BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 060635-EU

In the Matter of

PETITION FOR DETERMINATION OF NEED FOR ELECTRICAL POWER PLANT IN TAYLOR COUNTY BY FLORIDA MUNICIPAL POWER AGENCY, JEA, REEDY CREEK IMPROVEMENT DISTRICT, AND CITY OF TALLAHASSEE.
_____/

VOLUME 8

Pages 791 through 885

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PROCEEDINGS:	HEARING
BEFORE:	CHAIRMAN LISA POLAK EDGAR COMMISSIONER MATTHEW M. CARTER, II COMMISSIONER KATRINA J. TEW
DATE:	Friday, January 12, 2007
TIME:	Commenced at 10:00 a.m.
PLACE:	Betty Easley Conference Center Room 148 4075 Esplanade Way Tallahassee, Florida
REPORTED BY:	JANE FAUROT, RPR MARY A. NEEL, RPR
APPEARANCES:	(As heretofore noted.)

I N D E X

WITNESSES

EXHIBITS

NUMBER:		ID.	ADMTD.
19 and 20			806
23, 24, and 25			843
61, 62, and 63			882
65, 66, 67, 68, and 70			807
105, 106 and 107			807
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P R O C E E D I N G S

(Transcript follows in sequence from Volume 7.)

CHAIRMAN EDGAR: We will call this hearing back to order. And I believe when we stopped for some nourishment, Mr. Jacobs, you were continuing your cross. And if you are ready, we are ready.

MR. JACOBS: Thank you, Madam Chair.

GARY BRINKWORTH

continues his testimony under oath from Volume 7:

CONTINUED CROSS-EXAMINATION

BY MR. JACOBS:

Q Hi, Mr. Brinkworth. Earlier we were discussing the process that the City of Tallahassee used to assess your DSM portfolio, and I referred you to your deposition, and that page number is 77, and beginning at Line 14. And basically we talked about there that in your assessment you used something called hourly load shapes.

A Yes, that's correct.

Q Could you explain what that means for us?

A Certainly. When we get to the point in our process of having screened applicable DSM measures, we want to now start putting them together in a way that we can use in our production costing analysis, we have to prepare an hourly load shape. And, so what Navigant did for us was to build those hourly chronological shapes in such a way that what that shape

represents is the savings of that particular bundle of DSM measures on an hourly basis for each hour of the year. So you would get an annual shape that represented energy savings for that DSM bundle, then you take all of those bundles and add them together and that produces the savings in each hour for the total portfolio.

Q Now, in that analysis, basically you had to do some kind of -- and I want to kind of paraphrase, and you can correct me if I'm wrong, some of kind of the assumptions that you would have to look at in constructing that load shape. You would have to look at the end user's consumption profiles?

A Yes, you would have to know what end use you were targeting with that particular bundle.

Q And so you would look at multi-family, single family, and so forth and so on?

A That would be correct, yes.

Q And I notice that you did commercial measures, so you would have to look at some of the commercial uses and those load profiles and use consumption patterns also, would you not?

A Yes, that's true.

Q Is that different than what the FIRE model does?

A It is.

Q And could you describe that difference?

A Well, we don't use the FIRE Model directly, so I would have to go from what I generally understand about that

model. The FIRE Model is a spreadsheet based, what I would characterize as a static calculation of cost-effectiveness that uses measure costs and performance associated with a DSM program compared to an avoided unit. That methodology, as I understand it, does not involve any kind of load shapes or chronological analysis of any type, which makes it distinctly different from the hourly method that we used.

Q And to summarize, essentially, the value of a measure under the FIRE model looks at how a particular unit that is going to be operating, how it can shut down that unit, whereas you look at the uses of your customers and figure out how they can benefit from this demand reduction?

A Let me see if I can say it a little bit differently.

Q Thank you.

A The way I characterized that is that the FIRE model looks at the cost of a DSM measure compared to an avoided unit and tries to identify whether that measure is more or less expensive than serving that same amount of energy with the avoided unit, whatever unit that happens to be identified in the model. Our methodology looks at hourly energy savings from the DSM package on an hour-by-hour basis, and it does reflect end use patterns and other sorts of things that you described because those DSM measures are targeted at particular end uses.

Q Okay. And then you describe that you then took and put these measures into bundles. Do you have access to the

petition for need application in front of you?

A Yes, I have got the sections here.

Q And it is Volume E?

A Yes.

Q What I particularly want to look at -- and the page numbers that I have here are E, Volume E. -- let me get to the bottom here -- 7-11, and on that it is Table E.7-2. And, as I can understand, this table is actually telling you that over -- in each year when and how your DSM measures are going to give you relief from your summer peak, your winter peak, and so forth. Is that a correct statement?

A The table is an annual table, and I should probably point out that I didn't sponsor this portion of our Volume E, but I can talk generally about what's here. The table does show the annual contribution to the summer peak and winter peak and the annual energy reduction for the entire portfolio over that period from 2007 through 2025.

Q And is that how you derived your estimate of your cost savings from the implementation of your DSM portfolio?

A Well, the cost savings is actually done on that hourly annual basis because we actually use a chronological production costing model. Actually, I should say Black & Veatch runs that for us. But the savings are calculated on an hourly basis and then summed up for the year.

Q On the very next page is another table, Table E.7-3,

and here it looks like you have described all the particular bundles that you have used. And I'm not going into particulars of any of them, but I just want to kind of, again, generally characterize the table. Now you are saying here is how these bundles perform?

A Generally, that's correct. This table is intended to show how the bundles contribute to the annual demand and energy savings that is shown on the proceeding table. So, for example, I know we weren't going to go through all of these, but just in the way of clarification, if you look at our first bundle here on commercial space conditioning. What the table is telling you is that of the total summer peak demand reduction by 2025 that particular bundles contributes 22 percent of that demand savings, and it contributes 20 percent of that winter demand savings, and 24 percent of the projected annual energy savings by 2025.

Q Thank you. Now, I note that you don't have any industrial bundles on here, and I think we discussed at your deposition that you don't have any industrial customers, is that correct?

A That's correct.

Q But if this were complete and you did have industrial customers, you would expect that there would be a bundle on here for industrial, correct?

A We would have targeted all of our end uses, so, yes,

there would have been an industrial bundle here.

MR. JACOBS: Just one moment. I think I may be done.

BY MR. JACOBS:

Q And your rationale in looking at -- we've heard the term bantered about today of aggressive DSM versus non-aggressive DSM, and I won't go into what was understood, but your operational and approach in doing this was targeted to your users, is that a fair statement? And so there was symmetry between what you were trying to accomplish in your DSM and what actually happens on your system?

A Yes. Our city commission particularly directed us to adopt a more ambitious DSM program that could bring perhaps additional benefit to our customers, because that was one of their policy objectives, and so that is what led us ultimately to the development of this portfolio.

MR. JACOBS: Thank you. No further questions.

CHAIRMAN EDGAR: Questions from staff?

MS. FLEMING: Just a few, Madam Chair.

CROSS-EXAMINATION

BY MS. FLEMING:

Q Good afternoon, Mr. Brinkworth.

A Good afternoon.

Q Earlier you discussed the demand savings from the City's new DSM measures, do you recall that?

A Yes.

Q If the demand savings from these new DSM measures are less than anticipated, could the city use the capacity from TEC to meet its higher than expected load?

A Absolutely. In fact, that's one of the things that we pointed out to our own city commission is that having TEC in our mix allows us to fall back kind of, if you will, on less expensive coal power if for some reason our DSM bundles didn't perform like we hope that they will.

Q And earlier you stated that the City has approval in TEC through the permitting process, but not the construction phase. The City will have another opportunity to decide if they want to proceed with the Taylor Energy Center at the construction phase?

A That is my understanding. All the participants have that same, what is called go/no go option.

Q At that time where the City determines whether they want to move forward or not, what factors will the City review to determine if it is still cost-effective or in the best interest to participate in TEC?

A Well, I expect that we would do a refresh of our economic analysis. I hope we won't do another three-year IRP study like we just finished, but it would be our intention to update our IRP analysis. I'm sure our commission would want to look at all the economic factors as well as weigh any other issues related to permit conditions or something like that

before we made a decision.

Q Would you agree that it is prudent for utilities to continuously evaluate whether participating in a particular generation plant continues to be cost-effective for that utility?

A Yes, I would, presuming that we mean continuous. At some point when we make a commitment to either finance the project or begin to break ground on the project, I think you stop at that point. But, yes, you would continuously evaluate until you made that commitment to construct.

MR. FLEMING: Thank you, Mr. Brinkworth.

REDIRECT EXAMINATION

BY MS. RAEPPLE:

Q Mr. Brinkworth, you were asked some questions related to the performance of your DSM portfolios, and I think you responded with regard to your expectation of the DSM performance. Could you explain to us what that expectation level is?

A Yes. Our DSM portfolio was built on the assumption of what is called maximum achievable potential. That basis, as described by Navigant, is a basis that identifies DSM that is possible recognizing the actual end uses of the customer and certain economic factors related to the age of appliances that might be replaced and then also the willingness of the customer to participate. That maximum achievable potential, we believe,

represents the most DSM we could realistically pursue given those end use market conditions.

Q Do you have any guarantee that the City will actually achieve that maximum achievable DSM?

A No, we don't.

Q Are any other utilities in the state of Florida using the DSM methodology used by the City of Tallahassee?

A Not that I'm aware of.

Q Ms. Brownless asked you earlier about the case, the one case where the Taylor Energy Center was more expensive than a gas plant. Do you remember that line of questioning?

A Yes, I do.

Q In how many cases was the Taylor Energy Center found to be the least cost plan?

A Forty-six.

Q For the case that Ms. Brownless pointed out, was the Synapse high CO2 allowance price estimate integrated with the fuel price estimates?

A No, it was not. The CO2 estimates provided by Synapse were developed independent of any fuel forecast. We believe that in order to properly capture the CO2 benefit it should have been an integrated analysis that allowed fuel prices to respond to those assumed CO2 allowance costs.

Q Ms. Brownless also asked you to look at some exhibits that are attached to Mr. Urse's testimony. I believe those are

Exhibits 65 through 68 and Exhibit 70. Do all of those charts represent the current analysis conducted by the city?

A Not all of them, no. Several of those slides are actually extracted from presentations we made to the Commission at various points in our IRP study. Two of them, in fact, are from September of 2005, and represent earlier levels of analysis that would no longer be representative of where the city is now currently in our cases.

Q Are the Progress Energy transmission rates regulated by FERC?

A Yes, they are.

Q Ms. Brownless also asked you about the possibility for the variation in the costs of the Taylor Energy Center depending on the SCA process. Can the costs vary depending on the results of the SCA process for any proposed power plant under the Power Plant Siting Act?

A Certainly they can.

Q She also asked you about whether or not the city had done an internal sensitivity analysis reflecting the 20 percent in addition to the new capital costs for the Taylor Energy plant, do you remember those questions?

A Yes, I do.

Q Do you know whether a sensitivity analysis adding 20 percent to those new capital costs was done as part of this need application process?

A Yes, the project, in fact, did do such a sensitivity, and I believe the results are part of Mr. Kushner's testimony.

MS. RAEPPLE: Thank you. I have nothing further.

MS. BROWNLESS: Madam Chair, may I just get Mr. Brinkworth to identify the two exhibits he believes were done in 2005?

THE WITNESS: Certainly.

CHAIRMAN EDGAR: If you can answer that, then that would be fine.

THE WITNESS: In Mr. Urse's testimony it would be the exhibit that is marked as SU-7. Pages 1 and 2 actually represent material that we presented in September of 2005.

MS. BROWNLESS: Thank you, sir.

MS. RAEPPLE: Madam Chairman, while Mr. Brinkworth is here, I would request an opportunity to also present his redirect, which is very brief. I don't mean redirect, I mean rebuttal.

CHAIRMAN EDGAR: And I knew what you meant, but thank you for that clarification, as well. Okay. Everybody take a deep breath. That seems logical to me. Is there an objection?

MS. BROWNLESS: No objection.

CHAIRMAN EDGAR: All right. Then let's go ahead and do that. Thank you.

DIRECT EXAMINATION (Rebuttal)

BY MS. RAEPPLE:0

Q Mr. Brinkworth, did you hear Doctor Bellamy's testimony during the public hearing?

A Yes, I did.

Q Could you please explain the City's electric rate structure and the influence that tax exempt government customers have on those rates?

A Yes, I'll be glad to. The City of Tallahassee's electric rate structure is built very much the same way any electric rate utility's rate structure is constructed. Doctor Bellamy was particularly identifying a component of our rate structure that allows us to transfer funds to the City of Tallahassee's general fund as part of a way, as he properly described, to offset the loss of tax revenues from tax exempt entities. However, he mischaracterized how large a component of our rates that particular factor represents. In fact, if you look at our 2007 revenue requirement models, you would see that our rate design recovery requires -- almost 65 percent of our rate revenue is related to fuel and purchased power while less than 6 percent is related to the transfer to the general fund. So it's clear that our rising electric rates are driven primarily by the cost of fuel and not by the transfer to the general government.

MS. RAEPPLE: Thank you. I have nothing further.

CHAIRMAN EDGAR: Okay. Good. Let's take up exhibits.

MS. RAEPPLE: At this time I would move Exhibits 19 and 20 into the record.

CHAIRMAN EDGAR: Exhibits 19 and 20 will be moved into the record.

(Exhibits 19 and 20 admitted into the record.)

MS. BROWNLESS: And at this time, Madam Chair, we would offer Exhibits 65 through 68, 70 -- let me get these in order -- 104, 105, 106, and 107.

MS. BRUBAKER: May I just ask for clarification. I had originally thought that we might take up the earlier exhibits with that testimony. If everybody is in agreement to do it now, that is fine.

CHAIRMAN EDGAR: Again, I want to maintain some consistency of the process because it helps me think and follow along, but yet we are trying to get as much done as we can, so if we can go ahead and do that. Is there any objection to -- and actually I'm going to ask you, Ms. Brownless, to read the numbers again for the exhibits from Witness Urse.

MS. BROWNLESS: 65, 66, 67, 68, and Exhibit 70.

CHAIRMAN EDGAR: Okay. 65, 66, 67, 68 and 70. Any objection?

MS. RAEPPLE: Madam Chairman, we would object to Exhibit 70 on grounds of relevance as Mr. Brinkworth has testified that that is outdated information.

CHAIRMAN EDGAR: Ms. Brubaker.

MS. BRUBAKER: To the extent that it was used for the purpose of cross examination, it is something that is used for Mr. Urse's testimony, I think it is appropriate to include that in the record.

CHAIRMAN EDGAR: Then I will go ahead and admit and we will enter the just listed exhibits by number into the record.

(Exhibits 65, 66, 67, 68, and 70 admitted into the record.)

MS. BROWNLESS: And 105 to 107.

CHAIRMAN EDGAR: Are we up to that? Okay. 105, 106, and 107. Any objection?

MS. RAEPPLE: No objection.

CHAIRMAN EDGAR: Okay, thank you. So Exhibits 105, 106, and 107 will also be moved into the record.

(Exhibits 105 through 107 admitted into the record.)

MS. BROWNLESS: Thank you, Your Honor.

CHAIRMAN EDGAR: Okay. And the witness can be excused. Thank you. And I believe that we are, in order to try to accommodate schedules, going to take the next witness out of order. Mr. Perko.

MR. PERKO: Paul Hoornaert.

PAUL HOORNAERT

was called as a witness on behalf of the Applicants, and having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. PERKO:

Q Please state your name and business address for the record?

A Paul Hoornaert, H-O-O-R-N-A-E-R-T, 55 East Monroe, Chicago, Illinois.

Q Mr. Hoornaert, have you been sworn?

A Yes, I have.

Q Mr. Hoornaert, did you submit prefiled direct testimony in this proceeding consisting of ten pages on September 19th, 2006?

A Yes, I did.

Q Do you have any changes or additions to that testimony?

A There is one change, and that was covered by supplemental testimony submitted December 26th.

Q And would that be the estimated capital cost revealed on Page 7, Line 5?

A That is correct.

Q Other than that change, are there any other changes to your testimony submitted on September 19th, 2006?

A No.

Q And other than that, with that change, if I were to ask you the questions in your testimony today, would the answers be the same?

A Yes.

Q Mr. Hoornaert, are you sponsoring any exhibits with your original prefiled direct testimony?

A Yes, I am, several sections in A.3 as identified in the prefiled testimony.

Q And those sections are identified as Exhibit Number 24 in this proceeding?

A Correct.

Q Are you sponsoring any other exhibits?

A My one exhibit is my resume, PH-1.

Q And that has been identified as Exhibit Number 23?

A Correct.

Q Do you have any changes or additions to that exhibit?

A No, I do not.

Q Mr. Hoornaert, did you also present supplemental or submit supplemental testimony in this proceeding consisting of four pages on December 26th, 2006?

A Yes, I did.

Q Are there any changes or additions to that testimony?

A No.

Q Are you sponsoring any exhibits with that testimony?

A One exhibit, the updated capital cost summary, PH-1R.

Q And has that exhibit been identified as Number 25?

A Yes.

Q And I may have asked you this, but do you have any

changes or additions to that exhibit?

A No, I do not.

Q If I were to ask you the same questions in your supplemental testimony as set forth therein today, would your answers be the same?

A Yes, they would.

MR. PERKO: At this time, Madam Chairman, we would request that the prefiled direct testimony and supplemental testimony of Mr. Hoornaert be inserted into the record as though read.

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

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

DIRECT TESTIMONY OF PAUL HOORNAERT

ON BEHALF OF

FLORIDA MUNICIPAL POWER AGENCY

JEA

REEDY CREEK IMPROVEMENT DISTRICT

AND

CITY OF TALLAHASSEE

DOCKET NO. _____

SEPTEMBER 19, 2006

Q. Please state your name and business address.

A. My name is Paul Hoornaert. My business address is 55 East Monroe Street, Chicago, Illinois 60603.

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

A. I am employed by Sargent & Lundy, LLC as a Senior Project Manager, Fossil Power Technologies.

Q. Please describe your responsibilities in that position.

A. As Senior Project Manager I am responsible for the overall planning, coordination, and performance monitoring of Sargent & Lundy, LLC project work. These projects include coal fired unit design, combined cycle unit design, power plant conceptual design, technology assessments, and plant betterments.

In performing these projects, I coordinate engineering activities across all engineering disciplines and work directly with our clients. I am currently managing the preliminary engineering and design work for the Taylor Energy Center (TEC) on behalf of the Florida Municipal Power Agency (FMPA), JEA, Reedy Creek Improvement District (RCID), and the City of Tallahassee (City) (collectively referred to as the Participants).

Q. Please describe your educational background and professional experience.

A. I have a Bachelor of Science degree in Mechanical Engineering from Purdue University. I am a registered professional engineer in Illinois, Florida, Michigan, Utah, and Wyoming. I have expertise in project management, conceptual designs, technology assessment, coal fired power plant design, selective catalytic reduction (SCR) design, combined cycle design, repowering, plant betterment, heat exchangers, pumps, and other power plant systems. I have over 34 years of experience in electric power facilities.

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

A. The purpose of my testimony is to discuss the technical aspects of TEC, and projected capital costs, operation and maintenance (O&M) costs, plant performance, availability, and schedule. My testimony will also include a discussion of advanced technology features that will be incorporated into the design of TEC.

Q. Are you sponsoring any exhibits to your testimony?

A. Yes. Exhibit ____ [PH-1] is a copy of my résumé.

Q. Are you sponsoring any sections of the Taylor Energy Center Need for Power Application, Exhibit __ [TEC-1]?

A. Yes. I am sponsoring Sections A.3.2, A.3.3 through A.3.3.6, A.3.3.8, A.3.5, A.3.6, A.3.7, A.3.8, and A.3.9, all of which were prepared under my direct supervision.

Q. Please describe TEC.

A. TEC will be an advanced supercritical pulverized coal unit that will be constructed on a 3,000 acre greenfield site located approximately 5 miles from Perry, in Taylor County, Florida. The boiler will be designed for 3,600 pounds per square inch gauge pressure (psig), 1,050° F main steam, and 1,100° F reheat steam temperature, which will make it a supercritical unit. The higher steam pressure in comparison to subcritical boilers, which generally operate in the 2,400 psig range or lower, will improve efficiency and, therefore, reduce overall fuel consumption per unit of output. TEC will include one boiler, one steam turbine generator with efficient steam cycle, cooling system with mechanical draft cooling towers, water and wastewater treatment systems, material handling, air quality control systems, electrical systems, and other balance-of-plant systems. A 3.5 mile Georgia-Florida rail extension to the proposed site and an onsite rail loop will be constructed to provide delivery of fuel to the plant.

Water will be supplied from a system of wells. The average use is estimated to be approximately 8 million gallons per day (MGD) with a maximum use of 10 MGD.

TEC will be electrically interconnected to the Progress Energy Florida (PEF) system at 230 kV. Transmission lines of approximately 5.5 miles in length will connect the plant to the Perry Substation. An additional 230 kV transmission line will also likely be required. The exact location of this additional transmission line is under evaluation. Transmission system studies are discussed in the testimony of Gary Brinkworth.

A more detailed description of TEC is presented in Section A.3 of Exhibit ___ [TEC-1], the TEC Need for Power Application.

Q. Will TEC include best available control technologies to minimize environmental impacts?

A. Yes. TEC will be designed to include the most advanced pollution control systems to minimize plant emissions. Low nitrogen oxide (NO_x) burners, over-fire air ports, and SCR will be used to limit NO_x emissions. A wet flue gas desulfurization (FGD) system will be utilized to reduce sulfur dioxide (SO_2) emissions, and a reverse air baghouse will be used to control particulate emissions. A wet electrostatic precipitator (WESP) will further reduce particulate matter, hazardous air pollutants in particulate form, and acid mists.

Mercury (Hg) emissions will be reduced through the co-benefits of these systems. Collectively, these pollution control systems will control TEC emissions to very low levels in compliance with all applicable regulatory standards.

In addition, process wastewaters generated from the plant will either be recycled within the plant or processed in a zero liquid discharge facility to eliminate process wastewater flows from the plant.

Q. Does the base capital cost estimate developed for TEC include appropriate costs for all these control systems?

A. Yes. The base capital cost estimate for TEC includes costs for all the control systems discussed above.

Q. Are there other important features that will be included in the design of TEC?

A. Yes. TEC will be unique among solid fuel plants in its ability to burn a wide variety of fuel types. The TEC boiler, material handling, and other systems will be designed to burn up to 30 percent petroleum (petcoke) blended with a variety of coals. In addition, TEC will be capable of burning coals from Latin America, the Powder River Basin (PRB) region in Wyoming, and Central Appalachia regions. This will provide fuel diversity and flexibility, producing additional benefits to the Participants including the ability to competitively bid coal

suppliers and transportation among multiple suppliers, and increased fuel supply reliability resulting from the ability to source from multiple geographic regions.

TEC will also include space to accommodate up to approximately 90 days of fuel storage for increased reliability by reducing the impact resulting from the unlikely event of a short-term fuel supply disruption. Startup fuel will be low sulfur No. 2 fuel oil, or ultralow sulfur No. 2 fuel oil if available.

Q. Please describe the construction costs for TEC.

A. The construction costs include direct costs for purchased equipment and materials, construction contract costs, and indirect costs. Construction costs are based on a multiple construction contracts contracting approach, which is the planned construction approach for the project. The construction cost estimate also includes costs for training, contractor general and administrative (G&A), and contractor contingency. Allowances have also been included for escalation, labor per diem, overtime differential for 50 hour workweeks, transmission lines to Perry Substation, spare parts, sacrificial coal bed, and commissioning consumables and initial fills.

Owner's costs have been separately estimated and include staffing, construction management, consultants, travel, insurance, services, supplies, rentals, one-time set-up costs, and energy and fuel for startup. Costs have also been included for land purchase and an allocation for an upfront community contribution. Ongoing community contributions are discussed in the testimony of Bradley

Kushner. An allowance for funds used during construction is also included in the estimate based on an assumed 5.0 percent interest rate, which is consistent with the economic assumptions.

The total capital cost is estimated to be $1,743,399,000 in 2012 dollars, and is summarized in Table A.3-5 of Exhibit ___ [TEC-1], the TEC Need for Power Application.

Q. Please provide the estimated fixed O&M costs.

A. Fixed O&M costs are estimated to be $17,710,227 in 2005 dollars, and are based on a full-time staff level of 149. Payroll costs of $11.36 million for the 149 full-time staff are included in the $17,710,227 fixed O&M costs. Fixed O&M is assumed to increase at the assumed inflation rate.

Ongoing capitalized expenditures are an additional aspect of fixed O&M expenses that have been included in the TEC estimates. These have been estimated to be $2.50/kW-yr in 2005 dollars. The escalation rate for ongoing capital expenditures is conservatively estimated to be 2.0 percent per year over the assumed inflation rate to account for increasing capital expenditures as the unit ages.

Q. Please provide the estimated variable O&M expenses.

A. Variable O&M includes FGD reagent, water treatment chemicals, ammonia for the SCR, an allocation for SCR catalyst replacement, allocation for baghouse

bag replacements, and other variable costs incurred during plant operation. Variable O&M expenses will also vary depending on the fuel blend being used. Assuming a 28 percent petroleum coke and 72 percent coal blend, the variable O&M estimates in 2005 dollars are $1.36/MWh for the Latin American coal blend, $1.37/MWh for the PRB coal blend, and $1.15/MWh for the Central Appalachia coal blend. Variable O&M is also assumed to escalate at the assumed inflation rate.

Q. Are emissions allowance costs included in the variable O&M expense estimates?

A. No. These were modeled separately as discussed in Bradley Kushner's testimony.

Q. What outage rates have been assumed for TEC?

A. TEC is assumed to have an annual forced outage rate of 5.23 percent over the analysis period. TEC is assumed to have an annualized scheduled outage rate of 16 days per year or 4.38 percent.

Q. Please describe the estimated performance for TEC.

A. Actual plant performance (including net plant output and net plant heat rate) will be a function of ambient conditions, fuel characteristics, and other factors. Estimated performance was developed for a summer condition, winter condition, and average annual condition. Part load performance was also developed for 35 percent load, 50 percent load, and 75 percent load. These

performance points were developed with three fuel blends consisting of 28 percent petcoke and 72 percent coal for each of the three coals, including Latin American, PRB, and Central Appalachia. For the base case fuel blend of petcoke and Latin American coal, the valves wide open net plant output is estimated to be 765.5 MW, and the net plant heat rate is estimated to be 9,238 Btu/kWh at average ambient conditions. The heat rate has been increased by a 1.5 percent allowance for degradation. Additional performance data is provided in Table A.3-7 of Exhibit ___ [TEC-1], the TEC Need for Power Application.

Q. What is the overall schedule for construction completion of the project?

A. The schedule is based on TEC achieving commercial operation on April 27, 2012. An air permit for the plant is expected to be received by April 1, 2008, which will allow for site construction activities to commence. Approximately 49 months will be required for construction of the plant after receipt of the air permit. To support this schedule, preliminary engineering and specification of major plant components will commence during the second half of 2006. These activities will primarily consist of development of specifications, identification of potential suppliers, prebid meetings with potential suppliers, and commencement of the procurement process for major long lead equipment items such as the turbine generator and steam generator (boiler).

Q. How many construction workers are estimated to be required for the construction of TEC?

A. Construction of TEC is estimated to require 1,500 construction workers during the peak construction period.

Q. Does this conclude your testimony?

A. Yes.

ORIGINAL

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

SUPPLEMENTAL TESTIMONY OF PAUL HOORNAERT

ON BEHALF OF

FLORIDA MUNICIPAL POWER AGENCY

JEA

REEDY CREEK IMPROVEMENT DISTRICT

AND

CITY OF TALLAHASSEE

DOCKET NO. 060635

DECEMBER 26, 2006

Q. Please state your name and business address.

A. My name is Paul Hoornaert. My business address is 55 East Monroe Street, Chicago, IL, 60603.

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

A. I am employed by Sargent & Lundy, LLC as a Senior Project Manager, Fossil Power Technologies.

Q. Have you previously submitted testimony in this proceeding?

A. Yes.

Q. What is the purpose of your supplemental testimony?

A. The purpose of my testimony is to provide updated capital cost estimates for the TEC project.

Q. Are you sponsoring an exhibit with your testimony?

A. Yes. I am sponsoring Exhibit No. ___ (PH-1R), which provides an update to the capital cost estimate summary included in Table A.3.5 in Section A.3.0 of the TEC Need for Power Application (Exhibit No. __ (TEC-1).

Q. Have you developed updated capital cost estimates for the TEC?

A. Yes. In light of changing market conditions observed nationwide, we have updated the TEC capital cost estimates to account for market impacts on the costs of major equipment and labor. We also have included cost estimates for mercury controls and certain additional items that the TEC Participants have selected since the filing of my original testimony. We also have adjusted the initial Community Contribution to account for changes in the structure of the contribution that were agreed upon with Taylor County after my pre-filed testimony was submitted.

Q. How do the updated costs compare to the cost estimates presented in your pre-filed testimony?

A. As shown in Table A.3-5 of the TEC Need for Power Application, Exhibit No. __ (TEC-1), the total capital costs for the TEC were originally estimated to be $1,713,399,000 in 2012 dollars. (My pre-filed testimony included a

typographical error on page 7, line 5, which states that the cost estimates were $1,743,399,000). As shown in Exhibit No. __ (PH-1R), which presents an Updated Table A.3-5 of Exhibit No. __ (TEC-1), as a result of market impacts and scope changes discussed above, the updated cost estimate is $2,039,074,000, which reflects an increase of approximately 19.01 percent from the original estimate.

Q. Why does your updated cost estimate include costs for mercury controls?

A. As stated in my pre-filed testimony, mercury emissions from the TEC will be reduced through the co-benefits of selective catalytic reduction (SCR), flue gas desulfurization (FGD), and a wet electrostatic precipitator (WESP). Because mercury controls for electric generation plants are relatively untested, however, it is possible that additional controls may be necessary to comply with the second phase of the Clean Air Mercury Rule (CAMR) discussed in pre-filed testimony of Mr. Rollins. For that reason, the TEC Participants have agreed to install additional controls if necessary to achieve a 90% reduction in TEC mercury emissions by 2018, when CAMR's second phase begins. Although the TEC Participants will implement a research program to determine if SCR/FGD/WESP or other more cost-effective controls can achieve this level of reduction, we have assumed that the only currently available mercury-specific control, activated carbon injection (ACI), will be installed. My updated capital cost estimate assumes that costs for ACI (approximately $40,000,000) will be incurred when the plant is constructed even though the TEC Participants

anticipate that additional mercury controls, if any, will not be needed until the second phase of CAMR.

Q. Does this conclude your rebuttal testimony?

A. Yes.

BY MR. PERKO:

Q Mr. Hoornaert, have you prepared a summary of your prefiled direct and supplemental testimony?

A Yes, I have.

Q Would you please provide that now?

A Sargent & Lundy is the designing engineer for the Taylor Energy Center. As project manager, I am responsible for the overall planning and coordination of the engineering aspects of the design. The purpose of my testimony is to review the technical aspects of the Taylor Energy Center design.

The Taylor Energy Center will use proven highly reliable supercritical pulverized coal technology. The supercritical pressure and temperatures and the higher cycle efficiencies result in less fuel consumption and lower emission levels. The nominal plant output will be 765 megawatts net. This unit will be equipped with the best available control technology to minimize environmental impacts. We will include an SCR for NOX control, wet FGD for SO2 control, a bag house and wet ESP for particulate control, and activated carbon injection as a contingency if that proves necessary for mercury control. The wastewater generated by the station will be recycled and processed. If needed, the processing of remaining wastewater will go through a zero liquid discharge system.

The Taylor Energy Center will be capable of burning a

wide range of solid fuels, including coals from Latin America, Central America, and the Powder River Basin, as well as up to 30 percent petroleum coke. The capital costs were developed to include equipment, materials, construction, and indirect costs. The capital costs have been updated to account for recent changes in market conditions. O&M costs, both fixed and variable, have also been estimated. That concludes my summary.

MR. PERKO: I tender the witness for cross-examination.

CHAIRMAN EDGAR: I apologize, but I need to take a five-minute break. So everybody relax for just a few minutes. Please don't go far, and we will start back in five minutes. Thank you.

(Short recess.)

CHAIRMAN EDGAR: I'm sorry. That was more than five minutes. And I want you all to know I do actually have excellent time management skills, although perhaps today it's not showing.

I need to step away for just a few more minutes, so Commissioner Carter is going to go ahead and chair the hearing. You're in very capable hands, and I'll be back very shortly.

Commissioner Carter, you have the gavel.

COMMISSIONER CARTER: I'm reminded of the beginning of *A Tale of Two Cities*. Dickens said it was the best of times and the worst of times. But that's just free.

Ms. Brubaker, we were --

MS. BRUBAKER: I believe Mr. Perko has a small clarification to make, and then I think we are at the point of tendering the witness, if I remember correctly.

MR. PERKO: Yes, Commissioner. I just want to clarify with Mr. Hoornaert.

We spoke about the application sections that you're sponsoring. Have those been updated in the errata sheet that has been submitted into evidence as Exhibit Number 3?

THE WITNESS: Yes, they have.

MR. PERKO: Thank you. We tender the witness for cross-examination.

COMMISSIONER CARTER: Okay.

MS. BROWNLESS: Thank you.

COMMISSIONER CARTER: Ms. Brownless, you're recognized.

CROSS-EXAMINATION

BY MS. BROWNLESS:

Q. Good afternoon, Mr. Hoornaert.

A. Good afternoon.

Q. We're handing out the responses of the applicants to NRDC's first set of interrogatories, and if you could just look at those when you get it and see if you provided the responses to numbers 18 and 19.

A. Okay.

MS. BROWNLESS: And I think that needs to be marked as an exhibit, which I think is 108; is that right?

MS. BRUBAKER: That's right. I'm sorry. Would you repeat the caption, please, the title?

MS. BROWNLESS: Sure. It's applicant's responses to NRDC's first set of interrogatories, numbers 1 through 26.

(Exhibit Number 108 was marked for identification.)

BY MS. BROWNLESS:

Q. And I'm sorry. Did you provide the responses to 18 and 19?

A. Yes, I did.

Q. Thank you. And are they true and correct to the best of your knowledge and belief?

A. Yes, they are.

Q. Thank you. Will you look at your updated Table A.3-5, which is your Exhibit PH-1R on your -- I think it's --

A. Okay. I have that.

Q. All right. And is that the updated capital cost summary to which you referred?

A. Yes, it is.

Q. Okay. On that updated capital cost summary, where it says base estimate --

A. Yes.

Q. Does that include the transmission costs that Mr. Brinkworth identified as directly assigned transmission

costs to TEC?

A. It includes the 5.5 miles to the Perry substation, which is what I believe Mr. Brinkworth was referring to.

Q. Okay. And those are the ones that solely benefit TEC?

A. That is correct.

Q. Okay. So you're not expecting to get those reimbursed by anybody?

A. I wouldn't expect so.

Q. Now, your revised cost estimate on your chart, does that include activated carbon injection for mercury removal in phase 2 of the CAMR regulation?

A. Yes, it does.

Q. And is that cost approximately $40 million?

A. Yes, it is.

Q. Okay. And I believe at your deposition, you testified there were approximately 2 to $4 million of variable O&M costs associated with that?

A. As an O&M cost, that's our estimate, yes.

Q. Okay. And that's a variable O&M cost; correct?

A. Yes, it would be.

Q. Okay. And that variable O&M cost was not included in the revised cost estimate that we just discussed?

A. That's correct.

Q. Now, as I understand it, TEC is projecting a need for

a 90-day coal supply; is that right?

A. Correct.

Q. Okay. And also, a 90-day limestone storage for inactive and a 10-day active limestone storage on-site?

A. Correct.

Q. Okay. Now, this is approximately a 3,000-acre site; is that correct?

A. Correct.

Q. And this site will accommodate or can accommodate another 800-megawatt size coal plant; is that correct?

A. It could.

Q. Okay. Are you aware of whether any site certification application has been filed in this case?

A. It has not been.

Q. Thank you. And are you aware of whether the applicants will ask -- or what amount of capacity the applicants will ask for under the ultimate site certification?

A. The SCA site certification application will be based on one unit of approximately 800-megawatt gross size.

Q. Okay. So they're not asking for any more than 800 megawatts for ultimate site certification at this time?

A. That is correct.

Q. With regard to the TEC unit, I believe your testimony at deposition was that at a minimum, there should be 30 days of coal supply on-site; is that correct?

A. That's correct.

Q. And that anything over 30 days was basically at the discretion of the utility?

A. Correct.

Q. Is it true that a 45-day coal supply would be sufficient for an 800-megawatt coal plant?

A. It could certainly be adequate. It's a matter of the utility's choice on how much coal they want to stockpile.

Q. Okay. So the 90-day, is that also true for the limestone storage?

A. That's correct.

Q. And just so I'm clear and the record is clear, the limestone storage is an operating expense, not a capital cost; is that correct?

A. That's correct.

Q. So the 90-day coal supply would be sufficient to accommodate two 800-megawatt coal plants on this site ultimately; is that correct?

A. If the utility elected to have half as much active or ultimate storage on-site, that would be correct.

Q. And that would be within the realm of reasonable utility practice; right?

A. It would be reasonable.

Q. If the second unit sited on this site was an IGCC plant, it could also take advantage of this coal, could it not?

A. Yes, it could.

Q. Is limestone required for an IGCC unit to operate?

A. No.

Q. Are there any technologies of which you are currently aware that will allow TEC to be retrofitted with CO_2 capture equipment should CO_2 be regulated during the 40-year life of this plant?

A. The CO_2 capture technology is an emerging technology, and there are technologies available. But as I mentioned, they're emerging. It's relatively new.

Q. Okay. Is it relatively expensive as well?

A. I really am not able to comment on the cost.

Q. Thank you. Should CO_2 be regulated in a fashion similar to SO_2 and NO_X under a cap and trade program, the net effect -- is it true that the net effect in order for TEC to operate would be that it would either have to purchase CO_2 emission allowances or turn off the plant?

A. Again, I'm really not in a position to comment on that. It's not my area of expertise.

Q. Is it true that current IGCC technology allows CO_2 to be captured and sequestered?

A. Again, it's emerging, but I believe that's accurate.

Q. And by sequestered, I mean not released into the atmosphere.

A. Right.

Q. So if that's the case, IGCC units would not necessarily be forced to use allocated allowances or to purchase them; is that correct?

A. I can't comment on that.

Q. This TEC plant is designed such that it can burn up to 30 percent petcoke; is that right?

A. That is correct.

Q. And it can also burn several types of domestic and international coal?

A. Yes.

Q. Okay. So is it fair to say that the fuel diversity that's demonstrated in this particular plant is as to coal type rather than as to fuel type? In other words, it isn't coal versus natural gas, coal versus diesel, it's different types of coal?

A. That is correct.

Q. An IGCC plant can burn natural gas as well as coal; is that right?

A. In an IGCC, if it's burning natural gas, that's typically a backup fuel when the gasification process is not available.

Q. All right. But the purpose of an IGCC plant is it produces synthetic gas from coal; correct?

A. Correct.

Q. So it can utilize natural gas in lieu of synthetic

gas?

A. If the combustion turbines are so designed.

Q. So in that sense, if the combustion turbines are correctly designed, an IGCC plant has dual fuel capability?

MR. PERKO: Commissioner Carter --

COMMISSIONER CARTER: I think you're right. He never said whether it was correct or not, so let's just stay focused.

MS. BROWNLESS: Okay.

MR. PERKO: Commissioner Carter, I have another objection. I've let this -- I've been somewhat patient, but --

MS. BROWNLESS: We're moving on, Gary. That's the last one.

MR. PERKO: Okay.

BY MS. BROWNLESS:

Q. You were asked at your deposition with regards to emissions and the difference between petcoke and coal. Do they -- does petcoke produce more or less SO_2 than coal?

A. The petcoke has a higher sulfur level, but we would be designing for the same outlet SO_2 level irregardless of the fuel, which coal or the blend.

Q. All I'm trying to do is just get a straight comparison. If one were to burn 100 percent petcoke versus burning 100 percent coal, would it produce more or less SO_2?

A. 100 percent petcoke is higher in sulfur, so it would be higher in SO_2 emissions.

Q. Does petcoke produce the same or greater or lesser amounts of NO_2 for the same volume?

A. I believe the NO_X is comparable.

Q. Okay. And do you know how petcoke compares with coal with regard to CO_2 emissions?

A. I do not.

Q. Do you know whether an IGCC unit of similar size would emit more or less SO_2 per ton of coal?

A. Could you repeat that question, please?

Q. Do you know whether an IGCC unit of similar size would emit more or less SO_2 per ton?

A. I'm not sure. I can't comment on that.

Q. Okay. The same question for NO_2, NO_X?

A. The same response.

Q. CO_2?

A. Same response.

MS. BROWNLESS: Thank you so much, Mr. Hoornaert.

MR. PABEN: I have nothing.

COMMISSIONER CARTER: No questions?

Mr. Jacobs, you're recognized.

MR. JACOBS: Thank you.

CROSS-EXAMINATION

BY MR. JACOBS:

Q. Good afternoon.

A. Good afternoon.

Q. Let me just touch on a couple of brief points. I believe in your deposition when you discussed the revised capital costs, you indicated that it would not be expected that these present projections would increase any further. Is that still your opinion?

A. That is correct.

Q. And that is based on what factors?

A. The estimate, the way we have developed it, does include escalation rates to get us through the construction period, and those are our best estimates as to the way the market will react.

Q. Are you familiar with present projects to design and construct supercritical pulverized plants in other areas of the country?

A. I'm not sure what specific ones.

Q. Okay. Let me direct you to two in particular. One would be the Big Stone project in South Dakota, and the other would be the Cliffside project in North Carolina.

A. The Cliffside project?

Q. Yes.

A. Is that the Duke project?

Q. Yes, that's the Duke plant.

A. I have read about those projects.

Q. And you're aware that in both those instances, they had a parallel experience as yours, where they came in with

original projections and then had to come back with substantially modified projections, are you not?

A. I'm aware of that.

Q. Without going too far afield -- and you can just indicate to me if you have familiarity with this. Let's talk specifically about the Duke instance. In that particular case, the company filed official pleadings with the State Commission in North Carolina indicating that an important part of the reason for their increase was due to market factors. And if you would like, I could read it to you, but are you aware generally of that concept?

A. I'm aware of that.

Q. And my question simply is this: In your statement today that you think you've captured all those potential escalation factors, you believe you've accounted for all the prevailing market factors that are in play in the design and construction of supercritical plants?

A. Yes, I have.

Q. Okay. You may be aware of the testimony we had earlier yesterday regarding the whole status of the technology in pulverized supercritical plants, supercritical pulverized plants. Let me restate the question then, if I may. Are you aware of any supercritical pulverized plants that are presently being designed and -- that are presently operational in the United States?

A. There are many supercritical pulverized coal units in operation in the United States.

Q. And have any of those been constructed and become operational within the last five years?

A. I think there's one in Iowa that's soon to come online. I think that's the newest. Within the last five years, I can't recall any specific ones that have come online.

Q. Okay. Let me move on to another item, and this is kind of under the general category of capital costs to construct a plant still. Are you aware of the market circumstances with regard to delivered coal? And in particular, I'm speaking to the rail difficulties with the delivery of coal in the United States.

A. That's outside of the area that I'm testifying to.

Q. Okay. Very well. And then it is the case that in Taylor Energy, the primary analysis that has been done assumes that the plant will burn primarily Latin American coal with up to a 30 percent mixture of petcoke; is that correct?

A. That was determined out of the fuel analyses that we did to be the lowest cost option.

Q. Okay. And then there was a sensitivity analysis done that would assume Powder River Basin would be the fuel; is that correct?

A. There's Central Appalachian and Powder River Basin; correct.

Q. In the event that there are regulations -- I'm not now arguing that there will be, but in the event that carbon is regulated, would that assumption still hold true, i.e., that the plant will primarily use Latin American and petcoke and not Powder River Basin as a base case?

A. Since the CO_2 regulations haven't been defined, I guess that piece of it I'll put to the side. But relative to those three fuels, I don't think there's any real difference.

Q. In terms of --

A. In terms of CO_2, I wouldn't think there's any significant difference.

Q. So if there are carbon allowances, you wouldn't see any preference amongst the owners to want to use Powder River Basin to address some of their allowance costs?

A. That would have to be reviewed, but I don't see that as a big impact.

Q. Okay. Just one moment. I think that may be it.

Oh, one final question. There was already a discussion of the flexibility in fuels at Taylor Energy. As one of those items of flexibility, could Taylor Energy burn biomass, or could it be designed to burn biomass?

A. At this point, it has not been incorporated into the conceptual design.

MR. JACOBS: Okay. Thank you.

COMMISSIONER CARTER: Staff?

CROSS-EXAMINATION

BY MS. BRUBAKER:

Q. Just a quick question or two, if I may, please. Mr. Hoornaert, at your deposition, you made reference -- it was at page 18, line 20 of your deposition, and I'll just read it for the sake of brevity. "The advantage of petcoke is an opportunity fuel that comes out of the refining industry, and it has a lower cost compared to coal." Can you explain for me what is meant by the term "opportunity fuel"?

A. As an opportunity fuel, it's a by-product of the refining industry, so the availability of petcoke varies, depending upon what other companies want to use petcoke as a fuel, along with what the output of the refining industry is. So it's almost like a spot market type arrangement for petcoke purchase.

MS. BRUBAKER: I think that actually concludes my questions there. Thank you.

COMMISSIONER CARTER: Okay. You want to --

MR. PERKO: Very briefly.

COMMISSIONER CARTER: Okay.

REDIRECT EXAMINATION

BY MR. PERKO:

Q. Mr. Hoornaert, with regard to the transmission lines between the Taylor Energy Center and the Perry substation that you referred to in response to Ms. Brownless, will Progress

Energy Florida make the determination whether these lines are properly categorized as direct assigned or as network upgrades as part of the ongoing facilities study?

A. I believe that's the case, based on Mr. Brinkworth's testimony.

Q. And, Mr. Hoornaert, you mentioned the potential O&M costs associated with activated carbon injection. Can you tell me why you did not include those in your cost estimates for the Taylor Energy Center?

A. The reason those have not been included, as earlier stated, the capital cost for the ACI equipment has been included as a contingency item, if in fact it's determined to be needed. We are -- there will be mercury removal capabilities based on the existing planned pollution control equipment in the neighborhood of 70 to 90 percent.

But since mercury capture is an emerging issue, exactly how those systems will react to mercury removal has not really been determined, and it isn't an item that we can get a guarantee from our equipment suppliers for. So therefore, there is some amount of uncertainty relative to how much co-benefit capture we'll get from the existing pollution control equipment. So the ACI equipment has been included as a backup, and the O&M costs have not been included, because it really isn't defined whether that's going to be needed or not or when that would be needed throughout the plant life.

Q. Mr. Hoornaert, you answered some questions from Ms. Brownless regarding CO_2 capture. Can CO_2 also be captured and sequestered at supercritical pulverized coal plants?

A. Yes, it can.

Q. And Mr. Jacobs asked you some questions regarding the Duke Energy plant that I believe was the Cliffside units.

A. Correct.

Q. And you're aware that Duke Energy had filed with the North Carolina Utilities Commission some updated costs. Do you know what those updated costs were?

A. It's my understanding that the costs for two 800-megawatt units were originally estimated at $2 million and are now estimated at $3 million. And if you compare that to the original Taylor Energy Center cost, we were considerably more conservative to begin with than the Duke project, and at this point, we continue to be much more conservative than even the revised Duke numbers.

Q. I just wanted to make sure. What were the revised Duke numbers? I believe you said it was 2 billion; is that correct?

A. I may have said million. Correct. It's 2 billion up to 3 billion.

Q. The original was 2 billion?

A. That is correct.

Q. And now what's the revised?

A. Three billion.

Q. And for how many units was that?

A. Two 800s.

Q. And the original estimate for Taylor County was what?

A. The original estimate for Taylor was 1 billion -- 1.7 billion, and we're now at over 2 billion for one 800-megawatt unit.

MR. PERKO: Thank you. No further questions.

COMMISSIONER CARTER: Okay. Let's see. We have an exhibit. Is this exhibit already part of our packet, or do we need to renumber this one?

MS. BRUBAKER: No, sir. Mr. Perko I think can walk us through Mr. Hoornaert's exhibits.

COMMISSIONER CARTER: Okay. You're recognized.

MR. PERKO: Yes, Commissioner. At this time, we would offer Exhibits -- I believe they're 23, 24, and 25.

MS. BROWNLESS: We have no objection, sir.

COMMISSIONER CARTER: Okay. No objections. Show it done.

(Exhibits Number 23, 24, and 25 were admitted into evidence.)

MS. BROWNLESS: And at this time we would like to offer what has been identified for the record as Exhibit 108.

MS. BRUBAKER: No objection.

MS. BROWNLESS: His portions that he sponsored, which

are 18 and 19.

COMMISSIONER CARTER: No objections; right?

MR. PERKO: (Shaking head negatively.)

COMMISSIONER CARTER: This means yes, this means no (indicating.) No objections. Okay. It's in, 108. I'm just trying to keep track here.

(Exhibit Number 108 was admitted into evidence.)

MS. BRUBAKER: And, Commissioner Carter, if the witness is ready to be excused, we had a request to take Mr. Lashof out of turn to accommodate a travel schedule, and certainly staff has no objection to doing so as the next witness.

COMMISSIONER CARTER: Okay. Does anyone have any further questions for this witness?

Thank you, sir. You are excused.

The next witness will be -- give me a second here. Mr. Daniel Lashof; is that right?

MR. SIMMS: Yes, Commissioner. NRDC would call Dr. Lashof.

COMMISSIONER CARTER: Okay. Give us a chance. Just a moment here.

MR. SIMMS: Sure.

MS. BRUBAKER: And actually, Commissioner Carter, if I may, while everyone is getting the relevant documents and whatnot, apparently there has also been a request to take

Mr. Powell up after Dr. Lashof, so I think everybody is in agreement that there's no objection to doing so.

COMMISSIONER CARTER: While we're coordinating, let's coordinate that too.

You're recognized.

MR. SIMMS: Thank you, Commissioner.

Thereupon,

DANIEL LASHOF

was called as a witness and, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. SIMMS:

Q. Good afternoon, Dr. Lashof.

A. Good afternoon.

Q. Could you please state your name for the record?

A. It's Daniel Lashof.

Q. And could you state your position and your business address, please?

A. I'm the science director of the NRDC Climate Center. My business address is 1200 New York Avenue Northwest, Washington, D.C., 20005.

Q. Thank you. Did you file testimony in this case on November 2, 2006, consisting of 12 pages?

A. I did.

Q. And do you have any changes that you wish to make to

your testimony?

A. No.

Q. If you were asked these same questions today, would your answers be the same?

A. Yes.

MR. SIMMS: I would like to ask that Dr. Lashof's testimony be placed in the record as though read.

COMMISSIONER CARTER: The testimony will be entered into the record as though read.

BY MR. SIMMS:

Q. Did you include any exhibits with your testimony?

A. Yes.

Q. And did these include an overview of your professional experience and qualifications?

A. Yes.

Q. A copy of the Stern Report, Summary of Conclusions?

A. Yes.

Q. A copy of "What To Do About Coal," a Scientific American article dated September 2006, of which you were an author?

A. Yes.

MR. SIMMS: For the record, those are identified as DAL-1, DAL-5, and DAL-6, identified for the hearing, I believe, as Numbers 61, 62, and 63.

BY MR. SIMMS:

Q. Dr. Lashof, did you provide answers to the staff's first set of interrogatories to NRDC?

A. Yes, I did, to numbers 1 through 5.

Q. Do you have a copy of those with you?

A. Yes.

Q. Is that true and correct, to the best of your knowledge and belief?

A. Let's see. The one I've been provided, it looks like the response to the applicants' interrogatories.

MR. SIMMS: I'm sorry. One second. We'll give you the staff's interrogatories. I apologize.

MS. BRUBAKER: Commissioner Carter, may we go off the record for a moment?

COMMISSIONER CARTER: Okay, everybody, let's take five.

(Discussion off the record and short recess.)

COMMISSIONER CARTER: We are back on the record. Ms. Brubaker.

MS. BRUBAKER: I suppose I'll let things fall naturally.

COMMISSIONER CARTER: Okay.

MR. SIMMS: I would like to just identify them for the record at this point, and then if it makes sense procedurally, deal with objections when we offer them.

MS. BRUBAKER: Okay. That's fine. Then I suppose

we're at the part where we have the opening statement from the witness then.

MR. SIMMS: I just wanted to make sure we get the identification on the record, and then I'll let him provide a summary, if that's procedurally -- if that's okay.

MS. BRUBAKER: Okay. With that, it would be identified as Exhibit 109 by my count.

BY MR. SIMMS:

Q. I'll make sure we're speaking about the same ones. The first was the answers to staff's first set of interrogatories. Dr. Lashof, do you have those now?

A. Yes, I do.

Q. And which of those interrogatories did you prepare the answers for?

A. One through 5.

Q. Thank you. And is that a true and correct copy that you have before you to the best of your knowledge and understanding?

A. Yes, it is.

MR. SIMMS: And if we could identify that as Exhibit 109.

(Exhibit Number 109 was marked for identification.)

BY MR. SIMMS:

Q. Dr. Lashof, did you provide answers to the applicants' first set of interrogatories to NRDC?

A. Yes, I did.

Q. For which of those interrogatories did you prepare answers?

A. One, 3, 4, and 6 through 12.

Q. Thank you. And do you have a copy of those before you?

A. I do.

Q. And is that a true and correct copy to the best of your knowledge and belief?

A. Yes, it is.

MR. SIMMS: And could we identify that as Exhibit 110? Thank you.

(Exhibit Number 110 was marked for identification.)

BY MR. SIMMS:

Q. Did you prepare a short summary of your testimony?

A. I did.

Q. Would you read that for the record, please?

A. Yes. Thank you.

Coal-fired power plants are the single largest source of heat-trapping carbon dioxide emissions in the United States. It has become abundantly clear that such emissions are creating a serious threat of dramatic climate disruptions, and as a result, many states have adopted or are in the process of adopting laws and regulations that will limit emissions of carbon dioxide from power plants. These include the Regional

Greenhouse Gas Initiative adopted in the Northeast and laws enacted last year in California to limit statewide emissions of greenhouse gases and to require that new long-term investments in baseload generation have CO_2 emissions no higher than those from state-of-the-art natural gas combined cycle power plants.

I'm also aware that the Florida Department of Environmental Protection is currently developing a white paper that will recommend that the State implement a program to limit carbon emissions. Among other things, the white paper acknowledges that costs associated with CO_2 mitigation --

MR. PERKO: Commissioner, I need to --

COMMISSIONER CARTER: I think we've already ruled on that, so I think this is out of bounds. Did we not rule on that white paper yesterday or two days ago?

MR. PERKO: And beyond that, it goes beyond his direct testimony.

MS. BRUBAKER: That's correct.

COMMISSIONER CARTER: So I would -- why don't we just take a minute, and you can get with your witness and just kind of let him know, just in case he's not aware of what we've already ruled on so it can all go smoothly for everyone. Okay? Let's just take five on that.

MR. SIMMS: Okay. Thank you, Commissioner.

(Short recess.)

COMMISSIONER CARTER: Okay. We are back on the

record. And the last we left, there was an objection that was sustained. Where are we?

MR. SIMMS: Thank you, Commissioner. I think we are ready to resume, and we will resume with the witness's summary. And we have discussed with him keeping the summary within the scope of his direct testimony.

Dr. Lashof.

THE WITNESS: Should I continue from where I left off or --

BY MR. SIMMS:

Q. I think that will be fine, if you will remain within the scope of the direct testimony.

A. Thank you. In 2005, the U.S. Senate passed a resolution calling for a, quote, comprehensive and effective national program of mandatory market-based limits and incentives on emissions of greenhouse gases that slow, stop, and reverse the growth of such emissions.

Based on these and other factors, it is my judgment that it is virtually certain that carbon dioxide emissions from the Taylor Energy Center will be regulated during the life of the proposed facility. It is reasonably foreseeable that TEC would incur substantial costs associated with obtaining carbon dioxide emission allowances.

It would therefore be prudent to adopt a moderate CO_2 emission allowance price forecast as part of the base case for

evaluating whether TEC is the least cost option for the participants and conduct sensitivity analysis with higher and lower forecasts. Consistent with assumptions adopted by utilities in many other jurisdictions, a reasonable estimate for CO_2 costs under expected U.S. regulation range from about 8 to about $40 per ton of CO_2.

In my judgment, the applicants have not included reasonably foreseeable CO_2 allowance costs in their economic evaluation. Therefore, I conclude the applicants have not demonstrated that TEC is the least cost option.

That concludes my summary.

Q: Please state your name, occupation, and business address.

A: My name is Daniel Lashof, I am the Science Director for the Natural Resources Defense Council's Climate Center, and my business address is 1200 New York Avenue, NW, Suite 400, Washington, D.C., zip code 20012.

Q: Please summarize your education and experience.

A: I hold a PhD in Energy and Resources from the University of California, Berkeley, and an undergraduate degree in physics and mathematics from Harvard. I am now the Science Director and Deputy Director for the Natural Resources Defense Council's Climate Center, and I have worked for NRDC for over 8 years. Prior to joining NRDC, among other things, I worked at the U.S. EPA as an environmental scientist, with the Bruce Company as a senior analyst in the climate change center, and with Lawrence Berkeley Laboratory as a research assistant. I have authored or co-authored more than 25 major publications, many directly relating to climate change, and have given testimony in dozens of instances in a variety of settings. I also have been the recipient of numerous honors and have held several climate-related appointments. My CV is attached as Exhibit A.

Q: What is the purpose of your testimony today?

A: This testimony is submitted in support of NRDC's intervention to advocate for the best and least cost option for meeting Florida's power needs, and in particular to explain why it is absolutely necessary to consider the likely costs associated with carbon dioxide emission in the context of decisions about the development of new capacity – especially for proposals involving coal-fired electricity generation. The regulation of carbon dioxide (CO_2) will have a significant impact on the relative economics of coal-based electricity generation, and should be taken into account when determining whether a particular project is the most cost-effective and least risky alternative available, whether other cost-effective alternatives exist, and whether efficiency and other demand-side

management ("DSM") measures are reasonably available to mitigate the need for the proposed plant.

Q: Why are Carbon Dioxide emissions so important?

A: Carbon dioxide is a potent heat-trapping (also known as "greenhouse") gas. As we burn fossil fuels, we release more and more CO_2 into the atmosphere – CO_2 that otherwise would have remained trapped in the coal, oil, or other fossil fuel source. By dramatically increasing the rate of such emissions over the past 200 years, we have significantly changed the concentration of CO_2 in the atmosphere, leading to changes in climate, including a pronounced increase in global temperatures, increased melting of sea ice, ice sheets, and glaciers, and alterations in weather patterns (and according to some scientists the generation of larger, more powerful hurricanes).

There is virtual unanimity within the scientific community that human activities have contributed significantly to global climate change and that if left unchecked the continued release of global warming pollutants (primarily CO_2) will result is dramatic climate disruption by the end of this century. The science tells us that each year emissions from burning fossil fuels and destroying forests puts about twice as much carbon dioxide (CO_2) into the atmosphere as natural sources can remove. As a result, the amount of carbon dioxide in the atmosphere is rising worldwide and the rate of growth is increasing. The average CO_2 concentration in Earth's atmosphere is now over 380 parts per million by volume (ppm), which is higher than it has been for at least 650,000 years.[1] In 2005 the concentration of carbon dioxide in the atmosphere increased by 2.5 ppm, the third largest annual increase ever recorded.[2] Although there is considerable variation from year to year in the rate of increase in atmospheric carbon dioxide, the rise has been

[1] Siegenthaler, U., T.F. Stocker, E. Monnin, D. Luthi, J. Schwander, B. Stauffer, D. Raynaud, J. Barnola, H. Fischer, V. Masson-Delmotte, and J. Jouse (2005) Stable Carbon Cycle-Climate During the Late Pleistocent, *Science*, 310, p. 1313-1317.

[2] Tans, P. (2006) Trends in Atmospheric Carbon Dioxide, NOAA ESRL, available at: http://www.cmdl.noaa.gov/ccgg/trends/

more than 2 ppm in 3 of the last 4 years and preliminary 2006 data indicate that this trend is continuing.

The unprecedented buildup of carbon dioxide in our atmosphere endangers our environment, our health, and our economy. Carbon dioxide traps heat in the earth's atmosphere, preventing it from escaping into space. So the imbalance in the carbon cycle has also thrown the earth's energy balance out of whack, which means that each year the earth absorbs more energy from the sun than it radiates back into space. Global warming is the inevitable result and the human fingerprint on Earth's climate is now clearly visible.

As a result, the control of carbon emissions (especially CO_2) is being widely recognized as vital to protect against catastrophic public health, environmental, and economic consequence of global warming. Indeed, a study release just this week, produced by Sir Nicholas Stern, former chief economist of the World Bank and currently the Head of the UK Government Economic Service, concludes, among other things, that the levelized costs of global warming could range from 5 to 20% of global GDP.[3] The report also concludes that many or most of the worst consequence of global warming can still be avoided at much lower cost, but doing so will require immediate and dramatic action.

In particular, because energy production is the single largest anthropogenic contributor of CO_2 emissions, and because coal-fired electricity generation is the largest single source of these energy-related emissions, controlling CO_2 from coal-fired power plants will necessarily become a major component of any program to reduce CO_2 emission.

Q: Why is regulation of CO_2 a virtual certainty during the life of this proposed power plant?

[3] The Summary of Conclusions from this report is included as an attachment to this testimony, and the full report is available at: www.sternreview.org.uk.

A: It has become abundantly clear that CO_2 emissions, from sources such as coal-fired power generation, are creating a serious threat of dramatic climate disruption. The international community has already begun to take action to curb such emissions – 190 countries have joined the United Nation's Framework Convention on Climate Change, and most have ratified the Kyoto Protocol (the U.S. and Australia alone among the industrialized countries have not). More recently certain States have also taken concrete steps to reduce their carbon footprint – for example, several Northeast States have formed the Region Greenhouse Gas Initiative (RGGI) to reduce carbon emission in that part of the country.[4] The state of California also has passed legislation to limit the state's greenhouse gas emissions, and to require that new long-term investments in baseload generation meet a minimum standard for greenhouse gas emissions, and several Western and Midwest States are now contemplating action to limit greenhouse gases. Moreover, members of Congress have introduced numerous bills, amendments, and resolutions specifically addressing global warming, and the Senate last year passed a resolution calling for a "comprehensive and effective national program of mandatory, market-based limits and incentives on emissions of greenhouse gases that slow, stop, and reverse the growth of such emissions" [5,6] Studies continue to show that such regulation is the only responsible and economically sensible course of action; for example the Stern Report referenced above concluded that while the cost of inaction could range from 5-20% of GDP, the cost of stabilizing ambient concentrations at 450 to 550 ppm CO_2-equivalent can be accomplished for about 1% of GDP. According to the report, the key policies

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[4] See www.rggi.org.

[5] Senate Amendment 866 a Sense of the Senate climate change resolution proposed by Senators Bingaman, Specter, Domenici, Alexander, Cantwell, Lieberman, Lautenberg, McCain, Jeffords, Kerry, Snowe, Collins and Boxer adopted by a vote of 53 to 44 on June 22, 2005. Congressional Record, Vol. 151, June 22 2005, S7033 – S7037, S7089.

[6] See www.aip.org/fyi/2005/114.html. In May of this year the House Appropriations Committee approved similar language. See www.pewclimate.org/what_s_being_done/in_the_congress/index.cfm for more information on Congressional action on global warming.

require to meet the goal are the implementation of carbon emission regulation (such as cap and trade measures), the deployment of low carbon-technologies and further low-carbon innovation, and the removal of barriers to energy efficiency.

As the momentum to regulate greenhouse gas emissions continues to grow around the country and internationally, businesses are increasingly recognizing the risk associated with carbon emissions. For example:

- PacifiCorp and Idaho Power Company have explicitly addressed the financial risk associated with carbon emissions in their recent IRPs. Idaho Power's draft IRP, for example, explains that the utility analyzed the financial risk of carbon emissions because "it is likely that carbon dioxide emissions will be regulated within the thirty year timeframe addressed in the 2004 IRP."[7]
- PG&E's long-term plan recognizes the risk of increasing costs for carbon emissions.
- Last year, the Coalition for Environmentally Responsible Economies (CERES) convened a Dialogue among experts from the power sector, environmental groups, and the investment community focusing on climate change. The Dialogue participants found that greenhouse gas emissions will be regulated in the U.S., and that the "issue is not whether the U.S. government will regulate these emissions, but when and how."[8]
- Utility shareholders are recognizing that the likelihood of regulation of carbon emissions represents a real financial risk, and are asking utilities to disclose those risks. Thirteen major public pension funds, which manage $800 billion in assets, recently asked the Securities and Exchange Commission to require companies to

[7] See PacifiCorp, "2003 Integrated Resource Plan," www.pacificorp.com. Idaho Power Company, "Draft 2004 Integrated Resource Plan," www.idahopower.com/energycenter/2004irpdraft.htm.
[8] Coalition for Environmentally Responsible Economies, "Electric Power, Investors, and Climate Change," June 2003, p. 4 (www.ceres.org/reports/main.htm).

disclose the financial risks they face from climate change.[9] Meanwhile, in 2004 alone institutional shareholder groups filed 29 proposals asking individual companies to outline their response to global warming.

There is overwhelming evidence that carbon emissions will likely be regulated in the near future, and accordingly, businesses in the U.S. are taking this financial risk quite seriously. We urge the Commission and Florida's utilities to recognize formally that carbon dioxide emissions pose a real and substantial financial risk to customers and shareholders.

The general consensus in the U.S. is that federal CO_2 emission controls are inevitable. Notably, the utility industry as well has begun to recognize that national carbon emission limits are both necessary and desirable – for example, executives from Duke Energy and NRG have recently made statements strongly supporting the idea of national carbon limits, and emphasizing the responsibility of the electric power sector to take action to address global warming.[10] Because power generation is the single most significant source of CO_2 in the United States (accounting for nearly 40% of U.S. emission), this industry – and coal-fired power generation in particular – is certain to be among the first industry sectors affected by carbon-related regulation.

Based on the growing consensus and concern about global warming, it is my view that national regulation of CO_2 is imminent, and is virtually certain to occur within the operational life of this proposed facility.

Q: Why would regulation of CO_2 have such a significant impact on the cost of coal-fired power generation?

A: Unlike other pollutant emissions, it is not economically feasible to capture CO_2 from conventional coal fired power plants. As a result, when a facility like the proposed TEC

[9] Margaret Kriz, "Measuring The Climate For Change," Congress Daily, April 22 2004.
[10] *See, e.g.*, http://www.cleartheair.org/proactive/newsroom/release.xml?id=25835.

is built, its carbon emissions are effectively "locked in" for the plant's operational life, making an overall reduction of aggregated CO_2 emissions that much more difficult.

However, because coal-fired power plants are the largest single contributors to CO_2 emissions, they represent the low-hanging fruit when it comes to CO_2 regulation. As a result, any strategy aimed at reducing CO_2 in order to address the impending global warming crisis will need to achieve significant reductions in emissions from such facilities. Because it is considered the most cost-effective way to ensure these reductions, a carbon trading scheme is likely to be established (much like the one now operating in Europe), which will assign a cost for CO_2 emission credits that large emitters of CO_2 (like power plants) will need to purchase. One result of this kind of regulatory scheme is a significant increase in the cost of generating electricity using carbon intensive-technology.

When carbon reduction requirements emerge they will make the operation of carbon intensive power generation units – like the one proposed here – much more expensive (requiring either the purchase of CO_2 credits to offset emissions, or the direct control of CO_2 output). To minimize costs of meeting Florida's power needs, the PSC should require exploration of other options (including conservation, efficiency, and other demand-side strategies, renewable energy sources, and alternative technologies such as IGCC).

Q: Why do you believe that the proposed Taylor Energy Center is not the least cost option and is a risky proposition for Florida's electricity customers?

A: As indicated in other testimony it appears that there are real opportunities to address future capacity needs through conservation, efficiency and other demand-side management options, and there are other potentially more cost-effective alternatives to the proposed project, such as renewable energy resources (such as biomass-fired power plants), and more advanced and more efficient coal technologies such as integrated

gasification combined cycle (IGCC), which can allow for the capture and permanent disposal of CO_2.[11] Indeed, an analysis of energy options available to the City of Tallahase found that a resource plan based on increased investment in demand side management (DSM) and a biomass-fired power plant would be lower cost than a plan in which the City invests in its proposed share of the Taylor Energy Facility. In addition, however, because the applicants here have not evaluated the true cost of a pulverized coal-fire power plant, including costs associated with future carbon regulation, their analysis is incomplete.

The Taylor Energy Center project has chosen a coal-based technology for generating electricity that will create huge volumes of CO_2 emissions that will be effectively uncontrollable for the foreseeable future. We estimate that the proposed 800 MW facility will emit about 5.8 million tons of CO_2 pollution annually. The facility will likely operate for at least 50 years – adding over 290 million tons of CO_2 to the atmosphere during its operational life. (Assuming the generating unit has an approximate heat rate of 9000 BTUs per kWh, that means about 1,850 pounds of CO_2 per MWH. An 800 MW plant running at approximately 90% capacity factor would produce 6.3 million MWH per year (800 * 8760 * 0.9). That equates to (1850*6,300,000/2000) or 5,827,500 million annual tons of CO2.). Because CO_2 emission will likely be regulated over most of this plant's operating life, these carbon emissions will add significantly to the cost of operating this facility.

There are various cost estimates related to future carbon dioxide emissions control that span a range from $8 per ton to $40 per ton. For example, there is currently a carbon dioxide trading program in Europe that serves as one component of European efforts to

[11] For a description of IGCC see: http://www.gasification.org/gasproc.htm. More information is also available at: http://www.netl.doe.gov/technologies/coalpower/gasification/index.html. Presentations from vendors and others from the recent gasification technologies conference in Washington D.C. are available on-line at: http://www.gasification.org/Presentations/2006.htm.

address global warming. In that trading program, carbon dioxide emissions have reached a high of about $42 per ton.[12] Several states in the U.S. have specifically required consideration of future carbon costs as a part of their energy planning processes. In particular, the California Public Utilities Commission requires that the utilities use a "greenhouse gas adder" of $8 per ton CO_2, beginning in 2004 and escalated at 5% per year, in long-term planning and procurement for purposes of evaluating new long-term resource investments.[13] The Montana Public Service Commission has a similar requirement.[14] Idaho Power is using a carbon cost of $14/ton starting in 2012.[15] As a result, reasonable estimates for CO_2 costs under expected U.S. regulations range from about $8 to about $40 per ton.

Even assuming a relatively low carbon cost, of say $12 per ton, it is clear that emission from a facility like the one proposed here could create a significant financial burden. At this rate to fully account for the facility's emission, for example, it would cost TEC almost 70 million dollar per year. Given the growing consensus regarding the need for quick and decisive action to control global warming, and the clear indication that carbon emission restriction of some kind are a virtual certainty, there is simply no good reason not to include consideration of such costs in the planning process. Failing to do so, in fact, does a material disservice to Florida's electricity consumers.

The fact that there is uncertainty about the timing and the specific cost impact of carbon dioxide regulation is no excuse to ignore the issue entirely. Assuming no cost for carbon emissions over the life-time of the plant is equivalent to assuming there is 100%

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[12] *See* http://pubs.acs.org/subscribe/journals/esthag-w/2006/jul/business/mb_carbonprices.html.
[13] California Public Utilities Commission. Decision No. 04-12-048, and Decision 05-04-024.
[14] Montana Public Service Commission. "Written Comments Identifying Concerns Regarding Northwestern Energy's Compliance with A.R.M. 38.5.8201-8229." Docket No. N2004.1.15, *In the Matter of the Submission of Northwestern Energy's Default Electricity Supply Resource Procurement Plan*, August 17, 2004.
[15] See http://www.idahopower.com/energycenter/irp/2006/2006IRPFinal.htm.

certainty that carbon will not be regulated, clearly an imprudent assumption. Indeed, there is an entire industry – the insurance industry – whose business it is to quantify uncertain risks, and despite profound uncertainty about whether and when we might experience significant costs, most of us make monthly payments to insure ourselves and our families against risks related to sickness, auto accidents, fire, disability and death. We do so because it is the responsible thing to do. The PSC owes no lesser responsibility to the people of Florida.

In addition to the purely energy cost-related issues described above, Florida sits on the front-lines of the battle against global warming and its potentially devastating effects, and therefore should have a particular interest in recognizing the importance of addressing global warming and leading the charge to reduce carbon emissions. The overwhelming consensus among climate scientists is that global warming, if it remains unchecked, will cause serious climate disruption including more intense hurricanes, more frequent and more severe floods, and potentially catastrophic sea level rise – effects that the citizens of Florida are likely to feel acutely. Certainly a strong policy that recognizes the likelihood and importance of controlling CO_2 emissions would be consistent with the PSC's mission to serve the public welfare, especially in a state with 2,276 miles of tidal coastline and a mean elevation of only 100 feet above sea level.

Q: Are you sponsoring any exhibits?

A: Yes. There are 7 exhibits attached to my testimony.

MR. SIMMS: I would tender the witness for cross-examination.

MR. PERKO: Commissioner, I think that it would probably be more appropriate for the other intervenors to go first. Depending on whether and the extent to which friendly cross-examination is allowed, my cross-examination may be very limited.

COMMISSIONER CARTER: So you want to cross-examine your own witness? Is that what you're saying?

MS. BROWNLESS: No, sir. Here's --

MR. PERKO: No, I'm speaking of --

MS. BROWNLESS: -- the problem, Your Honor. The problem is this concept of, quote, friendly cross, close quote. There is no such concept under the Florida Rules of Civil Procedure, which are the rules that apply to administrative proceedings and proceedings before this body.

So to the extent Mr. Perko would like to go last, he's certainly welcome to go last. But, you know, I do not acknowledge or accept, and would strongly contest that there is any such thing as friendly cross, so I think the order is up to my colleagues. It's not a matter of friendly cross.

MR. JACOBS: And I think that's who Mr. Perko is really addressing, is our opportunity to cross-examine the witness of NRDC. And I think Mr. Perko's -- we had discussed -- we were already in agreement that we would go

first, but I think his concern is that we would operate in tandem as one party in our questioning of these witnesses, and I too would disagree with that assumption. They're not totally unified interests. We have interests that are distinct.

COMMISSIONER CARTER: Well, let's not get far afield. Let's stay focused on why we're here, and let's stay focused on the issue. We'll allow some, but I'll expect us to really -- you know, let's don't turn this into more than what it really is, and let's adhere to some modicum of professionalism. This is a situation where we're dealing with something that's significant to the people of Florida, so let's keep it on that level.

Ms. Brubaker.

MR. JACOBS: We can assure you, Commissioner Carter, that --

COMMISSIONER CARTER: Wait, wait, wait, wait. Ms. Brubaker.

MS. BRUBAKER: I don't really have anything in particular to add. I would just note that the direct case is the direct case. I think cross-examination is probably most appropriate to try the direct case, to get clarification where clarification is needed, to challenge where challenging is appropriate, depending on one's position in the proceeding.

I don't think it's appropriate to -- and I'm not -- I don't mean to infer that this is what the intervenors intend to

do or will do, but I don't think it's appropriate to wholesale enlarge, expand upon the case in chief when that opportunity was already provided through prefiling in your direct case.

I don't think that cross-examination, in any event, should be irrelevant, immaterial, unduly repetitious. That's in Section 120.569, Florida Statutes. So I would expect everyone to be mindful of time and to be professional.

COMMISSIONER CARTER: Thank you, Ms. Brubaker.

Mr. Jacobs, you were about to say?

MR. JACOBS: I would like to move on, but I feel I have to at least be very clear. Unless there have been some modifications of the Florida Rules of Civil Procedure or --

COMMISSIONER CARTER: Are you going to make a speech, or are you going to move on? Okay. Let's move on. Let's move on.

MR. JACOBS: I would like to move on. Very well, sir.

COMMISSIONER CARTER: Let's move on.

MR. JACOBS: And what I would like to say is that we intend to be bound --

COMMISSIONER CARTER: This is not a forum to discuss whether or not the Florida Rules of Civil Procedure are appropriate or not. That's a different forum. That's across the street at the Supreme Court. So let's move on with our case.

MR. JACOBS: Very well.

CROSS-EXAMINATION

BY MR. JACOBS:

Q. Good afternoon, Mr. Lashof.

A. Good afternoon.

Q. How are you? I want to be very clear and very specific. I want to direct you to your testimony. And I want to go to page -- I'm sorry. Let me get to the bottom here. Page 10.

A. Yes, sir.

Q. And I want to begin at line 9. And here you indicate that the Taylor Energy Center would generate substantial volumes of carbon emissions.

A. Yes. I provide an estimate of the lifetime emissions from the plant over 50 years.

Q. And on what do you base those estimates?

A. I base the estimates on my knowledge of the carbon content, average carbon content of coals and an estimate of the heat rate of the plant.

Q. And the baseline assumptions for your analysis comes from the application that was generated by the applicants; is that correct?

A. I don't recall whether these specific numbers for the heat rate come directly from the application. The size of the plant comes from the application.

Q. Okay. Now, there is clear indication in your testimony that there is an economic cost associated -- real economic cost associated with generating carbon; is that correct?

A. I believe it's virtually certain that over the life of the facility, there will be economic costs associated with emissions of CO_2 from the plant, yes.

Q. And that is based on your understanding of what the start date, the operational date of this plant is?

A. Yes, based on the expected start date and the lifetime of the facility.

Q. Okay. And so the idea here is that in evaluating this plant, the true O&M costs of the plant when it comes online will be affected by a carbon regulatory regime; is that correct?

A. Yes.

Q. You in your testimony on page 11 -- actually, it begins on page 10 at line 21, and you talk about several proxies for what a cost might be. Over on the next page, you cite some examples of regulatory regimes that are in place today and other regulatory agencies. Do you see that?

A. Yes.

Q. You also cite a regulatory regime that exists in Europe; correct?

A. Yes, I do.

Q. And would it be reasonable to use these proxies as evidence of an emerging trend that exists today for a carbon regulatory regime?

MR. PERKO: Objection. I believe Mr. --

COMMISSIONER CARTER: Let's focus. Look, everyone is entitled to their day, and we want to have that, but let's stay focused. If you want to get information in the record, the proper way to do it is to do it properly, so let's stay focused. We're not here litigating what they're doing in Europe or anything like that. We're talking about this project as planned and our the needs determination, so let's stay focused.

MR. JACOBS: Yes, sir.

BY MR. JACOBS:

Q. Mr. Lashof, we're looking at your testimony still, the same page. You cite the Idaho -- I'm sorry. You cite a carbon price that is in existence today that applies to Idaho Power. You cite a price that is in today that has been required by the Montana Public Service Commission; is that true?

A. That's correct.

Q. You cite a price that is in existence today that has been implemented by the California Public Utilities Commission; is that correct?

MR. PERKO: Commissioner, I'm sorry. I need to

object. I think we're just reading through the testimony. And furthermore, I don't believe Mr. Jacobs is allowed to ask leading question, since this witness is clearly not adverse to the party he's representing.

COMMISSIONER CARTER: Ms. Brubaker, you know, I --

MS. BRUBAKER: I suppose if --

COMMISSIONER CARTER: I don't want to delete the entire information, but I do see that we're just getting far afield here.

MS. BRUBAKER: If Mr. Jacobs could -- I suppose -- I understand that he's probably laying a foundation. If there's any way to accelerate that process and get to the questioning --

MR. JACOBS: I would love to do that.

MS. BRUBAKER: Okay. Asking leading questions of a witness is generally more appropriate when it is an adverse witness. I would not consider Mr. Lashof an adverse witness to the Sierra Club and the other inventors that Mr. Jacobs represents.

MR. JACOBS: Ms. Bru -- I'm sorry to interrupt. Go ahead.

MS. BRUBAKER: I've completed.

MR. JACOBS: If I may, Commissioner Carter, the way that I was anticipating doing that was having him read his testimony into the record, which I thought was more

inappropriate than simply quoting to him what was in his testimony. If that's more appropriate, I would be happy to do that. That would not be leading; is that correct?

MS. BRUBAKER: Well, I suppose my concern would be that the testimony is in the record at this point. Perhaps if there's a way to accelerate to the actual questioning --

MR. JACOBS: I think we can. Let me try that.

MS. BRUBAKER: Thank you.

BY MR. JACOBS:

Q. Dr. Lashof, based on your testimony that has been prefiled, is it your view -- strike that. What is your opinion as to an emerging standard for carbon regulatory costs in the United States?

MR. PERKO: Objection. First of all, it calls for speculation. And secondly, the opportunity to file testimony for this witness came and passed on November 2nd. He has provided expert opinions. Those are in the testimony, and they stand for themselves. I think all we're getting into here is supplementing the record inappropriately.

COMMISSIONER CARTER: Mary Anne?

MS. HELTON: I'm sorry. I just -- I find myself at the point where I just can't keep my mouth shut.

COMMISSIONER CARTER: I'm listening.

MS. HELTON: First I would like to read you the Florida Statutes, because I think that's what is applicable

here. "Irrelevant, immaterial, or unduly repetitious evidence shall be excluded, but all other evidence of a type commonly relied upon by reasonably prudent persons in the conduct of their affairs shall be admissible whether or not such evidence would be admissible in a trial in the courts of Florida."

So I think one thing we need to think about today is, we're trying to get through this massive number of witnesses and get finished with the hearing so you all can actually make your decision.

I would also -- if I could just beg your indulgence and read a paragraph from the 2004-2005 edition of *Florida Civil Practice* by Judge Padovano. He is talking about civil trial practice, which is not exactly on point, but I think it's interesting, in that he disagrees with Ms. Brownless with respect to which parties are entitled to cross-examine witnesses.

MS. BROWNLESS: With all due respect, and I'll make this very brief, I know Judge Padovano. He's an excellent appellate judge. It's his treatise. It's his opinion. With that caveat, please read.

MS. HELTON: I would be happy to. Section 19.6 concerning cross-examination: "If there is one party on each side of the case, each would have the right to cross-examine the witnesses called by the other. Likewise, if there are multiple parties on one side of the case, all parties on one

side would have a right to cross-examine a witness called by a party on the other side.

"It is more difficult, however, to determine whether a party has a right to cross-examine a witness called by another party on the same side of the case. A party who is aligned on the same side of the litigation as the party calling the witness should be allowed to cross-examine the witness if the interests of the parties are adverse to each other.

"On the other hand, a party who is aligned on the same side of the litigation with a party having a common interest should not allowed to cross-examine a witness called by that party. Co-parties having common interests in the litigation shouldn't be allowed to cross-examine witnesses called by each other."

I agree with Ms. Brownless that this is a treatise. However, it's a treatise written by, I believe, a respected judge in the State of Florida, one who presided over circuit court and now is presiding in appellate court. I know that I think he takes a pretty hard line, one that the Commission does not follow in its practice strictly.

However, I do think that we need to all be aware of the time that we have in this case. We have to be aware that we have certain prehearing procedures here at the Commission which involve parties prefiling their direct case by way of prefiled testimony. It should not be, and I do not believe is,

proper Commission practice for another party to bolster a case filed by that party by way of cross-examination. And I would hope that all parties here today could keep that in mind so that we can move along in a quick and deliberate manner.

MS. BRUBAKER: If I might also just weigh in, from a quick review of the issues, while not necessarily word for word identical, there is a certain amount of similarity in the positions take by the party whom the witness represents and the counsel who is currently asking questions, and perhaps if there's a way to focus on whatever differences there may be in those positions, that might be a more effective and useful use of our time.

COMMISSIONER CARTER: Thank you. I am fairly close to disallowing this whole process, but I was hoping that if we were to just stay focused, we could go down it. I gave you some leeway, Mr. Jacobs, and it seemed like it's a figurative slap in the face.

You must take the proceedings serious before this tribunal. I mean, every lawyer that I know of in Florida, and practically any other state, has taken an oath of office. And in that oath of office, we have three responsibilities, to our client, to the lawyers on the other side, that is, the process, and to the judicial tribunal before which we're appearing. And I don't need to lecture to any of your lawyers about that, because those are the rules that we all adhere to over and

above what's written in the books.

And I was willing to allow some leeway. And I'm telling you, I'm going to take two minutes, and then when I come back in two minutes, I'm going to make a ruling. So I would hope that this is not the way that we reward the process when I say I'm willing to allow some leeway. You can't have it your way just because you want it a certain way. I can't have it my way.

So I'm going to take about two minutes, and I suggest that those of you that have similar interests get your act together.

We are in recess.

(Short recess.)

COMMISSIONER CARTER: We are back on the record. And the last time, there was an objection pending, and I shall sustain the objection, and will most happily pass the gavel on to our distinguished chairman.

CHAIRMAN EDGAR: Okay. My understanding is that, Mr. Jacobs, you are questioning; is that correct?

MR. JACOBS: Yes.

CHAIRMAN EDGAR: Okay.

MR. JACOBS: Yes, Madam Chair.

BY MR. JACOBS:

Q. Dr. Lashof, if I recall, my last question was objected to.

Off the record for a moment. The objection was as to speculation; is that correct?

MR. PERKO: I believe the objection was to reading the testimony and getting him to try to supplement the testimony through additional opinions, and speculation.

BY MR. JACOBS:

Q. Dr. Lashof, would you give us your statement and the basis of your statement in your testimony on page 11, beginning at line 2 to line 10?

A. Yes. In my testimony, I review the practice of a number of other states in requiring utilities in their integrated resource plans to quantitatively incorporate expected carbon dioxide emission allowance costs for the purposes of determining what a least cost option is, as required in their base cases, and I conclude that a reasonable range based on that practice is 8 to $40 per ton.

MR. JACOBS: No further questions.

CHAIRMAN EDGAR: Okay. Thank you. Mr. Paben, did you have questions?

MR. PABEN: Just a few.

CROSS-EXAMINATION

BY MR. PABEN:

Q. Mr. Lashof, did you complete the response to NRDC's response to applicants' first set of interrogatories, number one?

A. Yes.

Q. In that response, did you provide a chart which compared different CO_2 prices?

A. Yes, I did.

Q. Let me ask you -- is this a true and correct copy of that chart?

A. Yes, it is.

Q. And can you briefly describe what this chart shows and your basis?

MR. PERKO: Objection. Madam Chairman, we're trying to supplement the record here. This is not in the witness's testimony, nor does he speak about it.

MR. PABEN: Well, you know, my client has his own witness that speaks about potential future carbon dioxide costs, and it doesn't coincide with this chart.

CHAIRMAN EDGAR: Mr. Perko.

MR. PABEN: And I just wanted to ask him to explain the difference.

MR. PERKO: Ms. Deevey's testimony is in the record, and it speaks for itself, as does Mr. Lashof's.

CHAIRMAN EDGAR: I think we need to move on. I will concur with the objection.

BY MR. PABEN:

Q. Mr. Lashof, the last question then. Mr. Preston based his carbon dioxide sensitivity analysis on the

McCain-Lieberman bill, the Climate Stewardship Act of 2005; is that correct?

A. Yes.

Q. Is that the most recent version of the McCain-Lieberman Act?

MR. PERKO: Objection, Your Honor. Again, it's outside his direct testimony.

CHAIRMAN EDGAR: Mr. Paben.

MR. PABEN: Well, his direct testimony is on the likelihood of various federal legislation passing. That's what his direct testimony is pretty much about. He states fairly often that he's virtually certain that, you know, federal legislation will pass.

CHAIRMAN EDGAR: Ms. Brubaker, or Ms. Helton?

MS. BRUBAKER: If we could have just a moment.

CHAIRMAN EDGAR: Just a moment, yes, of course.

(Pause.)

MS. BRUBAKER: Could I trouble counsel for Mr. Whitton to repeat his grounds for continuing this line of questioning?

MR. PABEN: It's based on Mr. Lashof's -- trying to understand his basis for his virtual certainty, which he repeatedly states, that there will be -- you know, there's federal legislation regarding these CO_2 costs, you know, which stems from page 5 of his testimony.

MS. HELTON: And did your question go to whether there is a certainty or not? I'm sorry. I didn't hear your full question.

MR. PABEN: This question goes to the applicants' expert, Mr. Preston, based his analysis on the McCain-Lieberman bill, Senate 342, you know, the Climate Stewardship Act of 2005, and I was just wondering if that was the most recent.

MR. PERKO: Madam Chair, I would just point out that Mr. Lashof's testimony does not even reference Mr. Preston nor the McCain-Lieberman bill.

MR. PABEN: I was just going to Mr. Lashof's testimony about the virtual certainty of CO_2 --

CHAIRMAN EDGAR: Ms. Brubaker?

MS. BRUBAKER: I'm inclined to agree that it's outside the scope of the direct testimony. If you want to allow some very limited questioning to see where it goes, but I'm afraid I don't see it in the testimony at this time.

CHAIRMAN EDGAR: Okay. Because of the previous ruling about allowing some latitude, but I think we have done that, and for consistency, again, I think we need to move along, so I will agree with the objection.

BY MR. PABEN:

Q. Let me just ask then, Mr. Lashof, what is the basis of your virtual certainty that carbon dioxide regulation will be passed?

A. It stems from the developments in the states, where a number of states have recently passed laws or adopted or are in the process of adopting regulations, as well as the developments in Congress, which include a series of bills that have been introduced recently, the resolution, as I discussed in my testimony, passed by the Senate last year, and additional legislation, many of which include much deeper reductions than the McCain-Lieberman bill.

MR. PABEN: That's all. Thank you.

CHAIRMAN EDGAR: Thank you. Mr. Perko.

MR. PERKO: Just very briefly, Madam Chairman.

CROSS-EXAMINATION

BY MR. PERKO:

Q. Mr. Lashof, on page 11 of your testimony -- I believe Mr. Jacobs referenced this. On line 8, you state that Idaho Power is using a carbon cost of $14 per ton starting in 2012. And there's a footnote referencing a website, and I believe that is to the Idaho Power 2006 Integrated Resource Plan; is that correct?

A. Yes.

Q. Now, in that 2006 Integrated Resource Plan, it states that Idaho Power expects to add approximately 250 megawatts of pulverized coal generation in 2013; is that correct?

A. I don't recall that specifically. I don't recall whether that's what it states in the resource plan. I don't

have the document with me.

MR. PERKO: If we could just have a moment, Madam Chairman, while that document is distributed to counsel.

CHAIRMAN EDGAR: Yes, sir.

(Documents distributed.)

BY MR. PERKO:

Q. Dr. Lashof, do you see the document that I gave to you entitled "2006 Integrated Resource Plan, Idaho Power"?

A. Yes, I do.

Q. Is that the document referenced in your testimony?

A. Yes, it is.

Q. And I would refer you to page 97 of that document, the first full paragraph. Does that refresh your recollection as to whether Idaho Power expects to add approximately 250 megawatts of pulverized coal generation in 2013?

A. Yes. The Integrated Resource Plan calls for 150 megawatts of wind in 2012, followed by 250 megawatts of pulverized coal in 2013.

Q. Thank you. Now, Mr. Lashof, beginning on page 9, line -- it looks like it's after 25, but the last word starts, "integrated gasification combined cycle." And the gist of the sentence is that integrated gasification combined cycle or IGCC can allow for the capture and permanent disposal of CO_2.

Is it technically feasible to permanently capture and sequester carbon dioxide from pulverized coal units?

A. As addressed in my article, "What To Do About Coal," yes, it's technically feasible. But it's more expensive and requires approximately 30 percent of the energy output of a pulverized coal unit to capture carbon dioxide, and therefore it's more expensive and requires more energy than with an integrated gasification combined cycle unit.

Q. Are there any integrated gasification combined cycle units currently in operation that capture and sequester carbon dioxide?

A. I'm aware of a proposed unit by BP that is expected to be online in 2011 or 2012 in Carson, California, but not any currently in operation.

MR. PERKO: Thank you. No further questions.

CHAIRMAN EDGAR: Are there questions from staff?

MS. BRUBAKER: Just one, please.

CROSS-EXAMINATION

BY MS. BRUBAKER:

Q. Dr. Lashof, are you aware of any particular methodology that has been approved by either the EPA or DEP expressly for the purpose of evaluating source-specific costs associated with controlling SO_2 and NO_X and CO_2 air emissions?

A. I'm not aware of any formally approved methodology. I'm aware that the Environmental Protection Agency uses various models to make estimates.

MS. BRUBAKER: Thank you.

CHAIRMAN EDGAR: Ms. Brownless?

MS. BROWNLESS: I think at this time we would like to move Dr. Lashof's exhibits into the record, and they are --

CHAIRMAN EDGAR: So no redirect?

MS. BROWNLESS: No, ma'am.

CHAIRMAN EDGAR: Okay. Before we do that, do we need to mark this document that Mr. Perko distributed?

MR. PERKO: No, ma'am.

CHAIRMAN EDGAR: Okay. Thank you.

Okay. The exhibits.

MS. BROWNLESS: Give me a minute, and I'll make sure I have the right numbers for you.

CHAIRMAN EDGAR: Okay. From my list, 61, 62, and 63.

MS. BROWNLESS: Yes, ma'am. And I believe that there would also be -- well, why don't we do these first.

CHAIRMAN EDGAR: Yes, let's start with those. Are there any objections to the exhibits marked as 61, 62, or 63?

MR. PERKO: Madam Chairman, I understand that we had previously had an objection to 62 as hearsay, and we understand that that will be admitted, but I just would like to preserve that objection to the extent that it's uncorroborated hearsay.

CHAIRMAN EDGAR: So noted. With that objection, Exhibits 61, 62, and 63 will be entered the record.

(Exhibits Number 61, 62, and 63 were admitted into evidence.)

CHAIRMAN EDGAR: And then that brings us to --

MS. BROWNLESS: And that brings us to Exhibit 109 and 110.

CHAIRMAN EDGAR: Yes, ma'am.

MR. PERKO: And, Madam Chairman, we would object to those as supplementation of the record outside the witness's direct testimony.

CHAIRMAN EDGAR: And my understanding is that those exhibits do go beyond the direct testimony, so unless I hear something different, I am inclined to not admit at this time.

MS. BROWNLESS: Thank you, Your Honor. And I'm just going to put this on the record. With regard to Exhibits 109 and 110, we don't think they go beyond direct.

We would say that there's no prejudice to either the staff or the applicants, because these responses were provided prior to the hearing. They've had plenty of time to review them. They can cross-examine on them. They could do whatever they needed to do. So there's no prejudice to admitting them into the record.

Thank you.

CHAIRMAN EDGAR: Okay. That objection is also noted for the record, and my ruling remains to not enter them.

MS. BROWNLESS: Thank you, Your Honor.

CHAIRMAN EDGAR: Thank you. And I believe that concludes where we are with this section and witness Lashof.

Thank you. And you are excused.

THE WITNESS: Thank you.

(Transcript follows in sequence in Volume 9.)

CERTIFICATE OF REPORTER

STATE OF FLORIDA:

COUNTY OF LEON:

WE, JANE FAUROT and MARY ALLEN NEEL, Registered Professional Reporters, do hereby certify that the foregoing proceedings were taken before us at the time and place therein designated; that our shorthand notes were thereafter transcribed under our supervision; and the foregoing pages numbered 791 through 884 are a true and correct record of the aforesaid proceedings.

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

DATED THIS 16th day of January, 2006.

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