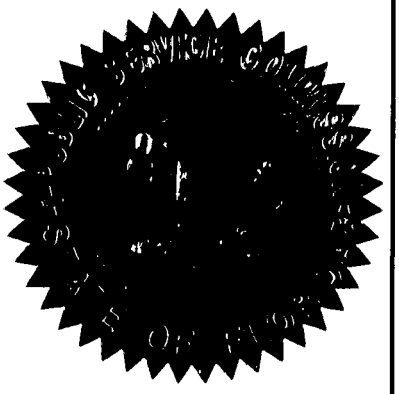
BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 070650-EI

In the Matter of:

PETITION TO DETERMINE NEED FOR TURKEY POINT NUCLEAR UNITS 6 AND 7 ELECTRICAL POWER PLANT, BY FLORIDA POWER & LIGHT COMPANY.

_____/



VOLUME 7

Pages 808 through 964

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PROCEEDINGS:	HEARING
BEFORE:	CHAIRMAN MATTHEW M. CARTER, II COMMISSIONER LISA POLAK EDGAR COMMISSIONER KATRINA J. McMURRIAN COMMISSIONER NANCY ARGENZIANO COMMISSIONER NATHAN A. SKOP
DATE:	Friday, February 1, 2008
TIME:	Commenced at 9:30 a.m.
PLACE:	Betty Easley Conference Center Room 148 4075 Esplanade Way Tallahassee, Florida
REPORTED BY:	LINDA BOLES, RPR, CRR Official FPSC Reporter (850) 413-6734
APPEARANCES:	(As heretofore noted.)

I N D E X

WITNESSES

EXHIBITS

NUMBER:		ID.	ADMTD.
66	KFK-1		837
67	KFK-2		837
68	KFK-3		837
69	KFK-4		837
70	KFK-5		837
71	KFK-6		837
72	KFK-7		837
73	KFK-8		837
74	KFK-9		837
75	HJS-1	846	846
76	SRS-1	868	
77	SRS-2	868	
78	SRS-3	868	
79	SRS-4	868	
80	SRS-5	868	
81	SRS-6	868	
82	SRS-7	868	
83	SRS-8	868	
84	SRS-9	868	
85	SRS-10	868	
86	SRS-11	868	
97	Excerpts from U.S./Emission and Fuel Markets Outlook 2006		839

EXHIBITS

NUMBER:		ID.	ADMTD.
99	Recalculated Appendix F		839
101	MIT Study	820	840
102	(Confidential) (Late-Filed) Complete ICF Study	824	840
103	(Late-Filed) ICF Update	838	840

P R O C E E D I N G S

(Transcript follows in sequence from Volume 6.)

CHAIRMAN CARTER: Good morning. We'll reconvene the hearing. When we last left we had -- Mr. Beck finished his cross on Mr. Kosky. And now we'll recognize Mr. Krasowski or is it Ms.? Ms. Krasowski, you're recognized.

MR. KRASOWSKI: Mrs. Krasowski.

CHAIRMAN CARTER: Ms. Krasowski.

MR. KRASOWSKI: Mrs.

CHAIRMAN CARTER: I've been saying Ms. all week. I'm so sorry. Mrs.

MR. KRASOWSKI: Well, that's okay. Either way.

MRS. KRASOWSKI: Or Ms. is fine.

MR. KRASOWSKI: Who knows what the future holds, especially after this.

(Laughter.)

CHAIRMAN CARTER: Jan, you're recognized.

MRS. KRASOWSKI: Thank you.

MR. ANDERSON: Chairman Carter.

CHAIRMAN CARTER: Yes, sir. Mr. Anderson, one moment.

MR. ANDERSON: Before we begin I wanted to indicate that there has been passed out to everyone Late-Filed Exhibit 99 in two versions. Some of our colleagues were very good and stayed up very, very late last night and prepared this in time

for the hearing this morning and I wanted people to have this.

CHAIRMAN CARTER: One second. Hold on. Hold your thought.

(Pause.)

Okay. Mr. Anderson, we're back on the record. And you were mentioning the fact that we had premarked as late-filed exhibits, if I can find my exhibit list here, I think we were in the 99 and 100, in that category.

MR. ANDERSON: Our records show this would be FPL Late-Filed Exhibit 99.

CHAIRMAN CARTER: This will be 99. Okay.

MR. ANDERSON: A good name might be CO2 Environmental Compliance. I'm sorry it was named yesterday.

CHAIRMAN CARTER: Yes. We got a name, we got a name for it. It's Recalculated Appendix F. Right, Mr. Beck? Wasn't that what you --

MR. BECK: Yes.

CHAIRMAN CARTER: Okay. Good deal. So this will be 99. Thank you so kindly, Mr. Anderson.

MR. ANDERSON: You're welcome.

CHAIRMAN CARTER: Appreciate it. Commissioner Skop, one moment. One second.

(Pause.)

Jan Krasowski, you're recognized.

MRS. KRASOWSKI: Thank you, Chairman Carter.

CROSS EXAMINATION

BY MRS. KRASOWSKI:

Q Good morning, Mr. Kosky. Nice to see you again.

A Good morning.

Q Am I correct in my understanding that the reason you didn't consider the greenhouse gas effect, the greenhouse gases from efficiencies is because you're, you're only reading generating technologies? This is a general question.

A In terms of my testimony, it really dealt with the avoided CO2 emissions of technologies, that's correct, as they operate and generate electricity.

Q Thank you. I would like to go to Page 11 of your testimony. If I may have a minute, please.

CHAIRMAN CARTER: You can take a minute.

MRS. KRASOWSKI: Excuse me. I have to get on Page 11 here.

CHAIRMAN CARTER: Page 11 is fine.

MRS. KRASOWSKI: Thank you.

BY MRS. KRASOWSKI:

Q Mr. Kosky, in Lines 2 through 6 you speak of the water use of the plant and where the water is going to come from. Can you, can you tell me where the water is going to come from and where -- are you allowed to take -- okay -- where the water is going to come from?

A Well, I cannot. But as testified to by Mr. Scroggs,

there's several alternatives being evaluated, of which -- and on Page 11 I allude to several.

Q Thank you. On Line 6 -- can you tell me what a UIC well is?

A UIC is an acronym for underground injection control well or otherwise called an injection well.

Q And will you need permits for those if you plan on using those for, for the cooling water?

A Yes. Actually, that would also -- that would be looked at in the site certification application process. In addition, this particular permit also has federal ramifications that has special public notice and review processes with it.

Q Thank you. In Lines 7 and 8 of the same page you say that "Turkey Point 6 and 7 will not have industrial water charges to surface waters or groundwater that can impact the environment."

Are you -- on what do you base this opinion?

A Well, the opinion is based on -- and, again, they haven't decided exactly all the engineering aspects of the control was -- on Lines 5 and 6 I allude to the cooling canal system. That's regulated by FDEP as an industrial wastewater facility. There's no discharges and UIC injection wells. UIC injection wells are used throughout South Florida to, to inject wastewaters. And, in fact, West County Energy Center is using those wells and it's been used on power plants.

Q Are, are the cooling canal systems already used to their maximum by the existing Turkey Point nuclear plants that are there at the site?

A I'm not sure I understood your question.

Q Are the cooling canal -- is the cooling canal system that is currently used by the current Turkey Point 3 and 4 nuclear generators used to its maximum already?

A From the standpoint of thermal cooling it would not be used for Turkey Point 6 and 7, so in that context it would not. However, possibly some other waters could be released to the cooling canal system. For example, on Turkey Point Unit 5 the cooling tower blowdown, as it were, using water is released to the cooling canal system. Those studies have not been done to date for Turkey Point 6 and 7.

Q Thank you. Mr. Kosky, are you familiar with the allowed levels of tritium emissions that are allowed to be emitted into the water and into the cooling canal system at Turkey Point?

A No, I am not.

Q In the same line, which is Page 11, Number 8, you state that "Nuclear steam generation does not produce air emissions." Can you elaborate?

A Well, during the generation of electrical power they do not emit air emissions. In fact, the FDEP issues federally enforceable air operating permits. Turkey Point Units 3 and 4

are covered by that permit. The DEP categorizes various different types of emissions, whether they be, let's say, major or unregulated. But in this case all the facilities at Turkey Point Units 3 and 4 are listed in that permit as insignificant activities, virtually no air emissions. There's -- essentially they are covered by that, that permit and there is no air emissions of, of any type that DEP would regulate or care to regulate.

Q Are you familiar with Mr. Stall's testimony given earlier in this hearing?

A I listened to some of Mr. Stall's testimony.

Q Thank you. On Page 23 -- oh, wait. I'm sorry. On Page 12, Line 23. Sorry. Are you familiar with the manmade, with the manmade gas uranium hexafluoride?

A I'm not familiar with that specific gas.

Q Thank you. On Page 1, Lines 8 through 11, have --

A I have that.

Q Does this include the dry casking storage of spent fuel waste?

A Well, the testimony here deals with life cycle, greenhouse gas emissions, and it would follow from the development of a resource to the final decommissioning, which would include any activities that are associated with storage of anything whether the power plant be nuclear or whether it be coal.

Q Does, does a coal plant have waste that lasts for 3,000 years and beyond?

MR. ANDERSON: FPL objects to this line of questioning. It's beyond the scope of Mr. Kosky's testimony.

CHAIRMAN CARTER: We'll sustain the objection.

MRS. KRASOWSKI: Okay. I'll move on.

BY MRS. KRASOWSKI:

Q All right. On your exhibit, on your Exhibit KFK-4, which is on the handout, does --

A I have it.

Q Okay. Thank you. Does this include the life cycle of -- does this include the nuclear fuel cycle?

A Well, what this exhibit really presents is the avoided CO2 emissions from nuclear. If nuclear, if the four nuclear units that Florida Power & Light operates were never constructed, that power would have to be supplied by something. This particular exhibit shows that if it was replaced by gas, oil or coal, these emissions would have occurred. Now in each case, whether nuclear, oil, gas or coal, it doesn't, it doesn't have the life cycle emissions, it has the actual emissions. But related to your question, if this were to add life cycle emissions to it, nuclear -- and the difference would be much greater for oil, coal and gas than it would be for nuclear.

MRS. KRASOWSKI: Thank you. That's the end of my questions.

CHAIRMAN CARTER: Thank you. Commissioners, I'm going to go to -- unless you've got some questions, I'm going to go to staff next.

Staff, you're recognized.

MS. KLANCKE: Thank you, Commissioner.

At this time as a predicate matter I'd like to move into the record staff's fourth request for production of documents number 20. We have asked the parties and there are no objections, and as such I would like to move this MIT report entitled "MIT Joint Program on the Science and Policy of Global Change" into the record.

CHAIRMAN CARTER: Has this, has this been premarked? So this will be Exhibit Number 100.

MS. KLANCKE: Yes, sir.

CHAIRMAN CARTER: Just one second here. Give everybody a chance to kind of get a copy and then we'll log it. This will be Exhibit -- no, actually it will be 101.

MS. KLANCKE: 101. That's correct.

CHAIRMAN CARTER: 101. No. FPL late-filed was 99. And, oh, the FPL updated pages from the new study would be 100. I'm sorry. Give us a second to get together.

From my tracking here, 98 was the updated ICF forecast, 99 was the recalculated Appendix F, 100, updated pages from the new study. You guys are listening; right?

MR. BECK: Right.

CHAIRMAN CARTER: So this would be 101. This is, 101 is a, this is a -- give me a title, staff.

MS. KLANCKE: The title of this document is "MIT Joint Program on the Science and Policy of Global Change."

CHAIRMAN CARTER: Just call it "MIT Study." Would that work for everybody?

MS. KLANCKE: You could just do POD 20, if it's easier.

CHAIRMAN CARTER: "MIT Study" works for me.

MS. KLANCKE: That's fine.

CHAIRMAN CARTER: Okay. Now you wanted to move this in? Are you going to --

MS. KLANCKE: We'll just have it identified as 101 at this time.

CHAIRMAN CARTER: Okay. Yeah. Let's identify it first and then see what happens from there. Okay?

(Exhibit 101 marked for identification.)

MS. KLANCKE: Excellent. Thank you.

CHAIRMAN CARTER: All right. You're recognized.

CROSS EXAMINATION

BY MS. KLANCKE:

Q Good morning, Mr. Kosky.

A Good morning.

Q Mr. Kosky, you have provided us with Exhibit 99 reflecting the updated Page 3 of 4 of Appendix F; is that

correct?

A Yes.

Q And this updated Page 3 of 4 of Appendix F, of Appendix F is based upon a 2000 report by ICF Consulting entitled "U.S. Emissions and Fuel Market Outlook 2007"; is that correct?

A Yes. It reflects an adjusted Appendix F, which was the label that we had.

MR. ANDERSON: For the clarity of the record, I think you said 2000 report. I think it's 2007.

MS. KLANCKE: 2007.

MR. ANDERSON: Very good. Thank you.

THE WITNESS: It's 2007.

BY MS. KLANCKE:

Q And this new adjusted ICF report forms the basis of this Page 3 of 4 of Appendix F?

A Yes. It's a recalculated page of 3 of 4. There's actually two components. One is the Appendix F, which was the basis for the environmental compliance cost. The adjusted Appendix F was requested by the Office of Public Counsel and calculated in a, in a similar manner.

Q With regard to the original Appendix F, this comprised FP&L's forecast of environmental compliance costs; is that correct?

A Yes. It was used as a forecast.

Q Has your testimony changed at this time such that Appendix F as filed currently is no longer your forecasted environmental compliance costs?

A No, it has not from my perspective. As you can see from the chart, the actual costs for the 2007 projection are higher and in some cases much higher depending upon the year for the different scenarios.

Q Given these fairly considerable higher adjustments, why are you not changing your testimony given this updated information that has been made available?

A Well, Appendix F, and I believe another FP&L witness will address the actual use of that within the overall determination of cost, I was not involved in that, evaluated the Appendix F relative to various scenarios.

My understanding of those scenarios are that these costs on appendix, original Appendix F produced certain outcomes of which nuclear generation at Turkey Point 6 and 7 were favorable.

If the adjusted Appendix F were used, the cost would even be higher and, in fact, higher than what I illustrated in my testimony. And that's my basis that I would not change Appendix F.

Q Do both the 2007 ICF report as well as the MIT study consider the effects of the 110th Congressional session?

A Yes, in part. The MIT is actually earlier than the

ICF report. The ICF report is more current. And as I testified yesterday, I had received it last Thursday, Friday.

Q Well, then what weight should this Commission attribute to this MIT study, given that it does not take into consideration the 110th Congressional session as the updated ICF report does?

A Well, the weight it should give is the fact that it did consider some bills that are more current than the 2006 projection of ICF.

The MIT study was used as an indicator, it wasn't used as the exact numbers because the analysis was different, that CO2 costs might be higher in the future.

That was used to encompass a range as shown on the exhibit Appendix F, ENV IV, increasing a previous ENV III by 30 percent based on the study.

Now based on the latest information from ICF, in fact, that particular judgment which was made months and months ago appears to be correct in looking at ICF's latest numbers. All the -- if you were to look at, at even what we characterize as ENV III on the adjusted, they're all higher than ENV IV. So that's the way I would use to judge the MIT study. It was used as a tool to reflect increasing CO2 costs, which ICF has confirmed in their latest analysis.

Q Since you therefore relied on the 2006 ICF report to prepare your testimony and pursuant to your deposition and that

report has now been updated by this new 2007 ICF report, is your testimony or the testimony of the other FPL witnesses reflective of the best information available, currently available for the purposes of making a decision regarding the cost-effectiveness of these proposed units in your opinion?

A In my opinion, it wouldn't be the latest information. It would be, in my opinion, the analysis that was done conservative and conservatively low in terms of CO2 costs. Any -- since it does increase, any increase, because nuclear generation is not emitting, would be added to the overall assessments made by Florida Power & Light and presented in the Need Study presented to the Commission.

Q Would you please provide to this Commission a late-filed exhibit, I believe Number 102, containing the entire 2007 ICF Consulting report entitled "U.S. Emissions and Fuel Market Outlook 2007"?

A That report is confidential and would have to be addressed by FPL.

CHAIRMAN CARTER: Mr. Anderson, you're recognized.

MR. ANDERSON: FPL will be pleased to provide that on a confidential basis, and we have copies here for staff.

CHAIRMAN CARTER: We'll mark that as Exhibit 102.

(Exhibit 102 marked for identification.)

MR. ANDERSON: The other thing is yesterday Mr. Beck marked and it was offered into evidence certain excerpts from

that report, and he asked if we could have copies of those made. So we have copies of all of those in red folders should there be a desire for that also, just whenever people would like that.

MS. KLANCKE: Excellent.

MR. BECK: Mr. Chairman, I don't know if this simplifies it or makes it more difficult, but if the whole study is going to come in, then that could replace Exhibit 100, which is an excerpt from the study, at your pleasure. Number 100 is only certain select pages from the study. Staff has asked for the whole study, so it seems to me you could have one, replace 100 with the entire study, if you wish.

MR. ANDERSON: And FPL has no objection to that.

CHAIRMAN CARTER: We'll replace -- you want the entire study in?

MS. KLANCKE: Chairman, we would like the entire study to be reflected as an exhibit. That being said, I believe that we can include -- we can keep the exhibit list as it is right now and just mark it 102 and leave the excerpted pages as 101.

CHAIRMAN CARTER: You maintain the confidential nature of the document; correct?

MR. ANDERSON: As long as in each case it's maintained as confidential, and that's what I'm hearing, there's no problem with that.

CHAIRMAN CARTER: Mr. Beck, you're comfortable with that?

MR. BECK: Either way is fine with me.

CHAIRMAN CARTER: Commissioners? Well, it's -- let's try it again so we're --

MR. BUTLER: Chairman Carter?

CHAIRMAN CARTER: Yes, sir, Mr. Butler.

MR. BUTLER: I think what Mr. Beck was suggesting, we certainly are fine with it, we're fine the other way too, but we wouldn't have to do any renumbering. He would simply withdraw the earlier exhibit and we would have 102 is what would be admitted into the record, and that would be the entire study. That's probably the cleanest way to do it. It avoids having an additional confidential exhibit.

CHAIRMAN CARTER: I was just getting, just getting friendly with 99.

COMMISSIONER SKOP: Mr. Chair.

CHAIRMAN CARTER: Yes, sir, Commissioner Skop.

COMMISSIONER SKOP: Thank you, Chairman Carter. Again, I was the same way in the same comfort -- again, this is a technical point of clarification. It seemed, and I think the testimony and, again, Mr. Beck, perhaps you can chime in, but the revised study data seems to increase the environmental compliance costs over the 2006 study, which would tend to support building nuclear, I would think. I'm a little confused

by staff's questioning and I'm trying to flesh out what we're trying to see from the data and that's where I'm a little lost. And I just wanted to -- you know, I'm trying to bring clarity to that because I'm losing it. I think I see what it is. I think the 2007 data projects higher environmental compliance costs on a forward-going basis. I think that's also reflected in the revised Exhibit F. But if that's the point that's trying to be made, can somebody just come out and say it plainly like that?

MS. FLEMING: Commissioners, if I may make a point of clarification with respect to the exhibits.

CHAIRMAN CARTER: Clarity would be most appreciated.

MS. FLEMING: I believe what Mr. Beck was stating is that Exhibit Number 100; is that correct?

MR. BECK: Yes.

MS. FLEMING: Could be replaced by 102. What I would suggest is we keep the exhibits identified as they are and at the end of Mr. Kosky's testimony when we move in the exhibits into the record, we not move in Exhibit Number 100. Instead, we move in Exhibit 102.

CHAIRMAN CARTER: Once again, Ms. Fleming, your clarity is impeccable.

MS. FLEMING: I'm glad I could help.

CHAIRMAN CARTER: What we're doing is that now Exhibit 102, which would be the "Complete ICF Study," is that

correct? Is that the title we're using?

MR. ANDERSON: Yes, sir.

CHAIRMAN CARTER: We're all on the same page? Okay. So we've got that marked, and we'll deal with exhibits as we normally do at the end of the testimony of the witness.

MS. KLANCKE: Mr. Chairman?

CHAIRMAN CARTER: Yes, ma'am.

MS. KLANCKE: At this point I do have a few more remaining questions for the witness.

CHAIRMAN CARTER: Okay.

MR. KRASOWSKI: Mr. Chairman, may I ask a question before she proceeds?

CHAIRMAN CARTER: Wait a minute. Before I recognize you for your question, what is the nature of your question?

MR. KRASOWSKI: The nature of my question is about the exhibits.

CHAIRMAN CARTER: This -- I'm not sure because I don't know if you -- this is what I was asking staff and the parties before because I don't think you're party to the confidentiality agreement and I think we're dealing with some documents that are confidential. So that's why I was reticent about recognizing you. So I'm --

MR. KRASOWSKI: It wouldn't be a question regarding the content of the exhibits, just --

CHAIRMAN CARTER: I would rather be clear for the

record and not even go there because it's, this is judicial proceedings.

MR. KRASOWSKI: Yes.

CHAIRMAN CARTER: This is a judicial proceeding. It's also administrative and regulatory. And if there's an appeal or anything like that, I want to make sure that we have the record protected and perfected. So at this point in time I will not recognize you for your question. We may take a break and I'll talk to you, but I don't want to recognize you at this point for this question in this context. Okay? It would be inappropriate.

MR. KRASOWSKI: Sure.

CHAIRMAN CARTER: Okay. Staff, you're recognized.

BY MS. KLANCKE:

Q Mr. Kosky, let me turn your attention back to your updated Appendix F.

Is it correct that your Appendix F shows that as CO2 allowance prices increase, the allowance price for the other listed pollutants within the original Appendix F including SO2, NOx and mercury would decrease; is that correct?

A Yes. In the projections there's an interaction between the pollutants that ICF projects.

Q Does the 2007 ICF report reflect any substantive changes to the other pollutants, including SO2, NOx and mercury forecasts as compared with the 2006 ICF report?

A I haven't studied that in detail, just having the document less than a week. I did look at those pollutants and, in fact, they're very similar trends. There is interaction between CO2 and the other pollutants. I don't think there's any major changes in the allowance costs in my review of some of the costs and the comparisons I was making as compared to the original Appendix F that included those pollutants.

Q Will your -- as a point of clarification, your updated Appendix F includes Page 3 of 4 of the original Appendix F pertaining solely to CO2 environmental compliance costs; is that correct?

MR. ANDERSON: If we might just object as to form. The late-filed Exhibit 99 has been characterized as updated FPL Appendix F. To be very clear, it is not. We stand by our Appendix F attached to the Need Study. What this is is we were asked as a late-filed exhibit to provide the specific information by OPC and we did that. So this should be considered in the nature of supplemental information in the record just in terms of attributions. Okay?

CHAIRMAN CARTER: I think you're correct. And this was asked for from Mr. Beck and that's the way it was prepared, and I like it because I actually understand it. So, but so let's let the record reflect the accurate title for the document.

MS. KLANCKE: I'll rephrase.

CHAIRMAN CARTER: You're recognized.

BY MS. KLANCKE:

Q The supplemental figures reflected in Exhibit 99 pertain solely to environmental compliance costs associated with CO2 compliance; is that correct?

A That's correct.

Q Would you please provide this Commission with a late-filed exhibit reflecting the supplemental information as it pertains to all of the emissions in the original Appendix F, including sulfuric dioxide, NOx and mercury on Pages, in particular, 1, 2 and 4 of the original Appendix F?

CHAIRMAN CARTER: Mr. Anderson.

MR. ANDERSON: My suggestion would be, if you don't mind, if we could take that request offline. We have to consult with the people who would have to do that work and work with you and see what, what work can be done, whatever. If we can resolve it, we can report on the record. If we don't, we can talk about it further. Is that okay? Because that's quite a pile of work and it's a really a tail of the dog financial issue. Thank you.

CHAIRMAN CARTER: Why don't we do this, Mr. Anderson. We'll probably take a break at some time in the next millennium and maybe you can confer with your client at that point in time and then get back with staff. Would that be all right?

MR. ANDERSON: Yes, sir.

CHAIRMAN CARTER: Okay. You're recognized.

MS. KLANCKE: Chairman, this is all the questions that I have for this witness.

CHAIRMAN CARTER: Thank you so kindly.

Commissioners?

COMMISSIONER SKOP: I have some questions.

CHAIRMAN CARTER: Commissioner Skop.

COMMISSIONER SKOP: Thank you, Chairman Carter. And, again, I apologize. It is relatively early again this morning, so I'm trying to follow along diligently.

And I think from what I understand is that yesterday we were provided Appendix F and Mr. Beck had some questions with respect to a revised 2007 study. I think the chain of events was that FPL ran the numbers overnight and the revised number showed a higher compliance cost on a forward-going basis for CO2 compliances; is that correct?

MR. ANDERSON: Commissioner Skop, that's right. The expected CO2 compliance costs according to this later ICF report are higher. Yes.

COMMISSIONER SKOP: Okay. And then my question for staff is I think staff may be suggesting that the other emission components may be -- while CO2 compliance costs may be going up under the revised study, that the other emissions may be going down as to negate or balance out or remain constant. Is that what we're trying to flesh out here? Because I'm,

literally I'm confused.

MS. KLANCKE: That is correct, Commissioner.

COMMISSIONER SKOP: All right. Thank you.

CHAIRMAN CARTER: Okay. I think we got clarity there. Commissioners?

Okay. Mr. Butler, is it Mr. Butler or Mr. Anderson on redirect? Mr. Anderson.

REDIRECT EXAMINATION

BY MR. ANDERSON:

Q Mr. Kosky, you were asked some questions by staff about FPL's continued reliance upon the environmental compliance costs in Appendix F. Do you recall those questions?

A Yes.

Q Is FPL relying on a precise set of projections or a range of projections?

A It's relying on a range of projections.

Q Would you explain to the Commission the thinking behind use of a range of projections for things like CO2 costs?

A Well, the reason for the use of a range especially for CO2 is the fact that no legislation has been passed. There have been several bills and in a new ICF report I believe there's seven that are analyzed, and they may change through Congress. It's unlike the Acid Rain Program which started in 1990 where we actually have legislation for sulfur dioxide, nitrogen dioxides where there are knowns. Where there are

unknowns it's more appropriate to use a range. And, in fact, ICF in its report does not indicate or do one particular scenario. It does many scenarios for use by the electric utilities to evaluate. And in this case because there's no legislation CO2 as a range is entirely appropriate.

Q When you look at the updated values in the Appendix F version provided for OPC, what do you conclude in terms of the reasonableness of the range that FPL has presented and relied upon in its economic studies?

A Well, the range is entirely reasonable because it looks at both a low CO2 cost as well as a high cost. It'll likely be somewhere between those. And evaluating what the environmental costs would be because of the uncertainty, looking at that range would certainly be reasonable.

Q Staff also asked some questions about the possible effect if one were to look at the figures for the, for other emissions, sulfur dioxide and things like that. You had some testimony in your direct testimony about those. Could you just give the Commission an idea of kind of order of magnitude of the environmental compliance costs between CO2 and the others when we think about the nuclear plant?

A I did present some illustrative costs using the original Appendix F for all the pollutants. The order of magnitude is two or three times more, 100,000 times more for CO2. In terms of overall compliance costs, CO2 would be in the

billions of dollars; whereas, sulfur dioxide, nitrogen dioxide, mercury is in the, you know, millions, tens of millions, maybe a hundred million dollars. It's that kind of difference. I haven't done any calculation on 2007, but that's the difference between the CO2 effect and the other pollutants.

Q And, finally, if you think about the overall CO2 cost benefits down the road associated with existing nuclear or new nuclear, if the future were to hold higher CO2 costs like those in the adjusted Appendix F prepared at the request of Office of Public Counsel, which way does that favor things?

A It would certainly favor nuclear generation in terms of costs because the costs are projected to be higher.

Q And one last question. Did you have a chance to look at the SO2, NOx and mercury costs in the new 2007 ICF report?

A Yes. As I testified to the staff, I did some preliminary comparisons and they look comparable. There were decreases, there were interactions between the pollutants. I didn't see anything that was that different that would suggest that those pollutants would in the overall, in compliance costs particularly comparing them with nuclear would have really much of an effect. But I haven't done, you know, a detailed study of those particular projects.

Q Any substantial change?

A I don't believe so in my review of it.

MR. ANDERSON: Okay. FPL has no further questions

for the witness.

MS. BRUBAKER: Mr. Chairman, I'm sorry. May I?

CHAIRMAN CARTER: Staff.

MS. BRUBAKER: With apologies. With regard to the Exhibit 99 that was apparently provided this morning, staff has been reviewing, and, again, our apologies, we're trying to adapt and move as quickly as we possibly can. But with the Commission's indulgence and FPL's we would like to take a moment to confer. We may have an additional question or two.

CHAIRMAN CARTER: That's my favorite exhibit. Okay. Let's do this -- and in the meantime, Mr. Anderson, before we deal with the exhibits, you may have an opportunity to visit with your client about the request from staff. So I'm looking at 10:16. Let's be back at 10:21. That will be -- that's five minutes, isn't it?

MR. ANDERSON: Yes, sir.

CHAIRMAN CARTER: Okay. Let's do it. Five minutes.

(Recess taken.)

Okay. It's 10:22. I gave you an extra 60 seconds. Let's do this, let's kind of bring this in for a landing on the exhibits. And then I think we've got, we may have a couple of questions from the bench. But let's deal with the exhibits first. Well, I guess the last exhibit we'll wait to hear from Mr. Anderson on. I know he's checking with the client. But let's deal with the other exhibits first.

Let's deal with -- I think with Mr. Kosky it's Exhibits 66 through --

MR. ANDERSON: 74, Chair.

CHAIRMAN CARTER: -- 74. You're recognized to make your motion on the exhibits.

MR. ANDERSON: Thank you very much. FPL moves into evidence Exhibits 66 to 74.

CHAIRMAN CARTER: Okay. With no objection, show it done.

(Exhibits 66, 67, 68, 69, 70, 71, 72, 73 and 74 admitted into the record.)

Okay. You may proceed further.

MR. ANDERSON: I also have a report that -- as requested, we consulted with FPL's businesspeople who would prepare the requested staff late-filed exhibit. They can do that. They say it'll take several business days though. So the suggestion is if we were to give it a number, give it a name, stipulate it into the record, and we would provide that as quickly as we can.

CHAIRMAN CARTER: And according to my notes, staff, correct me if I'm wrong, is that we're -- it's Exhibit 102 and we call it the "Complete ICF Study." Is that, is that what we're using as a title?

MS. KLANCKE: I believe that this is Exhibit 103.

CHAIRMAN CARTER: Oh, 103.

MS. KLANCKE: Oh, no, it's 102. Forgive me.

CHAIRMAN CARTER: Okay. It's been that kind of day. Mr. Butler.

MR. BUTLER: Yes. 102 is the complete 2007 ICF study. But I thought what we were talking about here is, in fact, 103, which is this additional update to Appendix F that we would be preparing and providing as a late-filed exhibit.

CHAIRMAN CARTER: Okay. Let's --

MS. KLANCKE: That's correct, Commissioner. Sorry. We're lawyers. We don't deal with numbers. That's okay. 103 is the new late-filed exhibit.

CHAIRMAN CARTER: 103, late-filed exhibit. Give us a name.

MR. ANDERSON: How about staff requested ICF update.

CHAIRMAN CARTER: Too slow -- that's too long. Give me a short name. Give me something short I can hold on to.

MS. KLANCKE: "ICF Update."

CHAIRMAN CARTER: "ICF Update." I like it. Does that work for you, Mr. Anderson?

MR. ANDERSON: That's fine. Of course, sir.

CHAIRMAN CARTER: "ICF Update."

(Late-Filed Exhibit 103 identified for the record.)

Now Mr. -- are you complete? Let's go to Mr. Beck.

MR. BECK: Yes. I would move in Exhibit 97 and 99.

CHAIRMAN CARTER: Okay. Any objections,

Mr. Anderson?

MR. ANDERSON: No.

CHAIRMAN CARTER: Staff? Okay.

MS. KLANCKE: No objections.

CHAIRMAN CARTER: No objections. Show it done. Exhibits 97 and 99.

(Exhibits 97 and 99 admitted into the record.)

Mr. Beck.

MR. BECK: Right. I will not move in Exhibit 98.

CHAIRMAN CARTER: Say again?

MR. BECK: I will not move in Exhibit 98 and will not move in Exhibit 100, contingent on Number 102 coming into evidence.

CHAIRMAN CARTER: Okay. Thank you, Mr. Beck.

Staff, we're just dealing with the exhibits for now. We need a playbook on these exhibits.

MS. KLANCKE: We'd like to, staff would like to move in Exhibit Number 101.

MR. ANDERSON: No objection.

CHAIRMAN CARTER: What about 102 and 103?

MS. BRUBAKER: The other two are late-filed, Chairman, and I'm --

CHAIRMAN CARTER: Okay. Let's deal with 101 first.

MS. BRUBAKER: I think procedurally --

CHAIRMAN CARTER: Okay. All right. We'll deal with

101 first. No objections? Any objections? Okay. 101 entered without objection. Show it done.

(Exhibit 101 admitted into the record.)

Now we'll deal with the late-fileds 102 and 103. Staff, you're recognized.

MS. KLANCKE: Are we dealing with the -- we're fine with the late-filed exhibits?

CHAIRMAN CARTER: Absolutely, unless we have an objection. I think that both Mr. Anderson and Mr. Butler said it was fine and Mr. Beck was okay with that.

MS. KLANCKE: Excellent. Well, with that, staff does have a few additional questions for the witness.

CHAIRMAN CARTER: One moment. Hold on. Hold on. First things first. Hold on. Back up the train. Hold up. Hold up. Let's don't leave the station before we get our tickets.

MS. KLANCKE: Forgive me.

CHAIRMAN CARTER: Now let's deal with -- we're dealing with the exhibits now. Let's clear the deck first.

Exhibit 102, 103, no objection from the parties, the late-filed exhibits, but we'll show those moved into -- 102 and 103.

(Exhibits 102 and 103 admitted into the record.)

Now before I recognize staff I want to recognize Commissioner Skop.

COMMISSIONER SKOP: Thank you, Chairman Carter. And, again, I'm trying to follow along and I just want to make sure I have it straight in my head not only for myself but hopefully for the benefit of my colleagues. Because, again, I was trying to follow along and I think I've got it now and I think Mr. Anderson, FPL provided the revised graph and the data and I think that was helpful for me to understand what was going on, and staff had some questions.

But in summation, I think what happened is there was the question raised about the revised 2007 ICF data for CO2 compliance, and I think that that data showed as plotted that costs under the latest study for CO2 compliance are supposed to go up and that would increase environmental costs for CO2 compliance. And I think that on redirect the witness also spoke to the fact that all things being equal, that the other -- what am I trying to think here -- the other emissions would remain relatively constant based on 2006 data. I think that's what I heard. So all things being equal, based on staff's questioning, Mr. Anderson's redirect, the witness testimony and Mr. Beck's concerns, all things being equal, it seems like if the other emissions are constant and CO2 compliance costs are expected to go up, that would be one factor weighing in favor of nuclear. Am I correct on that? Staff?

MR. ANDERSON: Yes, sir.

COMMISSIONER SKOP: Thank you.

CHAIRMAN CARTER: All right. Commissioners, any other questions before I go back to staff?

MR. BUTLER: Chairman.

CHAIRMAN CARTER: Oh, wait. Commissioner McMurrian, you're recognized.

COMMISSIONER McMURRIAN: I apologize for this but I wanted to make sure, in some of the cross earlier I think, Mr. Kosky, you stated that in order of magnitude that the CO2 costs would be much higher than the SO2 and the, and the NOx. Is that -- am I stating that correctly as far as the order of magnitude with respect to the potential, I guess, for CO2 costs compared to SO2 and NOx?

THE WITNESS: Yes. In my original testimony using Appendix F CO2 costs were much higher, and with the 2007, my review of it, it didn't look like that was going to change and, as I testified, several orders of magnitude different.

COMMISSIONER McMURRIAN: Okay. And what I wanted to follow up on that was with respect to the original Appendix F that we were looking at, they were all on the first three charts, which I believe were SO2 and NOx and then CO2, the numbers were all reported in nominal dollars per ton. And the dollars in the SO2 and the NOx charts, those numbers were, they looked higher. What -- how do I -- how are those numbers -- how are the CO2 costs much larger in magnitude? Is it a, is it

because of the amount of tons that would be involved with a CO2 compliance regime, that that would make those CO2 costs that much higher, but when you just look at the charts, the numbers look lower on the CO2 cost chart compared to the other two?

THE WITNESS: That's absolutely correct.

COMMISSIONER McMURRIAN: Okay.

THE WITNESS: Other pollutants are in the hundreds to thousands of tons maybe. CO2 difference is millions of tons.

COMMISSIONER McMURRIAN: Thank you.

THE WITNESS: And that's the difference.

COMMISSIONER McMURRIAN: That helps a lot. Thank you. Thank you, Chairman.

CHAIRMAN CARTER: Thank you.

Commissioners, any further? Staff, you're recognized.

MR. BUTLER: Sorry, Chairman Carter.

CHAIRMAN CARTER: Oh, Mr. Butler. One moment.

MR. BUTLER: I've been trying to find the right moment to slip this in, but we just need to make an oral notice of intent to request confidential classification for Exhibit 102. That was one that hadn't been identified and, therefore, I hadn't covered it yesterday afternoon when we had that point arise. We will be filing a request for confidential classification with respect to that.

CHAIRMAN CARTER: I think in view of the fact when we

went down this road we knew it was going to be a confidential document, so that will just be, that will be granted. So there won't be any slip ups, no one will say they're not on notice. We knew this when we started going down this road and the company voluntarily would provide this information without a whole bunch of mishmash. So the confidential nature of this will be granted so we're all on the same page. All right.

MR. BUTLER: Thank you. Thank you.

CHAIRMAN CARTER: Staff, you're recognized.

MS. KLANCKE: Thank you, Chairman.

RECROSS EXAMINATION

BY MS. KLANCKE:

Q Mr. Kosky, is it correct that the MIT study that I asked you about before was the basis, formed the basis for ENVIRO IV?

A It's correct that that study was used as a basis to make a decision for ENV IV, and that decision was to increase the cost of ENV III by 30 percent reviewing the projections that MIT had made.

Q So just to be on the same page, ENVIRO IV then is merely a 30 percent increase from ENVIRO III; is that correct?

A That's correct.

Q Does the 2000 ICF report incorporate all or most of the congressional proposals that were contained within the MIT study -- 2007 rather?

A As I testified, the MI -- there's different times. The MIT study had a few of the studies that ICF had. ICF, I believe, had several additional legislation proposals that had been sorted out since the time that MIT had done its study. So MIT, MIT included some and ICF is the latest, including all the, all the latest proposals.

Q Well, could you explain then the relevance or the weight that staff should give to the current ENVIRO IV reflected in Exhibit 99, the updated ENVIRO IV, as it were?

A The adjusted Appendix F ENVIRO IV was calculated in the same manner as the original Appendix F, and the corresponding, although different in analysis, are similar.

I can say in reviewing the ICF report that ENV IV as far as its costs are actually enveloped by a case or maybe more cases that ICF reviewed and evaluated. So ENV IV in the adjusted calculation is not higher than anything that ICF had projected in its evaluations of all of the legislation.

MS. KLANCKE: Thank you. Chairman, staff has no further questions for this witness.

CHAIRMAN CARTER: Mr. Anderson, any re-redirect?

MR. ANDERSON: No, sir.

CHAIRMAN CARTER: I was following along. And we've already taken care of the exhibits, so I guess we're done with this witness. Okay. Thank you, Mr. Kosky.

THE WITNESS: Thank you, Chairman.

CHAIRMAN CARTER: Have yourself a great day.

Call your next witness.

MR. ANDERSON: The next witness on the list is Hector Sanchez, who I believe has been stipulated by the parties. He has been excused as a witness. FPL would move the admission of Mr. Sanchez's testimony into the record as though read.

CHAIRMAN CARTER: Any objections? Without objection, show it done.

MR. BUTLER: Also, Mr. Sanchez had what was identified as Exhibit 75, his exhibit HJS-1, and we would move that into the record.

CHAIRMAN CARTER: Any objection? Without objection, show it done.

(Exhibit 75 marked for identification and admitted into the record.)

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

FLORIDA POWER & LIGHT COMPANY

DIRECT TESTIMONY OF HECTOR J. SANCHEZ

DOCKET NO. 07____-EI

OCTOBER 16, 2007

Q. Please state your name and business address.

A. My name is Hector J. Sanchez. My business address is Florida Power & Light Company, 4200 West Flagler Street, Miami, FL 33134.

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

A. I am employed by Florida Power & Light Company (FPL) as the Director of Transmission Services and Planning.

Q. Please describe your duties and responsibilities in that position.

A. I am responsible for matters relating to the provision of transmission services on the FPL system and for planning the expansion of the FPL transmission system to meet the requirements of FPL's retail and wholesale customers, and its transmission service obligations.

Q. Please describe your educational background and professional experience.

A. In December 1985, I received a Bachelor of Science degree in Electrical Engineering from the University of Miami. In 1990, I completed the Southeastern Electric Exchange's Course in Modern Power Systems Analysis held at Auburn University. In 1991, I received a Master of Business

Administration degree from Florida International University. Additionally, I have completed various other power system courses offered by Power Technology Incorporated, courses offered internally at FPL, and business and management courses at Columbia University.

Since joining FPL in 1986, I have held positions of increasing responsibility. My first positions at FPL were as an Applications Engineer in the Power Systems Control group and as an Engineer in the Protection and Control department. In 1989, I joined the System Operations group in the area of operations planning where I was responsible for performing technical analyses associated with short-term planning and operation of the FPL system. In 1994, I became a Transmission Business Manager where I was responsible for issues associated with the provision of transmission service. Subsequent to that assignment, in March 2000, I held the position responsible for the planning of the bulk transmission system and interconnections. In January of 2006, I became responsible for the operation and dispatch of the FPL system on a real time basis. Lastly, in March of 2006 I assumed my current position as Director of Transmission Services and Planning.

Q. Are you sponsoring an exhibit in this case?

A. Yes. I am sponsoring Exhibit HJS-1, Summary of Required Facilities for Turkey Point Units 6 & 7 (Turkey Point 6 & 7), which is attached to my direct testimony.

Q. Are you sponsoring any sections in the Need Study document?

A. Yes. I am sponsoring the portions of Section V.A.4 addressing Transmission Facilities. In addition, I sponsor Appendix A of the Need Study.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to describe FPL's process for determining the transmission plan for the interconnection and integration of FPL's Turkey Point 6 & 7. The two nuclear units are expected to have in-service dates of 2018 and 2020, respectively, with each unit ranging in size from approximately 1,100 to 1,520 MW net output. I discuss the overall transmission evaluation process and the attendant results of preliminary studies performed by FPL to determine how to interconnect and integrate Turkey Point 6 & 7 into FPL's transmission system.

Q. Please summarize your testimony.

A. My testimony provides a description of the evaluation process used to develop the transmission-related requirements for the Turkey Point 6 & 7 generation expansion plan, considering factors associated with planning, construction, and operation of the electric system. The results of FPL's evaluation are that the transmission facilities and upgrades described in Exhibit HJS-1 present the necessary transmission interconnection and integration requirements for Turkey Point 6 & 7 within the range of generator sizes being contemplated. Based on FPL's preliminary assessment, the addition of Turkey Point 6 & 7 at approximately 1,200 MW gross output for each unit is not expected to adversely impact the transmission import capability into the state of Florida.

If the unit size increases, more detailed studies will be needed to determine the specific impacts and mitigation alternatives.

EVALUATION PROCESS FOR DETERMINING FPL'S TRANSMISSION SYSTEM REQUIREMENTS

Q. Please describe FPL's evaluation process for transmission interconnection and integration of new generation resources.

A. The process commences with an evaluation team, including engineers from transmission and substation planning, operations, engineering, project management, permitting, and siting who together use their combined knowledge and years of experience to perform the evaluation and develop a transmission interconnection and integration plan. The evaluation process considers many factors, as outlined below, in order to develop an effective transmission plan. In some instances, the determination of the transmission interconnection and integration plan is relatively straightforward; however, other times it requires an iterative assessment of various factors and a substantial amount of time to perform appropriate studies. The resultant plan must be in compliance with North American Electric Reliability Corporation (NERC) and Florida Reliability Coordinating Council (FRCC) Reliability Standards.

Generally, the first step in the process is to evaluate the proposed generating plant site location to determine its proximity to existing transmission facilities. To the extent there are existing transmission facilities nearby, those facilities are assessed to determine their capabilities for reliably interconnecting and integrating the proposed new generation into the transmission system as a firm FPL generation resource. Next, other factors such as those listed below are considered (as applicable):

- Amount of generation (MW) being added at the new generation site, and the dispatch profile of the new generation resource relative to FPL's other generation resources in serving FPL's load;
- Capabilities to upgrade existing facilities (e.g., can the conductor on an existing transmission line be upgraded on the existing structures or would the entire transmission line have to be rebuilt?);
- Capability of transmission lines needed, right-of-way requirements, existing right-of-way capabilities, siting of new right-of-way, permitting requirements, and expected time-frame to acquire right-of-way and necessary permits;
- Ability to transport power efficiently (e.g., would using higher voltages be more efficient by reducing the amounts of transmission losses incurred when moving large amounts of power over long distances?);
- Existing and new substation requirements, capabilities, and availability;
- Impact on existing facilities (e.g., does the proposed interconnection and integration plan result in an overload on an existing facility or does it

result in a material adverse impact somewhere else on the transmission system?);

- Constructability (e.g., can the necessary transmission facilities be constructed without having to take existing operating facilities out of service during periods that would result in an adverse reliability impact?);
- Overall compatibility with the system (e.g., do the new facilities require new material stocking requirements or the need for new tools to maintain?);
- Compliance with NERC and FRCC Reliability Standards;
- Operating considerations (e.g., what are the maintenance requirements of the proposed interconnection and integration facilities and how will they impact the on-going operation of the system?);
- The timing and amount of power needed for testing of equipment such as pumps and motors;
- Expected in-service testing and commercial operations dates for new generation (e.g., which transmission facilities necessary for interconnection and integration need to be in-service prior to the commercial operation in-service date for testing?);
- The need for procuring transmission service from a third party;
- Material adverse impact on third party transmission owner(s); and,
- Initial and recurring costs of facilities and operations.

The next step in the interconnection and integration evaluation process is to perform power flow studies for a proposed transmission interconnection and integration plan. These power flow studies are used to evaluate the performance of the system and to converge on specific new system facilities and upgrades that would be needed to interconnect and integrate the new generation into the transmission system.

When the evaluation team is satisfied that they have developed an effective transmission interconnection and integration plan that is in compliance with NERC and FRCC Reliability Standards for the new generation resources, the process is deemed complete. If this result is not achieved, the evaluation process proceeds iteratively, as needed, until this result is achieved.

I would also note that this evaluation process, including the power flow studies, is the same as that used in FPL's recent Need Determination proceedings.

Q. Please describe how FPL evaluated the transmission-related requirements associated with Turkey Point 6 & 7.

A. When evaluating a generation plan, FPL considers different categories of transmission requirements that arise from the proposed delivery of additional power over FPL's transmission system. These categories are:

1) Transmission interconnection;

2) Transmission integration; and

3) Third party transmission service (as applicable).

FPL's Transmission Services and Planning Department evaluated the three categories of transmission requirements for Turkey Point 6 & 7 under my direction.

Q. Please describe in more detail each of the three categories associated with the transmission requirements that you have identified.

A. The three categories can be summarized as follows:

1) Transmission interconnection requirements

Transmission interconnection requirements are generally the facilities necessary to connect the new generation to the system. These facilities typically include generator step-up transformers, connection facilities from the transformers to the switchyard, and certain substation equipment at the point of interconnection. Additionally, certain facilities may need to be replaced or upgraded as a result of the generator interconnection at locations beyond the point of interconnection, such as circuit breakers and overhead ground wires due to increased fault current from the generator. Finally, there is the potential that interconnecting a generator that is larger than the largest single generator in the region may require upgrades to the transmission system to accommodate the instantaneous loss of the larger generator. The instantaneous loss of any generator in Peninsular Florida results in a sudden in-rush of power into Florida from the eastern United States interconnection

reacting to make up for the deficiency in generation. The transmission system must be capable of sustaining the loss of the single largest generator without violating any NERC or FRCC Reliability Standards.

2) Transmission integration requirements

Transmission integration requirements include system upgrades of existing transmission facilities and new transmission facilities that the power flow studies have determined are necessary for the reliable operation and firm delivery of the new FPL generation resources to FPL's load.

As part of this assessment, any adverse impacts that result in NERC or FRCC Reliability Standard violations on third party transmission systems are identified. In such instances, FPL would confer with the parties to confirm that the violation is valid and, if so, determine if there is a mitigation measure already available, or jointly develop mitigation measures to address the violation.

3) Third party transmission service requirements (as applicable)

Third party transmission service requirements are considered when generation resources are connected to an external transmission provider's system(s). When a generation expansion plan, such as the plan that includes FPL's Turkey Point 6 & 7, does not contain generation connected to a third party transmission system, there is no need for transmission service for the delivery

of generation connected to a third party to the FPL system. As such, this category of transmission service requirements will not be discussed further in my testimony.

TRANSMISSION SYSTEM REQUIREMENTS FOR TURKEY POINT 6 & 7

Q. Please describe FPL's proposed Turkey Point 6 & 7 units for which transmission requirements are being evaluated.

A. As discussed in FPL witness Silva's testimony, Turkey Point 6 is proposed as an 1,100 to 1,520 MW net nuclear unit (1,200 to 1,650 MW gross electrical output) with a planned in-service date of 2018, and Turkey Point 7 is proposed as an 1,100 to 1,520 MW net nuclear unit (1,200 to 1,650 MW gross electrical output) with a planned in-service date of 2020.

TRANSMISSION INTERCONNECTION

Q. Please describe the transmission interconnection requirements for Turkey Point 6 & 7.

A. The required transmission interconnection facilities for Turkey Point 6 & 7 are summarized in Exhibit HJS-1, Summary of Required Facilities for Turkey Point 6 & 7. These facilities include:

- The connection of Turkey Point 6 & 7 Generator Step Up (GSU) transformers to a new 500 kV switchyard at the Turkey Point site, and attendant bus equipment; and,
- Circuit breaker and overhead ground wire upgrades that may be required.

Additionally, as discussed later in my testimony, there may be potential upgrades associated with increasing the size of the largest unit in the FRCC beyond approximately 1,200 MW gross output.

TRANSMISSION INTEGRATION

Q. Please describe the transmission integration evaluation for the new generation at Turkey Point 6 & 7.

A. The integration evaluation is comprised of power flow studies. The power flow studies are used to identify any upgrades to existing transmission facilities or new transmission facilities that may be needed to integrate Turkey Point 6 & 7 into the transmission system as firm FPL generation resources while meeting NERC and FRCC Reliability Standards. The methodology used to perform these power flow studies is the same as that used in connection with FPL's other recent need determination proceedings, and is consistent with the methods used to ensure compliance with the NERC and FRCC Reliability Standards. In addition, compliance with U.S. Nuclear Regulatory Commission (NRC) requirements must be ensured. I reviewed

and approved the results of the power flow studies and reviewed the need for new facilities and upgrades required to integrate Turkey Point 6 & 7 into the transmission system as firm FPL generation resources used to serve FPL's retail customers.

My review determined that to reliably integrate the new generation resources in compliance with NERC and FRCC Reliability Standards, and with NRC requirements, new system facilities and upgrades are required for Turkey Point 6 & 7 for either the 1,100 MW or 1,520 MW net units. Exhibit HJS-1 summarizes the new system facilities and facility upgrades required for the range of unit sizes being considered.

Q. Please describe the power flow studies performed.

A. First contingency alternating current (AC) power flow analyses were performed for Turkey Point 6 & 7 to assess the need for transmission system upgrades and new facilities. All analyses were performed using the latest available 2007 FRCC power flow databank cases, updated to reflect FPL's latest load and resource forecast. Since the FRCC only developed load flow cases through 2017, FPL's load in the 2017 case was scaled to the latest available load information through 2020.

Analyses were performed using power flow simulations to identify the facilities that may become overloaded because of the integration of the capacity provided by Turkey Point 6 & 7, as well as the upgrades and new

transmission facilities required to mitigate such overload(s). An AC solution technique was also used to assess the voltage performance of the system against NERC and FRCC Reliability Standards. In the analysis, Turkey Point 6 & 7 were subjected to a first contingency screening for loss of transmission elements or generators out of service, one at a time, in accordance with NERC and FRCC Reliability Standards. This resulted in approximately 3,600 power flow calculations being performed for each case assessed. All of the Peninsular Florida interconnected transmission system was analyzed to determine whether thermal or voltage reliability criteria violations for system elements at voltages of 69 kV and above occur as a result of the generation resource addition. NERC or FRCC Reliability Standard violations on any FPL or other Peninsular Florida system elements directly related to the generation resource addition could indicate the potential need for transmission reinforcements.

Q. What factors associated with Turkey Point 6 & 7 have a major impact on the results of the analysis?

A. The requirement to add major transmission facilities is the result of the need to deliver from 2,200 MW (from two 1,100 MW net units) to 3,040 MW (from two 1,520 MW net units) of new generation northward from the existing Turkey Point site in the southern most part of Miami-Dade County in order to serve FPL's load. This results in significant transmission facilities being required in the area from Turkey Point to central Miami-Dade County.

Q. Please provide a general description of the transmission upgrades and new transmission facilities required for Turkey Point 6 & 7.

A. Turkey Point 6 & 7 will be connected to a new switchyard at the site. The two units will be connected to the new switchyard at 500 kV. This new switchyard will be connected by two 500 kV transmission lines to the 500 kV section of the existing Levee substation in central Miami-Dade County, which is located approximately 42 miles north of the Turkey Point switchyard. A new 230 kV line, approximately 13 miles long, will also be required from the Levee substation to the Gratigny substation located north and east of the Levee substation in central Miami-Dade County. The new switchyard at Turkey Point will also have a 230 kV section. The new 500 and 230 kV sections will be connected via a 500/230 kV auto-transformer. The new 230 kV section will be connected to the Davis substation in southern Miami-Dade County utilizing an approximately 18 mile line which will be rerouted from the existing Turkey Point plant switchyard and rebuilt to larger capacity. Additionally, the 230 kV line rerouted from the existing Turkey Point plant switchyard will be replaced with a new 230 kV circuit from the switchyard to the Levee 230 kV substation. The aforementioned facilities are required for either the 1,100 MW net units or the 1,520 MW net units. Finally, depending upon the amount of generation output of Turkey Point 6 & 7, certain other 230 and 138 kV upgrades to existing facilities are required. A summary of the base and additional facilities is set forth below:

Base Facilities Required for Two 1,100 MW Net Units:

- The connection of Turkey Point 6 Generator Step Up (GSU) transformer to the new Turkey Point switchyard, and attendant bus equipment.
- The connection of Turkey Point # 7 GSU transformer to the new Turkey Point switchyard, and attendant bus equipment.
- The new Turkey Point 500/230 kV switchyard.
- The two 500 kV transmission lines from the new Turkey Point switchyard to Levee Substation.
- The 230 kV transmission line from the Levee Substation to the Gratigny Substation.
- Rebuild and rerouting of the existing Turkey Point-Davis #1 230 kV line to the new Turkey Point 230 kVswitchyard.
- Replace the line removed from the existing Turkey Point switchyard with a new line from the existing Turkey Point switchyard to Levee 230 kV line.
- Upgrade Killian-Turkey Point 230 kV line
- Upgrade Turkey Point-Galloway Tap 230 kV line
- Upgrade Davis-Montgomery 138 kV line
- Upgrade Dadeland Tap-Snapper Creek 138 kV line
- Two 5-Ohm Reactors installed on the 230 kV side of the autotransformers at Levee Substation

- Two 5-Ohm Reactors installed on the 230 kV side of the autotransformers at Andytown Substation
- Two 5-Ohm Reactors installed on the 230 kV buses at the existing Turkey Point 230 kV switchyard.

Additional Facilities Required for Two 1,520 MW Net Units:

- Upgrade Killian-Miller 230 kV line
- Upgrade Mitchell-Court 138 kV line
- Upgrade Kendall-Suniland 138 kV line
- Upgrade Marion-Village Green 138 kV line
- Upgrade Marion-Montgomery 138 kV line

These facilities for Turkey Point 6 & 7 are also summarized in Exhibit HJS-1.

Q. Are there other factors associated with Turkey Point 6 & 7 that have a potential to require additional transmission facilities or upgrades?

A. Yes. The size of the single largest generator in Peninsular Florida is a significant factor because the transmission system must be capable of sustaining the loss of that generator without violating any NERC or FRCC Reliability Standards. This requirement may have a direct impact on the import capability from the Southeast Electric Reliability Council (SERC).

Q. Will either Turkey Point 6 or 7 increase the size of the single largest unit in the FRCC when they enter service?

A. Yes. Prior to the addition of Turkey Point 6 or 7, Progress Energy Florida plans to uprate its Crystal River nuclear unit to 1,080 MW gross output, making it the largest sized unit expected to be in-service in the FRCC. Turkey Point 6 & 7 are each expected to be larger than 1,080 MW gross output under either unit size scenario.

Q. Because a unit size of greater than 1,080 MW gross output will be selected for Turkey Point 6 & 7, how will such a unit impact the FRCC's import capability from SERC?

A. The import capability into Peninsular Florida from SERC is in large part determined by the contingency of the instantaneous loss of the largest unit in the FRCC, and the attendant sudden in-rush of power from the eastern United States interconnection reacting to replace such lost power source until more generation is dispatched in the FRCC region (within thirty minutes). Currently, based upon preliminary assessments by FPL, the sudden outage of a unit size of approximately 1,200 MW gross output or less should not adversely impact the FRCC's import capability from SERC in this time frame. If the unit size increases, more detailed studies will be needed to determine the specific impacts and mitigation alternatives.

Q. What evaluation process and assessments must be performed to determine how the capability of the transmission system would be increased to accommodate a larger sized unit?

A. First, FPL would complete its preliminary assessments. Next FPL would request through the FRCC that an FRCC/SERC regional/inter-regional study be performed to review the preliminary assessment findings performed by FPL and to determine the requirements, if any, to the transmission systems within the FRCC and SERC to accommodate a larger sized unit. Such a study would be performed with members of the FRCC, SERC, and FPL. Initial communications with the FRCC are currently underway to prepare for the commencement of this study. It is expected that this study would take up to 24 months to complete. The 2018 and 2020 commercial operation dates for Turkey Point 6 & 7 should not be affected so long as the results indicate that any required transmission improvements within the FRCC and SERC regions to accommodate a larger sized unit will be effective and feasible within this time frame.

Subsequent to the completion of such a study, FPL would seek an affirmation by the FRCC that the interconnection and integration plan for Turkey Point 6 & 7 is adequate and results in no reliability issues. Additionally, FPL would seek a determination from the FRCC and SERC that the interconnection and integration plan for Turkey Point 6 & 7, as it relates to any impacts on the FRCC-SERC interface, is adequate and results in no reliability issues.

Q. Does this conclude your testimony?

A. Yes.

MR. ANDERSON: FPL would call as its next witness Dr. Steven R. Sim.

CHAIRMAN CARTER: Dr. Sim.

MR. ANDERSON: Good morning, Dr. Sim.

THE WITNESS: Good morning.

MR. ANDERSON: Have you been sworn as a witness yet?

THE WITNESS: I have not.

CHAIRMAN CARTER: Would you please stand and raise your right hand.

(Witness sworn.)

Please be seated.

THE WITNESS: Thank you.

STEVEN R. SIM

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

DIRECT EXAMINATION

BY MR. ANDERSON:

Q Dr. Sim, please tell us your name and your business address.

A My name is Steven Sim. I work at 9250 West Flagler Street, Miami, Florida.

Q By whom are you employed and in what capacity?

A Florida Power & Light as a Senior Manager in the Resource Assessment and Planning Business Unit.

Q Have you prepared and caused to be filed 72 pages of

prefiled direct testimony in this proceeding?

A Yes.

Q Did you also cause to be filed an errata sheet?

A That's correct.

Q Do you have any further changes or revisions to your prefiled direct testimony other than the errata sheet?

A Yes. I have two corrections. On Page 28, Line 15, the word "cumulative" should be changed to "annual." And on Page 36, Line --

CHAIRMAN CARTER: Hold on. Hold on. On Line 28 --

THE WITNESS: 28, Line 15.

CHAIRMAN CARTER: -- Line 15, the word "cumulative" --

THE WITNESS: The word "cumulative" should be changed to "annual."

CHAIRMAN CARTER: Okay.

THE WITNESS: And the other one is on Page 36, Line 9, the word "both" should be changed to "all three."

CHAIRMAN CARTER: Okay. Got it.

BY MR. ANDERSON:

Q Other than those you've just told us about, are there any other changes or revisions to your prefiled direct testimony?

A No, sir.

Q If I asked you the same questions, would your answers

be the same?

A Yes.

MR. ANDERSON: Chairman Carter, FPL requests the prefiled direct testimony as amended be inserted into the record as though read.

CHAIRMAN CARTER: The prefiled testimony will be inserted into the record as though read.

BY MR. ANDERSON:

Q Are you also sponsoring some exhibits?

A Yes.

Q These are documents SRS-1 through SRS-11?

A Yes.

MR. ANDERSON: Chairman Carter, we'd note that Dr. Sim's exhibits have been premarked for identification as 76 through 86 on staff's comprehensive list.

CHAIRMAN CARTER: Thank you.

(Exhibits 76, 77, 78, 79, 80, 81, 82, 83, 84, 85 and 86 marked for identification.)

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Florida Power & Light Company's Petition to Determine Need for Determine Need for Turkey Point Nuclear Units 6 and 7 Electrical Power Plant	Docket No: 070650-EI Filed: January 25, 2008

ERRATA SHEET

DIRECT TESTIMONY OF STEVEN R. SIM

PAGE #	LINE #	CORRECTION
1	11	Change "Supervisor" to "Senior Manager"
56	12	Change "$374/kw" to "$429/kw"
56	13	Change "$2,836/kw" to "$2,891/kw"
56	13	Change "Low" to "High"
56	15	Change "Low" to "High"
Exhibit SRS-9	Column 5	Remove dollar sign ($) for all values in this column

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

FLORIDA POWER & LIGHT COMPANY

DIRECT TESTIMONY OF STEVEN R. SIM

DOCKET NO. 07_____ - EI

OCTOBER 16, 2007

Q. Please state your name and business address.

A. My name is Steven R. Sim, and my business address is 9250 West Flagler Street, Miami, Florida 33174.

Q. By whom are you employed and what position do you hold?

A. I am employed by Florida Power & Light Company (FPL) as a Supervisor in the Resource Assessment & Planning Business Unit.

Q. Please describe your duties and responsibilities in that position.

A. I supervise a group that is responsible for determining the magnitude and timing of FPL's resource needs and then developing the integrated resource plan with which FPL will meet those needs.

Q. Please describe your education and professional experience.

A. I graduated from the University of Miami (Florida) with a Bachelor's degree in Mathematics in 1973. I subsequently earned a Master's degree in Mathematics from the University of Miami (Florida) in 1975 and a Doctorate in Environmental Science and Engineering from the University of California at Los Angeles (UCLA) in 1979.

While completing my degree program at UCLA, I was also employed full-time as a Research Associate at the Florida Solar Energy Center during 1977 - 1979. My responsibilities at the Florida Solar Energy Center included an evaluation of Florida consumers' experiences with solar water heaters and an analysis of potential renewable resources including photovoltaics, biomass, and wind power applicable in the Southeastern United States.

In 1979 I joined FPL. From 1979 until 1991, I worked in various departments including Marketing, Energy Management Research, and Load Management, where my responsibilities concerned the development, monitoring, and cost-effectiveness of demand side management (DSM) programs. In 1991, I joined my current department, then named the System Planning Department, as a Supervisor whose responsibilities included the cost-effectiveness analyses of a variety of individual supply and DSM options. In 1993, I assumed my present position.

Q. Are you sponsoring any exhibits in this case?

Yes. I am sponsoring the following Exhibits SRS-1 through SRS-11, which are attached to my direct testimony:

Exhibit SRS-1	Projection of FPL's 2007 - 2020 Capacity Needs
Exhibit SRS-2	Projected Incremental FPL DSM: 2006 – 2020
Exhibit SRS-3	Projection of FPL's 2007 – 2020 Capacity Needs: with Turkey Point 6 & 7
Exhibit SRS-4	The Three Resource Plans Utilized in the Analyses

Exhibit SRS-5	Economic Analysis Results for One Fuel and Environmental Compliance Cost Scenario
Exhibit SRS-6	Economic Analysis Results: Total Costs and Total Cost Differentials for All Fuel and Environmental Compliance Cost Scenarios
Exhibit SRS-7	Economic Analysis Results: Matrix of Total Cost Differentials for All Fuel and Environmental Compliance Cost Scenarios
Exhibit SRS-8	Economic Analysis Results: Breakeven Cost for Nuclear Capital Costs for All Fuel and Environmental Compliance Cost Scenarios
Exhibit SRS-9	Economic Analysis Results: Projection of Approximate Bill Impacts with Turkey Point 6 & 7: 2009 - 2021
Exhibit SRS-10	Non-Economic Analysis Results: FPL System Fuel Mix Projections by Plan
Exhibit SRS-11	Non-Economic Analysis Results: FPL System CO_2 Emission Projections by Plan.

Q. Are you sponsoring any sections in the Need Study document?

A. Yes. I am co-sponsoring Sections II, III, V, VII, and IX of the Need Study document. I also sponsor Appendices B and G, and co-sponsor Appendices C and H.

Q. What is the scope of your testimony?

A. My testimony addresses ten main points:

(1) I briefly discuss FPL's integrated resource planning (IRP) process and note that the application of the IRP process in 2006/2007 focused in large part on promoting fuel diversity in FPL's system.

(2) I identify FPL's additional resource needs for 2007 - 2020, with particular emphasis on the 2018 through 2020 time period, and explain how these needs were determined.

(3) I discuss why demand side management (DSM) cannot reasonably be expected to eliminate these resource needs.

(4) I present an overview of the analysis approach used to evaluate the addition of the two new nuclear units, Turkey Point 6 & 7, to FPL's system versus the most likely non-nuclear competing technologies, natural gas-fired combined cycle (CC) units or coal-fired integrated gasification combined cycle (IGCC) units, from both an economic and non-economic perspective. The economic analysis was designed to identify the breakeven capital costs for these new nuclear units versus the competing technologies. The non-economic analysis provides projections of FPL's system fuel mix and system carbon dioxide (CO_2) emissions.

(5) I discuss three resource plans: one plan assuming nuclear units are added in 2018 and 2020, a second plan assuming CC units are added in 2018 and 2020, and a third plan assuming IGCC units are added in 2018 and 2020.

(6) I discuss FPL's use of various fuel cost forecasts and environmental compliance cost forecasts that were combined into 9 fuel cost and environmental compliance cost scenarios that were used in the analyses of the three resource plans.

(7) I present the results of FPL's economic analyses of the three resource plans that identify what the breakeven nuclear capital costs are projected to be for each of these scenarios. A projection of approximate customer bill impacts from the addition of the two new nuclear units is also provided.

(8) I present the results of the non-economic analysis of the three resource plans that includes projections of system fuel mix by fuel type and system CO_2 emissions.

(9) I discuss the adverse consequences in regard to economics, system fuel diversity, and CO_2 emission impacts that would occur if a Need Determination for the two new Turkey Point nuclear units is not approved.

(10) I present the conclusions I draw from the above referenced analyses.

Q. What is your primary conclusion?

A. Based on the analyses that have been performed, the two new Turkey Point nuclear units in 2018 and 2020 are currently projected to be the economically competitive choice for addressing FPL's future capacity needs in the 2018 through 2020 time period. In addition, these two new nuclear units are also projected to be the best choices for both promoting fuel diversity and lowering FPL's CO_2 system emissions beginning in 2018. The increase in the annual

amount of nuclear energy produced from Turkey Point 6 & 7 is equivalent in 2021 to the annual total electrical usage of approximately 1,075,000 residential customers. For these reasons, it makes sense to continue to pursue the option of additional capacity and energy from new nuclear generating units at Turkey Point in 2018 and 2020.

Q. Please summarize your testimony.

A. FPL's 2006/2007 resource planning work determined that FPL has future resource needs starting in 2012 and growing through 2020 to a total of 6,156 MW of incremental capacity (power plant construction and/or new purchases) or 5,130 MW at the generator of additional cost-effective DSM. All DSM that is known to be cost-effective through 2014, plus an assumption that currently projected annual implementation levels of cost-effective DSM will be continued for 2015-2020, have already been reflected in FPL's 2006/2007 resource planning work. This amount of known and projected cost-effective DSM through 2020 is 1,899 MW. In order to fully meet FPL's resource needs of 5,130 MW through 2020 with DSM, one would have to assume the availability of approximately three times this amount of 1,899 MW of cost-effective DSM that FPL already projects in its resource planning projections.

Consequently, FPL cannot meet its resource needs through 2020 solely with DSM. Therefore, in order to meet FPL's summer reserve margin criterion of 20% through 2020, FPL needs new capacity (power plant construction and/or purchase). This large capacity need provides significant opportunities for a

wide variety of options – renewable energy options, new fossil units, additional DSM and other energy efficiency options (such as building standards and appliance standards), plus new nuclear generating capacity – to play a role in FPL's resource plans.

FPL also determined that a key objective during this resource planning cycle was to select capacity options that would promote FPL's system fuel diversity. FPL projects that the earliest practical deployment schedule for new nuclear units would bring these units in-service no earlier than 2018 and 2020 if it acts now. Therefore, FPL is seeking an affirmative determination of need that will enable it to pursue the option of two nuclear units at its existing Turkey Point site, one in 2018 and one in 2020.

FPL developed three resource plans for analyzing these nuclear unit additions. These three resource plans include: a Plan with Nuclear that included the two new nuclear units described above, an alternate Plan without Nuclear – CC that added CC units in 2018 and 2020, and another alternate Plan without Nuclear – IGCC that added IGCC units in 2018 and 2020. The use of these resource plans allows the evaluation of the economic and non-economic impacts of adding the new nuclear units. FPL's analyses compared the Plan with Nuclear to these two alternate Plans without Nuclear under 9 scenarios of forecasted fuel costs and environmental compliance costs.

Because of the uncertainty in capital costs for new nuclear units, the economic analysis consisted of two steps. In the first step the cumulative present value of revenue requirements (CPVRR) for the three resource plans was calculated for each of the 9 scenarios. The Plan with Nuclear that included Turkey Point 6 & 7 assumed zero capital costs for the two new nuclear units. In the second step, the CPVRR cost differential between the resource plans for each scenario was divided by the CPVRR cost equivalent of $1/kW of new nuclear capital cost. The resulting value is a "breakeven" cost in terms of $/kW of nuclear capital cost for a given scenario; i.e., what the capital cost for the two new nuclear units can be and have identical total CPVRR costs for the resource plans.

The economic analyses resulted in a wide range of breakeven capital costs for new nuclear units. This wide range of $3,206/kW to $7,281/kW in 2007$ versus the Plan without Nuclear – CC, and $5,921/kW to $9,450/kW in 2007$ versus the Plan without Nuclear – IGCC, are generally higher than FPL's current cost estimate range for new nuclear units of $3,108/kW to $4,540/kW in 2007$. Therefore, it is reasonable to expect that new nuclear units at Turkey Point can be constructed at a cost that would, at worst, break even with the total system cost of non-nuclear units that might otherwise be constructed, and that there is a very good chance that the new nuclear units would result in lower total system costs. Customer bill impacts from the addition of Turkey Point 6 & 7 will depend upon a number of factors

including, but not limited to, the capital cost of the new nuclear units, fuel costs, and environmental costs. Using a capital cost assumption for the new nuclear units of $3,800/kW in 2007$, approximately the mid-point of FPL's projected capital cost range, a customer bill impact for one of the 9 scenarios ranging from approximately $0.43 to $5.80 per 1,000 kWh is projected for the 2009 – 2020 time period. The projected bill impact is -$0.36 per 1,000 kWh, a reduction, for 2021, the first year in which both of the new nuclear units are in-service for a full year.

The non-economic analysis showed that the Plan with Nuclear has a significant advantage in regard to system fuel diversity compared to the Plan without Nuclear - CC, and similar fuel diversity impacts compared to the Plan without Nuclear - IGCC. The increased nuclear energy generation from Turkey Point 6 & 7 would serve the total electricity needs of about 1,075,000 residential customers in 2021. The Plan with Nuclear also has a significant advantage in regard to FPL system CO_2 emissions compared to both of the two alternate plans.

I. FPL'S INTEGRATED RESOURCE PLANNING PROCESS

Q. What are the objectives of FPL's integrated resource planning process?

A. The fundamental approach used in FPL's IRP process was developed in the early 1990s and has been used and refined since that time to accomplish three

primary objectives: 1) determine the timing of when new resources are needed to maintain the reliability of the FPL system; 2) determine the magnitude (MW) of the needed resources; and 3) determine the type of resources that should be added. The analysis required to accomplish the first two objectives – determining the timing and magnitude of needed resources – is often referred to as the reliability assessment portion of FPL's IRP process and these analyses are relatively straightforward.

The analyses required to accomplish the third objective – determining the type of resources that should be added – is more complex and involves the consideration of both economic and what I'll refer to as non-economic perspectives. From an economic perspective, the type of resources that should be added is primarily based on a determination of the resources that result in the lowest system average electric rates for FPL's customers. It should be noted that when only power plants or power purchases are the resources in question, the determination can be made on the basis of lowest total costs (cumulative present value of revenue requirements, CPVRR). The lowest total cost perspective (CPVRR) in these cases is the same as the lowest average electric rate perspective, because the number of kilowatt-hours over which the costs are distributed does not change, as would be the case when DSM resources are being examined.

However, the decision of what type of resources to add is also influenced by considerations such as whether a resource can be brought into service on FPL's system in time to meet a projected capacity need and whether a given resource or resource plan is best suited to address system concerns that may have been identified in the resource planning process. While these system concerns usually have an economic component or impact, they are often discussed in quantitative, but non-economic terms, such as percentages, etc. rather than in terms of dollars.

Q. What are these system concerns and how are they addressed in FPL's IRP process?

A. One of the system concerns is that of promoting (i.e., maintaining and/or enhancing) system fuel diversity. FPL's IRP work in 2006/2007 has directly addressed this concern. Accordingly, in addition to this proposal for the addition of two new nuclear units to address FPL's capacity needs in 2018 and 2020, FPL has separately proposed capacity uprates to its four existing nuclear units. Promoting system fuel diversity will continue to be an issue that FPL's resource planning work addresses in coming years. The issue of fuel diversity is further discussed in FPL witnesses Yupp's and Silva's testimonies.

Another system concern is maintaining a regional balance between load and generating capacity, particularly in Southeastern Florida. This concern has been satisfactorily addressed for the near-term with the addition of Turkey

Point 5, West County Energy Center (WCEC) 1, and WCEC 2 generating units, all in Southeastern Florida.

A third system concern, that of moving in the direction of lowering utility system CO_2 emissions over the long-term, has been prompted by growing interest in reducing greenhouse gas emissions.

System concerns such as these are generally addressed in the IRP process in regard to meeting the third objective described above - determining the type of resources that should be added. The selection of resource options and resource plans for analyses is done with these system concerns in mind. Then, in conducting the analyses needed to determine which resource options and resource plans are best for FPL's system, both the economic and non-economic analyses are conducted with an eye to whether the system concern is positively or negatively impacted by a given resource option or resource plan.

Q. Did FPL utilize its IRP process in the analyses that led to FPL seeking approval of a determination of need for two new nuclear units in 2018 and 2020?

A. Yes. However, the process was modified for this analysis as will be discussed shortly. FPL utilized its IRP process to first determine the timing and magnitude of resource needs over a multi-year period. It was determined that FPL's first resource need was in 2012 and that this resource need increased

every year thereafter, including the 2018 through 2020 time period for which it is possible to address capacity needs with new nuclear units, and in all years after 2020. Second, FPL identified resource options and resource plans that could meet these 2018 and 2020 capacity needs. FPL then determined through economic analyses what the CPVRR costs were in 2007$ for these competing resource plans.

However, because it is not possible to accurately determine the capital costs of new nuclear units at this time, FPL's IRP process was modified to enable FPL to address this fact. The CPVRR total cost differences between the resource plans were used to determine what the capital costs for new nuclear units in 2018 and 2020 could be and have the CPVRR costs for the resource plans be equal. FPL refers to this as a "breakeven" capital cost analysis.

In addition, the impacts on FPL's system in regard to promoting system fuel diversity and of lowering system CO_2 emissions were determined for each of these resource plans.

Q. At the same time FPL has filed for approval of a Determination of Need for Turkey Point 6 & 7 in this docket, FPL has also recently filed for approval of a Determination of Need for capacity uprates for its four existing nuclear units. Do these two filings share common elements?

A. Yes. These two filings contain a number of common elements. The major common elements include: load forecast, fuel cost forecasts, environmental

compliance cost forecasts, purchase power projections, and DSM projections. In addition, the two filings have common financial and economic assumptions including escalation rates, cost of capital, allowance for funds used during construction (AFUDC) rates, etc.

The analyses that support both filings compare alternate resource plans. One resource plan is common to both filings although it is described by different names in the two filings. It is described as the Plan with Nuclear in this filing and is described as the Plan with Nuclear Uprates in the other filing. In both filings this resource plan contains the nuclear capacity uprates, the new Turkey Point 6 & 7 nuclear units, and the same non-nuclear unit additions.

Q. In its analyses, what in-service dates were assumed for the Turkey Point 6 & 7 units?

A. For purposes of its analyses, FPL assumed that the in-service dates for the two new nuclear units are June 2018 for Turkey Point 6 and June 2020 for Turkey Point 7, the earliest practical deployment schedule for the new nuclear units. However, given the long lead times inherent in these assumed dates, these dates could change.

II. FPL'S FUTURE RESOURCE NEEDS

Q. How did FPL decide it needed additional resources and what was the magnitude of the needed resources?

A. FPL uses two analytical approaches in its reliability assessment to determine the timing and magnitude of its future resource needs in order to continue to provide reliable electric service to its customers. The first approach is to make projections of reserve margins both for Summer and Winter peak hours for future years. A minimum reserve margin criterion of 20% is used to judge the projected reserve margins. The 20% reserve margin criterion is based on the reliability planning standard FPL currently believes is necessary to ensure reliable service, and which FPL committed to maintain and the Commission approved in Order No. PSC-99-2507-S-EU.

The second approach is a Loss-of-Load-Probability (LOLP) evaluation. Simply stated, LOLP is an index of how well a generating system may be able to meet its demand (i.e., a measure of how often load may exceed available resources). In contrast to the reserve margin approach, the LOLP approach looks at the daily peak demands for each year, while taking into consideration the probability of individual generators being out of service due to scheduled maintenance or forced outages. LOLP is typically expressed in units of "numbers of times per year" that the system demand could not be served. FPL's LOLP criterion is a maximum of 0.1 days per year. This LOLP criterion is generally accepted throughout the electric utility industry.

For a number of years, FPL's projected need for additional resources has been driven by the summer reserve margin criterion. This again was the case in

FPL's 2006/2007 reliability assessment work that was the basis for FPL's projected resource needs. Assuming that the proposed nuclear uprates are in-service in the targeted in-service years of 2011 and 2012, significant additional resources (MW) are needed for each year beginning in 2013 to meet the summer reserve margin criterion of 20%. (A relatively small 180 MW need also exists in 2012.)

The additional incremental MW needed by the Summer of 2013 is projected to be 493 MW if the resource is to be provided by a supply side option (i.e., power plant construction or purchase) or, due to the 20% reserve margin criterion, (493 MW/1.20 =) 411 MW if provided by a DSM-based reduction to the forecasted peak load. The similar incremental need values for the Summers of 2014 - 2020, respectively, are an additional 450 MW (supply) or 375 MW (DSM) for 2014, an additional 640 MW (supply) or 533 MW (DSM) for 2015, an additional 1,933 MW (supply) or 1,611 MW (DSM) for 2016, an additional 659 MW (supply) or 549 MW (DSM) for 2017, an additional 645 MW (supply) or 538 MW (DSM) for 2018, an additional 641 MW (supply) or 534 MW (DSM) for 2019, and an additional 696 MW (supply) or 580 MW (DSM) for 2020. Furthermore, the trend of annual increased resource needs of at least 600 MW (supply) or 500 MW (DSM) continues after 2020.

These incremental annual resource need values add to a cumulative need value for 2012 - 2020 of approximately 6,156 MW if the resource need is to

be met by supply options. The corresponding cumulative resource need for this period is approximately 5,130 MW if the resource need is to be met by DSM. The projections of resource needs to meet the Summer reserve margin criterion for 2012 - 2020 if the resource needs are to be met by supply options are shown in Exhibit SRS-1. This document also shows that, if these levels of supply additions are added to meet the summer needs, these additions will also easily satisfy the smaller resource needs to meet the winter reserve margin criterion. This projection of capacity needs was used in the development of the three resource plans analyzed for this filing.

These projections rely upon FPL's IRP 2006 load forecast that was developed in September 2006 and used in both FPL's recent Need filing for advanced technology coal units and the current Need filing for the proposed capacity uprates at FPL's existing four nuclear units. This same load forecast was used in the economic and non-economic analyses discussed in the remainder of my testimony. This load forecast is discussed by FPL witness Green in his testimony.

Q. Do these resource need projections take into account the proposed capacity uprates to FPL's existing four nuclear units?

A. Yes. As previously mentioned, these projections include the proposed 414 MW of capacity uprates to FPL's four existing nuclear units in 2011 and 2012. Without the inclusion of these uprates, FPL's projected resource needs through 2020 discussed above would have been 414 MW higher.

This projection of future capacity need does not take into account the impact of any other additional generating capacity from existing FPL generating units or any new FPL generating units after the WCEC 1 and 2 units added in 2009 and 2010, respectively.

Q. Do these resource need projections take into account any projections of purchased power beyond what is currently under contract?

A. Yes. For purposes of the analyses conducted for this filing, FPL has included the capacity and energy contributions from six renewable energy purchases not currently under contract for the 2009 – on time period. Three of these assumed purchases are extensions of current purchases from municipal waste-to-energy facilities. The current contracts for these three purchases are scheduled to end in the time period from August 2009 to December 2010. The current total capacity under contract from these three purchases is 143 MW. However, new contractual arrangements have not yet been developed.

In addition, FPL has received three firm capacity proposals in response to its recent Renewable Request for Proposals (RFP). These three proposals, one from a waste-to-energy facility and two from biomass facilities, would provide a total of 144 MW of capacity starting between March 2011 and January 2012 with proposed end dates ranging from 2021 to 2036. At the time of this filing, FPL is analyzing these three firm capacity proposals.

Although no contracts have been developed in regard to any of these six renewable capacity options, for purposes of the analyses conducted for this filing, FPL is assuming that all 287 MW of firm capacity will be in place to serve FPL's customers. The 143 MW from the three municipal waste-to-energy facilities currently under contract is assumed to continue from the above-mentioned contract expiration dates through 2026 when other contracts for smaller capacity amounts from these same facilities are scheduled to end. The 144 MW from the three renewable RFP proposals are assumed to be in place through their proposed end dates.

Arguably, assuming that every MW from these renewable options will be available and realized for the benefit of FPL's customers, might be considered overly, if not unduly, optimistic. At the very least, it serves to provide a conservative projection of FPL's future resource needs by lowering FPL's projected resource needs by 287 MW.

Q. Why is the 1,933 MW incremental capacity need for 2016 so much larger than for the other years in the 2012 – 2020 time period?

A. In addition to the forecasted peak load growth in 2016, two significant power purchases are projected to no longer be providing capacity and energy to FPL starting in 2016. One of these is a 931 MW power purchase agreement with the Southern Company that expires at the end of 2015. The other is a 381 MW power purchase from the St. Johns River Power Park (SJRPP). Due to Internal Revenue Service regulations, FPL will no longer be able to receive

capacity and energy from the SJRPP agreement once a certain amount of energy has been received. FPL currently estimates that this point will be reached at the end of 2015. After accounting for the loss of these two capacity resources, the remaining capacity need attributed solely to FPL system growth is 621 MW (= 1,933 – 931 – 381). This 621 MW capacity amount attributable solely to projected load growth is similar to the annual capacity need amounts described earlier for other years.

III. DEMAND SIDE MANAGEMENT

Q. Do these projections of FPL's resource needs include all of the cost-effective DSM currently known to FPL?

A. Yes. These projections already incorporate all of the cost-effective DSM currently known to FPL through the year 2014 plus a projection of continued DSM implementation for 2015 – 2020 at currently planned annual implementation rates. This amount of DSM includes not only FPL's current DSM Goals, but also a significant amount of additional DSM through 2014 that FPL has identified as cost-effective, and which the Florida Public Service Commission has approved, since the current DSM Goals were established. In addition, these projections include an assumption that FPL will continue to implement additional, cost-effective DSM for each of the remaining years 2015 through 2020 at the same implementation rates that are projected for the years immediately preceding 2015. FPL witness Brandt's testimony provides

additional information regarding the DSM Goals and additional DSM amounts.

In summary, FPL now projects implementing 1,899 MW at the generator of additional Summer DSM demand reduction capability from August 2006 through August 2020 as presented in Exhibit SRS-2. This amount of additional DSM is incorporated into the projection of FPL's resource needs presented in Exhibit SRS-1 and discussed above.

Q. Could FPL meet its 2012 through 2020 resource needs with DSM?

A. No. As discussed above, FPL's resource needs presented in Exhibit SRS-1 already account for all of the reasonably achievable, cost-effective levels of DSM for FPL through 2014, plus the assumption that this trend of implementing additional cost-effective DSM would be continued through 2020, as is presented in Exhibit SRS-2. As shown in this document, FPL's DSM activities will result in 1,899 MW at the generator of incremental DSM from August 2006 through August of 2020. In other words, FPL's reliability assessment has already captured the cost-effective DSM known to be available on FPL's system, plus a projection that this DSM trend will continue, resulting in almost 1,900 MW of incremental cost-effective DSM. Even after accounting for the very large amount of incremental DSM, FPL still needs a significant amount of additional capacity (6,156 MW) to meet its resource needs.

As previously discussed, if the resource needs for the years 2012 through 2020 were to be met solely by additional new DSM resources, one would have to assume the availability of an additional 5,130 MW (= 6,156 MW / 1.20) of cost-effective DSM to meet these resource needs. It is unrealistic for one to assume the existence of another 5,130 MW of cost-effective, incremental DSM to meet these needs. This is especially so considering that this amount of DSM is approaching three times the maximum amount (1,899 MW) of cost-effective DSM known to FPL, plus projections, for the August 2006 through August 2020 time period, and that is already included in the projection of capacity needs. Consequently, cost-effective DSM could not meet FPL's incremental resource needs for this time period. These resource needs must be met by capacity (construction and/or purchase) additions; i.e., the system resource needs presented in this testimony are actually capacity needs and will be referred to as such in the remainder of my testimony.

Q. What would FPL's projected resource need be without the contribution of the nuclear uprates capacity, the renewable energy purchase capacity, and FPL's DSM?

A. The 6,156 MW of capacity need that is shown in Exhibit SRS-1 would increase to a capacity need of 8,350 MW if one were to ignore the projected contributions of 414 MW from the nuclear uprates, the 287 MW from the renewable energy purchases, and 1,493 MW of DSM capacity equivalence. The DSM capacity equivalence number is derived from Exhibit SRS-2 by first calculating 1,244 MW of incremental DSM from 2010 to 2020 (3,390 MW for

2020 minus 2,146 MW for 2010 = 1,244 MW incremental), and then multiplying that value by 1.20 to account for FPL's 20% reserve margin criterion. The resulting projection of FPL's capacity need if these contributions were ignored would be 6,156 MW + 414 MW + 287 MW + 1,493 MW = 8,350 MW of need.

IV. OVERVIEW OF THE APPROACH USED TO ANALYZE THE NEW NUCLEAR GENERATING UNITS VERSUS NON-NUCLEAR GENERATING UNITS

Q. Please provide an overview of the analysis approach FPL utilized to evaluate the impacts of adding two new nuclear units to FPL's system versus the most likely non-nuclear options, CC and IGCC units.

A. The analytical approach FPL utilized can be summarized as follows. First, FPL developed one resource plan that includes the two new nuclear units. This resource plan is referred to in this filing as the Plan with Nuclear. In this resource plan, FPL assumed that the proposed two new nuclear units, Turkey Point 6 & 7, would be added, Turkey Point 6 by June 2018 and Turkey Point 7 by June 2020. FPL next developed a second resource plan that does not include any new nuclear unit additions, but assumes that CC units are added in 2018 and 2020. This plan is referred to in this filing as the Plan without Nuclear - CC. Finally, a third resource plan was developed that does not include any new nuclear unit additions, but assumes that IGCC units are

added in 2018 and 2020. This plan is referred to in this filing as the Plan without Nuclear – IGCC. A comparable amount of capacity is added in 2018 and 2020 in all three resource plans.

These resource plans assumed specific, representative generating units for the 2011 – 2017 time period and utilized generic "filler" units for the 2021 – on time period. These resource plans are discussed in more detail later in my testimony. Second, economic and non-economic analyses were then carried out to compare the three resource plans.

The economic analyses were carried out in two steps. In the first step, the CPVRR amounts in 2007$ for the three resource plans were determined. In this first step, the assumption was made that the new nuclear units would have no capital costs for either generation or transmission facilities for reasons that will be discussed later in my testimony. In the second step, the differences in the CPVRR results for each of the resource plans were calculated and utilized to determine the amount of CPVRR capital costs for the new nuclear units that would make the total CPVRR costs equal for each resource plan. These capital costs, expressed in terms of 2007 dollars per kilowatt ($/kW), represent the "breakeven" capital costs for the new nuclear units. In addition, a projection of approximate customer bill impacts from the addition of Turkey Point 6 & 7 was also made.

The non-economic analysis compared FPL's system projections of fuel mix by fuel type and CO_2 emissions for the three resource plans. This analysis allows the fuel diversity and CO_2 emission impacts of the addition of two new nuclear units to be determined.

Q. You mentioned above that "resource plans" were used in the analyses. Why is it appropriate to perform the economic and non-economic analyses based on multi-year resource plans?

A. It is not only appropriate to do this, but also necessary if one is to fully capture and fairly compare all of the economic and non-economic impacts of different capacity options that could be added to a utility system.

For example, assume we are comparing Option A and Option B. Option A offers 500 MW of capacity and has a heat rate of 7,000 Btu/kWh while Option B has a 9,000 Btu/kWh heat rate, but offers 600 MW of capacity. Evaluating these options from a resource plan perspective allows one to capture the economic impacts of both the heat rate and capacity differences. The lower heat rate of Option A will allow it to be dispatched more than Option B, thus reducing the run time of FPL's existing units more than Option B will. This results in greater production cost savings for Option A. However, Option B's greater capacity means that it is better able to defer the need for future capacity additions. Therefore, Option B will get greater capacity avoidance benefits.

Only by taking a multi-year resource plan approach to the analysis can factors such as these be captured and effectively compared. In the economic analysis, the resource plans created addressed impacts to the FPL system through the year 2060 to address the projected 40-year life of new nuclear units that would be added in 2018 and 2020.

Q. Why are "filler" units needed in a resource plan analysis?

A. The three resource plans that FPL developed for use in the analyses each contained various unit additions to address FPL's capacity needs for the 2011 - 2017 time period as will be discussed later in my testimony. The generic "filler" units are also needed in a multi-year resource plan analysis as a proxy resource added to meet FPL's capacity needs in later years. In these analyses, filler units were used for 2021 – on (i.e., after the 2018 and 2020 options have been added in each resource plan). In this way the three resource plans being compared both meet FPL's reliability criteria for each year in the analysis period, ensuring both that the resource plans are comparable in regard to meeting the 20% reserve margin criterion and that the results of the evaluation of those plans are meaningful.

Q. How were the economic analyses performed?

A. The economic analyses were carried out using Resource Assessment & Planning's "integrated model." This model primarily consists of a Fixed Cost Spreadsheet and the P-MArea production costing model from P-Plus. The Fixed Cost Spreadsheet model captures all of the fixed costs (capital, fixed O&M, capital replacement, capacity payments for purchases, firm gas

transportation, etc.) associated with the three resource plans. The P-MArea model captures variable costs (such as fuel, variable O&M, and environmental compliance costs) in its production costing calculations, projects the annual emission levels associated with the resource plans, and incorporates the effects of system transmission transfer limits on the dispatch of generating units. This integrated model approach was used in FPL's recent advanced technology coal unit filing and in FPL's current filing for capacity uprates for its four existing nuclear units.

Two additional spreadsheets are also used in analyzing the resource plans. One spreadsheet was used to download the annual emission levels projected in P-MArea and then to calculate the annual net costs for those emissions after allowances, if applicable, are accounted for. The other spreadsheet projected the annual amounts of nuclear capital costs that would be incurred both prior to, and after, the in-service dates of the nuclear units. This projection was then used to develop a CPVRR cost value for a $1/kW in 2007$ capital cost for a new nuclear unit. This CPVRR value was then used in determining the breakeven capital costs for the nuclear units.

Q. What were the bases of comparison for the economic and non-economic analyses of the three resource plans?

A. In regard to the economic analyses, the basis of comparison was the calculated breakeven capital cost of the nuclear units that was compared to the non-binding capital cost estimates for the new nuclear units. The breakeven

capital cost includes both the generation and transmission capital cost of the units and is presented in terms of $/kW in 2007$. A range of breakeven capital costs was developed using a number of combinations (or scenarios) of fuel cost forecasts and environmental compliance cost forecasts.

In regard to the non-economic analyses, there are two bases of comparison. The first basis of comparison is a projection of annual system energy by fuel type, or system fuel mix, for the three resource plans using the same fuel cost and environmental compliance cost scenarios for the 2018 – 2021 time period. This four-year time frame was chosen because it addresses the time period starting when the first nuclear unit is assumed to come in-service (2018) through the first year that both nuclear units are in-service for a full year (2021).

The second basis of comparison is a projection of ~~cumulative~~ annual CO_2 emissions for the FPL system under each of the three resource plans for the 2007 – 2021 time period.

Q. Why did FPL utilize more than one fuel cost forecast and more than one environmental compliance cost forecast in its analyses?

A. In order to address the potential impacts of uncertainty in both future fuel costs and environmental compliance costs on generating unit options – nuclear, CC, and IGCC units - that use different types of fuel, namely uranium, natural gas, and coal and which have different emission profiles,

three different fuel cost forecasts and four different environmental compliance cost forecasts were used in the analyses. These three fuel cost forecasts and four environmental compliance cost forecasts could be combined into 12 potential scenarios of forecasted fuel costs and environmental compliance costs. After considering these 12 possible scenarios, it was determined that three of the scenarios, those with a combination of a low gas cost forecast and a medium-to-high CO_2 environmental compliance cost forecast, were very unlikely to occur. Consequently, these three scenarios were dropped from further consideration and FPL utilized the 9 remaining scenarios of fuel cost forecasts and environmental compliance cost forecasts in its analyses.

The specific fuel cost forecasts are discussed in detail in FPL witnesses Yupp's and Villard's testimonies and the specific environmental compliance cost forecasts are discussed in detail in FPL witness Kosky's testimony.

V. THE THREE RESOURCE PLANS UTILIZED IN THE ANALYSES

Q. Please discuss the development of the three resource plans used in the analyses.

A. As FPL began its analyses, it considered new nuclear units at FPL's existing Turkey Point site as potentially the best economic choice to meet future capacity needs, to promote fuel diversity, and to lower CO_2 emissions on

FPL's system starting in 2018. However, in order to fully evaluate this possibility, FPL needed to develop a long-term resource plan that could be used to analyze the long-term system impacts of the addition of the new nuclear units. This resource plan is referred to in this filing as the Plan with Nuclear. In addition, FPL needed to develop alternate resource plans that did not include new nuclear unit additions that could be used in comparative analyses with the nuclear-based resource plan. These are referred to in this filing, respectively, as the Plan without Nuclear – CC and Plan without Nuclear - IGCC.

In developing these resource plans, FPL had several criteria. First, each resource plan chosen must meet FPL's system reliability criteria for all years, especially the reliability criterion that currently drives FPL's resource needs, the 20% Summer reserve margin criterion that FPL currently believes is necessary to provide reliable service. This ensures that the resource plans will be both meaningful and comparable in regard to system reliability. Second, the cost and performance assumptions (heat rate, availability, etc.) for the generating units that are included in each resource plan should be current assumptions of comparable confidence levels to the extent possible. Third, the resource plans should focus as much as possible on the assumed in-service or decision years in question, 2018 - 2020, and should seek to minimize as much as possible influencing the cost and other system impact differences

between resource plans that could be caused by the addition of units in other years.

In regard to meeting the first criterion listed above, the 20% reserve margin criterion, Exhibit SRS-3 was developed to present a revised projection of FPL's capacity needs assuming that Turkey Point 6 & 7 are added in 2018 and 2020, respectively. Each unit is assumed to provide 1,100 MW of capacity. By comparing this document with Exhibit SRS-1, it is clear that the capacity needs are lower by 1,100 MW in 2018 and 2019, and by 2,200 in 2020.

Exhibits SRS-1 and SRS- 3 were then utilized to develop the three resource plans. These three plans are presented in Exhibit SRS-4. The three resource plans are identical through 2017 and all of the plans meet all of the criteria discussed above.

Q. Does the use of an assumed capacity of 1,100 MW each for the two new nuclear units discussed above mean that FPL has decided upon a size for these new nuclear units?

A. No. As discussed in several places in FPL's filing documents, FPL is currently examining different new nuclear unit technologies that would result in capacities for the new nuclear units ranging from approximately 1,100 MW to 1,520 MW per unit. For analysis purposes it is necessary to select a capacity rating for these units and a unit capacity of 1,100 MW was selected for these analyses.

Q. Is the Plan with Nuclear a dynamic long-term resource plan?

A. Yes. By definition, any long-term resource plan, such as the three resource plans utilized in these analyses, is a dynamic plan that is subject to change as conditions change.

As demonstrated through this filing, FPL believes that the nuclear units included in the Plan with Nuclear are currently projected to be the best choice for meeting FPL's capacity needs from an economic perspective, for promoting fuel diversity in FPL's system, and for lowering FPL system CO_2 emissions starting in 2018.

The other capacity additions shown in the Plan with Nuclear (and in the Plan without Nuclear – CC and Plan without Nuclear - IGCC) in the 2011 – 2017 time period are reasonable assumptions for meeting system capacity need requirements at the time of this filing. All new generating unit additions in the three resource plans for the 2011 – 2017 time period are assumed to be new CC unit additions.

To date, none of the new advanced technology coal generating units for which recent approval has been sought in Florida has received both Need and permitting approval. Therefore, it appears possible that any new generating unit additions in the relative near-term will be gas-fired. Consequently, the new generating units included, for analysis purposes, in these resource plans

in the 2011 – 2017 time period are CC units similar to the 3x1 G technology (G) CC units being built at FPL's WCEC site or 2x1 G CC units. However, because FPL is not at this time making definitive selections for 2011 - 2017, these CC additions would be re-evaluated in the future using updated information when it is necessary to make those resource decisions. FPL will evaluate a variety of resource options including additional DSM, renewable energy options, gas-fired and coal-fired generating units, and power purchases prior to making its eventual decision on how best to meet its resource needs for the 2011 – 2017 time period and for the 2021 – on time period.

In addition, as previously discussed, for purposes of these analyses FPL has included 6 renewable energy purchases totaling 287 MW. At the time of this filing no contracts regarding any of these 6 capacity options have been entered into.

Therefore, although a number of the capacity additions assumed for the three resource plans may ultimately change in the future due to re-evaluation and/or evolving factors, these capacity additions are reasonable and representative additions for all years for analysis purposes. Regardless of whether these other capacity additions may change, FPL believes such changes would be applicable to all three resource plans so that the centerpiece of the Plan with Nuclear, the two new nuclear units themselves, will remain as potentially the best option to add. The new nuclear units will provide capacity to meet FPL's

future resource needs, plus promote fuel diversity and lower system CO_2 emissions.

Q. In developing the resource plans, what assumptions were made in regard to the near-term, 2011 - 2017, unit additions?

A. Other than the previously mentioned 287 MW of additional renewable energy purchases and 414 MW of capacity uprates at FPL's four existing nuclear units, all capacity additions in all three resource plans were assumed to be new generating units. In developing the resource plans presented in Exhibit SRS-4, several assumptions were made regarding these new unit additions for 2011 - 2017 time period.

First, it was assumed for analysis purposes that all new unit additions in the resource plans would have a June 1 in-service date for the respective year in which the capacity addition is needed to meet the reserve margin requirement. Second, sites for the assumed CC units in the 2011 – 2017 time period are not known (in large part because no decision to build these new CC units has been made as discussed above). However, in order to develop costing for these assumed CC units, costs and performance characteristics for a greenfield CC of similar design and capacity as the two 3x1 G CC units being constructed at FPL's WCEC site were used.

Third, in regard to the size of the CC units included in the three resource plans in the 2011 – 2016 time period, the same size (1,219 Summer MW

representing a 3x1 G CC unit) as the WCEC units was assumed. For 2017, a 2x1 G CC unit with a capacity of 812 MW was assumed. Finally, all three resource plans are identical in terms of their capacity additions for the 2011 – 2017 time period.

Q. Is the fact that all three resource plans have the same type of capacity additions in the 2011 - 2017 time period important in regard to the analyses that were conducted?

A. Yes. As previously discussed, FPL does not yet know what type of capacity additions will eventually be made in the 2011 – 2017 time period. These selections will be made at later dates. In regard to the analyses presented in this filing, the system impact of adding two new nuclear units in 2018 and 2020, respectively, will largely (if not totally) be unaffected by the type of capacity added in 2011 – 2017. Therefore, the type of capacity options selected for inclusion in the analyses in 2011 - 2017 should not be viewed as critical factors in the analyses. The fact that the three resource plans are identical in the 2011 – 2017 time period ensures this is the case for analysis purposes.

Q. Please discuss the 3x1 G CC unit in 2011 assumed for each of the resource plans.

A. Because FPL is constructing 3x1 G CC units with in-service dates of 2009 and 2010 at its WCEC site, it is anticipated that significant construction cost savings are possible if a third unit of identical design could be built for 2011 at a location near the WCEC site because key personnel in regard to the

engineering and construction of the units could move from the WCEC 1 & 2 work directly to the construction of the 2011 unit. Second, FPL's preliminary analyses show that system fuel savings from an earlier (2011 instead of 2012) 3x1 G CC unit would be beneficial to FPL's customers even without these potential construction cost savings if an earlier unit could be built.

Although FPL has made no firm decisions at the time of this filing to proceed with a 2011 CC, for analysis purposes in this filing it was decided to assume that such a unit would be included in ~~both~~ all three resource plans.

Q. How does the assumption of a 2011 CC unit impact the economic and non-economic analyses of the three resource plans?

A. Because the 2011 CC unit is assumed to be in each of three resource plans, it has no impact on the relative differences between the three resource plans in regard to the economic and non-economic analyses.

Q. In developing the resource plans, what assumptions were made in regard to additions for the period 2021 - on?

A. The remainder of FPL's capacity needs for 2021-on are assumed to be met by the requisite number of unsited 2x1 F technology (F) CC filler units to meet FPL's system reserve margin requirements. The timing and number of these filler units varies slightly between the three resource plans due to the difference in the capacity of the nuclear units (1,100 MW), the 3x1 G CC units (1,219 MW), and the IGCC units (600 MW) added in 2018 and 2020. The decision to utilize 2x1 F CC units as the filler units for the 2021-on time

period was made to minimize the potential impact that differences in unit types for filler units between the resource plans in these latter years might have on the analysis results. And, as previously discussed for the capacity options included in the resource plans for the 2011 – 2017 time period, these 2x1 F CC filler units do not represent FPL's definitive resource plan for the 2021 – on time period. They are utilized for analysis purposes solely to better focus the analysis on the resource decision years of 2018 – 2020.

Q. How would the Plan with Nuclear change if the size of the new nuclear units were to change from 1,100 MW to approximately 1,520 MW?

A. As previously mentioned, FPL has steadily growing cumulative resource needs each year after 2012 so such an increase in the capacity of the new nuclear units could definitely be utilized. An increase of approximately 420 MW (= 1,520 MW – 1,100 MW) of capacity for each of the nuclear units would introduce a change to the previously described Plan with Nuclear assuming that no other change to the plan occurred prior to 2018.

This change to the Plan with Nuclear is that the additional 840 MW (= 420 MW per unit x 2 units) of capacity from the two new nuclear units would reduce the number of 2x1 filler units for the 2021 – 2040 time period from 38 to 37 and would also alter the timing of these filler unit additions. In addition, it is possible that changes to other factors (such as the project schedules or the load forecast) could result in a later in-service date for the second of two larger nuclear units.

In summary, a change in the size of the nuclear units from 1,100 MW to approximately 1,520 MW would have only a slight impact to the Plan with Nuclear after 2020; primarily reducing the number of, and changing the timing of, subsequent filler unit additions. The additional 840 MW would definitely be usable on FPL's system to meet future capacity needs. In addition, a greater amount of nuclear capacity would also be useful from both a fuel diversity perspective and a CO_2 emission reduction perspective.

VI. FUEL COST AND ENVIRONMENTAL COMPLIANCE COST FORECASTS AND SCENARIOS USED IN THE ANALYSES

Q. Please discuss the use of different fuel cost forecasts in the analyses.

A. When comparing generating technologies that burn different fuels, i.e., nuclear units, natural gas units, and coal units, it is appropriate that different fuel cost forecasts be utilized in order to determine the relative economics between the technologies. In this way the analyses can address the uncertainty that exists regarding future fuel costs, particularly in regard to the future cost differential between natural gas, coal, and nuclear fuel.

Although there are virtually an inexhaustible number of possible future fuel cost outcomes, a small number of forecasts that effectively reflect a reasonable range of future fuel costs are sufficient to conduct a meaningful economic analysis. Consequently, three different fossil fuel cost forecasts that

reflect a reasonable range of future fossil fuel costs were developed and used in these analyses. These three fossil fuel cost forecasts are referred to as the High Gas Cost forecast, the Medium Gas Cost forecast, and the Low Gas Cost forecast. As indicated by this naming convention, the High Gas Cost forecast projects high natural gas costs, the Medium Gas Cost forecast projects medium natural gas costs, and the Low Gas Cost forecast projects low natural gas costs. In addition, forecasted nuclear fuel costs were also developed and used in the analyses.

These forecasts are provided in Appendix E of the Need Study Document. FPL witness Yupp's testimony addresses the fossil fuel forecasts and FPL witness Villard's testimony discusses the forecasted nuclear fuel costs.

Q. Please discuss the use of different environmental compliance cost forecasts in the analyses.

A. Just as there is uncertainty in regard to the future cost of fuels, there is uncertainty in regard to the future environmental regulations and the costs of complying with those regulations. When comparing generating technologies that burn different fuels and have different emission profiles, such as is the case with nuclear, natural gas, and coal units, the future environmental regulations will determine how the differences in the emission profiles of the generating technologies will affect the relative cost of the technologies. Therefore, FPL found it appropriate to conduct its analyses using different environmental compliance cost forecasts to address the uncertainty that exists

regarding future environmental regulations and the costs of complying with those regulations. These environmental compliance cost forecasts addressed four emissions: sulfur dioxide (SO_2), nitrogen oxides (NOx), mercury (Hg), and CO_2.

As is the case with future fuel costs, there are also a large number of future environmental cost outcomes. However, a small number of forecasts that effectively reflect a reasonable range of future environmental compliance costs are sufficient to conduct a meaningful economic analysis. Therefore, four different environmental compliance cost forecasts that reflect a reasonable range of future environmental compliance costs were developed and used in these analyses. These four environmental compliance cost forecasts are referred to as Env I through Env IV. These forecasts are provided in Appendix F of the Need Study Document. FPL witness Kosky addresses the environmental compliance cost forecasts in his testimony.

Q. How did FPL make use of the three fuel cost forecasts and four environmental compliance cost forecasts in its analyses?

A. As previously discussed, FPL initially combined the three fuel cost forecasts with the four environmental compliance cost forecasts to develop a total of 12 initial scenarios of forecasted fuel costs and environmental compliance costs. Then, after examining the different scenarios, FPL removed from further consideration three scenarios comprised of a low natural gas cost forecast and medium-to-high environmental compliance cost forecasts for CO_2 based on

FPL's belief that medium-to-high environmental compliance costs for CO_2 will result in upward pressure on natural gas prices. In other words, an assumption of medium-to-high environmental compliance costs for CO_2 is incompatible with an assumption of low natural gas prices. Each of the remaining 9 scenarios was then utilized separately in both the economic and non-economic analyses of the three resource plans.

Because the fuel cost forecasts are designated as High Gas Cost, Medium Gas Cost, and Low Gas Cost, and the environmental compliance cost forecasts are designated as Env I through Env IV, the 9 scenarios of fuel costs and environmental compliance costs are designated as High Gas Cost Env I through High Gas Cost Env IV, Medium Gas Cost Env I through Medium Gas Cost Env IV, and Low Gas Cost Env I. (The three eliminated scenarios are Low Gas Cost Env II, Low Gas Cost Env III, and Low Gas Cost Env IV.)

VII. RESULTS OF THE ECONOMIC ANALYSES

Q. You previously indicated that FPL's IRP process was used in these analyses. How does the economic analysis used to compare these three resource plans compare to the economic analyses used in previous FPL determination of need filings?

A. The economic analysis approach utilized for analyzing the addition of two new nuclear units to FPL's system consisted of two steps. The first step is to

develop and then compare the CPVRR costs for the Plan with Nuclear, the Plan without Nuclear – CC, and the Plan without Nuclear - IGCC. The analysis approach used in this step was virtually identical to the approach used in FPL's most recent Need filings (i.e., the filings for the Turkey Point 5, the WCEC 1 and 2, and the advanced technology coal generating units) and that is being used in FPL's current Need filing for capacity uprates at FPL's four existing nuclear generating units. However, there are two differences in this analysis approach step as applied for Turkey Point 6 & 7 when compared to this approach as utilized in the most recent Need filings.

The first difference is that the cost of transmission losses for the resource plans is not included because there are no known sites for the CC and IGCC units selected to compete with the new nuclear units in 2018 and 2020. Consequently, it is not possible to calculate losses for the two alternate Plans without Nuclear.

The second difference in the economic analysis approach step that developed CPVRR costs for the resource plans is that no generation or transmission capital costs associated with Turkey Point 6 & 7 were included in the analysis.

The reason for this is that FPL does not believe it is currently possible to develop a precise projection of the capital costs associated with new nuclear units with in-service dates of 2018 – on. FPL witness Scroggs' testimony

addresses the subject of FPL's current projection of capital costs for new nuclear units in more detail. Consequently, FPL's economic analysis approach normally used to evaluate generation options has been modified to include a second step in the economic analysis.

The second step in the economic analysis used to compare the Plan with Nuclear with the alternate Plans without Nuclear consists of taking the CPVRR cost differential between the Plan with Nuclear and one of the Plans without Nuclear for a given scenario of fuel costs and environmental compliance costs, then using this differential to determine the capital cost (generation and transmission) of the two nuclear units that could be spent so that the CPVRR costs for the two plans would be identical. In other words, a "breakeven" capital cost for the nuclear units versus both CC and IGCC units is determined for each of the 9 scenarios versus both CC and IGCC capacity that might otherwise be added. These breakeven costs are presented in terms of $/kW in 2007$.

In summary, the objective of this two-step economic analysis is to allow FPL to determine a breakeven capital cost range of potential generation and transmission capital costs for Turkey Point 6 & 7 in which these new nuclear units are projected to be equal to the cost of alternative, non-nuclear generating technologies. Later in my testimony I will discuss how this breakeven capital cost range of potential generation and transmission capital

costs compares to FPL's current non-binding capital cost estimate range for Turkey Point 6 & 7. FPL witness Scroggs' testimony addresses this non-binding cost estimate range based upon currently available information. FPL's capital cost estimate range will become more refined as the project continues to develop, especially as contracts are negotiated. Both the breakeven capital cost range and FPL's capital cost estimate range for the new units will continue to be updated as capital costs, fuel costs, environmental compliance costs, etc. evolve. This will provide ongoing points of comparison for FPL and the Commission as the project continues to develop.

Q. What costs are included in the first step of the economic analysis?

A. The first step of the economic analysis addresses total system costs for the FPL system including all fixed and variable costs, upstream gas costs, and cost of capital impacts for the two Plans without Nuclear. All of these costs, except for capital costs for the new nuclear units in the Plan with Nuclear as discussed above, were addressed in the analyses for all three resource plans.

However, for the three resource plans in this analysis, there were no upstream gas costs and cost of capital impacts (i.e., net equity adjustment) were not included. The upstream gas cost adder is essentially used to account for any additional gas transportation infrastructure cost resulting from the combined effect of one or more gas-fired option that is offered to FPL from an outside party for use in a resource plan (such as when bids are received by FPL in response to a Request for Proposals). Because FPL was assumed to supply all

of the gas-fired units in each resource plan and the amount of gas needed by, and the timing of, those units were known in advance when creating the resource plans, all gas-related costs were accounted for in the unit and fuel cost information and no upstream cost adders were needed.

Likewise, all cost of capital impacts were already accounted for by assuming an incremental 55.8% equity / 44.2% debt investment for the new units assumed in each resource plan.

In order to show that the cost categories that were addressed in these economic analyses are similar to those addressed in FPL's recent Need filings (with the exception of capital costs for the new nuclear units), Exhibit SRS-5 presents the economic evaluation results for the three resource plans for one fuel cost and environmental compliance cost scenario, the High Gas Cost Env I scenario, using the same presentation format that FPL used in its most recent Need filings. As discussed above, because the costs for Upstream Gas Pipeline and Net Equity Adjustment are zero for each of the three resource plans, these cost categories are not shown.

Q. How were the environmental compliance costs captured in the economic analyses?

A. The environmental compliance costs were captured in the economic analyses through four steps. First, for each fuel cost and environmental compliance cost forecast scenario, the production costing analyses carried out with the P-

MArea model include a projection of the cost of allowances for each applicable emission category. Using the emission rates for each generation unit in FPL's system, P-MArea incorporates the allowance costs for each emission into the dispatch cost for each generating unit and dispatches the generating units on an economic basis to minimize system production costs.

Second, once the production cost projection was completed, the costs of the allowances included in the production costs were subtracted from the production cost projection. Third, the projected annual system emission levels were extracted from the P-MArea results and compared to a projection of the allowance levels for each emission that are assumed to be granted to FPL. (For purposes of these analyses, FPL assumed that no CO_2 allowances would be granted.) The annual differences between emissions and allowances for each emission type are then calculated.

Finally, for each year in which FPL's allowances are less than the projected amount of emissions for each emission type, the net deficit amount of allowances needed to cover emissions is multiplied by that year's projected allowance cost to derive a compliance cost for that year. Conversely, for each year in which FPL's allowances exceed the projected amount of emissions, the net excess amount of allowances is multiplied by that year's projected allowance cost to derive the value of the excess allowances that could be sold. This value is entered as a negative compliance cost for that year. If the

amount of allowances exactly equals the projected emissions for a given year, there is no net deficit or excess allowances for the year and, therefore, a zero compliance cost is entered for that year. The compliance costs – positive, negative, or zero – for each year are then summed over the analysis period and the present value of that sum is calculated. This present value amount is then added to P-MArea's fuel and variable O&M costs to derive the System Variable Costs for that scenario.

Q. What conclusions can be drawn from these results shown in Exhibit SRS-5?

A. It is important to remember that the results shown in Exhibit SRS-5 provide a comparison of the costs for the three resource plans under only one of the 9 fuel cost and environmental compliance cost scenarios, the High Gas Cost Env I scenario.

Exhibit SRS-5 shows that the Plan with Nuclear is approximately $12.1 billion CPVRR in 2007$ less expensive than the Plan without Nuclear – CC, and approximately $13.3 billion CPVRR in 2007$ less expensive than the Plan without Nuclear – IGCC for this scenario.

Although these results are valid for only one of the 9 fuel cost and environmental compliance cost scenarios, these values do indicate two cost results that will hold true for all of the analyses to follow involving the remaining 8 scenarios.

The first such result is that the Plan with Nuclear has lower fixed costs, lower variable costs, and lower total costs than does either of the alternate Plans without Nuclear. This is expected because, as previously discussed, the Plan with Nuclear contains no capital costs for the two new nuclear units. Therefore, the Plan with Nuclear is expected to have lower fixed costs. Nuclear units also have lower energy costs than CC or IGCC units so a resource plan containing new nuclear units is expected to have lower variable costs than a comparable plan without nuclear units. The second such result is that the System Fixed Costs for a specific plan are established solely by the generation capacity additions in that resource plan and will not change as fuel costs and/or environmental compliance costs change. Therefore, the System Fixed Costs shown in Exhibit SRS-5 for the three resource plans will remain unchanged for all 9 fuel cost and environmental compliance cost scenarios while the System Variable Costs will change from one scenario to another.

Q. Please explain the nature of the Transmission System costs that are included in the analyses of the resource plans.

A. In practice, transmission capital expenditures are required when new power plants are built due to the need for new transmission facilities required to connect the new power plant additions to the transmission grid and to allow the transmittal of the new plant's output throughout the transmission system. These costs are referred to, respectively, as transmission interconnection and integration costs. In the economic analyses that FPL has performed, certain representative transmission interconnection capital costs are assumed, but no

transmission integration capital costs were assumed for the 2011 – 2017 power plant additions that are identical in each of the three resource plans because no sites are known for the power plant additions assumed for analysis purposes. A designation of sites would be necessary in order to determine transmission integration costs. Similarly, for the filler units that appear in each of the plans for the 2021 – on time period, no transmission integration capital costs are assumed for the same reason.

In the Plan without Nuclear – CC and the Plan without Nuclear – IGCC, a total transmission capital cost addressing both transmission interconnection and integration of $500 million is assumed for the 2018 and 2020 capacity additions. This approach was taken because FPL's non-binding cost estimate range for Turkey Point 6 & 7 does include a similar total transmission capital cost estimate. Therefore, the inclusion of transmission capital costs for the 2018 and 2020 CC and IGCC capacity additions allows the calculation of breakeven capital costs for Turkey Point 6 & 7, and the subsequent comparison to the non-binding estimates, to be more meaningful. Given that these generating additions are of similar capacity in the same years, it is reasonable to assign a similar magnitude of cost for transmission capital costs.

In discussing the transmission facilities that are initially projected for Turkey Point 6 & 7, FPL witness Sanchez's testimony generally addresses how

transmission analyses are carried out and what requirements are examined in these analyses.

Finally, as previously discussed, the cost of losses for the three resource plans are not included because sites for these assumed future generating unit additions are not known.

Q. What were the results of the first step of the economic analyses in which all 9 of the fuel cost and environmental compliance cost scenarios were included?

A. Exhibit SRS-6 presents the total costs for the three resource plans for all 9 of these scenarios. In addition, the total cost differences between the three plans are also shown. The total cost results shown on this document for High Gas Cost Env I scenario for the resource plans are the same as the total cost results presented for the resource plans in Exhibit SRS-5.

The total cost results shown on Exhibit SRS-6 for the remaining 8 scenarios have not been previously presented. However, by examining Exhibits SRS-5 and SRS-6 and considering that the System Fixed Costs shown on Exhibit SRS-5 do not change as the scenarios change, it is clear that all of the cost differences shown on Exhibit SRS-6 are due to the System Variable Cost category on Exhibit SRS-5. In other words, all of the differences are from changes in the fuel costs and/or environmental compliance costs.

In regard to the columns titled Total Cost Difference in Exhibit SRS-6, a negative value indicates that the costs for the Plan with Nuclear are lower than those of the alternate Plan without Nuclear to which the Plan with Nuclear is being compared (while a positive value would indicate that the costs for the Plan with Nuclear are higher than those of the comparable Plan without Nuclear).

Exhibit SRS-6 shows that, as expected for the first step of the economic analysis, the Plan with Nuclear has a lower CPVRR cost under all scenarios of fuel cost forecasts and environmental compliance cost forecasts. This is because the capital cost of the new nuclear units is assumed to be zero for this first analysis step and the Plan with Nuclear will have lower variable costs.

Exhibit SRS-6 provides a significant amount of cost and cost differential data for the three resource plans. In order to simplify this comparison of costs for the plans, the cost differentials for the plans that are shown in Exhibit SRS-6 are reorganized and presented again in matrix format in Exhibit SRS-7. The intent is to provide a somewhat more easily understood summary of the Total Cost Difference column results in Exhibit SRS-6, particularly as the results relate to the different fuel cost and environmental compliance cost forecasts.

Q. How would you summarize the information for each resource plan that is presented in Exhibit SRS-7?

A. First, as previously mentioned, these results of the first step in the economic analysis show the expected result: that the Plan with Nuclear (that assumes no capital costs for the new nuclear units) has a lower CPVRR cost for all scenarios than do either of the Plans without Nuclear. Second, the CPVRR cost advantage of the Plan with Nuclear versus the Plan without Nuclear – CC is greater on the left side of the matrix presented in Exhibit SRS-7 due to the higher gas cost forecasts on the left hand side. Also, the CPVRR cost advantage of the Plan with Nuclear versus either of the Plans without Nuclear are greater nearer the bottom of the matrix due to the higher environmental compliance costs nearer the bottom of the matrix and the fact that operation of the new nuclear units will result in essentially no SO_2, NOx, Hg, or CO_2 emissions.

Exhibit SRS-7 summarizes the results at the conclusion of the first step of the economic analysis. These results are then used to determine the breakeven capital costs of the new nuclear units.

Q. How did the second step of the economic analysis convert the results presented in Exhibit SRS-7 into breakeven nuclear capital costs?

A. Having determined the CPVRR cost differentials between the three plans for all 9 scenarios in the first step of the economic analysis, FPL then developed an estimated projection of the recovery schedule of nuclear capital costs prior to the in-service dates of Turkey Point 6 & 7. This information, when combined with the traditional recovery of annual revenue requirements after the in-

service dates for the two nuclear units, allows the calculation of how a $1/kW capital cost in 2007$ translates into a CPVRR capital cost. Appendix H of the Need Study Document presents this projection and CPVRR calculation. This calculation shows that a new nuclear unit cost of $1/kW in 2007$ equates to $1.973 million CPVRR in 2007$.

Using the CPVRR cost differentials for each scenario presented in Exhibit SRS-7, and the above-mentioned $1.973 million CPVRR capital cost calculated in Appendix H, a nuclear capital breakeven cost was calculated for each of the 9 scenarios versus the alternate Plans without Nuclear. The calculation consists of dividing the CPVRR differences in Exhibit SRS-7 (the differences are presented in terms of millions of dollars) by 1.973 (also in terms of millions of dollars) to obtain the breakeven capital cost in $/kW in 2007$.

Q. What were the results of this second step of the nuclear capital cost breakeven analysis?

A. The nuclear breakeven capital costs are presented in Exhibit SRS-8. These breakeven capital costs range from $3,206/kW to $7,281/kW in 2007$ versus the Plan without Nuclear – CC, and ranged from $5,921/kW to $9,450/kW in 2007$ versus the Plan without Nuclear - IGCC. As expected from the CPVRR cost differences presented in Exhibit SRS-7, the higher breakeven costs were calculated for the scenarios on the left hand side of the matrices

due to higher gas costs and nearer the bottom of the matrices due to higher environmental compliance cost forecasts.

Q. What conclusions did FPL draw from these economic analysis results?

A. The breakeven nuclear capital cost ranges show the current projection for the range of nuclear capital costs that would allow the addition of two new nuclear units, one in 2018 and one in 2020, to yield identical CPVRR system costs over a 40-year period versus a comparable amount of CC or IGCC capacity added in the same years.

These two breakeven cost ranges are generally higher than FPL's current non-binding capital cost estimate range for new nuclear units; i.e., the non-binding cost estimate of $3,108/kW to $4,540/kW in 2007$. Consequently, FPL believes it is reasonable to begin making expenditures in order to continue to obtain refined cost and performance projections for new nuclear units; i.e., to retain the option of adding new nuclear generating capacity, Turkey Point 6 & 7, by the 2018 – 2020 time period.

Q. Are there comparative aspects between the three resource plans that FPL has not quantified in these economic analyses results that would further favor the addition of Turkey Point 6 & 7?

A. Yes. There are four comparative aspects of the resource plans that have not been quantified in the economic analyses presented in these exhibits. All four of these comparative aspects would be expected to further favor the addition of Turkey Point 6 & 7. FPL has quantified one of these four comparative

aspects. The remaining three comparative aspects have not been quantified for reasons that will be discussed shortly.

Q. Please discuss the one comparative aspect that FPL has quantified.

A. This comparative aspect involves the difference in CO_2 emissions between the nuclear, CC, and IGCC options. The economic analysis results presented in Exhibits SRS-5 through SRS-8 take this difference in CO_2 emissions into account by utilizing the CO_2 compliance costs from the different environmental compliance cost forecasts. The annual costs of CO_2 compliance for the CC unit, and even more so for the higher CO_2-emitting IGCC unit, are increased by the inclusion of these CO_2 compliance costs.

However, it is expected that another way to address CO_2 emissions will ultimately become an option: carbon capture and sequestration (CCS) which would result in physically preventing, at least to a significant degree, CO_2 emissions during power plant operation. Although this approach will result in lower CO_2 emissions, it will also result in higher capital and operating costs for the generating unit which utilizes CCS. In order to project what the overall cost impact of CCS might be on the breakeven capital cost estimates for Turkey Point 6 & 7 presented in Exhibit SRS-8, FPL reevaluated the Plan without Nuclear – IGCC after assuming that the 2018 and 2020 IGCC units would have CCS capability.

The capital and operating cost impacts of CCS are not currently known with any significant level of precision, so the actual values by which the breakeven costs are projected to change with the inclusion of CCS should be taken with reservations. It is for this reason that FPL has not presented the economic analysis results with CCS in the same format as Exhibits SRS-5 through SRS-8. However, the direction and approximate magnitude of these changes in the breakeven costs for Turkey Point 6 & 7 are meaningful.

When the Plan without Nuclear – IGCC was reevaluated with CCS costs, the breakeven previously presented in Exhibit SRS-8 increased significantly in each of the 9 scenarios. The range of increase in the breakeven costs ranged from a low of approximately $374/kW for the Medium Gas Cost Env IV scenario which features high CO_2 compliance costs to $2,836/kW for the Low Gas Cost Env I scenario which features low CO_2 compliance costs. In the Low Gas Cost Env I scenario, the higher capital and operating costs associated with CCS are not offset to any significant degree with reduced CO_2 compliance costs. In the Medium Gas Cost Env IV scenario, the high CO_2 compliance costs avoided by the CCS equipment at least partially offsets the higher CCS costs.

Exhibit SRS-8 already shows that, for all 9 scenarios, the breakeven costs for Turkey Point 6 & 7 versus IGCC capacity are already higher than the non-binding cost estimate range for new nuclear units. The inclusion of CCS costs

would significantly increase these breakeven costs. Consequently, Turkey Point 6 & 7 are projected to be even more cost-effective versus IGCC capacity with CCS than versus IGCC capacity without CCS.

Q. What are the three remaining comparative aspects between the resource plans that FPL has not quantified?

A. These three comparative aspects include: (1) the differential in costs to maintain an on-site operating fuel supply between the nuclear, CC, and IGCC technologies; (2) the cost of losses; and (3) a periodic system concern in FPL's resource planning, a recurring imbalance between generation and demand in the Southeastern Florida region.

The first of these comparative aspects, on-site fuel supply, highlights the fact that although a significant amount of on-site fuel supply is inherent in the design of, and included in the cost estimates for, the IGCC and Turkey Point 6 & 7 units (60 days of supply for the IGCC and up to 18 months for Turkey Point 6 & 7), the on-site fuel supply for the CC units is for three to four days of backup fuel oil supply. Therefore, the Turkey Point 6 & 7 units offer a very substantial advantage over CC units in terms of fuel supply reliability. This advantage is difficult to quantify, however, because the amount of unburned fuel remaining in a nuclear generating unit declines steadily over the course of an operating cycle and hence there is no fixed, consistent level of nuclear fuel "reserve" on-site from which to calculate the cost of equivalent fuel supply at a CC unit. In any event, FPL's analyses show that the Plan with

Nuclear appears to be at least as economic as the Plan without Nuclear – CC even without including a quantified benefit for the inherent on-site fuel supply at a nuclear unit.

The second comparative aspect that was not quantified is the cost of losses. As previously discussed, the cost of losses was not included in the economic analyses due to lack of knowledge regarding where new CC or IGCC units might be built in 2018 and 2020. However, if the costs of losses were to be calculated, the Turkey Point site for the new nuclear units would likely result in a significant advantage for the new nuclear units due to the proximity of the Turkey Point site to FPL's load center.

In addition, the fact that the Turkey Point site is located in the Southeastern Florida region means that Turkey Point 6 & 7 would likely also have an advantage in regard to the third comparative aspect that has not been quantified: the recurring regional imbalance between generation and load in the Southeastern Florida region. As mentioned earlier in my testimony, concern regarding this imbalance has been addressed for a number of years in the immediate future with the addition of the Turkey Point Unit 5 (added in 2007) and the addition of WCEC Units 1 and 2 (to be added in 2009 and 2010, respectively). However, as the electrical load continues to grow, additional generation will subsequently need to be built in Southeastern Florida or additional transmission facilities that increase the ability to import

power into the region will have to be built. The addition of two large units, such as Turkey Point 6 & 7, in Southeastern Florida would certainly be helpful in addressing this imbalance.

Therefore, while neither the inherent on-site fuel supply benefits of Turkey Point 6 & 7, nor the benefits in regard to losses and regional imbalance associated with siting new nuclear units at Turkey Point, have been quantified in the economic analyses, these advantages are real. If a quantification of these advantages of Turkey Point 6 & 7 had been made, the projected nuclear breakeven capital costs for Turkey Point 6 & 7 would be increased beyond what is presented in Exhibits SRS-5 through SRS-8.

Q. What is the approximate magnitude of the impacts to FPL's customers' bills that can be expected from Turkey Point 6 & 7?

A. At this time it is not possible to precisely project bill impacts due to uncertainty in a number of key factors including, but not limited to, the capital costs for Turkey Point 6 & 7, the fuel costs, and the environmental compliance costs as has been previously discussed. However, monthly bills for FPL's customers can be expected to increase in years preceding the in-service dates of Turkey Point 6 & 7 as capital costs are recovered with no system fuel or environmental compliance cost savings yet occurring. Once the new nuclear units begin to come in-service and provide system fuel and environmental compliance cost savings, these savings begin to offset the capital and fixed operating costs. Over time, as the annual capital cost

recovery amounts decline due to depreciation and the annual fuel and environmental compliance cost savings are expected to increase as these costs rise, the projected increased bill amounts will steadily decrease and then turn into bill savings.

In order to present a representative bill impact projection, FPL has assumed a capital cost of $3,800/kW in 2007$ for both Turkey Point 6 & 7. This assumed capital cost value falls in the middle of FPL's projected range of non-binding cost estimates for these new units. Then, an approximate customer bill impact has been calculated for the years 2009 – 2021 for one of the fuel cost and environmental compliance cost forecast scenarios, Medium Gas Cost Env II, and is presented in Exhibit SRS-9. The range of years 2009 – 2021 begin with the first year in which recovery of capital costs for the new nuclear units is projected through 2021 that is the first full year in which the two new nuclear units are projected to be in operation.

The calculation is based on a system average rate differential for each year between the Plan with Nuclear and one of the alternate Plans without Nuclear, the Plan without Nuclear - CC. The difference in the annual revenue requirements between the Plan with Nuclear and the Plan without Nuclear – CC is calculated first. Then this annual revenue requirement differential is divided by the projected annual sales amount to develop a system average rate differential for each year. Finally, this system average rate differential is

multiplied by 1,000 kWh to develop an approximate customer bill impact between the two plans.

As shown in Exhibit SRS-9 the results of that calculation for a 1,000 kWh bill range from $0.43 to $5.80 for 2009 through 2020. For 2021, the first year in which both new nuclear units are in-service for a full year, the projected 1,000 kWh bill impact is -$0.36, a reduction.

Q. Has FPL projected the annualized base revenue requirements for the first 12 months of operation of Turkey Point 6 & 7?

A. Yes. However, it is not possible at this time to precisely project the annualized base revenue requirements, also referred to as non-fuel costs, because the capital costs for Turkey Point 6 & 7 are not yet known. As indicated throughout FPL's filing, FPL's current non-binding capital cost estimate for the new nuclear units ranges from $3,108/kw in 2007$ to $4,540/kw in 2007$. For purposes of providing a projection of the non-fuel costs for the first 12 months of operation of Turkey Point 6 & 7, FPL assumed the same capital cost value of $3,800/kW in 2007$ for both Turkey Point 6 & 7 that was used in the customer bill impact projection. This assumed capital cost value falls in the middle of FPL's projected range of non-binding cost estimates for these new units. Using this capital cost assumption and the assumption that both units will go in-service on June 1 of their respective in-service years, the approximate non-fuel costs for the first 12 months of operation are $1,242 million for Turkey Point 6 and $761 million for Turkey

Point 7. Both of these values include the non-fuel costs for the 7 months of operation in the in-service year (2018 for Turkey Point 6 and 2020 for Turkey Point 7) and for 5 months of the following year.

These cost projections are based on the in-service dates, the mid-range single point capital cost estimate, the projected fixed O&M and capital replacement costs, and the financial/economic assumptions used in the economic analyses. If the actual values are different for one or more of these assumptions, then these projected cost values may also change.

Q. You mentioned earlier that FPL's analyses assumed a 55.8% equity / 44.2% debt capital structure. What is the basis for this assumption?

A. This capital structure represents FPL's projection of its capital structure over the long-term. This projection also uses the 11.75% return on equity value reflected in FPL's last base rate settlement agreement.

Q. Is it possible that additional risk may be attributed to the construction and permitting of new nuclear generating units, thus affecting FPL's present long-term capital structure and return on equity assumptions?

A. Yes, it is possible. However, it is not possible at this time to accurately gauge the level of additional risk that will be attributed to the construction of new nuclear units in Florida compared to other forms of generation to which nuclear might be compared and what the economic impact of that risk would be. FPL's filing is basically intended to provide a first cut at how the cost of new nuclear units would compare to other generating units that might be built.

FPL believes its analytical approach of looking at a broad range of breakeven costs for new nuclear units provides a reasonable comparison of the capital costs of new nuclear units to those of non-nuclear generation options.

VIII. RESULTS OF THE SYSTEM NON-ECONOMIC ANALYSES

Q. How were the effects of the three plans on FPL's system fuel diversity evaluated?

A. The effects of the three resource plans on FPL's system fuel diversity were evaluated by projecting the annual percentage of system energy that is supplied by each fuel type - coal/petroleum coke, natural gas, oil, nuclear, and other (primarily purchases such as from waste-to-energy facilities) - for the resource plans for the 2018 - 2021 time period; i.e., a system fuel mix projection. This four-year time frame was chosen because it addresses the time period starting when the first nuclear unit is assumed to come in-service (2018) through the first year that both nuclear units are in-service for a full year (2021).

Generation unit dispatch is affected by the types of generating units available, the fuels they use, and the relative fuel costs and/or environmental compliance costs. Because unit dispatch determines the relative amount of energy that is supplied by each unit, and consequently by each fuel type, the system fuel mix is also affected by the types of generating units available, the fuels they use,

and the relative fuel costs and/or environmental compliance costs. Consequently, the fuel diversity results will be presented for each resource plan for two scenarios, High Gas Cost Env III and Low Gas Cost Env I, selected to represent a range of fuel cost forecasts and environmental compliance cost forecast scenarios.

Q. What were the differences in the FPL system fuel mix between the three resource plans?

A. Exhibit SRS-10 presents the annual projection for 2018 - 2021 of the percentage of energy produced by coal/petroleum coke (coal), natural gas, oil, nuclear, and other for the resource plans for the two scenarios mentioned above.

As shown in Exhibit SRS-10, the Plan with Nuclear holds a significant advantage in regard to fuel diversity compared to the Plan without Nuclear – CC, and has a similar fuel diversity impact to the Plan without Nuclear - IGCC. When looking at the results for the High Gas Cost Env III scenario for the year 2021 for nuclear, natural gas, and coal/petroleum coke, it is projected that the Plan with Nuclear will result in FPL's system supplying approximately 27% of its energy with nuclear, 65% with natural gas, and 7% with coal/petroleum coke. By comparison, it is projected that the Plan without Nuclear - CC will result in FPL's system supplying only 16% of its energy with nuclear, 75% with natural gas, and 7% with coal and the Plan without Nuclear – IGCC will result in FPL's system supplying only 16% with nuclear,

64% with natural gas, and 17% with coal. The contributions of oil and other fuel remain essentially unchanged at 2% and less than 1%, respectively, for all three plans.

For the Low Gas Cost Env I scenario, the relative fuel mix percentages for the various fuels are relatively unchanged for the three resource plans.

Therefore, the Plan with Nuclear is projected to have a significant fuel diversity advantage, as measured by its approximately 10% higher reliance on nuclear energy and 10% lower dependence upon natural gas, over the Plan without Nuclear – CC and has a similar fuel diversity advantage as the Plan without Nuclear - IGCC.

An increase of 10% in nuclear's contribution to the system annual fuel mix on a utility system the size of FPL's system is definitely meaningful. This is more readily apparent when the difference is translated into terms of increased MWh supplied by the new nuclear units, and the equivalent number of residential customers whose total annual energy usage could be supplied by the additional energy output from these units.

For 2021, the first full year in which both new nuclear units are in-service, the Plan with Nuclear will provide an increase of approximately 17.64 million MWh from nuclear compared to the two alternate Plans without Nuclear.

Taking into account that FPL's average residential customer is projected to use approximately 16,400 kWh in 2021, the increased nuclear energy generation from Turkey Point 6 & 7 would serve the total electricity needs of about 1,075,000 residential customers in 2013.

Q. Another perspective would be to examine how much fossil fuel would be consumed if the annual output of the new nuclear units were to be provided by conventional fossil fuel generating units. If FPL were to generate the Turkey Point 6 & 7 projected annual energy output with such units, how much oil, coal, or natural gas would be needed?

A. If this same amount of annual energy were to be produced by existing units in 2021, the projected amount of oil consumed would be approximately 27.6 million barrels of oil if the energy were solely produced with oil units, 7.1 million tons of coal if the energy were solely produced with coal, and 123.5 billion cubic feet (BCF) of natural gas if the energy were solely produced with natural gas. Taking into account the projected 40 year life of the Turkey Point 6 & 7 units, these annual amounts would increase to the following approximate amounts over this 40 year period: 1.1 billion barrels of oil, 284 million tons of coal, and 4,900 BCF of natural gas.

Q. How were the effects of the three plans on FPL system emissions of CO_2 evaluated?

A. The effects of the three resource plans on FPL's projected CO_2 emission levels were evaluated by projecting the annual CO_2 emission levels for the resource plans for the 2007 - 2021 time period.

Q. What were the results of the CO_2 emission analysis?

A. The results of this analysis are presented in Exhibit SRS-11. As expected, there are no differences between the three plans for the years 2007 through 2017 because the plans are identical. However, starting in 2018, there are significant differences in CO_2 emissions between the plans. The Plan with Nuclear shows dramatically lower CO_2 emissions in the 2018 – 2021 time period due to the fact that nuclear power plant operation results in essentially zero CO_2 emissions as further discussed in the testimony of FPL witness Kosky.

For 2021, the first year for which the 2018 and 2020 unit additions are operating for a full year, the projected FPL system CO_2 emissions for the three plans are as follows:

- Plan with Nuclear = 64.9 million tons
- Plan without Nuclear – CC = 71.8 million tons
- Plan without Nuclear – IGCC = 82.4 million tons

Comparing these values shows that the CO_2 emission projection for 2021 for the Plan with Nuclear is 6.9 million tons per year lower than for the Plan without Nuclear – CC. Also for 2021, the Plan with Nuclear is 17.5 million tons per year lower than for the Plan without Nuclear - IGCC.

From a percentage perspective for 2021, the Plan with Nuclear would result in approximately a 10% reduction in annual CO_2 emissions compared to the Plan without Nuclear – CC and approximately a 21% reduction in annual CO_2 emissions compared to the Plan without Nuclear – IGCC.

Q. Would these CO_2 emission reductions for the Plan with Nuclear be sustained for years after 2021?

A. Yes. Assuming that the post-2021 capacity additions for each of the three plans would be identical, the projected CO_2 emission differentials between the three plans would be maintained for the life of Turkey Point 6 & 7.

Q. Please summarize the results of the non-economic analyses of the three plans.

A. In regard to system fuel diversity, the Plan with Nuclear is projected to have a significant advantage over the Plan without Nuclear – CC and a comparable result to the Plan without Nuclear – IGCC. The increased nuclear energy generation from Turkey Point 6 & 7 would serve the total electricity needs of about 1,075,000 residential customers in 2021. In regard to system CO_2 emissions, the Plan with Nuclear has significant advantage over both alternate plans. By 2021 the Plan with Nuclear has an advantage of 6.9 million tons per year (or a 10% reduction) compared to the Plan without Nuclear – CC and an even larger advantage, 17.5 million tons per year (or a 21% reduction), compared to the Plan without Nuclear – IGCC.

IX. ADVERSE CONSEQUENCES OF NOT APPROVING TURKEY POINT 6 & 7

Q. Would there be adverse consequences if a Need Determination for Turkey Point 6 & 7 is not approved?

A. Yes. If FPL's request for a Need Determination for Turkey Point 6 & 7 is not approved, FPL's ability to pursue the option of capacity additions from new nuclear units would be seriously hampered. As discussed in the previous section, this would likely lead to adverse consequences in regard to economics. This is evidenced by the favorable projections of breakeven capital costs for new nuclear units compared to FPL's non-binding cost estimates for such units.

In addition, a decision not to approve the Need petition for Turkey Point 6 & 7 would definitely lead to adverse consequences in regard to promoting fuel diversity and lowering CO_2 emissions in the long-term for FPL's system. This is evidenced by the projections of significant gains in system fuel diversity and reduced system CO_2 emissions from Turkey Point 6 & 7.

Q. How would FPL's ability to pursue the option of capacity additions from new nuclear units be affected if a Need Determination for Turkey Point 6 & 7 were not approved?

A. If a Need Determination for Turkey Point 6 & 7 is not approved, FPL would not be able to obtain needed information regarding the costs and performance

for new nuclear units and to proceed with the necessary licensing steps for approval of new nuclear units. Delay in pursuing the option of new nuclear generating units would be inevitable. This would greatly restrict FPL's options in regard to reliably and economically meeting future capacity needs with generating options that could also significantly increase system fuel diversity and lower system CO_2 emissions.

X. CONCLUSIONS

Q. Would you please explain the conclusions you draw from the analyses previously discussed?

A. Yes. I draw the following four conclusions from the results of these analyses:

1) The range of breakeven capital costs for new nuclear units at Turkey Point is a broad one that encompasses FPL's current range of non-binding cost estimates for new nuclear units. Therefore, it appears there is a strong likelihood that new nuclear units at Turkey Point can be constructed at a cost that would allow the units to be economic compared to CC and/or IGCC units that might otherwise be constructed.

2) The Plan with Nuclear has a significant advantage in regard to system fuel diversity compared to the Plan without Nuclear – CC and has similar fuel diversity advantages to the Plan without Nuclear - IGCC. The increased nuclear energy generation from Turkey Point 6 & 7

would serve the total electricity needs of about 1,075,000 residential customers in 2021.

3) The Plan with Nuclear has a significant advantage in regard to system CO_2 emissions compared to the Plan without Nuclear – CC and an even larger advantage compared to the Plan without Nuclear – IGCC.

4) Failure to obtain Need approval for Turkey Point 6 & 7 will, at the very least, significantly delay FPL from pursuing the option of obtaining capacity addition from new nuclear units. This would greatly restrict FPL's options in regard to reliably and economically meeting future capacity needs with generating options that could also significantly increase system fuel diversity and lower system CO_2 emissions.

Based on these four results from the analyses, my overall conclusion is that FPL's Need Determination petition should be approved so that FPL can pursue the option of capacity and energy from new nuclear units at the Turkey Point site for the benefit of its customers.

Q. Would your conclusion be the same if the in-service dates of Turkey Point 6 & 7 were different from those used in the analyses?

A. Yes. The projected economic and non-economic advantages of the new nuclear units as analyzed are significant and their addition should benefit FPL's customers regardless of the in-service date.

Q. Does this conclude your testimony?

A. Yes.

BY MR. ANDERSON:

Q Dr. Sim, have you prepared a summary of your direct testimony?

A Yes, sir.

Q Please provide your summary to the Commission.

A Good morning, Chairman Carter and Commissioners.

A projection of FPL's capacity needs identified an additional resource need by the year 2020 of over 6,100 megawatts if those resources were provided by supply options or over 5,100 megawatts if they were to be supplied by DSM. However, this resource need projection already includes all of the cost-effective DSM known to FPL, approximately 1,900 megawatts. Therefore, this significant resource need projected through 2020 will largely need to be addressed by new supply options. New nuclear units are one option that could address this resource need starting in 2018.

Our approach for analyzing the option of new nuclear units was to create three resource plans with comparable amounts of new capacity added in the years 2018 and 2020. One plan added Turkey Point 6 and 7 nuclear units, a second plan added a comparable amount of combined cycle capacity, and a third plan, a comparable amount of IGCC capacity.

We then conducted both economic and noneconomic analyses of these three resource plans, and in those analyses we utilized nine scenarios of forecasted fuel costs and

environmental compliance costs.

In the economic analysis, FPL first determined the break-even capital cost for new nuclear units versus combined cycle and IGCC for each scenario, then compared the break-even cost to a current capital cost range for new nuclear units that range from approximately $3,100 a kW to $4,500 a kW in 2007.

In the noneconomic analyses we compared the three plans of the three types of capacity options in regard to FPL's system fuel diversity or fuel mix and in regard to CO2 emissions.

The results of the economic analysis were that the break-even costs for Turkey Point 6 and 7 were higher than the current capital cost range for new nuclear units in nine of nine scenarios versus IGCC, in eight of nine scenarios versus combined cycle, and in the remaining one scenario for combined cycle within the current cost range for new nuclear units.

The results of the noneconomic analysis were as follows. In regard to system fuel diversity, Turkey Point 6 and 7 would result in approximately a 10 percent less dependence on natural gas by the year 2021 versus combined cycles. In regard to system CO2 emissions, Turkey Point 6 and 7 would significantly reduce FPL's annual CO2 emissions, approximately a 7 million ton per year reduction versus combined cycle or a 17 million ton per year reduction versus IGCC. And these equate to approximately a 10 percent reduction

annually versus combined cycle and 21 percent versus IGCC.

In conclusion, the Turkey Point 6 and 7 units are currently projected to be the economically competitive capacity option for addressing our capacity needs in 2018 through 2020 to lower dependency on natural gas by 10 percent starting in 2021 and to annually reduce CO2 emissions by seven to 17 million tons starting in the same year. Therefore, FPL's need determination petition should be approved so that FPL can pursue the option of capacity and energy from new nuclear units at the Turkey Point site for the benefit of its customers. Thank you.

MR. ANDERSON: Dr. Sim is available for cross-examination.

CHAIRMAN CARTER: Let me -- before we start our cross-examination, Dr. Sim -- and forgive me if I sometimes say Sims. I'm so used to playing Sim City.

Just kind of a generic question. I want you to assume just temporarily that I'm a Martian with about a five-minute attention span and I wouldn't know SOx from NOx and wouldn't know a megawatt from a kilowatt and you had five minutes to explain to me why this plant is needed, these plants are needed. Could you explain it to me based upon that set of factors? The reason I ask you that is that a lot of times what we do here at the Commission sounds like inside baseball to the public. So if you could break it down like that, then I think

that will be something that people can legitimately listen to and hear.

THE WITNESS: I'll try to do it in a couple of points, Chairman Carter.

CHAIRMAN CARTER: Great.

THE WITNESS: Number one, we have a significant capacity need ongoing through the analysis years that we looked at capacity needs through 2020, and nuclear units are one option that we believe we can bring online in 2018. So, therefore, it was one competing option that we looked at.

Our analysis has shown that there is a very strong likelihood that it is the economically competitive choice versus the competing options of combined cycle or IGCC, number one; number two, that it would greatly reduce the dependency of our system on natural gas; and, number three, it would significantly reduce emissions on our system, CO2, SO2 and NOx.

CHAIRMAN CARTER: Thank you so kindly. That was not a cross-examination. That was just a general question. Again, as I say, a lot of times what we do here at the Commission to the average person on the street sounds like, you know, gobbledygook. So I just wanted to put something on the record just in case so that the people in Palatka or like my aunt in Pompano Beach could read this and understand it. So just, just kind of for the people.

Mr. Beck, you're recognized.

MR. BECK: Thank you, Mr. Chairman. I have no questions.

CHAIRMAN CARTER: Okay. Is it Mr. or Mrs. this time?

MR. KRASOWSKI: It's Mr. this time.

CHAIRMAN CARTER: Mr. this time. Mr. Krasowski.

MR. KRASOWSKI: Thank you, Mr. Chairman.

CROSS EXAMINATION

BY MR. KRASOWSKI:

Q Hello, Dr. Sim. Nice to see you again.

A Yes, sir. Nice to see you again as well.

Q I'm Bob Krasowski here with Jan Krasowski, and we're participating in this hearing so as to learn more about your comments in your testimony and have a chance to speak to you about it, to ask questions of you.

Our greatest interest is represented in your testimony, Page 59 through 61, and how your comments here impact what is on your, one of your exhibits, and that's exhibit SR, excuse me, SPS-9 (sic.). If you could find that.

So you speak about how this project may impact FPL rates charged to the customers. Okay? So on this chart, your SPS-9, in the final column if we look down -- it's SRS-9. Sorry. If we look down that column, it shows the impacts that, what might be considered your expectation of the impacts on rates to customers, and this is an additional charge on their monthly bill and it goes from 2009 down to 2021. But at 2018,

as you note in your testimony, the increase, the annual increase in the rate then starts to, it starts to decline. And you identify the year 2019 as being a time -- okay. Okay. Could you please explain to us the main variables you're monitoring when you calculate your projection of future rates?

A Let me try to answer the question in regard to how the calculation was done, and I believe that will answer your question, sir.

First, we took a look at the annual revenue requirements both for the plan with nuclear units and the plan without nuclear units but with combined cycles being built in 2018 and 2020. We looked at the total annual revenue requirements for each plan and then compared the differential between the two plans in regard to the annual revenue requirements.

We then divided that difference in, shown in Column 3 by the total, projected total sales after DSM is accounted for in Column 4, and that provided us with a differential in the average rate between the two plans shown in Column 5. Then we simply multiplied that value, which is in Column 5 ranging from, I believe, a high of .58 cents per kilowatt hour times 1,000 kilowatt hours to derive the values in Column 6. And what's occurring over this range of years, Commissioners, is that the nuclear units are fairly unique in that there is such a long lead time in regard to the

construction before the units come online. Expenditures are made much earlier for nuclear units than they are for other units. And as we see, if we were to go back and use as a starting point a combustion turbine, we would see a couple of years of capital cost expenditure before the unit came online and had a chance to provide any fuel savings to the system.

If we were to move from a combustion turbine to a combined cycle, we'd see a couple of more years of upfront capital costs that would tend to result, all things equal with the nuclear analysis, in higher rates before the unit went in service and fuel savings began to take over.

If we were to go to a coal unit, we would again, if the costs were treated the same way they're treated for a nuclear unit with early recovery, we'd see even more years, probably up to seven or eight years of capital costs. With a nuclear unit it's longer still, about ten. So we're seeing a more capital intensive project with a longer lead time and early recovery over those years that tends to lead to increases in customer bills during the early years and then it turns around dramatically once both nuclear units are in and the fuel savings take over.

Q Thank you. That helps a lot. One minute, please.

(Pause.)

Now is CO2, the cost of CO2 part of the, one of the variables you use in considering the projected costs to the

customer in the future?

A Yes. The environmental compliance costs that are presented in Appendix F are part of the annual revenue requirements that are captured here.

Q And that's pretty much what I'm trying to understand. Okay. In the, in that last column at the year 2018, and you mentioned this in your testimony, that the drop in rates that's identified there starting '18 and then the drop continues through 2019 and 2020, that that is dependent on environmental cost factors kicking in. Is that not correct?

A Could you point me to that passage in my testimony, please?

Q Okay. Let's see. It's on Page 59 starting on Line 18. Excuse me. The sentence starts at the end of Line 17 and it goes through to Line 20. Okay. And then if we continue on to Line 21 through 23, that's, that's where you specifically say that the nuclear units begin to come in-service and provide system fuel and environmental compliance cost savings. And you're speaking specifically, I understand, to the 2019 drop in rates to the customers.

A Beginning in 2018 on when the first new nuclear unit comes into effect or comes into service we do see reductions in both fuel and environmental compliance costs.

Q Okay. Now what are the environmental compliance costs that you expect to occur that will cause this reduction

in rates to occur in relation to CO2?

A Okay.

Q Greenhouse gases. I'm sorry.

A What's occurring in the exhibit is that the two expansion plans, the one with nuclear and the one without nuclear and combined cycle instead, are identical through 2017. So there are no changes in system fuel and no, or no differences in system fuel and system emissions through 2017 between the two plans. However, once the plan with nuclear has its first unit come in in 2018 and the first combined cycle in the plan without nuclear comes in in 2018, we begin to see dramatic savings in fuel and dramatic reductions in CO2, SO2 and NOx. And we have applied the cost for those emissions that are shown in Appendix F of our Need Study.

Q Okay. So are you saying that in the year 2017 regardless of what technology you use there will be an increase of $5.80 to the customer bill as you show in the -- are you saying that?

A No, sir. What we are saying is when you compare a plan in which nuclear will be built in 2018 and you are recovering the capital costs early, from, say, 2010 on, your bill is affected by the selection of the nuclear unit that comes in service in 2018. If we had selected another technology and compared it to the combined cycle plan, we would not be seeing that early increase in, in customer bills.

However, we would then also not be seeing the dramatic fuel savings and the dramatic savings in emission and in emission costs that we see from 2018 on once the nuclear units come in-service.

Q Thank you. I appreciate your answers. I'm, I'm developing an understanding of what you're talking about. Let's see if I understand it though.

Will this -- let's use, let's use 2017, which shows a $5.80 a month increase per 1,000 kilowatt hours to the ratepayer bill. And if I understand correctly, please correct me if I'm wrong, that this represents only the nuclear scenario.

A No, sir, not quite. What it represents is the difference between two resource plans: One in which we are assuming we're building nuclear in 2018 and 2020, and the other in which instead of building nuclear we're building a comparable amount of combined cycle capacity in 2018 and 2020.

Q And for my purpose of understanding is combined cycle coal or gas?

A Natural gas-fired.

Q Natural gas.

A Yes.

Q Okay. So you've not provided an analysis if you were to use more IGCC coal?

A On this page we did not provide that analysis.

However, I believe that a staff interrogatory -- if memory serves me correct, it was Number 19 -- did ask for an analysis similar to these, in fact, extending further out through 2035, I believe, against both combined cycle and IGCC.

And, for example, in the IGCC case, where we show here the analysis was truncated or stopped in the year 2021 and showed we were, the customers were seeing bill savings of about 36 cents, if we had extended that out through 2035 as in the interrogatory, I believe, against combined cycle, we were seeing savings on the bill of about $6.60 approximately and against IGCC it was roughly $8.90, I believe, subject to check.

Q Okay. Thank you. Now what I'd like to understand is what you identify as environmental cost factors kicking in. Okay. So are those environmental cost factors dependent on projected future legislation as it determines a charge for CO2 emissions and other greenhouse gases?

A I'd say ultimately yes, although we were not relying on any one specific piece of legislation. We were relying on the range of SO2, NOx, mercury and CO2 costs that are presented in FPL's Appendix F.

Q So would I be correct in understanding that these rate projections are not dependent on what you perceive to be future CO2 costs?

A The future rate projections are based on a, in this case, in Exhibit SRS-9 we were looking at a medium gas, a

scenario of medium gas costs and the environmental II, environmental compliance costs.

So to perhaps assist you, if one were to take the CO2 cost range for any year you would pick, let's say 2018, and we were to look at that cost for CO2 in the dollars per ton, what we would do is between the plan with nuclear and the plan without nuclear we would look at the difference in the emissions of CO2, X million tons of CO2. We would take that difference, the savings that would come from nuclear, and we would say that that times the 2018 cost for CO2 that's shown in Appendix F would be worth some amount of money, say Y millions of dollars. That number would be accounted for in Columns 1 and Column 2.

Q So I would be correct to adjust my thinking to -- I'd be correct to say that the projected costs of CO2 is a factor in what you identify here as a decrease in the cost to the customer in electric rates?

A Yes. It is a factor, as is the even larger fuel savings that would be experienced with a nuclear unit. For example, starting in 2021 when we have both nuclear units projected to come online, the annual fuel savings in nominal dollars is over a billion dollars. That number grows over time. So in the projected 40-year life of the plant in nominal dollars, if you add up each year, you come to about $94 billion in fuel savings from the two units. So fuel savings in this

calculation is an even larger component than the environmental compliance costs, but environmental compliance costs are included.

Q I have in front of me Appendix F. I think you've been referring to it. But I have here Appendix F of Florida Power & Light Company, description of staff's exhibit. But on Page 3 of 4 -- do you have that with you?

A Are you referring to the late-filed exhibit that was given out this morning?

Q Yes.

A Yes, I have that.

Q Okay. Thank you. This, this will help me understand what you're saying. So you did refer already to the year 2018, I believe, and environment, ENV II column, we move down and there's a 19. That would represent $19 per ton of CO2 emissions.

A That is correct.

Q And this estimate is based on what you perceive to be legislation that will be passed that would attribute this cost per ton of CO2; is that correct?

A In general terms, yes. But, again, I would not characterize this as being tied to one particular piece of legislation, although there is a tie if you go back to the starting point for FPL's derivation of Appendix F in the ICF report.

Q Okay.

A So I don't think of it in terms of a particular piece of legislation. I look at it as one scenario of CO2 costs.

Q I appreciate that and I understand that.

Okay. What I want -- okay. So I'd be correct, would you agree that I'd be correct in understanding this as an estimate of what is projected to occur when you're considering the full range of legislation available that will attribute a dollar amount to the cost of CO2 emissions in the future?

A Taken in total, the Environmental I through Environmental IV, yes, FPL believes that encompasses a reasonable range of the projections of CO2, of future CO2 costs.

Q Okay. So back to SRS-9 where you identify the decrease in ratepayers' costs as a result of what you perceive to be a reasonable expectation for environmental cost factors, this is what you're talking about, what's represented in this chart, your projection that in 2018 the range of probable CO2 costs will fit within the parameters you show here under Environment I, II, III and IV.

A Actually this page is using only one scenario, that of the medium gas cost and Environmental II.

Q Okay. Okay. Yeah. Fair enough. Okay. So I understand that.

So my question is now what if there is no legislation

to attribute a cost to CO2, what happens to the ratepayers' cost if you go ahead and build this plant?

A There would be less savings than we are currently projecting due to the fact there would be no CO2 compliance costs. However, there would still be, as I earlier indicated, annual fuel savings of a billion dollars increasing every year from 2021 on. So there would still be massive fuel savings from the nuclear units even if there were no CO2 legislation.

Q Okay. And the fuel costs represent the difference between the nuclear fuel and the gas fuel in this, in this scenario?

A It would -- it represents the different -- there's a slight distinction I'll make. It represents a, the difference between the entire FPL system with the two nuclear units versus the entire FPL system without the nuclear units but with a comparable amount of natural gas-fired combined cycle on it. So these are system costs, not one unit versus another.

Q Okay. And we're talking FPL's system Florida?

A Yes, sir.

Q Okay. Okay. Great. Okay. Thank you for that. I appreciate that. It's helped quite a bit.

Have you considered -- is there a page number there? We're on Page 59, Line 19, you mention capital costs. In your, in your considerations and analysis of capital costs have you been monitoring the construction of new nuclear power plants in

other parts of the world?

A I have not.

Q Okay. Thank you.

A However, there are others in our company that I'm certain keep track of that with, with great interest.

Q Are you, are you, have you considered potential cost overruns in the capital costs? I'll just pull that back. I think you have, so.

Okay. In your assessment of costs have you considered the possibility of increased costs involved in making payments to the Department of Energy for their surcharge for handling spent fuel into future?

A Specifically, no, we have not looked at individual components and said what if this were to rise by X percent. What we have tried to do in this analysis is in looking at the costs for combined cycle and IGCC we've used the latest information we have regarding those costs and we've used what we think is a reasonable estimate of the heat rate and fixed O&M and fuel cost for nuclear units and then tried to work into a calculation of what the capital cost for nuclear units would be in order to break even versus either combined cycle or IGCC. We do not as a normal matter of course look at what if one particular cost component for nuclear or another cost component for IGCC or combined cycle were to increase by 10 percent, how would that change the result. It would be an endless series of

calculations. And what we are trying to do here is to take a look at what we think the, both the economic and noneconomic position of nuclear is projected out versus the likely competitors of combined cycle and IGCC, and to us it looks very favorable.

Q Okay. But wouldn't you identify what you've done in the greenhouse gas computation as being a projection into the future of possible costs?

A Yes. We've taken a scenario approach that we do not know what the CO2 costs would be. So we've come up with a fairly wide range that we think is representative of the costs that are likely to occur with legislation that may be enacted.

Q But there was, there was no -- but, but you haven't done the same for any potential increase in the cost of handling, of paying a fee for the future handling of the waste. You found that unnecessary.

A At this point in our analysis I would say that that would, would not be needed. We are simply trying to take a look as to whether it makes sense for FPL to keep the option of new nuclear units open by taking a broad look at the likely competitors, a wide range of costs for nuclear units and a wide range of fuel and environmental compliance costs. And, again, we come out of the analysis with a clear indication that new nuclear units are an option that is certainly in the best interest of our customers to keep open.

Q Do you think in the future you'll be analyzing the cost to the customers if, in fact, Congress cannot get together to act on identifying costs for CO2 release, for CO2 and greenhouse gas emissions?

A Yes. Again, for the answer I've mentioned before, the significant billion dollar a year starting in 2021 and increasing from nuclear, that in and of itself would make it a viable option for FPL to consider for its customers, and for its ability to not only save fuel but to significantly lessen our system's dependence upon natural gas. Which if we go with a gas-only build-out plan between now and 2020, we're looking at 75 percent of our energy would be supplied by natural gas. We can significantly cut back on that in regard to going forward with nuclear.

Q Okay. Could I have just a second here, a couple of seconds, a minute?

(Pause.)

That's all the questions we have of you, Dr. Sim. Thank you very much for your information.

A Thank you.

COMMISSIONER EDGAR: Thank you. Commissioners, any questions at this time? No?

Are there questions from staff?

MS. KLANCKE: Yes. There -- we have a few questions for this witness.

COMMISSIONER EDGAR: Thank you.

CROSS EXAMINATION

BY MS. KLANCKE:

Q Good morning, Dr. Sim.

A Good morning.

Q My name is Caroline Klancke, appearing for Commission staff.

Dr. Sim, are you familiar with Witness Scroggs' Exhibit SDS-7 entitled "Comparison of Cost Estimate Range to Break Even Capital Cost Range Combined Cycle"?

A I believe so. Is that the one that I was asked to take a look at in the deposition?

Q Yes, sir.

A Yes. I do not have it in front of me, but I generally remember it.

Q I believe that we may have an extra copy of that to provide to you.

MR. BUTLER: We have one.

MS. KLANCKE: Excellent. Thank you.

BY MS. KLANCKE:

Q To the best of your knowledge, could you briefly explain the information that's encapsulated within SDS-7?

A On the left-hand side of SDS-7 we provide the range of $3,108 per kW to $4,540 per kW as the, what's termed here the nonbinding cost range for new nuclear units. It's FPL's

current view of what the construction costs would be for new nuclear units.

On the right-hand side the numbers that range from a low of 3,206 to a high of 7,281 represent the results of our analysis of the break-even capital costs for the scenarios that we analyzed as to how, how high the nuclear capital costs could be in 2007 dollars and break even at the end of the analysis period with either combined cycle or IGCC.

Q Now the analysis used to derive the break-even capital costs shown in Exhibit SDS-7 go through the year 2060; is that correct?

A That is correct.

Q Were you present during the testimony of Mr. Kosky yesterday and this morning?

A During parts of it.

Q Are you familiar with the 2007 ICF report that was discussed earlier this morning?

A I'm not familiar with it. I know the document exists. In fact, it was handed to me at breakfast this morning. But I have not looked at the document.

Q Are you familiar with FP&L's late-filed Exhibit 99 and the information contained therein?

A That's the two-pager that was handed in this morning?

Q Yes, sir.

A Yes, I'm familiar with it.

Q Could you comment upon how this 2007 ICF report impacts the analysis reflected in Exhibit SDS-7?

A Literally speaking, it doesn't impact it because it was not used in the analyses that led to SDS-7. However, if it had been used, what would occur is that the break-even costs that are shown on the right-hand side of this, of this exhibit would be higher than the way, than what is shown in the exhibit currently because the CO2 compliance costs are, are higher than what were used in the analyses.

Q Now pursuant to your deposition you were asked to file three late-filed exhibits. I'd like to turn your attention to late-filed Exhibit Number 1.

And, Commissioners, this is Exhibit 15, Tab 14. It's Bate stamped numbered 000550 just for your point of reference.

CHAIRMAN CARTER: Let's start all over again and back up to the exhibit number.

MS. KLANCKE: This is Exhibit Number 15, staff's composite exhibit.

CHAIRMAN CARTER: Okay.

MS. KLANCKE: Tab 14. And it's Bate stamp number 000550.

CHAIRMAN CARTER: One moment, please. One moment, please.

Commissioner Argenziano, are you there?

COMMISSIONER ARGENZIANO: Yes, Mr. Chair. I have to

hit the mute button when you talk to me because I don't want you to hear me coughing.

CHAIRMAN CARTER: Okay. This morning we were given a plethora of late-filed exhibits and things of that nature.

COMMISSIONER ARGENZIANO: I've gathered that.

CHAIRMAN CARTER: And it's, it's piling up. And I know that we need to proceed and all, but I need to look at some of this stuff before we go further on this.

COMMISSIONER ARGENZIANO: Absolutely.

CHAIRMAN CARTER: It's just too much stuff. We had -- I mean, now we're flipping on staff's exhibit and it's like a Chinese checkerboard here. I've got a -- Commissioner, I know that you've been there with us all week and you're not feeling well. I'm going to, just going to break for lunch so we can go through all these documents. I need to see all of this stuff because it's getting squirrely here.

COMMISSIONER ARGENZIANO: Certainly, Mr. Chair. And perhaps I can get in touch with Larry then and he can kind of fill me in on everything.

CHAIRMAN CARTER: Okay. So I've got 11:21. We'll come back at around 12:30. We're on lunch.

COMMISSIONER ARGENZIANO: Thank you.

(Recess taken.)

(Transcript continues in sequence with Volume 8.)

STATE OF FLORIDA)
: CERTIFICATE OF REPORTER
COUNTY OF LEON)

I, LINDA BOLES, RPR, CRR, Official Commission Reporter, do hereby certify that the foregoing proceeding was heard at the time and place herein stated.

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

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

DATED THIS 4th day of February, 2008.

Linda Boles

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