I think either one would be satisfactory. Certainly we all could look at what lines should not be relied upon for purposes of the record. I think that would be sufficient.

CHAIRMAN EDGAR: Mr. Gross. I'm sorry. To the -- yes, there you go.

MR. GROSS: I'm sorry. I didn't realize I had it on already. We would prefer a redacted version.

CHAIRMAN EDGAR: Okay.

MR. ANDERSON: We don't have a problem with that. We'll work with counsel with respect to that. Document 193 would be the Schlissel deposition with Exhibits 1, 2, and 3.

Then a couple of other small matters. We were asked this morning for a late-filed exhibit. It was premarked as 185. Basically, staff was asking for a corrected figure without AFUDC. We have that here. Copies are being made also.

CHAIRMAN EDGAR: Thank you. Okay. So the document that we had marked 185 which was to be late-filed and is being distributed, seeing no objection, will be admitted into the record.

MR. GUEST: May we see that before we decide whether or not to object, Madam Chair?

CHAIRMAN EDGAR: Oh, I'm sorry. I didn't realize that you didn't have it yet. I apologize, Mr. Guest. Certainly you can take a moment to look at it.

MR. GUEST: Yes, I think we did see this. No, wait a minute.

THE WITNESS: Madam Chairwoman, since I have --

CHAIRMAN EDGAR: Mr. Furman.

THE WITNESS: Since I have a flight to catch, could I be dismissed?

CHAIRMAN EDGAR: Are there any further matters that we need Mr. Furman to remain with us for?

MS. BRUBAKER: Staff is aware of none.

CHAIRMAN EDGAR: Okay. Seeing none, thank you, Mr. Furman.

THE WITNESS: Thank you.

MR. ANDERSON: Other housekeeping matters --

CHAIRMAN EDGAR: Hold on. I'm sorry, Mr. Anderson. Again, I don't want to get confused. So, Mr. Guest, we were -- I perhaps spoke too soon on 185, and so --

MR. GUEST: I am a little confused, frankly. I don't understand what the revisions are. I guess that's what -- maybe you could just tell me what they are and I might not be concerned. What's different?

MS. BRUBAKER: I'll ask FPL to clarify if I'm wrong, but I believe the change is on section 1, construction, grand total costs in service year without AFUDC, that the Glades County IGCC number has been revised. If there are any other revisions, I'll let FPL speak to them, but that's the only one we've asked for.

MR. ANDERSON: That's the only revision that has been made per your request.

CHAIRMAN EDGAR: Mr. Guest, was that clear?

MR. GUEST: I think so. I think that that means that the number goes up a little from 5.7 billion. Is that the bottom line?

MS. BRUBAKER: I'm sorry. I didn't follow

you.

MR. GUEST: The price goes up a little bit? Is that the difference?

MS. BRUBAKER: I believe actually it -- this is for the IGCC. You might recall during my cross-examination of Dr. Sim that there was a disconnect between what we had asked for in an interrogatory response and what we actually received, and so this is to clarify that number for IGCC without the AFUDC rather than with, as it was included in the previous response.

MR. GUEST: So it's a revised interrogatory answer?

MS. BRUBAKER: That's correct.

CHAIRMAN EDGAR: That is my understanding.

MR. GUEST: Okay.

CHAIRMAN EDGAR: So with that additional review, this document that will be marked 185 is admitted into the record, as I said previously.

(Exhibit Number 185 marked for identification and admitted into the record.)

MR. BECK: Madam Chairman, may I ask staff a question concerning that?

CHAIRMAN EDGAR: Mr. Beck, yes.

MR. BECK: Jennifer, does that mean you're also revising the staff Exhibit 155, page 3, where that

was discussed?

MS. BRUBAKER: Yes, I think that would qualify to revise that. However, please be aware that 155 is not entered into the record. In terms of -- if I were to refer to that document again, yes, it would necessarily have to modify that.

MR. BECK: I just thought it would be easier. This changes the 4,197 to 3,373?

MS. BRUBAKER: Yes, off the top of my ahead. Again, for clarity, 155 and 156, staff is not moving those into the record.

CHAIRMAN EDGAR: Okay. Are we all almost there? Mr. Anderson.

MR. ANDERSON: Just about there.

CHAIRMAN EDGAR: Okay.

MR. ANDERSON: What I would like to do is just walk around the Furman dep and the Schlissel dep so people have them, and then we can work with counsel, however they want to handle any redaction they want. But the last three points we wanted to talk about were, during Mr. Schlissel's cross-examination, we had Exhibits 163, 164, and 165, which have had not been offered yet, which we want to offer. Those are being walked around also.

CHAIRMAN EDGAR: Okay. And we also,

Mr. Gross, had 162, which was, according to my record that I am keeping, the errata.

Okay. So we have the deposition that has been passed around of Mr. Schlissel with the exhibits with it, which we marked as 193. I don't think I've entered that, so any objection to 193 as it has been distributed? Seeing none, Exhibit 193 will be entered.

(Exhibit 193 admitted into the record.)

CHAIRMAN EDGAR: And then, Mr. Anderson, thank you for bringing us back to this. We had Exhibit 162, Mr. Gross, that you had offered, which was the errata information. Seeing no objection, 162 will be entered.

(Exhibit 162 admitted into the record.)

CHAIRMAN EDGAR: And then we had 163, 164, and 165, which Mr. Litchfield had put forth. Any objection? Do we need a moment? We need a moment. Okay.

MR. ANDERSON: While that moment is being taken, just as a practical way, on the Furman deposition, one way to do that might be if counsel just wanted to mark through the lines he talked about and give that to the court reporter, that might be the fastest way. My recollection is that it was fairly little material, and we had no problem with what they wanted to do.

CHAIRMAN EDGAR: Mr. Gross, does that work for

you?

MR. GROSS: That works for us.

CHAIRMAN EDGAR: Ms. Brubaker?

MS. BRUBAKER: That's fine.

CHAIRMAN EDGAR: Then we will take up Exhibit 192, which is the Furman deposition and contains the small bits of redacted material that will be given to the court reporter and then be part of the record.

(Exhibit 192 admitted into the record.)

CHAIRMAN EDGAR: So that leaves us, I think, with 191 that we still need to discuss. And Mr. Guest, I'm still waiting for comment from you and your colleagues as to 163 through 165.

MR. GUEST: It's being reviewed as we speak.

CHAIRMAN EDGAR: Okay. Mr. Litchfield.

MR. LITCHFIELD: Madam Chairman, I think we have resolution on the three exhibits in question, 163, 164 and 165. Mr. Gross has no objection with respect 163 and 165. He has asked that we in entering 164 simply qualify that the exhibit itself in this form does not appear in Mr. Schlissel's testimony. This was as modified per the cross-examination to remove the blue and green data points.

CHAIRMAN EDGAR: This is the one where we removed the blue and green data points. I recall.

MR. LITCHFIELD: Yes. With that qualification, I believe there's no objection.

CHAIRMAN EDGAR: Okay.

MR. GROSS: I would have a greater comfort level if we just struck through the testimony, because it appears that it is the exhibit in his testimony. Part of the testimony is captured on the sheet.

MR. LITCHFIELD: FPL is okay with that. This would simply mean drawing a line through lines 3 through 6 on Exhibit 164.

CHAIRMAN EDGAR: I'm sorry. I need you to repeat that for me, if you would.

MR. LITCHFIELD: It would involve drawing a line through lines 3 through 6 on Exhibit 164, so essentially the Q and A, including the table there, would be lined through to indicate, as Mr. Gross suggests, that this -- so there's no confusion as to whether this was lifted directly from his testimony or not. It was a cross-examination exhibit.

CHAIRMAN EDGAR: I'm having a hard time putting my hands on that, so just a moment.

MR. GUEST: May we have a further moment? I think we've got a problem that we're going -- we've got a problem we're going to have to deal with here.

CHAIRMAN EDGAR: I'm sorry, Mr. Guest. A

problem with a problem?

MR. GUEST: Yes.

CHAIRMAN EDGAR: All right. Well, once again, we'll all just take a moment.

MR. GUEST: Well, I think I can probably tell you what it is.

CHAIRMAN EDGAR: Okay. And now that I know what I'm looking at, I can maybe understand it.

MR. GUEST: Well, as I understand what happened here is that -- these are projections for future carbon cost regulation. And what happened is that we've had a shift in proposals that are sort of on the table for future carbon regulation. Some are off the table and some are on. And what has happened here is that the ones that are off the table are gone, but the new ones that are on the table aren't on.

And so it seems to me that if what I'm saying is true, and I'm assuming that it is, that in fairness, if you're going to update an exhibit, you should update it so that the things that go off the table go off, and the things that go on the table go on. And so this is sort of a fairness -- I mean, if we're going to update, let's update everything. I'm not sure we have to deal with that today.

CHAIRMAN EDGAR: We may hold this in abeyance,

so to speak.

Ms. Brubaker, please.

MS. BRUBAKER: May I ask for clarification? Mr. Guest, which exhibit are you referring to? 163?

MR. GUEST: I thought it was 164. 163, 64.

CHAIRMAN EDGAR: Okay.

MR. LITCHFIELD: 163 is just a color version of what appears in Mr. Schlissel's testimony. 164 is the identical figure, and we established that on cross-examination, with the only change being that we whited out the green and the blue data points, consistent with the cross-examination. That's it.

MR. GUEST: Things that went off the table. And our point is that, well, if you're going to update, you should be able to update both ways. That's my point.

MR. LITCHFIELD: Madam Chairman, I don't believe that Mr. Guest was even here during the cross-examination, and I don't recall that there were any updated data points offered by Mr. Schlissel, and certainly there has been no redirect of Mr. Schlissel. So I think the exhibit is complete as it was offered.

CHAIRMAN EDGAR: Okay. Mr. Brubaker, I was going to suggest that we wait on this. Is that consistent with --

MS. BRUBAKER: That's fine. The only comment I was going to offer is, I don't think anyone is believing that this is Mr. Schlissel's exhibit, that it's simply a modification made for the purpose of cross-examination, very much like what staff had earlier for Dr. Sim.

You know, if you would like to wait and have the parties talk about it, that's fine, but certainly in my mind, I'm comfortable with the exhibit as it is, with the understanding that this is not put forward by Sierra. It is simply an instrument that was used by FPL for the purposes of cross, and I think the transcript sets forth that fully and adequately.

CHAIRMAN EDGAR: I'm sorry. Mr. Guest.

MR. GUEST: May I defer to --

CHAIRMAN EDGAR: Yes.

MS. REIMER: Madam Chairwoman, I was here during the examination of Dr. Schlissel, and in fact, he did mention that there were additional studies that had been done that he had not looked at, because his study was done prior to this, and that there were other things that he would have added if he had not finished his study at the time that he finished it. So what this represents is simply FP&L deciding to take off some data points, and we never got an opportunity for

Dr. Schlissel to add the data points on. So it seems like all it is is just a modified version of Dr. Schlissel's, which I don't see that it has any material value.

CHAIRMAN EDGAR: Okay. Understood. Therefore, I'm going to come back to my earlier suggestion a few moments ago and say let's just take this under advisement, and we will be back on -- we're not done yet today, but we will be back on Monday, and we will all be a little clearer then. I certainly will be. And if we have consensus, we will approach that it way, and if not, I will make a ruling.

Okay. Which leaves us -- that was 164. I thought I heard earlier no objections to 163 and 165. If that is an correct understanding, then we'll go ahead and dispose of those. Is that correct? It is? Okay. Then we will enter 163 and 165. We will address 164 as a preliminary matter when we go back in on Monday morning.

(Exhibits 163 and 165 admitted into the record.)

CHAIRMAN EDGAR: And let's see. That brings me, I believe, to -- I don't think we addressed 191; is that correct?

MS. BRUBAKER: We need to.

CHAIRMAN EDGAR: Okay. Any objections to 191, which is the testimony previously offered by Mr. Furman at a prior proceeding which was put forth by Mr. Anderson? Am I seeing no objection?

MR. GUEST: Give us a second.

We think it's admissible.

CHAIRMAN EDGAR: Is that the same thing as no objection?

MR. GUEST: Yes, I guess so.

CHAIRMAN EDGAR: Okay. All right. Seeing no objection, we will enter 191.

(Exhibit 191 admitted into the record.)

CHAIRMAN EDGAR: I think that dispenses with all the procedural evidentiary type of things that I have pending before me other than one that we are holding for Monday.

And so, 4:30. We have one witness that we want to try to take up; is that correct?

MR. LITCHFIELD: If we could, Madam Chair. My understanding is that there are very few questions from among the parties for Mr. Rose. He is an out-of-state witness and would be our last out-of-state witness. It would be helpful if we could dispense with him this afternoon.

CHAIRMAN EDGAR: Okay. Are all the other

parties able to continue on, because I had said yesterday that we would break prior to this, and I try stick to that. However, if we can continue to forge on, we will.

Okay. Then, Mr. Litchfield, if you would call your witness.

MR. LITCHFIELD: FPL would call Mr. Judah Rose. Mr. Rose, have you been sworn?

THE WITNESS: No, I have not.

CHAIRMAN EDGAR: Okay. Then we will do that if you'll stand with me and raise your right hand.

Thereupon,

JUDAH L. ROSE

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

DIRECT EXAMINATION

BY MR. LITCHFIELD:

Q. Would you please state your name and business address for the record?

A. Yes. Judah L. Rose, 9500 Lee Highway, Fairfax, Virginia, 22031.

Q. And by whom are you employed and in what capacity?

A. I'm employed by ICF International, where I am

a managing director.

Q. And you're here on behalf of Florida Power & Light?

A. Yes, I am.

Q. Have you prepared and caused to be filed 25 pages of prefiled rebuttal testimony in this proceeding?

A. Yes, I have.

Q. And did you also cause to be filed errata to your testimony on April 13, 2007?

A. Yes.

Q. Do you have any changes or revisions to your prefiled rebuttal testimony other than the errata sheet that you have submitted?

A. No.

Q. If I were to ask you the same questions contained in your prefiled rebuttal testimony, would your answers be the same?

A. Yes.

MR. LITCHFIELD: Madam Chair, I would ask that Mr. Rose's prefiled rebuttal testimony and the associated errata be inserted into the record as though read.

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

BY MR. LITCHFIELD:

Q. Now, you're sponsoring just one exhibit to your rebuttal testimony?

A. Yes.

Q. And that consists of document JLR-11?

A. Yes.

MR. LITCHFIELD: And I would note that Mr. Rose's exhibit has been premarked as 147.

BEFORE THE PUBLIC SERVICE COMMISSION

FLORIDA POWER & LIGHT COMPANY

REBUTTAL TESTIMONY OF JUDAH L. ROSE

DOCKET NO. 070098-EI

MARCH 30, 2007

Q. Please state your name and business address.

A. My name is Judah L. Rose. I am a Managing Director of ICF International ("ICF"). My business address is 9300 Lee Highway, Fairfax, Va. 22031.

Q. **Please briefly describe your educational background and professional experience.**

A. After receiving a degree in economics from the Massachusetts Institute of Technology (MIT) and a Masters Degree in Public Policy from the John F. Kennedy School of Government at Harvard University, I joined ICF International in 1982. I have been working at ICF International since then and now direct ICF's wholesale power practice. I have also been a member of the Board of Directors of ICF International and am one of three people in a firm of over 1,500 people to have been given the title Distinguished Consultant.

Q. Have you worked with public sector clients on electric power issues?

A. Yes. ICF has been the principal power consultant to the U.S. Environmental Protection Agency (EPA) continuously for over 25 years, and analyzed all the major policy initiatives involving regional controls on power plant emissions such as SO_2, NO_x, and Hg. ICF also has extensive experience in analyzing the

impact of CO_2 regulations on the power sector including conducting the electric sector analysis for the Regional Greenhouse Gas Initiative (RGGI) in the Northeast and MidAtlantic.

Q. Do you have other public sector clients?

A. Yes. ICF has worked with the Federal Energy Regulatory Commission (FERC), U.S. Department of Energy (DOE), Environment Canada, and the European Union. We have also worked with state entities including those in Ohio, New Jersey, California, South Carolina, New York, Connecticut, Kentucky, and Michigan.

Q. Do you have private sector clients?

A. Yes. ICF provides assistance to electric utilities, financial institutions, power marketers, fuel companies, and independent power producers. ICF also works with Regional Transmission Organizations (RTOs).

Q. What type of work do you typically do?

A. I have extensive experience in assessing the effects of market and regulatory trends on the wholesale power generation sector. This work regularly addresses capacity expansion, market prices for power, and fuel and environmental controls.

Q. Are there other relevant aspects of your experience?

A. Yes. I have authored numerous articles in industry journals and spoken at scores of conferences. For additional details, please see my resume which is labeled Document No. JLR-1.

Q. Have you testified before other state regulators and legislators?

A. Yes. I have testified before state regulators and legislators in Florida, New Jersey, Ohio, California, North Carolina, Oklahoma, Louisiana, New York, Pennsylvania, Indiana, Kentucky, and Minnesota.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of Florida Power & Light Company ("FPL").

Q. What is the purpose of your rebuttal testimony?

A. The purpose of my testimony is threefold: first, to rebut Mr. David Schlissel's supplemental testimony on the magnitude of his suggested CO_2 price forecast; second, to demonstrate that the CO_2 allowance price forecasts used by FPL in their costing calculations for FGPP were reasonable; and third, to demonstrate that there is a direct linkage between the stringency of CO_2 policy and the impact on gas prices.

Q. Are you sponsoring any exhibits to your rebuttal testimony?

A. Yes. I am sponsoring an exhibit consisting of one document, JLR-1, which is attached to my rebuttal testimony.

Q. Can you summarize your testimony?

A. Yes. My testimony centers on seven main points:

First, I believe it is reasonable and prudent to take plausible CO_2 allowance prices into account when planning future generation and that the allowance prices used by FPL in their planning process meet these criteria.

Second, while I believe that there is uncertainty involved in forecasting CO_2 prices, reasonable parameters can be defined to develop plausible ranges of potential prices.

Third, the CO_2 prices that Mr. Schlissel suggests be used to evaluate the economics of building FGPP, and his high case in particular, are extreme and represent a view unsupported by any analysis conducted by Mr. Schlissel and Synapse. I say this because of a variety of policy and technology options that I believe are likely to be employed that will reduce the cost of CO_2 allowances. These include the use of offsets and international allowance trading and the deployment of new low emitting technologies including nuclear, coal with carbon capture and sequestration (CCS), and renewables such as wind and biomass.

Fourth, as has been stated in previous testimony by Rene Silva (pg 34), the economics of building gas versus coal will largely hinge on the relative fuel price versus the relative cost of environmental regulation – most notably CO_2. Both of these issues are highly uncertain, but plausible, integrally related scenarios can be developed and appropriately weighted.

Fifth, even if one assumes that allowance prices could potentially reach $50/ton from a fundamental perspective, I do not believe that many countries,

including the U.S., would tolerate the impact that such an allowance price would have on the broader economy.

Sixth, not only does Mr. Schlissel's \$50/ton CO_2 price represent an extreme view, but there is no evidence that he has effectively or systematically modeled CO_2 prices using industry-accepted modeling techniques.

And seventh, Mr. Schlissel's characterization of EIA and MIT analyses are incomplete and selective.

Q. Do you believe it is reasonable and prudent to take CO_2 allowance prices into account when planning future generation?

A. Yes. Although nothing is certain of course, there is increasing momentum in the U.S. that points to the fact that CO_2 will most likely be regulated in the mid to long-term. This is evident in the six legislative initiatives that have been introduced in the 110th Congress.

Q. Will potential CO_2 emission reduction requirements tend to favor new natural gas power plants over new coal power plants, all else being equal?

A. Yes. This is because coal power plant emissions of CO_2 are higher per unit of fuel input and electrical output compared to gas plants, and this issue is not in dispute. What is in dispute is the extent new gas plants will be favored.

Q. Are there aspects of CO_2 emission regulations that tend to mitigate the effect on coal power plants?

A. Yes. The principal mitigants are:

- Natural gas demand is expected to increase due to CO_2 emission regulations and as a result, natural gas prices are expected to be higher than otherwise would be the case. This natural gas price increase is expected to be substantial and must be accounted for in any analysis of a policy to control CO_2. This increase in gas prices at least partially rebalances the cost comparison in favor of coal plants, especially high efficiency coal plants, to say nothing of the reliability benefits associated with fuel diversity.
- Coal demand is expected to decrease, especially from older existing plants. As a result, coal prices would be lower than if CO_2 reduction regulations did not exist, also partly readjusting the balance. While this effect is likely to be smaller than the gas price increase, it should be considered.
- Allocations of CO_2 emission allowances or permits from the government can be extremely valuable in a marketized version of CO_2 control. The U.S. DOE considers the technology being proposed by FPL as a clean coal technology. This is because it uses advanced technology to increase thermal efficiency and could be favored by the provision of extra CO_2 emission allowance allocations. This can also partially redress the balance between new coal and gas plants in the favor of coal. As an example, with regards to clean coal technology, the Feinstein Bill to control CO_2 emissions S. 317 orders the EPA to create a definition of 'qualifying advanced clean coal technology'

within 18 months of enactment. It must reflect advances in available technology, taking into consideration net thermal efficiency, measures to capture and sequester carbon dioxide, and output-based emission rates for CO_2, SO_2, NO_X, PM, and Hg. In another example, in Europe, CO_2 emission allowance allocations are being used to cushion the effect on various sectors in accordance with national policy. A fair consideration of the decision to build new coal plants like the one being proposed by FPL must at least give qualitative consideration to this potential.

Q. What are the factors that tend to limit future long-term CO_2 emission allowance prices separate from limiting the stringency of the policy?

A. There are numerous options for reducing CO_2 and other greenhouse gas (GHG) emissions (CH_4, N_2O, PFC, HFC and SF_6) which are believed to contribute to climate change. These various measures of reducing GHG emissions form a supply curve of mitigation options. In order for CO_2 prices to be extremely high, not only does the demand for CO_2 reductions have to be high (i.e., the program is very stringent), but the supply of reductions has to be severely limited. The CO_2 reduction options that should be addressed in an analysis of CO_2 emission allowance prices include a combination of on-system reductions specific to the power system and off-system reductions, or offsets, which occur outside the power sector. On-system reductions include measures such as fuel switching, unit redispatch, technology and efficiency improvements at existing units as well as the deployment of carbon capture

and sequestration, nuclear power and renewables. The deployment and adoption of energy efficiency measures can also play a role. Off-system reductions include such measures as CO_2 offsets from forestry and other sources, and non-CO_2 greenhouse gas (GHG) reductions from other sectors. These include both reductions that occur domestically in the U.S., as well as those that occur abroad, particularly in developing countries. Taken as a whole, these mitigating options are significant and, depending on the way in which CO_2 regulation is implemented and coupled with other market forces, could significantly offset any direct cost differential between a gas-fired plant and a coal-fired plant imposed by CO_2 regulation.

Q. Can you elaborate on the on-system reductions in more detail?

A. Yes. On-system reductions, as mentioned above include a portfolio of measures and actions that the power system, in aggregate, can undertake to reduce CO_2 emissions. These measures can impact the dispatch and, in some cases, the fuel choices of existing units as well as decisions regarding what type of new capacity is added to the system in the future to meet load growth and peak demand plus reserve margin requirements. In forecasting CO_2 allowance prices, new build options and their cost and performance characterizations play an important role in determining the cost of complying with future carbon constraints. Assumptions regarding the ability of existing units to retrofit with controls can also play a role.

Q. Is it reasonable to believe that carbon capture and sequestration (CCS) will play a role in mitigating rapid growth in CO_2 costs?

A. Yes. Numerous parties have discussed the importance of CCS in meeting future energy needs in the U.S. and the world and are encouraging research and development of CCS options. A recent study by MIT called "The Future of Coal" concluded that CCS is "the critical enabling technology that would reduce CO_2 emissions significantly while also allowing coal to meet the world's pressing energy needs." (Executive Summary, p.x) President Bush has stated that CCS is a top priority and supports the FutureGen project to develop a low- to zero-emissions coal plant early in the next decade. Two bills have been introduced this Congressional session with goals of providing financial support to facilities that capture carbon emissions and improving carbon capture and sequestration research, development and demonstration (S. 155 and S. 962).

There is a large effort underway, both in the private and public sectors, to evaluate the technologies and resources necessary for CCS to work. The U.S. Department of Energy's National Energy Technology Laboratory (NETL) is working on several fronts to bring CCS to commercialization. These include: developing a network of regional partnerships to determine approaches for CCS; funding several technology research projects to assess the potential for different capture options; and researching measurement, monitoring and verification approaches for the CO_2 once it is stored.

Utilities are also conducting analysis of CCS. AEP recently announced that it will be conducting tests of two capture options over the next two years with the intention of installing a commercial scale capture operation sometime in the period after 2011.

Q. Do these CCS tests include both new PC as well as IGCC plants?

A. Yes. The two AEP tests, for example, will both be on conventional pulverized coal units. The MIT study states that in terms of future CCS potential there is no clear preference for IGCC versus other new coal plants. The MIT study states that even though IGCC is currently the leading electricity generation candidate for carbon capture, CCS has not yet been proven on this technology. Further R&D may show that another technology is more cost effective or more efficient at capturing CO_2; an even more likely finding is that a variety of technologies will need to be deployed to suit the wide variety of coal types used for electricity generation. (Executive Summary, p. xiii). The MIT study also notes the trade-off between the cost to produce electricity before a carbon regulation is implemented and the cost after the start of the program; depending on the timing of the CCS retrofit and magnitude of that carbon cost, it may be difficult to tell which plant type (IGCC or PC) will actually have a lower net present value, when incorporating CCS. (Executive Summary, p. xiv)

Q. Does the MIT study indicate any factors with potential to alter the cost of retrofitting CCS on existing plants?

A. Yes. According to the study, the largest source of efficiency loss observed with CO_2 capture on a pulverized coal plant and therefore the largest cost increase comes from recovering the CO_2. The efficiency loss associated with this process could potentially be reduced by one-half with a more efficient capture technology, resulting in a decrease in costs per ton of CO_2 of 25%. (p. 28)

Q. Can you elaborate on the off-system reductions in more detail?

A, Yes. Off-system reductions, or offsets, represent the ability to reduce CO_2 or CO_2 equivalent emissions from the six greenhouse gases identified under the Kyoto Protocol (CO_2, CH_4, N_2O, PFC, HFC and SF_6) outside of the GHG regulated sector. One of course has to be convinced these offsets represent reductions that are equivalent to reduced on-system emissions; measurement and verification protocol are currently being developed to assure that these off-system reductions are real and quantifiable. The Kyoto Protocol has set up flexibility mechanisms such as the Clean Development Mechanism (CDM) and Joint Implementation (JI) mechanisms to assure that compliance with a CO_2 cap can be met through the investment in, and purchase of, low cost GHG abatement options.

Offsets exist both domestically and internationally. ICF has been at the forefront of developing the inventory and cost of these potential reductions

through the development of both domestic marginal abatement cost curves (MACCs) for the U.S. EPA and international MACCs for the International Energy Agency (IEA), and we incorporate these MACC curves in our analyses.

Q Can you explain why you think the CO_2 allowance price forecasts developed by Synapse are unreasonable?

A. Yes. I believe that the CO_2 price forecasts developed by Synapse are unreasonable because Synapse has not conducted any modeling in order to forecast CO_2 allowance prices. In developing prices they have relied indirectly upon studies conducted by others, giving no explanation of how they arrived at the specific CO_2 price forecasts represented.

Q. What is wrong with relying on other studies?

A. There are several problems. First, the studies in some cases analyze the same program with very different results. An expert opinion should not give equal weight to contradictory inputs or methodologies. Second, the studies are of different vintages and some are likely out-of-date. Mr. Schlissel elsewhere emphasizes in his testimony recent developments and should not ignore recent information here. Third, the studies in some cases have clear and obvious methodological flaws which Mr. Schlissel ignores. These studies should not be included. Fourth, Synapse selectively used certain scenarios from studies, ignoring or rejecting others with no explanation. Fifth, there are certain aspects of these studies that are not apparent to outsiders without full and complete access to the models, data, results, limitations, etc. This would not

be a problem if Synapse and Mr. Schlissel did their own analysis and presented the results of their own studies.

Q. Can you provide examples of flaws in the studies that should have caused them to be given significantly less weight?

A. Yes. Examples of significant problems include:

- EPA Analysis of S. 843 – This analysis used offset curves only and did not include CO_2 costs in plant dispatch and operation.
- MIT was not an energy sector specific model. The Emissions Prediction and Policy Analysis Model is a multi-regional general equilibrium model of the world economy. The version of the model used in their analysis did not have the capability to represent policies that discriminate among economic sectors, so MIT approximated the S. 139 as applying to the entire United States economy, rather than only applying it to the specific affected sectors. The MIT study explains this probably causes a slight overestimation of CO_2 prices, yet this point is ignored by Mr. Schlissel.
- Tellus and EIA use the National Energy Modeling System (NEMS), developed by EIA, but with contradictory results. While the electric sector representation in NEMS is reasonable from a national perspective, it lacks detail at the regional level. For example, NEMS lacks transmission transfer capabilities and treats each NERC region as one large market. There is a general lack of granularity at the more disaggregated regional level. The contradictory results, as filed by Mr.

Schlissel in exhibit DAS-3, are the result of widely divergent input assumptions. Mr. Schlissel makes no determination as to which set of assumptions are more or less plausible and therefore which outcome should be given greater weight.

- It is important to note that the model developed and used by ICF – the Integrated Planning Model (IPM®) has undergone a rigorous peer review process and is regularly used for financial due diligence and regulatory analysis.

Q. Can you provide examples of studies of the same program which are widely divergent?

A. Yes. Mr. Schlissel identifies three studies each (MIT, EIA, Tellus) of the two versions of the McCain Lieberman bill (S139 S. 139 and SA 2028) with widely different results. Nonetheless, he gives equal weight to each. The Tellus results are much lower for the same program compared to EIA and Mr. Schlissel provides no view as to which is correct.

Q. How does Mr. Schlissel handle multiple results in the same study?

A. He excludes results from some of the studies without explanation. For example, the MIT study was conducted with and without offsets and with different baseline growth assumptions, but it is unclear which version of the analysis he is presenting. Understanding the amount of offsets and their cost is critical to understanding the relative impact of on-system reductions versus the amount of reductions coming from outside the system. These factors

together determine the effective stringency of a CO_2 policy and determine the directionality and order of magnitude of the allowance price forecast.

Additionally, Mr. Schlissel does not explain why one scenario from a study was accepted and plotted while other scenarios were rejected. For example, in presenting the EIA analysis of S. 139, Mr. Schlissel showed only one set of results (the analysis of S. 139 with *AEO2003* reference case assumptions) from a study that included eight sensitivity analyses. Among the sensitivities left out is an analysis of the bill using *AEO2003* high technology assumptions (earlier availability, lower cost, and higher efficiencies for advanced technologies), which results in CO_2 allowance prices that are 25% lower in 2010 and 29% lower in 2025.

Q. Do any or all of the analyses address the effects of CO_2 on gas and coal prices?

A. Mr. Schlissel provides CO_2 prices but not fuel prices, and the numerous studies he relied upon have different treatment ranging from no treatment to more nuanced treatment. While Mr. Schlissel seems to acknowledge that gas prices are important in evaluating power sector economics, he gives no weight to the fact that CO_2 policy would have a direct impact on the price of natural gas. I believe this is a key flaw in his understanding of how CO_2 prices are determined and the feedback that CO_2 has on fuel prices in general and gas prices in particular.

Q. Do any or all of the analyses address the effects of new technologies in mitigating the growth in CO_2 allowance price projections that were developed?

A. All studies implicitly had to make assumptions in this regard even if that assumption was no technological improvement. Some of the studies conducted by EIA for example did explicitly include an advanced technology scenario that resulted in lower CO_2 prices – and it is interesting to note that Mr. Schlissel explicitly chose not to represent those lower CO_2 prices in his presentation of the different analyses or to take them into account when he interpolated between the price points of the various analyses. Mr. Schlissel himself does not provide a view regarding the issue of technology development in mitigating CO_2 prices other than to say it is a contributing factor.

Q. Do any or all of the analyses address the effects of alternative emission allowance allocation programs?

A. Mr. Schlissel does not address this important issue and treatment of this issue varies across the studies. None address the issue of clean coal technology allowance bonuses.

Q. Does Mr. Schlissel contradict Synapse and his own testimony by giving equal weight to the High CO_2 Case?

A. Yes, in his corrected direct testimony, Exhibit DAS-3, pg 53 of 63, Mr. Schlissel says "the most likely scenario (will be) closer to (though not equal to) low-case scenarios than the high case scenario…". He states that after

2030 allowance prices could be higher in response to more stringent emissions caps to achieve atmospheric stabilization. This notwithstanding, he gives added weight to the high CO_2 case in his supplemental testimony where he concludes that the proposed new coal plant has costs above new gas plants. I discuss this contradiction later in my testimony.

Q. Do you find Mr. Schlissel's CO_2 scenarios reasonable?

A. No, for all the reasons I describe above. I especially take issue with his higher CO_2 estimates which reach $40 to $50/ton CO_2. These scenarios represent extreme views and should be given a very low weight by decisions makers. It is important to note the extreme implications of a $50/ton CO_2 price on the power sector specifically and the U.S. economy in general. These implications include:

- Very large increases in natural gas prices of $2/MMBtu in real 2006 dollars. Natural gas is a crucial fuel for home heating and industrial activity, including power generation.
- Very large decreases in coal use of 40 percent with adverse consequences for coal using and producing areas.
- Average power sector costs increase 3¢/kWh in 2006 dollars versus U.S. average rates of approximately 7¢/kWh.
- If $50/ton CO_2 is applied nationwide, this is equivalent to adding $357 billion in costs in today's dollars. On a net present value basis, this equals roughly $3.6 trillion dollars. Total wealth of U.S. households

(real estate, stocks, bonds, bank deposits) is $45 trillion, and hence, such a program equals a burden 8 percent of total U.S. wealth.

- U.S. power sector CO_2 emissions by 2030 decrease 47 percent from base line. China alone is increasing its CO_2 emissions by over 10 percent per year and is poised to overtake the U.S. this year as the world's largest carbon emitter and is not subject to controls as are many other countries. The $50/ton price is associated with small effects in terms of CO_2 controls, but huge economic effects, and hence, is extreme.

Current CO_2 prices in Europe are $6/ton. Thus, there is no history to support $50/ton, adding to the implausibility and the inappropriateness of such an extreme price forecast.

Q. How do you forecast CO_2 emission prices?

A. ICF explicitly takes into account up-to-date policy, market and technical information and integrates these factors in our sophisticated modeling framework – the Integrated Planning Model (IPM®) that has been used by multiple utilities as well as by the US EPA and others. When conducting this type of analysis, we take into account the fundamental supply and demand of CO_2 reduction options including on-system reductions, offsets and alternative technologies. This allows us to provide decision makers a coherent integrated and documented view upon which to base decisions. Further, since it is our analysis, we are in a position to fully present it in forums such as this proceeding.

Q. Did you model the CO_2 allowance prices used by FPL in their analysis?

A. Yes. ICF developed these CO_2 allowance price streams by conducting rigorous, bottom-up analyses of the cost of meeting specific CO_2 cap limits using our IPM® model. We specifically developed the following scenarios:

- Mild CO_2 – representative of the Senator Bingaman's Policy (S.A. 868) as proposed in 2005.
- Stringent CO_2 – representative of the Senators McCain and Lieberman's (S. 1151) policy as introduced in 2006.
- Moderate CO_2 – representative of a weighted price stream that used the Bingaman and McCain-Lieberman policies as noted above plus an analysis ICF conducted of Senator Carper's policy introduced in 2006.

It is important to note that CO_2 prices, like any allowance price under a cap and trade policy, are representative of the marginal cost of imposing emissions limits. In the case of CO_2, meeting those emission limits can mean a variety of responses as noted earlier including fuel switching away from more carbon intensive fuels, shifting dispatch away from less efficient generation sources, building more efficient generation such as ultra-super critical pulverized coal, and building less carbon-intensive, but generally more expensive generation sources such as renewables.

Q. Is this approach consistent with your firm's historical role in assessing the impacts of air emission regulations?

A. Yes. ICF has a long history of forecasting emission allowance prices and the impact of air regulations on the power and other sectors. This capability has been built over the past three decades through the Firm's continuous support for the U.S. EPA Office of Air and Radiation, as well as our work with a wide range of utilities, merchant generators, power marketers, environmental groups, fuel companies, and public agencies across the country and internationally. Our analysis is based on the same framework that we use for our power market evaluation, providing internal analytical consistency. As noted, ICF has been the leading consultant to the US Environmental Protection Agency and to commercial industry on the economic and environmental impacts of the Clean Air Act Amendments (CAAA) and other environmental policies for over 30 years. We evaluated the costs of compliance with the acid rain regulations (Title IV) of the CAAA of 1978 and 1990, focusing on forecasted effects on utility SO_2 emissions, utility costs, electricity rate increases, and regional coal markets.

Prior to the CAAA, ICF evaluated all of the major legislative proposals from industry and environmental groups, appraising the emissions, costs, and coal market impacts of various proposed and final revisions to the CAAA. We have assessed impacts of SO_2 emissions trading on utility compliance costs and regional coal markets under an acid rain control program. We continue to

support EPA's air regulatory analyses. We were the lead analysts supporting the Clean Air Power Initiative (CAPI); provided analytic and other support for the SIP Call process; provided carbon related analysis, and currently support ongoing multi-pollutant and related analyses including the Clear Skies Act, Senator Carper's Clean Air Planning Act, the Clean Air Interstate Rule (CAIR) and Clean Air Mercury Rule (CAMR) regulations and mercury maximum achievable control technology (MACT) proposals. In addition, ICF has been one of the world's leading firms in the development and application of GHG estimation protocols. We have provided technical knowledge of GHG and other emissions sources in energy production operations to a wide range of clients including the Federal Government, the Intergovernmental Panel on Climate Change, Environment Canada, the UN, World Bank, and a number of public and private organizations across the U.S. and in Europe. We are increasingly working with states and regions to analyze the impacts of regional emissions caps, including the Regional Greenhouse Gas Initiative (RGGI), and the states of New York and Connecticut.

Q. Are there any errors in Mr. Schlissel's supplemental direct testimony that are pertinent to your rebuttal?

A. Yes. In Table 1 of his supplemental direct testimony, Mr. Schlissel makes two errors in replicating summary results originally provided in Mr. Silva's direct testimony. Table 1 shows the summary results of the cost differential analysis described in Mr. Silva's direct testimony (Document number RS-03) and notes the errors made by Mr. Schlissel in his representation of the same results. A negative value in

the table indicates that the Plan with Coal is less costly than the Plan without Coal.

Table 1. Cost Differentials of FPL Scenarios (Millions, 2006$)

Fuel Cost Forecasts	Environmental Compliance Cost Forecasts			
	A – No CO_2	B – Low CO_2	C – MidCO_2	D – High CO_2
High Differential	(2,792)	(2,045)	(1,127)	(666)*
Shocked Differential	(873)	(113)	804	1,278
Medium Differential	(219)	537	1,466	1,930
Low Differential	1,912^	2,670	3,604	4,037

* In his Supplemental Direct Testimony, Mr. Schlissel entered an incorrect value of 1,912.
^ In his Supplemental Direct Testimony, Mr. Schlissel entered an incorrect value of (1,912).

Q. Can you please explain why Mr. Schlissel's conclusions from the results shown in Table 1 are unreasonable?

A. In his examination of the results in Table 1, Mr. Schlissel states that the cases under Environmental Cost A "are not reasonable and should not be considered." Similarly, he describes the Low CO_2 cost forecast in column B as an "unreasonable assumption over such a long period of time." He then concludes that "just one out of eight scenarios ... suggest[s] that FGPP would be the lower cost capacity addition to FPL's system," referring to the case combining CO_2 Cost Forecast C and the High Differential Fuel Forecast.

I would first point out that correcting the error in Mr. Schlissel's Table 1, even under his unduly narrow approach, results in 2 of the 8 scenarios showing FGPP as the lower cost option relative to new gas capacity.

More importantly, however, is that Mr. Schlissel fails to evaluate the potential for each of the scenarios with an integrated view of fuel and CO_2 markets and therefore is too broad in his determination of which scenarios he considers reasonable. As discussed earlier, ICF regularly analyzes the interactions of fuel markets and environmental regulations. In those analyses, it quickly becomes apparent that as environmental costs for coal-fired plants increase relative to those for gas-fired plants, as they would under any sort of CO_2 regulation, the demand for gas-fired generation and therefore for natural gas itself increases. At the same time, coal prices tend to decrease, broadening the differential between gas and coal prices.[1] Therefore, the Fuel Cost Forecasts with lower differentials between gas and solid fuel costs are unlikely under the Mid and High Environmental Cost Forecasts.

By narrowing Mr. Schlissel's subset of 8 cases further by removing the Low and Medium Differential Fuel Cost Forecasts, 2 of 4 cases show FGPP as the lower cost option for FPL's system, with the upside of the project roughly equivalent to the downside. Based on this subset of cases in Table 1, the

[1] Mr. Yupp describes the relationship between environmental cost and gas prices the same way in his testimony.

upper bound of the potential cost of FGPP over natural gas generation is $1.278 billion, as compared to Mr. Schlissel's conclusion of $4.037 billion.

Q. Would higher CO_2 costs than those included in the analysis in Table 1, such as the Synapse Mid and High Cases proposed by Mr. Schlissel, increase the potential cost of FGPP relative to the costs presented in Table 1?

A. Not necessarily. First, as discussed earlier, I believe the higher CO_2 costs proposed by Synapse are unreasonable for a number of reasons. But even if CO_2 costs did rise above those assumed in the High Environmental Cost Forecast reflected in Table 1, natural gas prices would likely rise as well, thereby offsetting some of the additional cost incurred by FGPP relative to a gas-fired generator. Depending on the relative stringency and the reaction of gas prices, FGPP may or may not remain the lower cost option for FPL's customers.

Q. So Mr. Schlissel's conclusion that the cost to FPL's customers "would rise significantly above $4.037 billion" under Synapse's Mid and High CO_2 Price Forecasts is unreasonable?

A. Yes, for a couple of reasons. First, Mr. Schlissel uses the highest cost in Table 1 as a basis for his comparison even though, as noted above, the combination of a High CO_2 cost and low fuel price differential is very unlikely. I would argue that the Shocked or High Differential costs would serve as the starting point for such a comparison. Second, the higher CO_2

costs assumed in the Synapse cases would drive up gas prices, offsetting some of the added cost to FGPP of the higher CO_2 cost.

As with the Synapse CO_2 forecasts themselves, Synapse does not appear to have done any analysis to support Mr. Schlissel's claim that costs would rise "significantly" and certainly not as compared to the $4.037 billion value.

In fact, Mr. Schlissel concedes in his recent deposition that while he understands that CO_2 regulations have the effect of increasing natural gas prices, no specific gas price forecast or price response was assumed in his studies. By not taking a position on this effect, he did not adequately consider the impacts to natural gas prices that would result from higher CO_2 prices.

Q. Does this conclude your testimony?

A. Yes.

BY MR. LITCHFIELD:

Q. Have you prepared a summary of your rebuttal testimony?

A. I have.

Q. Would you please offer that at this time?

A. Yes. My testimony centers on six main points. First, I believe it is reasonable and prudent to expect future controls of CO_2 emissions and reasonable to take plausible CO_2 allowance prices into account when planning future generation. The allowance prices used by FPL in their planning process meet the plausibility and prudence criteria.

The CO_2 allowance prices used by FPL were developed by my company, ICF International, based on ICF's modeling of proposed CO_2 regulatory programs. In contrast, there's no evidence that Mr. Schlissel has effectively or systematically modeled CO_2 prices using industry accepted modeling techniques.

Second, the development of reasonable CO_2 parameters requires a balanced accounting of both the negative impacts of CO_2 regulation on the economics of new coal power plants versus new gas plants, as well as offsetting factors. The offsetting factors largely mistreated by Mr. Schlissel include: (1) Higher natural gas prices; (2) lower coal prices; (3) the potential for

CO_2 emission allowance allocations to new coal power plants employing clean coal technology, such as ultra-supercritical PC; (4) low prices for SO_2, NO_X, and mercury allowances; and (5) increased diversification and reliability benefits from coal power plants.

Third, Mr. Schlissel uses analyses with significant methodological flaws, including studies claiming negative compliance costs and others ignoring the effect of CO_2 regulation on power plant operations. He selectively uses results excluding nine of eleven EAI S. 139 analysis scenarios and 13 of 14 MIT S. 139 analysis scenarios without explanation.

Fourth, I believe the CO_2 prices that Mr. Schlissel suggests be used to evaluate the economics of building FGPP, in his high case with $50 per ton prices in particular, are extreme and should be given very little weight. I say this because there are a variety of policy and technology options that reduce the cost of CO_2 allowances, including use of offsets, international allowance trading, and the deployment of new low-emitting technologies, including nuclear, coal with carbon capture and sequestration, and renewables.

Fifth, even if one assumes that allowance prices could potentially reach $50 a ton from a fundamentals perspective, I do not believe that the U.S.

could tolerate the impact of such an allowance price. Raising retail rates 50 percent in real terms would so depress electricity demand as to preclude allowance prices at these levels.

Sixth, neglecting to account for increasing gas prices caused by CO_2 regulation, combined with other errors and contradictions, leads Mr. Schlissel to an incorrect treatment of FP&L's analysis of the relative economics of new coal and gas power plants. Mr. Schlissel greatly understates the likelihood that new coal power plants will outperform new gas power plants. When I correct his review of FPL analysis, the number of cases in which the proposed coal plant outperforms an alternative gas plant increases from 1 in 8 to 2 out of 4.

Q. Does that conclude your summary?

A. It does.

MR. LITCHFIELD: Mr. Rose is available for cross-examination.

CHAIRMAN EDGAR: Thank you. Mr. Beck.

MR. BECK: Thank you, Madam Chairman.

CROSS-EXAMINATION

BY MR. BECK:

Q. Good afternoon, Mr. Rose.

A. Good afternoon.

Q. Would you turn to page 19 of your testimony, please.

A. Yes.

Q. On page 19, you describe certain scenarios which you developed that FP&L relied on for their forecasts; is that correct?

A. Yes.

Q. Could you tell me the date that you prepared those scenarios?

A. These scenarios were prepared approximately at the end of last year. We have subsequently completed our update, and I'm prepared to discuss that as well, but these particular scenarios were prepared as of the end of 2006.

Q. The first scenario that you list beginning on line 5 is the mild CO_2 representative of Senator Bingaman's policy.

A. Yes.

Q. Do you see that?

A. Yes, I see it.

Q. Would you briefly describe Senator Bingaman's policy as proposed in 2005 that it lists there? What is that?

A. Senator Bingaman has a proposed bill that requires emission reductions via a procedure by allowing

that the CO_2 intensity of the economy should decrease over time. So it's taking into account both economic growth, allowing that to sort of raise the level of CO_2 emissions, but also asking that the CO_2 per dollar go down.

He also has in there provisions related to economic hardship, as many of the bills do. One of the provisions there is related to what they call a safety valve, saying that there's a maximum price that we'll allow for CO_2. This is one of many provisions that's in place to prevent there being a catastrophic or extremely negative outcome for the economy associated with the CO_2.

So that is the main elements of Senator Bingaman's policy proposal as embodied in his proposed legislation.

Q. Why did you choose that as representative of a mild CO_2 forecast?

A. As the debate has developed over the last couple of years, there seems to be a recurrence of a particular set of proposals. It seems the debate is coalescing around three types of proposals. Senator Bingaman's is one of those three. It is the more mild, and generally because of the safety valve and the willingness to allow and accommodate economic growth

explicitly, tends to have a relatively low CO_2 price in terms of dollars per ton.

Q. The second scenario that you describe beginning on line 7 is the stringent CO_2 representative of Senators McCain and Lieberman's policy as introduced in 2006; is that correct?

A. Yes.

Q. Would you describe their bill?

A. In contrast to Senator Bingaman's proposal, which is explicitly trying to balance the rate of economic growth and the CO_2 intensity of the economy, the McCain-Lieberman bill has an explicit cap. It's a fixed amount of tons that's decreasing over time. There is no safety valve provision, although there is a recognition of hardship via the use of giving out the allowances to the people that are most adversely affected. But it has a cap that is not directly tied to economic growth.

Q. And your third scenario listed is a moderate CO_2, which is representative of a weighted price stream of both Bingaman and McCain-Lieberman and an analysis of Senator Carper's policy; is that correct?

A. Yes.

MR. BECK: Okay. I would like to hand you an exhibit, if I could. And it has to be marked for

identification.

CHAIRMAN EDGAR: Okay. And this will be 194. Mr. Beck, title as listed here, does that work?

MR. BECK: Yes.

CHAIRMAN EDGAR: "Redacted Excerpt from ICF Emission Markets Outlook."

(Exhibit 194 marked for identification.)

BY MR. BECK:

Q. Mr. Rose, do you have Exhibit 194 for identification in front of you?

A. Yes, I do.

Q. And do you recognize that?

A. Yes, I do.

Q. And is this an excerpt from the report that Florida Power & Light used in their scenarios for carbon emission costs?

A. Yes, it's a redacted portion, so there's some proprietary information there, confidential information.

Q. ICF developed what you call an expected case for air regulation, did it not?

A. Yes.

Q. Could you describe that for me, what that is?

A. The expected case was based on looking at several of the proposed legislation related to CO_2 control and giving weight to those proposals, and over

time increasing the weight that we give to the more stringent proposals, in recognition that there's likely to be increasing stringency in the program over time. So we start with giving more weight to the less stringent programs, more weight to the more stringent programs, and we also tend to have the -- eventually, we give some weight to the stringency being such that it allows the CO_2 program in the United States to come into line with international developments. And that would be close to, although not exactly the same as the McCain-Lieberman bill.

Q. And page 2 of the exhibit describes some of the things you just described, does it not, describes what your expected case is?

A. Yes.

Q. And page 3 is a redacted page which has the specifics of the expected case; is that correct?

A. Yes.

Q. And it has both the Bingaman and McCain bills listed in the chart that's blacked out there, does it not?

A. Yes, it does.

Q. And are those the mild and stringent cases that you described earlier?

A. Yes.

MR. BECK: Chairman, I have a confidential -- or an exhibit that FP&L has claimed confidentiality for that I would like to be marked as an exhibit. I'll leave it to FPL to tell me who to provide it to.

CHAIRMAN EDGAR: Mr. Litchfield?

MR. GUEST: We've all signed confidentiality agreements, and we've seen this document. We would like a copy to work with while we're here.

MR. LITCHFIELD: I believe that's true with respect to counsel for Earthjustice. I cannot recall at the moment whether the Krasowskis did or did not sign.

CHAIRMAN EDGAR: Did not.

MR. LITCHFIELD: Did not? And AIF did not. So with those two exceptions, I think everyone else is entitled to review.

CHAIRMAN EDGAR: Thank you. Ms. Brubaker, do we need to mark?

MS. BRUBAKER: Yes, let's go ahead and mark it, and then we'll address whether it gets moved into the record or not afterwards.

(Exhibit 195 marked for identification.)

CHAIRMAN EDGAR: Okay. So this is 195. Mr. Beck, a title, please.

BY MR. BECK:

Q. Mr. Rose, do you have Exhibit 195 for

identification in front of you?

A. Yes.

Q. And that's page 142 from the full report that you provided, is it not?

A. Yes.

Q. And is that the same as page 3 on Exhibit 194, except the page I just handed out has no redactions on it?

A. Yes.

Q. On Exhibit 195, the expected case is charted on the right side of the page, is it not, in the dark line?

A. Yes.

Q. And the Bingaman case, which is the mild scenario, that's one of the lines on the chart that has small circles lightly shaded; is that correct?

A. Yes.

Q. And the McCain one is on the chart, and it's got little squares lightly shaded; is that correct?

A. Yes.

Q. If we were to compare the expected case to the Bingaman, which is the mild case, could you state generally whether it's less than, the same, or greater than the mild case?

A. The expected case is generally above the mild

case.

Q. And compared to the McCain case, which is the stringent case, could you state generally whether it's lower than, the same as, or higher than the McCain case?

A. It's generally lower than.

Q. On the left side of the exhibit, there's certain probabilities listed there. Do you see them?

A. Yes.

Q. So you have probabilities listed for each of the scenarios that are listed on the chart on the right side; is that correct?

A. That's correct.

Q. Could you state generally how you determined those probabilities?

A. The procedure is expert judgment. It's based on the experience of our staff who are actually doing the analyses of the bills and taking into account both the domestic and international developments.

Q. And does this reflect your best judgment of what is to be expected, you know, is the consensus of your experts?

A. Yes.

Q. I think you mentioned earlier that you have prepared an update to this?

A. Yes. We recently completed an update of our

analysis for all the bills and were able to confirm that there is no change in our expected case that's warranted based on the revisions to the legislation that we've chosen here to base our analysis on nor in terms of our perception of the international market.

Q. How often do you prepare revisions to the expected case?

A. We do attempt to stay as current as possible. Having said that, this particular documents tends to come out annually. We have a fairly broad subscription base. But again, even within that period of time, we do try to keep as up to date as possible based on the most recent developments.

MR. BECK: Mr. Rose, thank you. That's all I have.

CHAIRMAN EDGAR: Mr. Guest, do you have questions, or Mr. Gross? Mr. Gross.

MR. GROSS: One moment, please.

CROSS-EXAMINATION

BY MR. GROSS:

Q. Good afternoon, Mr. Rose. My name is Michael Gross, and I represent the environmental entities, Sierra Club, NRDC, and other environmental entities.

Referring to pages 9 and 10 of your rebuttal testimony, please.

A. Yes.

Q. You discuss the recent MIT study on the future of coal; correct?

A. Yes.

Q. And did you read the entire MIT report before you drafted your rebuttal testimony in this proceeding?

A. Most of it, but I can't say for sure that I read all of it.

MR. GROSS: I would like to hand out some excerpts from the MIT study, "The Future of Coal."

(Exhibit 196 marked for identification.)

CHAIRMAN EDGAR: Okay. Mr. Gross, 196, and why don't you give me a title, please.

MR. GUEST: Well, this is excerpts of MIT study, "The Future of Coal."

CHAIRMAN EDGAR: Thank you.

BY MR. GROSS:

Q. Mr. Rose, please refer to page Roman numeral 11 or xi, and the third paragraph from the bottom.

Now, is it not the case that MIT analysts estimate that it would take about a $30 per ton CO_2 emission price to make CCS, carbon capture and sequestration, cost competitive with coal combustion and conversion systems without CCS with respect to new plant construction?

A. Yes, they do say that here on this page. But as I quoted elsewhere, they're also saying that there's significant uncertainty about that particular number, and therefore, they've concluded that the technology needs to be given a chance to develop.

Q. Refer to page 10, Roman numeral x, the previous page. Again referring to the third paragraph from the bottom, the last sentence, is it a fact that MIT analysts used a high price trajectory that starts at $25 per ton CO_2 in 2015 and increases at 4 percent per year real rate? Is that correct?

A. Yes. They did not prepare any basis for that assumption in the document, but they did employ that as one of the scenarios that they examined.

Q. And do you agree, subject to check, that this would lead to about a $45 per ton CO_2 price in 2030?

A. What was the number that you said, sir?

Q. This would lead to about a $45 per ton price in 2030.

A. Yes.

Q. Now, next I would like to refer you -- and I don't know if you have a copy of this or if we have an extra -- we don't have an extra copy. We've been giving out the copies. But this is David -- is there a copy of David Schlissel's corrected supplemental testimony that

you could -- I mean, I don't mind approaching the witness, if that's okay with everyone, to show him a chart.

CHAIRMAN EDGAR: I'm sorry. Why don't you show Mr. Litchfield first, if you would, and we'll go from there.

BY MR. GROSS:

Q. Mr. Rose, if you would just please look at Figure 2 on page 8, and this is of David A. Schlissel's corrected supplemental testimony dated April 17, 2007, and familiarize yourself with that, and I have a question to ask you about it.

A. I'm familiar with this.

Q. Now, isn't it fair to say that the mid range price for CO_2 from approximately 2011 to 2030 for FPL is pretty similar to the mid range CO_2 costs projected by Synapse, which is Mr. Schlissel's employer?

A. If you just could give me like, you know, 12 more inches.

There is some similarity there. In fact, the number that I believe that he uses is about $5 a ton, 5 or $6 a ton higher on a levelized average basis in the mid case compared to our expected case. And to get a sense of what that is, it's something on the order, on average, of 19 to 20 versus 14.

Q. And that pattern continues all the way up to 2030; correct?

A. Well, now that you took the exhibit away --

Q. Okay. I thought you had memorized it.

A. Yes, I think that's a fair characterization. We're pretty close on the mid and expected cases. Where we differ is primarily -- not to minimize the difference that we just discussed, but there's a huge difference in the high case.

Q. Now, Mr. Rose, I would like to refer you now to page -- once again to page 19 of your rebuttal testimony, lines 5 and 6. And here you refer to your mild CO_2 scenario as being representative of Senator Bingaman's policy, S.A. 868. And I believe you were already questioned about this; correct?

A. Yes.

Q. Do you know for a fact that Bingaman's proposal was never actually submitted as a bill in Congress?

A. No, I do not know that to be the case.

Q. Do you know one way or the other?

A. My recollection is it was, and that's how it received the number S.A. 868. In order to receive that number, my understanding is that you have to propose it.

The revised bill, the one that's in the

current Congress, may not have yet been submitted, although there's a -- you can read it and see what it says.

MR. GROSS: Excuse me just a moment. I've got it here. I'm sorry. I was looking in the supplemental as opposed to the initial testimony.

BY MR. GROSS:

Q. Also looking at page 19, lines 9 to 11 of your testimony, how did you produce a weighted price stream for your moderate CO_2 scenario?

A. As was discussed in the previous set of questions, we analyzed individual bills plus an international scenario. And by the way, those proposals have with them -- each one of those are forecasts of natural gas prices. We believe that you can't do one without the other, and so we have an expected case that's a probability weighting. So if you had two cases and each was 50-50, you would sort of get a number. We did it for several cases plus an international scenario. We probability weighted that, and so we have an expected value, which mathematically means you're probability weighting it, and we have that for both CO_2, and I think importantly, for gas as well. So we have views with respect to how the two move together, and that's how we did it.

Q. Do you know whether Senator Carper has resubmitted his 2006 bill in the current Congress?

A. This is my understanding of the current situation. Senator Feinstein has introduced a bill which starts "Senator Feinstein," and then I think says parenthetically or something to that effect, "for Mr. Carper." So they're sort of cosponsoring a bill that's pretty similar to what they had in the previous session.

And I believe in the last several days, Senator Carper has introduced his own legislation, such that there are actually two, if you will, Carper bills that are out there, and that one is extremely similar in terms of its caps. So that's how I can say even in spite of the fact that one of bills just came in in a couple days, we've been able to analyze the most recent key legislation.

Q. Are you aware that the 2007 Feinstein-Carper bill goes much farther than the 2006 bill, mandating additional reductions after 2015 and mandating 1 -- in fact, mandating 1 percent reductions from 2016 to 2019 and 1.5 percent reductions starting in 2020?

MR. LITCHFIELD: Object to the form. It assumes facts not in evidence.

MR. GROSS: In fact, this is on page -- this fact is in a schedule of bills and their substance in

David Schlissel's corrected direct testimony filed March 16, 2007, and this is on page 11. I hope so. Let's see.

THE WITNESS: I'm sorry. Is there a question pending?

CHAIRMAN EDGAR: Oh, I think there are a couple of them, actually.

MR. LITCHFIELD: I'm searching for the reference, Madam Chairman. I don't seem to see it, but I may be --

CHAIRMAN EDGAR: Mr. Gross, can you point us?

MR. GROSS: Well, what I'm looking at is Feinstein-Carper, S. 317, 2007, and it shows here that it mandates 1 percent per year reduction from 2016 through 2019 and a 1.5 percent per year reduction starting in 2020. And that was the question, if he was aware that that 2007 bill goes farther than the previous Carper bill.

CHAIRMAN EDGAR: Okay. Hold on.

MR. LITCHFIELD: And I'm sorry. What was the reference in Mr. Schlissel's testimony?

MR. GROSS: Page 11, and it's the Feinstein-Carper.

MR. LITCHFIELD: Okay. I see it. Thank you. Does the witness have that in front of him?

THE WITNESS: I do not have Mr. Schlissel's testimony in front of me.

(Document tendered to the witness.)

THE WITNESS: I see that testimony, and I have a couple of things to say about that. I do see that the CO_2 reductions are moderately more stringent than the previous version, that is, the previous version of Feinstein. And having completed the analysis of the updated, I found that the expected value didn't change.

But I did also specifically mention in my testimony the fact that -- mentioned the Feinstein bill, S. 317, specifically to point out that, no, it had not gone more stringent. In some sense, it had gone the opposite direction, because specifically here they're saying that a clean coal plant, including ones that have high thermal efficiency, could qualify for CO_2 allowances.

So that actually works the other way, and in fact could be very favorable to this particular power plant, since it has clearly already been designated by the government, that particular technology, by the Department of Energy, as a clean coal technology. The provision of those allowances for this particular plant would significantly offset the fact that there are somewhat tighter emission reduction requirements.

And as I indicated, in balance, taking into account all of the new developments in the bills, my expected value has not changed, in part because some of the other bills went the other direction, particularly the McCain-Lieberman, as we discussed last week, went from 15 to 30 percent on the offsets. So taking that all into account, both this bill and the aggregate of the bills I don't consider to have gone much farther in the sense of being more difficult for FGPP.

BY MR. GROSS:

Q. Refer to your Table 1 on page 22 of your testimony. And in column A, there are -- there's information based on the assumption of no CO_2 costs; is that correct? Do you see that?

A. Yes.

Q. Isn't it unreasonable at this point to expect that there will be no regulation of CO_2 emissions, and consequently, no CO_2 allowance prices at any time during the projected lifetime of the FGPP project?

A. I guess what I would say is that it's unlikely. And as you know from my testimony, we do expect that there will be CO_2 controls. So I would say it's unlikely.

I would sort of have to also say that, just like maybe this no CO_2 column is not that useful to the

Commission, the same thing with the low gas prices, the low and medium differential. We provided the company four gas prices for each of the scenarios, the no CO_2, the low, the mid, and the high, and the medium differential on the low were below even our lowest gas price. So I would agree that I would give little weight to the no CO_2 case, very little weight, but I would also give very little weight to the medium and low differential gas price scenarios, which are outside of our range.

MR. GROSS: Mr. Rose, I have no further questions. Thank you.

CHAIRMAN EDGAR: Mr. Krasowski, do you have questions?

MR. KRASOWSKI: Adhering to the no joke rule, I'll say no.

CHAIRMAN EDGAR: Thank you. Are there questions from staff?

MS. BRUBAKER: Staff has none.

COMMISSIONER CARTER: Commissioners? No.

Mr. Litchfield?

MR. LITCHFIELD: Very brief redirect.

REDIRECT EXAMINATION

BY MR. LITCHFIELD:

Q. Mr. Rose, Mr. Gross referred you to what has

been marked as Exhibit 196. Do you still have that in front of you? I believe that was the excerpt from the MIT study.

A. Yes, I do.

Q. And in particular, I think he referred you to on Roman numeral page 10 the first full paragraph immediately beneath what is in bold face font there. The paragraph begins, "To explore this prospect," and I think in particular, he referred you to a sentence toward the bottom of that paragraph that begins, "In characterizing the CO_2 emission price, we employ a, open quote, high, close quote, price trajectory that starts at $25 per ton." Do you see that?

A. I do.

Q. Is it your understanding this was a forecast developed by MIT or a scenario that they modeled or ran?

A. As I indicated to the Commission earlier in my response, there was absolutely no basis in the report. They just essentially picked the number as -- I don't know. They just call it high. There's no basis, there's no runs, there's no analysis underneath it.

And even -- in my testimony, I have reviewed the model that MIT uses. I'm a graduate, so I have nothing negative against the institution per se. But in review of that model, it's not what I would consider a

model that is sufficiently detailed for the type of work that we need to do here.

So even if they had used the model to try to do the projection, I would have serious concerns. I don't think it's detailed enough in terms of what would be accepted for serious analysis. But that problem aside, and that problem was mentioned in my testimony, there's no basis at all. They simply picked that number.

Q. All right. Mr. Gross also referred to you an exhibit included in Mr. Schlissel's supplemental direct testimony on page 6. And the figure is number 2 entitled "Comparison of FPL CO_2 Forecast to Synapse Forecast." Do you see that?

A. Yes.

Q. And I believe he asked you to compare the FPL medium trajectory to the Synapse medium trajectory. Do you recall that?

A. I do.

Q. What's your understanding as to how Synapse developed their mid case scenario?

A. They reviewed published studies, some of which were out of date, some of which, in my view, as I described in my testimony, use erroneous methodologies. They take them, and then they decide how to --

MR. GROSS: I have an objection that this is beyond the scope of cross.

MR. LITCHFIELD: Chairman Edgar, Mr. Gross I think squarely put that mid forecast back in issue when he asked Mr. Rose questions about it in asking him to compare it to FPL's.

CHAIRMAN EDGAR: Mr. Gross.

MR. GROSS: This doesn't go to the comparison.

MR. LITCHFIELD: I think the witness is entitled to suggest what deficiencies, if any, he might have with the point of reference that Mr. Gross is asking him to make.

CHAIRMAN EDGAR: I'm going to allow.

THE WITNESS: Let me --

BY MR. LITCHFIELD:

Q. Had you finished your answer? I'm sorry.

A. No, I haven't. Mr. Schlissel provided to us the numbers, the dollars per ton from each of those studies. And when I went and took a simple average of them, the actual number was actually lower than what he reported. So the difference between my forecast and his collapsed by almost -- something on the order of 25 to 35 percent of the way. So part of his being above is that he had no methodology for actually picking among the numbers he had. I just took a simple average, and

that compressed the difference.

The second thing, as I was saying, is that he has used out-of-date analyses from out-of-date bills. We discussed last week that the McCain-Lieberman bill that he had mentioned now has been transformed from 15 percent offsets to 30 percent offsets, which is a big factor in terms of lowering the stringency of the program and lowering the dollar per ton. When I take those out from his spreadsheet, his number on an average basis is only one or two dollars higher than mine.

So that comparison, not only were we moderately close to begin with, if he had just done a simple average of the numbers that he was using, it would have been even closer. And if he had sort of eliminated out-of-date studies, we would have been even closer. So the idea that when we're looking at the mid cases in terms of CO_2 -- unfortunately, he didn't provide gas prices. But when we just look at CO_2, the idea that the company's analysis is unreasonable or implausible or imprudent I think is inconsistent with the fact that a proper use of his own data would show that the company and his numbers are fairly close.

Q. Let me ask you this question, Mr. Rose. Do you have a copy of Exhibit 163 in front of you, or do you recall -- this is Figure 1 from Mr. Schlissel's

testimony exactly as per his testimony, except shown in color. Do you recall that exhibit?

A. Yes, I do.

Q. And do you -- you said you ran a simple average of the data points there other than the ones identified by blue and green that were outdated. Is that what --

MR. GROSS: I'm going to object. Leading question. This is redirect.

MR. LITCHFIELD: I can restate the question, Madam Chair.

CHAIRMAN EDGAR: Please.

MR. LITCHFIELD: The witness has given an answer, and I'm simply trying to clarify what he intended to say with respect to this graph, so let me ask it this way.

BY MR. LITCHFIELD:

Q. Could you explain the answer that you just gave in the context of Exhibit 163, specifically identifying for the Commission where the line representing the simple average would fall on this graph?

A. The line of the simple average, if you just take an average of his own numbers, would have been lower than where he shows. He goes 2010, 2020, 2030,

and he sort of connects those three dots. But if he had taken the actual average, the numbers would have been lower. And then as I indicated, if he had taken out the old McCain-Lieberman bill and the analyses from 2003, his numbers would have been lower and on average almost identical to the ones that the company is using.

Q. Would that line have been lower or higher than what appears on Mr. Schlissel's Figure 2 as representing FPL's mid case?

A. Lower. And so ironically, if I can use the word "ironically," the question was, you know, don't the numbers sort of look close. You know, adjusted, they're almost identical, which then -- the irony of it is, his conclusion is that the company is being unreasonable in using scenarios that are not sufficient or not appropriate, and then when we actually look at the numbers, they're very, very close. So that's part of the irony of it.

MR. LITCHFIELD: That's all I have.

CHAIRMAN EDGAR: Okay. Exhibits. We have 147.

MR. GROSS: Madam Chair, I apologize for interrupting your chain of thought, but I wanted to move into evidence the excerpt of this MIT study that was cited by Mr. Rose in his testimony.

CHAIRMAN EDGAR: This is what we marked as 196?

MR. GROSS: Yes.

CHAIRMAN EDGAR: Okay. We're going to get to that in just a second. So 147 will go into the record.

(Exhibit Number 147 admitted the record.)

CHAIRMAN EDGAR: Then we had 194 put forth by Mr. Beck. Any objections to 194? Seeing none, 194.

(Exhibit 194 admitted into the record.)

CHAIRMAN EDGAR: Ms. Brubaker, how do we handle the confidential?

MS. BRUBAKER: Well, I leave that to Mr. Beck. Do you need to introduce that into the record?

MR. BECK: Yes, please. I would like to move it in.

MS. BRUBAKER: Then we move it into the record, we provide the confidential copy to the court reporter, and I believe it will also be appropriate to go ahead and collect the red folders otherwise from the parties to make sure they're secure.

CHAIRMAN EDGAR: Okay. So we will enter 195, a confidential exhibit.

(Exhibit 195 admitted into the record.)

CHAIRMAN EDGAR: Did you have a question to that, Mr. Guest?

MR. GUEST: Well, it seems like we should have it until at least we get our proposed orders in.

CHAIRMAN EDGAR: I can't hear you.

MR. GUEST: Could we keep it until the proposed order goes in?

CHAIRMAN EDGAR: I'm sorry. I'm just not --

MR. GUEST: Keep the exhibit until the proposed order goes in.

CHAIRMAN EDGAR: Until the proposed order -- I'm sorry. I just didn't catch that.

MR. GUEST: I'm sorry. I was mumbling.

MS. BRUBAKER: That's inconsistent with our procedures.

MR. GUEST: Should I memorize it? I do have a good memory.

CHAIRMAN EDGAR: I suspect that you do, actually.

Ms. Helton, I am going to need you to refresh my memory on what our rules are regarding confidential documents.

MS. HELTON: I think perhaps maybe the best thing for Mr. Guest to do is to work out with Florida Power & Light, who I believe is the owner of the information, a way in which he can get a copy that he can keep during the pendency of the proceeding.

MR. LITCHFIELD: The information actually is owned by ICF. We would be happy to discuss that with ICF sometime offline and get back with Mr. Guest to see whether suitable arrangements could be made. But in the meantime, I think I would request that the procedures be followed.

CHAIRMAN EDGAR: And I think I have to go that way as well, Mr. Guest. Apologies if there's an inconvenience, but the rules are clear. Thank you, Ms. Helton.

So, Mr. Beck, we'll finish with these, and then I will ask you to collect, if that's all right. So with the understanding that 195 is confidential, it will be collected here in a few moments, and Mr. Guest and Mr. Litchfield will speak after the proceeding about if there is a way to accommodate Mr. Guest's need to have use of that information.

We will move then to 196. Mr. Gross, any objection?

MR. LITCHFIELD: Actually, I would just prefer that -- if we could defer this also till Monday morning to give us an opportunity to review the study. We might ask to have the entire document submitted, or we may not, if that would be acceptable.

MR. GROSS: We would have no objection to the

entire document.

CHAIRMAN EDGAR: Mr. Litchfield, do you want to go with that, or do you prefer to wait?

MR. LITCHFIELD: If we could take that up first thing Monday morning.

CHAIRMAN EDGAR: All right.

MR. LITCHFIELD: Thanks.

CHAIRMAN EDGAR: We'll have a couple of items, I'm sure, to take up Monday morning, and we will add this one to the list, Ms. Brubaker, if you'll help me remember that.

And then Ms. Brubaker pointed out that I had missed a couple of exhibits earlier when we were going through and trying to clean up, so let me get there.

Okay. 126 through 129, which were the exhibits originally submitted as part of Mr. Schlissel's direct testimony. Seeing no objection, we will go ahead and add 126, 127, 128, and 129 to the record.

(Exhibits 126 through 129 admitted the record.)

CHAIRMAN EDGAR: And I'm sorry, Mr. Rose. I didn't mean to make you necessarily keep sitting there. So, Mr. Beck, if you would be sure to get that red folder as well. Thank you, Mr. Rose. I hope you will make your plane.

THE WITNESS: Thank you very much.

CHAIRMAN EDGAR: Okay. I think we're about to call it a day. Any other matters that would be helpful for us to discuss before we do?

MR. KRASOWSKI: Madam Chair.

CHAIRMAN EDGAR: Mr. Litchfield. Excuse me. Yes, Mr. Krasowski.

MR. KRASOWSKI: If I could have a minute.

CHAIRMAN EDGAR: You may.

MR. KRASOWSKI: Thank you. Through the proceedings and introductions over the last few days, the environmental justice people have been identifying themselves as representing the intervenors and the environmental intervenors -- Earthjustice, I'm sorry, Earthjustice group.

And I would like to make the point that there are other intervenors here, and I think there should be some accommodation for them to distinguish themselves from other people. We are environmental intervenors, to the extent that's appropriate in this setting, as well as they are. Maybe they could be called the big environmental intervenors and we could be the little environmental intervenors. But to say they're the intervenors also leaves out the Office of Public Counsel and the distinguished representative from the AIF.

Earlier today there was a suggestion that this group had been telling the FPL people that they were feeding me questions. Now, there was a conversation where it was suggested that maybe I could ask something or the other, but I was sensitive to that and didn't want any association or at any point in time anybody from any of those groups to say that we were an appendage to them.

And since we have been accepted by the Commission and allowed to participate and recognized, we're very sensitive to the fact that we put a lot of time and effort and energy into representing our specific points and making our own questions and asking the questions. So I'm very sensitive to that and think we deserve an apology if that's actually what happened. If it was suggested to FP&L that they're writing our questions, and then they're over here trying to secretly get me to ask questions, it's just pretty sleazy.

Also, though, aside from those comments, I would ask that FP&L, if FP&L has any question about anything, witnesses or schedules or anything like that, that they come directly to us so there's no concern. We've been open with them in talking with them, their people. We've talked with everyone. We would like to keep that going, but not have any confusion about who

represents us and what we're agreeing with or not agreeing with.

So thank you for the minute and 20 seconds.

CHAIRMAN EDGAR: You're welcome. And I appreciate your comments very much, and they are on the record, and they are noted. And I'll also add that the Commission recognizes your independence and also the work that you've put in to be prepared and to be a very useful participant, and we appreciate it.

MR. KRASOWSKI: Thank you.

CHAIRMAN EDGAR: Okay. Any other matters? Ms. Brubaker, before we go, hang on just a minute.

MS. BRUBAKER: Just a suggestion to the parties. We're resuming Monday. I would ask that all parties look at the briefing schedule and the posthearing schedule as it was currently scheduled, and let's look at the time that is going to be available to us now. I am open to discussion or any questions about the briefing schedule, but I would ask that we all be prepared to address on Monday, anticipating that that will be the conclusion of the hearing, what the briefing schedule will be. And any other posthearing matters of that nature please be prepared to discuss on Monday.

MR. LITCHFIELD: Madam Chairman, I might even suggest that we could take it up now, but at a minimum,

I think I would suggest that in light of the schedule constraints, that parties, if they haven't already been working on the brief, they should be working on it this weekend, because I anticipate that we will need a fairly quick turn on the briefs.

MS. BRUBAKER: That's correct. And I would note that the court reporters have been making a Herculean effort to get the transcripts out daily. They are available. I have already started actually reviewing the transcripts myself. So everybody please be mindful, we are all on a short time. I know the parties are under the gun. The staff is also under the gun. The Commission will need sufficient time to review whatever recommendation staff puts forward, so everyone, let's all cooperate. And again, if you have any questions or need feedback from staff, we are happy to provide that.

MR. LITCHFIELD: One question, though, with respect to the brief that if we could resolve it today would be helpful, and that is the page limit, which I think in the Prehearing Order was established at 40 pages, which seems a little light under the circumstances, and we would respectfully request that that be augmented to 80 pages.

CHAIRMAN EDGAR: That would be doubled rather

than just augmented. Mr. Guest.

MR. GUEST: Well, it was once said that I wanted to write you a short letter, but I didn't have time. And I think that goes to briefs too, that it requires more energy to write succinctly, and it's more useful to write a short brief than a long brief for you guys and for us too. It requires more self-discipline, and I think it's a valuable exercise to put a case like this into 40 pages.

MR. LITCHFIELD: I'm sorry. Mr. Guest is suggesting that we hold it to 40?

CHAIRMAN EDGAR: Yes, he is.

MR. LITCHFIELD: Well, he's free to write 40. We're asking for the opportunity to take a little more. We've got more issues to address, obviously, as a company.

CHAIRMAN EDGAR: Ms. Brubaker.

MS. BRUBAKER: It's true that the page limit was not raised at the prehearing conference. I think the Commission does have the discretion to extend that at this time if they wish to do so.

For frame of reference, Taylor County, Docket 060635-EU, 80 pages was allowed, I believe. In that case, you also have to look that there were actually four applicants that were being looked at, but then

again, in this case, we're looking at two units versus one. So an accommodation would be perhaps 60 pages. Eighty pages does not offend my sensibilities. As always in these circumstances, I merely say that brevity is the soul of wit, and I would expect all parties to --

CHAIRMAN EDGAR: I would also note that extending the page limit does not mean that every inch of that page limit is required to be used. And I echo Mr. Guest's comments. We are in agreement on this, Mr. Guest, that brevity and concise writing is often the most effective and useful. So with that, I will grant that extension of the page limit, with the again unnecessary reiteration that that does not mean you have to use all of those 80 pages.

Okay. Should we talk about dates? I'm shuffling paper, because I know we had penciled in some potential, and I'm having a hard time putting my hands on it. Do you have those, Jennifer?

MS. BRUBAKER: I do.

CHAIRMAN EDGAR: Okay. Why don't you lay out a suggestion?

MS. BRUBAKER: This is what I would suggest. We're looking at concluding the hearing on next Monday, which is April 30th. My proposal would be to have briefs filed on May 7th, which would be that next

Monday. That would permit a full weekend for parties to complete work on their briefs. Nobody likes working on the weekends, but certainly staff expects to be doing plenty of that in the context of the case, and we're happy to share the pain on that point.

The agenda that's currently scheduled for the posthearing recommendation is June 5th. There are some statutory dates which we are aware of that would make that currently the most logical and available agenda for us to take up the posthearing recommendation. That would have staff filing the recommendation, posthearing recommendation on May 23rd. That is a Wednesday, I would note, because there is a Monday holiday following on the 28th.

I think that having the briefs filed on the 7th will probably afford staff sufficient time to file on the 23rd, but I would ask as an accommodation to have two extra days just in case it's needed for staff to file the recommendation on the 25th of May.

MR. LITCHFIELD: That's acceptable to FPL.

MR. GROSS: Madam Chair, I am going to be sort of out of commission for two days during this period between the two Mondays for some minor, very minor surgery, which I've postponed throughout this because of this proceeding. So I would ask that the briefs not be

due till May 9th so I could have the full benefit of that week.

MS. BRUBAKER: With all due consideration to Mr. Gross's concerns, I have some concerns about putting the briefs off that far.

CHAIRMAN EDGAR: I do as well, just realizing we don't have any flexibility on the back end, that I'm aware of anyway. So, Mr. Gross, I guess what I will do is -- we've laid out these dates as what we're looking at, which was the briefs due May 7th, the staff rec due May 25th. You know, let's see where we are on Monday. Okay?

MR. LITCHFIELD: Madam Chair, I would express appreciation on behalf of FPL and Mr. Rose for the accommodation to take him up today on the part of the Commission and the other parties. We very much appreciate it.

CHAIRMAN EDGAR: I'm glad it worked out, hopefully, for most people's travel schedule to the best that we can try to make it all work out.

Okay. Thank you all once again for your work and for your patience. We will see you Monday at 9:30. We are adjourned.

(Proceedings recessed at 5:34 p.m.)

(Transcript follows in sequence in Volume 11.)

CERTIFICATE OF REPORTER

STATE OF FLORIDA:

COUNTY OF LEON:

I, MARY ALLEN NEEL, Registered Professional Reporter, do hereby certify that the foregoing proceedings were taken before me at the time and place therein designated; that my shorthand notes were thereafter translated under my supervision; and the foregoing pages numbered 1385 through 1624 are a true and correct record of the aforesaid proceedings.

I FURTHER CERTIFY that I am not a relative, employee, attorney or counsel of any of the parties, nor relative or employee of such attorney or counsel, or financially interested in the foregoing action.

DATED THIS 27th day of April, 2007.

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