ORIGINAL

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NOs. 02___-EI, 02___-EI
FLORIDA POWER & LIGHT COMPANY

IN RE: PETITION FOR DETERMINATION OF NEED FOR PROPOSED ELECTRICAL POWER PLANT IN MARTIN COUNTY OF FLORIDA POWER & LIGHT COMPANY

IN RE: PETITION FOR DETERMINATION OF NEED FOR PROPOSED ELECTRICAL POWER PLANT IN MANATEE COUNTY OF FLORIDA POWER & LIGHT COMPANY

TESTIMONY & EXHIBITS OF:

STEVEN R. SIM

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

FLORIDA POWER & LIGHT COMPANY

DIRECT TESTIMONY OF STEVEN R. SIM

DOCKET NOS. 02_____-EI, 02_____-EI

Q. Please state your name and business address.

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

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

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

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

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

Q. Please describe your education and professional experience.

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

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

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

Q. Have you previously testified before this Commission?

A. Yes. I have appeared in several dockets related to FPL's resource plans, including Docket No. 930548-EG, Adoption of Numeric Conservation Goals and Consideration of National Energy Policy Act

Standards. In that docket the Commission first established DSM Goals for FPL and other Florida utilities. I also appeared in Docket Nos. 920520-EQ and 920648-EQ that dealt with FPL's evaluation of outside proposals for filling capacity needs in the 1998-1999 time frame, the subsequent selection of the Cypress Energy Project as the best option, and FPL's request for Commission approval of that project in a Determination of Need hearing. More recently, I also filed testimony in Docket No. 971004-EG, Adoption of Numeric Conservation Goals (i.e., the second DSM Goals process), that was ultimately settled by all parties outside of a hearing.

Q. Are you sponsoring an exhibit in this case?

A. Yes. I am sponsoring Exhibit ___, Documents SRS - 1 through SRS - 16 that are attached to my direct testimony.

Q. Are you sponsoring any part of the Need Study in this proceeding?

A. Yes. I am sponsoring Sections IV and V in the Need Study.

Q. What is the purpose of your testimony?

A. My testimony has five main points. First, I identify FPL's additional resource needs for the 2005 and 2006 time frame and explain how these needs were determined. Second, I describe FPL's Request for Proposals (RFP) for meeting its resource needs in 2005 and 2006. Third, I discuss the outside proposals that FPL received in response to its RFP and the FPL construction options that were evaluated. Fourth, I explain the process FPL used in analyzing the outside proposals and FPL construction options. Fifth, I present the results of these analyses that demonstrate that two of FPL's construction options are the most cost-effective means to meet the 2005 and 2006 resource needs. In addition to being the most cost-effective alternatives, the FPL options have important non-price advantages as well in areas such as reliability of supply. Consequently, the FPL construction options are clearly the best resources for meeting FPL's customers' needs.

I. FPL's Resource Needs for 2005 and 2006

Q. How did FPL decide it needed additional resources for the 2005 – 2006 time frame, and what were the magnitude of these resource needs?

A. FPL uses two basic analytical approaches in its reliability analyses to determine the timing and magnitude of its future resource needs. The first approach is to project reserve margins for both Winter and Summer peak hours for future years. A minimum reserve margin criterion of 15% is used to judge the projected reserve margins through the Winter of 2004. Then, starting with the projected reserve margin for the Summer of 2004, and for all projected Winter and Summer reserve margins for subsequent years, the minimum criterion increases to 20%. This increase in the reserve margin criterion is due to the voluntary adoption of a 20% reserve margin standard by FPL, Florida Power Corporation, and Tampa Electric Company as a result of issues raised in the Commission's Docket No. 981890-EU.

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

For a number of years now, FPL's projected need for additional resources has been driven by the Summer reserve margin criterion. In other words, the Summer reserve margin criterion is projected to be violated before either the Winter reserve margin or LOLP criterion are violated. This again was the case in FPL's reliability analysis that was the basis for FPL's projected 2005 and 2006 capacity needs. The additional MW are needed to meet both the 2005 and 2006 Summer reserve margin criterion of 20%. The additional MW needed by the Summer of 2005 are projected to be 1,122 MW. Another 600 MW are projected to be needed by the Summer of 2006. In total, an additional 1,722 MW of new resources are needed for these two years. This projection is shown in Exhibit ___, Document SRS - 1.

Q. This value of 1,722 MW is slightly different from the 1,750 MW need listed in the RFP document. What is the reason for the difference?

A. The RFP document listed an FPL need of 1,150 MW for 2005 and 600 additional MW for 2006. As indicated on page 5 of the RFP, this 1,750 MW total need for these two years was based on FPL's 2001 Ten-Year Site Plan projection of capacity needs. The 2001 Site Plan reports the assumptions and forecasts used in FPL's 2000 resource planning work. Therefore, the 1,750 MW projection of capacity needs for the two-year period is based on 2000 assumptions and forecasts. An exact calculation of capacity needs based on 2000 assumptions and forecasts yielded 1,708 MW. This value was rounded up to 1,750 MW for purposes of the RFP.

Shortly before receiving the proposals submitted in response to the RFP, FPL finalized its 2001 resource planning assumptions and forecasts that it would use in evaluating these proposals and FPL's construction options. These 2001 assumptions and forecasts contained two significant changes from the 2000 assumptions and forecasts. The first of these was a change in the MW to be received from a series of short-term power purchase agreements that were not yet finalized when the 2001 Site Plan was filed in April, 2001. Consequently, the 2001 Site Plan used an estimate of the amount of purchased MW that those agreements were likely to result in. These agreements were all finalized several months after the Site Plan was filed. These final agreements showed that FPL actually would receive more MW for more years than what had been assumed in the 2001 Site Plan. By itself, this change in the projection of short-term purchase MW would lower FPL's capacity needs for 2005 and 2006. However, the load forecast finalized in 2001 was higher than the 2000 load forecast reported in the 2001 Site Plan. By itself, this change in the load forecast would raise FPL's capacity needs for 2005 and 2006.

When these two changes were combined, the net result was that these two changes largely cancelled each other out, with the 2001 capacity need projection for the years 2005 and 2006 being 1,722 MW.

Q. Could FPL have met this 1,722 MW total need for 2005 and 2006 with additional demand side management (DSM)?

A. No. Mr. Brandt addresses specific DSM information in his testimony. I'll address the question from a planning perspective as well.

In regard to additional DSM, there is not enough additional cost-effective DSM to meet this large resource need in the time frame in question. There are several bases for this conclusion.

First, the sheer size of the need (1,722 MW) is more than double the size of the latest DSM Goals amount of 765 MW. Stated differently, the entire DSM Goals amount is only 44% of the total capacity needed.

However, even if one were to consider the smaller of the two units FPL plans to add (the 789 MW of incremental capacity from the Martin Conversion project), and account for a 20% reserve margin requirement, 658 MW of additional, cost-effective DSM would be needed to avoid this capacity addition. This amount of additional DSM equates to 86% of the entire 765 MW DSM Goals value.

Second, this 765 MW DSM Goals value is to be achieved over a 10-year period, but there are only 3 and 1/2 years (2002, 2003, 2004, and the first half of 2005) before the need must be filled. This time period is approximately 1/3 of the DSM Goals 10-year period. Assume for a moment that somehow there was <u>another</u> 658 MW amount of reasonably achievable, cost-effective DSM out there. It is completely unrealistic to believe that this amount of DSM could be implemented in 3 and ½ years. This becomes even more unlikely as one factors in the several months, at least, that would be needed to successfully petition the Commission for approval to offer new programs and/or increase incentives for existing programs before these changes could be implemented. This would likely shrink the 3 and 1/2 year period to 3 years at most.

Third, it is unreasonable to assume that there even is a significant amount of additional reasonably achievable, cost-effective DSM available to be captured. Recall that the DSM Goals are based on all of the cost-effective DSM available to the utility at the time the Goals are set. There was no challenge to FPL's DSM goals as being too low. Therefore, there is no basis to assume that suddenly there is another vast amount of cost-effective DSM to be obtained.

Consequently, I do not believe that additional, cost-effective DSM could meet the need planned to be filled by either of the new FPL generating units discussed in these dockets.

II. The RFP Solicitation Process

Q. Please describe the objectives of FPL's Request for Proposal (RFP).

A. FPL had two primary objectives in issuing its Request for Proposals for Capacity and Energy. The first objective was to solicit outside proposals for meeting FPL's capacity needs for 2005 and 2006. The submitted proposals would be compared to FPL's construction options to determine the best approach for meeting FPL's 2005 and 2006 capacity needs. This objective of meeting FPL's 2005 and 2006 capacity needs is essentially the focus of these dockets.

The second objective was to solicit outside proposals for supplying FPL with energy only (MWH) from new, renewable energy sources starting in 2003. This solicitation was undertaken to determine if there were sufficient new renewable energy sources available for FPL to offer a "Green Power" program if FPL determined such a program was feasible. In 1999 as part of its settlement of a DSM goals case, FPL made a commitment to the Legal Environmental Assistance Foundation (LEAF) to develop a Green Power program, if feasible. FPL did not have a predetermined amount of energy (MWH) it sought to obtain from new renewable energy sources, but FPL wanted to identify potential available amounts of this energy and the costs of supplying it to FPL. Using this information, combined with market research-based projections of how much energy from renewable sources FPL's customers might buy, FPL would determine whether and how much of this identified energy it would purchase. FPL is in the process of evaluating these energy-only proposals from new renewable energy sources and that evaluation is <u>not</u> the focus of these dockets. Consequently, my testimony will not further address this facet of the RFP or the renewable energy proposals submitted in response to it.

Q. Please describe the RFP process from the time of issuing the RFP to the date the proposals were received.

A. The RFP document was announced on August 13, 2001 in an advertisement in the Wall Street Journal and in news releases to numerous newspapers throughout Florida. (A copy of the Wall Street Journal advertisement appears as Appendix I in the Need Study document.) Within a few days FPL began receiving requests for the RFP and the required $500 checks for Initial Registration. Upon receipt of the Initial Registration fee, FPL forwarded a copy of the RFP to the requesting party. (A copy of the RFP appears as Appendix E in the Need Study document.)

On August 24, 2001 a Pre-Bid Workshop was held in Miami to answer questions from potential bidders. This half-day workshop was open to all parties that had paid the Initial Registration Fee of $500 and had received the RFP document. A number of individuals paid their Initial Registration fees and picked up their copies of the RFP at the door of the workshop. In all, individuals representing 31 organizations attended the workshop, including a member of the Commission Staff. (This number includes organizations interested in firm capacity proposals and in renewable energy only proposals.)

After an introduction and an explanation of the RFP, FPL accepted written questions from the audience and orally provided answers. FPL also announced that all of these questions, plus any additional questions that potential bidders wished later to e-mail to FPL, would be placed on a special FPL website along with answers to the questions. This website, which was available only to RFP-registered parties, stayed in place through the Due Date for the proposals.

The next step in the RFP process was the submittal of a Notice of Intent to Respond to the Solicitation form and an accompanying check for a second $500. This step was a requirement of all parties who wished to submit a proposal. The Notice of Intent to Respond to the Solicitation form and check were due on August 31, 2001. FPL received submitted forms and checks from 19 organizations for firm capacity projects totaling approximately 20,000 MW.

The final step was the submittal of the actual proposals. The original Due Date for these proposals was September 14, 2001. However, at the Pre-Bid Workshop, a number of requests were made for additional time in order to develop their proposals. Shortly after the Pre-Bid Workshop, FPL agreed and moved the proposal Due Date to September 28, 2001. On that date, FPL received firm capacity proposals from 15 organizations that, in the aggregate, offered over 14,500 MW of capacity for the 2005 and 2006 time frame.

III. Overview of the Outside Proposals and the FPL Construction Options

A. The Outside Proposals

Q. Please provide a general description of the proposals that FPL received in response to the capacity portion of its RFP.

A. As previously mentioned, FPL received firm capacity proposals from 15 organizations (bidders). A listing of the bidders that submitted capacity proposals is presented in Exhibit __, Document SRS - 2. This exhibit also lists the type of proposal(s) submitted and the technology on which the proposal(s) was based. In summary, proposals were received from 12 non-utility bidders, 2 Florida utilities, and 1 non-Florida utility. The majority of the proposals were power purchase offerings rather than "turnkey" proposals. The vast majority of the proposals were based on combined cycle technology, while a few were based on existing utility system units or on combustion turbine technology.

Q. How many proposals did FPL actually receive for its evaluation?

A. Our initial estimate was that we had received 29 proposals from these 15 bidders. This estimate was based on a quick initial review of the proposal documents. However, later detailed readings of the proposals, combined with answers to questions that FPL later posed to the bidders, led FPL to conclude that there were 81 separate proposals. A listing of these outside proposals is presented in Exhibit ___, Document SRS – 3. It shows, for each proposal, the code number assigned to the proposal, the location of the generating unit(s) providing the capacity, the Summer capacity (MW), the proposed start date, and the term of service.

Q. How did the number of proposals increase from an original estimate of 29 to a final number of 81?

A. Our original estimate of 29 proposals was based on a simple counting of the number of separately bound proposal documents. Some bidders submitted more than one separately bound proposal, and we simply totaled the number of separately bound documents to obtain a total of 26 proposals. In addition, we received a message from one bidder that indicated that their one document contained not one but four proposals. This led us to our original estimate of 29 proposals.

Our next step was to read through these documents. In the course of this reading, a couple of items emerged that increased our estimate of the total number of proposals. First, it became apparent that some bidders submitted proposals that clearly addressed FPL's 2005 need, some clearly addressed FPL's 2006 need, and others were a bit unclear as to whether they were addressing the need for only one particular year or for both years. In cases where FPL believed there to be some question as to whether a proposal could address the need for more than one year, FPL contacted the bidders for clarification.

For example, FPL asked if a proposal with a proposed in-service date of 2005 could also be considered for 2006 and, if so, what changes to the proposed payment schedule should be made. The result of these contacts was that the bidders directed FPL to consider many of the proposals for both 2005 and 2006. Consequently, the number of proposals to be evaluated approximately doubled.

The second reason for the increase in the number of proposals was that, instead of submitting separately bound proposals, some bidders included completed RFP forms for two different "types" of proposals in one bound proposal document. For example, one proposal document might contain completed RFP forms for both a power purchase offering and a turnkey facility sale. In other cases the same proposal document would contain forms for two different power purchase terms of service (say, 10 years and 25 years). This also increased our estimate of the number of proposals.

The third reason for the increase in the number of proposals from the initial estimate to 81 was due to what I'll call a misunderstanding on the part of certain bidders as to what constituted an acceptable proposal. For example, a bidder would submit one bound proposal that instructed FPL to evaluate an entire <u>range</u> of MW instead of a specific MW value. In these cases, FPL contacted the bidders and asked them to select a specific MW value for the evaluation. In each of these cases, the bidders in question ended up proposing more than one specific MW value and/or the same single specific MW value for more than one term of service. As a consequence of this, the number of proposals again increased.

Q. Did the proposals clearly provide the information FPL requested for its evaluations so that FPL could begin its evaluations relatively quickly?

A. No, not entirely. The proposals showed considerable variation in both the completeness and clarity of the information provided. Some proposals were very comprehensible as submitted; other proposals lacked information and/or clarity such that FPL had to contact the bidder in question many times in order to obtain the information needed for the evaluation. It took more than a month after the proposals were received before all of the needed information was actually in-hand so that we could begin the process of analyzing the proposals. This delayed the start of the analyses.

Q. Did FPL eliminate any bids due to difficulty in obtaining the information needed to evaluate the bid?

A. No. FPL eliminated only one of the 81 proposals prior to starting the numerical evaluations. This one proposal was eliminated because it was deemed ineligible for having proposed a natural gas "tolling" arrangement that was specifically prohibited in the RFP. FPL kept all of the other 80 proposals "in play" for the numerical evaluations in order to evaluate as many alternatives as possible.

In so doing, FPL chose to be lenient in regard to certain occurrences or information that could have been grounds for elimination. For example, a number of bidders did not publish a newspaper notice within 10 days of submitting their proposal as was required. Along the same lines, a number of bidders did not send FPL a copy of the newspaper notice within 7 days of the notice appearing in the newspaper as was called for in the RFP. Rather than declare these proposals ineligible as FPL could have done, FPL allowed bidders to correct these deficiencies. As another example, FPL did not eliminate a bidder (or two) after news releases stating the financial health of the organization (or its parent) had significantly worsened. FPL consistently chose to keep as many bids as possible "in play" for the economic evaluations.

B. FPL's Construction Options

Q. What FPL construction options were considered for meeting FPL's capacity needs in 2005 and 2006?

A. In early November 2001, FPL's Power Generation Division (PGD) presented a list of 12 new capacity options that could meet FPL's 2005 and 2006 needs. About a month later, a "duplicate" of one of these 12 options (but at a different site) was added to bring the number of FPL construction options to 13. Many of these initial 12 construction options were various combined cycle (CC) unit configurations at FPL's existing Martin plant site. In addition to these new CC units at Martin, the following construction options were also initially offered:

- a new CC unit at FPL's existing Manatee plant site;
- the conversion of two existing combustion turbines (CT's) at FPL's Martin site into a four CT-based CC unit (two additional CT's would also be added);
- the conversion of two CT's scheduled to be added at FPL's existing Ft. Myers plant site into a two CT-based CC unit ;
- the repowering of FPL's existing Port Everglades steam units # 3 and # 4 into two CC units;
- the addition of power augmentation at FPL's existing Sanford units # 4 and # 5; and,
- two new steam units at FPL's Martin site that would be fueled with petroleum coke.

Exhibit ___, Document SRS – 4 is a listing of the FPL construction options showing the project locations and Summer capacity (MW). In addition, Mr. Yeager's testimony further addresses FPL's construction options.

Q. What was the 13th option that FPL added, and why was it added?

A. The additional option was a four CT-based CC unit at FPL's Manatee site. The decision to add it to the economic analysis was made around the end of November/start of December of 2001. The decision was based on a concern that was raised after seeing the preliminary results of a ranking of FPL's individual construction options only. That ranking showed that the Martin CT-to-CC conversion project (the Martin Conversion project), and an entirely new four CT-based (4x1) CC unit also sited at Martin, were among the most economic FPL options.

This late November/early December review of the preliminary results occurred shortly after power plant owners around the U.S. were put on alert for possible terrorist activity. This warning, and the heightened security moves at the power plants that followed, were fresh in the minds of FPL management when the preliminary results of the FPL option analyses were reviewed. A suggestion was made as to whether one of these top construction proposals could also be built at another non-Martin site. This would alleviate the concern that adding capacity only to one site (Martin) might make that site too inviting a target for someone seeking to disrupt FPL's or Florida's electric system.

It was decided that the entirely new four CT-based (i.e., a 4x1) CC unit at Martin was the best option to "relocate". Since the Manatee site, like the Martin site, would also leave open the possibility of accessing natural gas from the new Gulfstream pipeline as well as from the Florida Gas Transmission (FGT) pipeline, it was logical to look at the Manatee site for this new CC unit option.

Therefore, a 13th FPL construction option was added: a 4x1 CC unit at Manatee. This new option initially was assumed to be approximately identical in cost and performance to one of the 4x1 CC options at Martin. Updated Manatee-specific costs were later developed and incorporated into the analyses.

IV. Overview of the Economic Evaluation Process

Q. What was the objective of the economic evaluation FPL carried out?

A. The objective was to determine the most cost-effective selections among the outside proposals and FPL construction options with which to meet FPL's 2005 and 2006 capacity needs.

Q. What was the general approach used in its evaluation of the outside proposals and of FPL's self-build construction options?

A. FPL conducted its own evaluation of all of the outside proposals and FPL construction options. In addition, separate analyses of these options were performed by an independent consultant, Mr. Alan Taylor. Since Mr. Taylor's testimony addresses his analysis, I will focus primarily on FPL's evaluation.

FPL first ensured that its analyses of the outside proposals, and those performed by Mr. Taylor, were "blind." In other words, the analyses of the outside proposals were conducted without organizational names or project locations attached to the proposals. FPL's construction options were not evaluated "blind" because FPL needed to be able to differentiate between the outside proposals and FPL options. This was due to the fact that FPL's analysis sought to meet its capacity needs in three basic ways: using outside proposals only, using FPL options only, and using a combination of outside proposals and FPL options. This approach will be discussed later in my testimony.

FPL then utilized what I will describe as a basic 4-step evaluation approach to determine the economics of the proposals:

<u>Step 1: Individual Rankings of Options:</u> This involved economic analyses ranking all <u>individual</u> outside proposals and similar economic analyses resulting in a separate ranking of all <u>individual</u> FPL construction options.

<u>Step 2: Expansion Plan Analyses:</u> Using the highest ranked individual outside proposals, we then determined the best "All Outside" proposal expansion plan that is composed solely of outside proposals for 2005 and 2006. Similarly, using the highest ranked individual FPL construction options, we determined the best "All FPL" expansion plans composed solely of FPL construction options for 2005 and 2006. Finally, using the highest ranked individual outside proposals and FPL construction options, we determined the best "Combination" expansion plans that meet FPL's 2005 and 2006 needs. The results of

these expansion plan analyses were then compared to judge the economics of the best expansion plans of each of the three types mentioned above.

During the course of the overall evaluation, the Step 1 and Step 2 analyses were repeated a number of times as new information about the options became available and/or as assumptions changed.

Step 3: Total Cost Analyses: After identifying the most economic expansion plans from the final Step 2 analyses, we factored in additional cost information not included in the expansion plan analyses. These additional costs include: generating unit startup costs, transmission integration costs, and capital costs associated with additional power purchases ("equity penalty" costs). The results of this total cost analysis of the expansion plans are then compared to determine the most cost-effective expansion plan. This most cost-effective expansion plan, in turn, identifies the most cost-effective individual options.

Step 4: Review and Adjustments: The final analysis step involved the review of many of the inputs used in the analyses and the review of the computer model outputs. Adjustments, as needed, would be made. Adjustments that proved to be needed involved AFUDC (allowance for funds used during construction) costs.

Q. This multi-step approach to optimizing various types of expansion plans seems time-consuming. Why didn't FPL simply optimize an expansion plan using all of the options at the same time?

A. There were simply too many options for such a direct approach to be used. The volume of both the outside proposals and FPL construction options made this approach unworkable. Perhaps the best way to explain this is by way of an example of a more "typical" FPL analysis of generation options.

FPL's annual Integrated Resource Planning (IRP) work includes an economic evaluation of a number of FPL construction options in order to determine what type of unit(s) FPL should build to meet future needs. The evaluation is conducted using the Electric Generation Expansion and Analysis System (EGEAS) model. This model was designed by Stone & Webster for the Electric Power Research Institute (EPRI) some years ago, and FPL has used it since its development. In a more typical year, FPL will evaluate a list of FPL construction options in its IRP work. In recent years, the number of construction options on this list has ranged from approximately 6 to 16. FPL "loads" all of these options into EGEAS at the same time, and, in one computer run, can determine the most economic expansion plan. Such a run can typically be made in a matter of hours using FPL's main frame computer in a time-sharing mode.

However, the EGEAS model has a direct limitation in the number of options it can evaluate in one run and an indirect limitation in regard to the time it takes to complete an evaluation. In other words, the more options there are to evaluate and/or the longer the time period addressed in the analysis, the longer the computing time is. The limitation on the number of options EGEAS can evaluate in one run is 50. Considering only the 80 eligible outside proposals, we realized that it was impossible to evaluate all of them in one optimization run. Therefore, the group of 80 eligible outside proposals would have to be broken down into two or more groups of a more manageable size.

A major factor in deciding the size of these groups is EGEAS's run time. The run time, in turn, is primarily dictated by the number of options being evaluated. In addition, many of the options, both outside proposals and FPL construction options, had a duct firing or power augmentation feature for the generating unit in question. To be properly modeled, each of those features is treated as a separate "unit" that is "linked" to the generating unit's base operation mode (that is also modeled as a separate unit). In other words, if the EGEAS model selects the base operation "unit", it must also select the associated duct firing or power augmentation "unit" as well if the generating unit in question has duct firing or power augmentation capability. This means that one generating unit proposal can take two option slots in an EGEAS run if it has two operational modes.

Taking these considerations into account, FPL decided on a practical limitation of approximately 20 option slots that would be included in any one run.

Q. How did FPL ensure that the evaluations of the outside proposals were "blind" evaluations?

A. We did this very early in the process by assigning to each outside proposal a two-letter prefix "FC" (to denote proposals received in response to the firm capacity portion of the RFP) and a number ranging from 1 to 81. Together, the prefix and numbers made up a code number specific to each outside proposal. These code numbers were previously shown in Exhibit ___, Document SRS - 3.

The code numbers were assigned by a member of our staff who would not take part in the proposal evaluations. Only this individual and I knew which code number(s) tied to which bidder. I needed this information since I served as the RFP contact person with the bidders and needed to know which bidder to contact when questions came up about data in a code-numbered proposal. Similar to the individual who assigned the code numbers, I did no direct evaluation calculations (although I later reviewed a number of the calculations and made corrections as necessary).

All of the outside proposal data used both in-house with the EGEAS model and by Alan Taylor were identified only by these code numbers. This code-numbered outside proposal information revealed neither a bidder's name nor the project's location. In this way these analyses were "blind" evaluations.

Q. You described Step 1 as economic analyses of individual options to determine rankings within the outside proposal list and rankings within the FPL construction option list. Were these evaluations done in a similar manner?

A. Yes. The objective of these evaluations and the approach used were identical for both the outside proposals and the FPL construction options. The objective was to enable FPL to select a relatively small number of options from each list, outside proposals and FPL construction options, for further analysis in Steps 2 and 3. The options selected would be the most economic options from an individual option perspective.

The approach used in the Step 1 analyses was to give EGEAS one option at a time (for example, the outside proposal code-numbered FC 1) that was proposed to fill FPL's 2005 or 2006 need and have EGEAS construct an expansion plan using this option and various "filler" unit options so that FPL's future capacity needs for 2007 - on were met. The cumulative present value of revenue requirements (CPVRR) for this expansion plan was calculated in EGEAS and assigned to the individual option being examined for purposes of determining the ranking of each individual proposal.

Q. Why is it appropriate to perform these evaluations based on the costs of an expansion plan?

A. It is not only appropriate to do this, but also necessary if one is to capture all of the impacts an option will have on FPL's system in a given year and over time. For example, assume we are comparing Option A and Option B. Option A has a heat rate of 7,000 BTU/kwh and is offered to FPL for 5 years while Option B has an 8,000 BTU/kwh heat rate and is offered for 10 years. Evaluating these options from an expansion plan perspective allows one to capture the economic impacts of both the heat rate and term-of-service differences. The lower heat rate of Option A will allow it to be dispatched ahead of Option B, thus reducing the run time of FPL's existing units more than will Option B. This results in greater production cost savings for Option A. However, Option B's longer term-of-service means that it defers the need for the future generation that will be needed when its term-of-service ends longer than will Option A. Therefore, Option B will get capacity avoidance benefits for more years. Only by taking a multi-year, expansion plan approach to the evaluation will factors such as these be captured.

Q. Why are the "filler" units needed in the evaluation?

A. The "filler" units are needed in an expansion plan analysis to meet FPL's capacity needs for the 2007 – on time frame. In this way one can ensure that expansion plans are being compared that all meet FPL's reliability criteria for each year in the analysis period. By using these filler units, the expansion plans being compared are valid (i.e., they meet the reliability criteria), and the results of this comparison are meaningful.

Q. Earlier you stated that the Step 1 and Step 2 analyses were carried out more than once. Why was this done?

A. Our overall evaluation can be broken down into 4 time "periods." In those 4 periods, the Step 1 and/or Step 2 analyses were repeated as input assumptions changed. One input assumption that changed was the filler unit. We started with one type of filler unit and later expanded to three types of filler units for our computer model to choose from. There were numerous changes in other input assumptions as well, particularly as we received clarification of information contained in the outside proposals and FPL construction options. As these assumption changes were made along the way, we repeated the analyses for Step 1 and/or Step 2, as appropriate.

Q. Please describe these 4 analysis time periods.

A. These 4 analysis periods actually were preceded by a brief (approx. mid-October to early November) "shake down" period in which we made a few trial runs to identify problem areas. During this time we were heavily engaged in correspondence with the bidders to clarify and understand their proposals. Consequently, we used these "shake down" runs as a means of better identifying outside proposal data that needed clarification.

The first really meaningful (in terms of comparing options) analysis period basically encompassed the month of November. During this 1st analysis period, the outside proposals were further clarified through communication with the bidders. Also, FPL's initial 12 options were submitted, and the initial type of filler unit (a 2x1 CC unit used in the "shake down" period) evolved to a 4x1 CC unit. During the 1st analysis period, the primary focus of the work was on the individual rankings of the outside proposals and FPL construction options. At the end of this period, a number of outside proposals had emerged from the individual rankings as leading proposals. In addition, FPL's best two options had been identified from the individual rankings of the FPL options, and FPL's PGD group focused its efforts to refine assumptions for these two options.

Whereas the primary focus during the 1st period was the individual ranking work, the primary focus during the 2nd period (basically the month of December) was expansion plan analysis work. Although individual ranking analyses of all of the outside proposals continued, the real objective was to begin to identify the best expansion plans made up of outside proposals alone (an "All Outside" plan) or of outside proposals and FPL options combined (a "Combination" plan). Efforts to refine FPL's two best construction options also continued. During this period, 3 types of filler units were used (the 2x1 CC, the 4x1 CC, and a CT) in an attempt to ensure that the selection of the filler units was not unduly influencing the analysis results. At the end of this analysis period, many of the outside proposals had been eliminated as not being economically competitive. Moreover, it also became clear that no All Outside plan could economically compete with either the best Combination plan or the best All FPL plan.

In the 3rd analysis period (approximately the first half of January), FPL first made some final refinements to certain outside proposals and FPL construction options (which I'll discuss later in my testimony). Then we again developed Combination expansion plans made up of the top outside proposals and the two best FPL construction options. An "All FPL" expansion plan made up of these two most economical FPL options was then compared to a number of these "Combination" expansion plans. Once the most economical of these plans had been determined, other costs not included in the computer modeling done to this point were accounted for. These other costs included generator startup costs, transmission integration costs, and capital costs associated with power purchases (equity penalty costs). These costs were added to expansion plan costs from the EGEAS modeling to develop total costs for these expansion plans. At the conclusion of the 3rd analysis period work, FPL concluded that the All FPL plan would be the most economical plan and publicly announced its plans to build two new generating units.

The 4th and final analysis period occurred subsequent to FPL's announcement. During this period the Step 4 work ("review and adjustments") was carried out. In this review we found what I'll call a computational "quirk" in the EGEAS analyses of the options. We adjusted the model to account for that irregularity and reran a number of the Step 2 and Step 3 analyses. In addition, we made the AFUDC adjustments previously discussed. The results of these additional analyses and adjustments showed that although the All FPL plan's economic advantage had been reduced, it continued to be the most economical way to meet FPL's capacity needs.

V. The Results of the Analyses

A. The Results of the 1st Analysis Period

Q. How would you characterize the analyses carried out during the 1st period?

A. The analyses that were carried out in what I have called the 1st period primarily focused on individual rankings of both outside proposals and FPL construction options. At the end of that period, some limited expansion plan analysis work was also done primarily in regard to developing "All Outside" proposal expansion plans and All FPL expansion plans.

Q. What were the results of the individual ranking outside proposal analyses carried out in the 1st analysis period?

A. First, FPL developed an individual ranking of the outside proposals that had a 2005 start date and an individual ranking of the outside proposals that had a 2006 start date. In addition, Mr. Taylor also developed individual rankings of both the 2005 start date proposals and the 2006 start date proposals. Therefore, there were two separate rankings of the 2005 start date proposals and two separate rankings of the 2006 start date proposals.

Exhibit ___, Document SRS - 5 provides a list of the proposals that were in the top 10 for either the 2005 start date or 2006 start date in either Mr. Taylor's or FPL's rankings. Although there are some differences in these initial rankings, the top 10 in both Mr.Taylor's and FPL's rankings included many of the same proposals.

Q. What were the results of the All Outside expansion plan analysis carried out in the 1st period?

A. For this initial expansion plan analysis, FPL selected the top 10 proposals from its 2005 and 2006 rankings with two modifications. First, we added the 3 next best 2005 proposals (i.e., the 11th, 12th, and 13th ranked proposals which were FC 35, FC 3, and FC 27, respectively) to the analysis based on the fact that the 2005 capacity need is bigger than the 2006 need. Second, we removed all of the "turnkey" proposals that had emerged in the top 10 individual rankings so that we could focus solely on purchased power proposals in this initial expansion plan run. (These turnkey proposals, FC 31-33 and

FC 79-81, were not dropped; they were just carried over into the 2^{nd} period analyses.)

The results of this initial All Outside expansion plan analysis are shown in Exhibit ___, Document SRS - 6 which provides the projected total cost of each of the top 5 All Outside expansion plans in cumulative present value of revenue requirements (CPVRR).

Q. What were the results of the 1^{st} period analyses for the FPL construction options?

A. Exhibit ___, Document SRS – 7 shows the rankings of FPL's initial 12 construction options with either a 2005 or a 2006 start date. The top three projects in both rankings were, in order, the Martin CT-to-CC conversion (Martin Conversion project), two petroleum coke-fired units at Martin, and an entirely new 4x1 CC unit at Martin.

Q. What were the results of the All FPL expansion plan analysis that was then carried out?

A. Exhibit ___, Document SRS - 8 shows the top 5 expansion plans in which only FPL construction options met FPL's 2005 and 2006 capacity needs, followed by filler units. The projected CPVRR costs of each expansion plan are also shown.

Q. A comparison of Exhibit ___, Document SRS - 6 and Document SRS - 8 show a significant cost differential between the best All

Outside plan and the best All FPL plan. How meaningful were these results at this stage?

A. These two documents do show a substantial cost difference ($ millions, CPVRR) between these two best plans: the best All Outside plan's cost of $41,407 and the best All FPL plan's cost of $41,007 yielded a difference of $400 million (CPVRR). This early result turned out to be accurate not in terms of the numerical result (since the numbers would change), but in its indication that a plan made up of only outside proposals would <u>not</u> be competitive against an All FPL plan. It suggested that the real competition would be between an All FPL plan and a Combination plan consisting of a mix of FPL options and outside proposals.

FPL tested this hypothesis in the 1st period in a very limited Combination expansion plan run in which only a handful of outside proposals and FPL options were allowed to compete. The result of this limited run is that the $400 million differential between the best All Outside plan and the best All FPL plan was cut in half to a $201 million differential between this limited best Combination plan (with a CPVRR cost of $41,208) and the best All FPL plan. FPL expected that further analyses of Combination plans, particularly with more outside proposals competing for a slot in the plan, would result in this differential shrinking more. These analyses were carried out in the 2nd analysis period.

Q. Did FPL make any significant changes to the lists of either the outside proposals or the FPL construction options before beginning the 2nd analysis period?

A. Yes, but only in regard to the FPL construction options. All of the 80 eligible outside proposals were carried over into the 2nd analysis period for further analyses. In regard to the FPL options, several changes were made.

First, the decision was made to drop the petroleum coke-fired option even though it was one of FPL's top-ranked options. FPL reviewed this option and decided that assumptions on its cost and performance option were not as well developed as for the rest of the FPL construction options. Consequently, it was decided to remove the petroleum coke-fired option from further consideration in regard to this RFP and to study it further in the future. Note that this decision alone would substantially shrink the previously mentioned cost advantage of the All FPL plan by $77 million. This decision resulted in the best All FPL plan in Exhibit ___, Document SRS - 8 changing from the 1st ranked plan that contains the pet coke option to the 2nd ranked All FPL plan that is $77 million more expensive.

Second, because of their superior economics, FPL decided to focus its attention on only two FPL construction options: the Martin Conversion project and an entirely new 4x1 CC unit at Martin that make up the 2nd ranked All FPL expansion plan in Exhibit ___, Document SRS - 8. Consequently, all other FPL construction options were also dropped from further consideration.

Finally, as previously discussed, FPL then decided to "move" this new 4x1 CC option from its Martin site to its Manatee site. The end result of these three changes is that subsequent analyses in the 2^{nd} , 3^{rd} , and 4^{th} analysis periods contained only two FPL construction options: the Martin Conversion project and the new 4x1 CC unit at Manatee.

B. The Results of the 2^{nd} Analysis Period

Q. You stated that the 1^{st} period analyses focused primarily on individual option rankings. How would you characterize the analyses carried out in the 2^{nd} period?

A. Although individual rankings also were carried out in this 2^{nd} period, the primary focus was on developing expansion plans involving the outside proposals; i.e., determining the best All Outside plans and the best Combination plans. In addition, refinement of the two remaining FPL construction options continued.

Q. What were the results of the outside proposal analyses carried out in the 2^{nd} analysis period?

A. Both FPL and Mr. Taylor performed several individual rankings of the outside proposals during the 2^{nd} period. These analyses were intended to help clarify which outside proposals were the most economic on FPL's system. FPL used 3 types of filler units (2x1 CC, 4x1 CC, and a CT) in its rankings work to ensure that selection of one type of filler unit was not unduly influencing the results.

Exhibit ___, Document SRS - 9 provides a summary of these individual ranking analyses of the outside proposals. Using the same perspective as in Exhibit ___, Document SRS - 5, Document SRS - 9 shows those proposals that were in the top 10 for either the 2005 start date group or the 2006 start date group from these rankings.

FPL viewed the proposals listed in Exhibit ___, Document SRS - 9 as a group to be the most economical individual outside proposals. All of these proposals except two, FC 74 and FC 77 (which were two of the lower ranked projects in the 2006 start date group) were carried over for expansion plan analyses. In addition, one additional proposal, FC 72 (which was the 2006 version of highly ranked 2005 proposal) was also carried over into the expansion plan analyses that completed the 2nd analysis period work.

Q. What were the results of these expansion plan analyses?

A. Based largely on the results of these individual rankings, a number of the outside proposals were selected for an All Outside expansion plan analysis. Exhibit ___, Document SRS - 10 shows the top 5 All Outside plans along with their total ($ millions, CPVRR) costs. The best of the All Outside plans had a CPVRR cost of $41,130 million. Note that this cost is significantly reduced from the CPVRR cost of $41,407 million for the best All Outside plan emerging from the 1st analysis period.

Then a number of the best outside proposals as defined both by the individual rankings and the All Outside optimization run were selected to compete for a slot in Combination plans. Two combination plan optimization runs were made. In the first (Combination plan run # 1), two FPL construction options also competed. These were the Martin Conversion project and the new Manatee 4x1 CC unit. After noting that the best Combination plans from Combination plan run #1 all contained the Martin Conversion project, but not the new Manatee 4x1 CC unit, the new Manatee 4x1 CC unit was removed and several additional outside proposals were added for the Combination plan run # 2.

Exhibit ___, Document SRS - 11 shows the top 5 Combination plans from the combined results of these two Combination plan runs. The best Combination plan had a total CPVRR cost of $40,926 million. (Note that this is $104 million less expensive than the best All Outside plan.)

Q. **What were the results of the FPL construction option analyses carried out in the 2nd analysis period?**

A. Since FPL had removed all but two construction options from consideration at the end of the 1st analysis period, no further individual ranking analyses of the FPL options were needed. The only FPL option analysis to run in the 2nd analysis period was an expansion plan analysis. In this analysis only the type and timing of the filler unit additions would be determined. This analysis now projected that the total CPVRR cost for an All FPL plan would be $40,997 million.

Q. Did the results of the analyses carried out in the 2nd period show anything interesting?

A. Yes. Although the results from the 2nd analysis period work were still preliminary, two of these results were interesting. First, the best All Outside plan was significantly more expensive ($41,130 million) than either the best All FPL plan ($40,997 million) or the best Combination plan ($40,926 million). This result was consistent with that of the previous analyses and, as a consequence of these results, FPL decided to perform no further optimization work that focused solely on an All Outside plans. This would free up more analytical time that could be spent on the more promising Combination plans. (FPL also recognized that in the course of developing Combination plans using EGEAS, some All Outside plans would also be created by the model. This would allow FPL to keep track of any All Outside plans that became significantly more competitive versus either Combination plans or All FPL plans.)

The second interesting result from the 2nd analysis period was that the best Combination plan (in fact each of the top 5 Combination plans) was now projected to be less expensive than the best All FPL plan.

Q. What caused the "flipping" of these preliminary economic results, now showing the best Combination plan costing less than the All FPL plan?

A. In comparison with the results of the 1st analysis period, the costs of the Combination plans significantly decreased from $41,208 to $40,926 (millions, CPVRR). However, the costs of the All FPL plan decreased by a much smaller amount from $41,084 (for the best FPL plan without petroleum coke) to $40,997 (millions, CPVRR). There were several reasons for these cost changes.

First, the use of more than one type of filler unit (and the corresponding change in filler unit costs) lowered costs for both the Combination and All FPL plans. Second, as previously mentioned, the initial Combination plan analysis conducted in the 1st analysis period was a limited analysis in regard to the number of outside proposals that were selected for the run. The intent of that run was simply to get an initial idea of how a Combination plan would stack up versus an All Outside plan and an All FPL plan.

However, in the 2nd analysis period, the Combination plan runs included a greater number of outside proposals. In addition, this list of outside proposals was drawn from an updated list of the highest ranked proposals. Therefore, the Combination plans developed in the 2^{nd} analysis period were able to draw on all of the highest rated outside proposals. This resulted in a further lowering of the costs of the Combination plans compared to those developed in the 1^{st} analysis period.

In regard to the All FPL plan in the 2^{nd} analysis period, the cost reduction impact of the filler unit changes was partially offset by a major change made in the FPL construction option assumptions. The FPL construction options' performance assumptions used in the 1^{st} period analyses were based on the performance expected of the options when they were "new and clean" instead of "expected" values more representative of the units' performance over an extended time. These assumptions were revised, and we then ran the 2^{nd} period analyses on the basis of expected values for FPL's options.

These new performance assumptions were based on what might be expected after a number of months of operation and just prior to the units coming off-line for major overhauls. This decreased the assumed MW outputs and increased the assumed heat rates, thus increasing the operational cost of the FPL options. This resulted in increased costs for the Martin Conversion project and the new Manatee CC unit in the All FPL plan.

C. The Results of the 3rd Analysis Period

Q. Were changes in assumptions made as the 3rd analysis period was entered and, if so, why were these changes made?

A. Yes. A number of changes were made as we entered the 3rd analysis period. The incorporation of these changes is consistent with the approach we had utilized from the beginning. We began the analyses with some interpretation questions still remaining and the expectation that other interpretation questions would arise as we proceeded with the analyses. Our basic approach was to interpret the option (outside proposal or FPL project) information about which we had questions on the optimistic side that favored the option in question. We would then take a look at the analyses results. If the option became or remained a strong contender, we planned to come back to the option and reexamine our interpretation of the information to make certain our assumptions were not too optimistic. However, if the option in question finished significantly out of the running, we considered the question to be moot.

As we left the 1st analysis period, we had a preliminary result that showed that the FPL options were substantially in the lead. Our focus in the 2nd analysis period was on the FPL option assumptions and whether they had been too optimistic. As previously mentioned, several of those assumptions were changed in a more conservative direction and this made the All FPL plan more costly. If the 2nd period expansion plan analyses had still shown the All FPL plan with a substantial lead, we likely would not have reviewed the assumptions of as many outside proposals in the 3rd analysis period as we did. However, the 2nd period expansion plan analyses showed significant change from the 1st period expansion plan analyses.

Consequently, we continued with our approach and now focused more on the "optimistic" assumptions that remained for the leading outside proposals and the filler units in the same way the assumptions for the FPL options had just been scrutinized in the 2nd analysis period. The intent was to ensure that both FPL and Mr. Taylor were using a consistent and reasonable set of assumptions for all of the leading outside proposals, the FPL construction options, and the filler units.

Some of these changes resulted in projections of increased costs for some cost components and in projections of decreased costs for other cost components. Most importantly, FPL and Mr. Taylor believed they now had an improved set of assumptions for both the leading outside proposals and FPL construction options that were consistent and reasonable.

Q. What were the assumption changes that were made at this time?

A. There were five changes made to assumptions concerning either the FPL construction options or the filler units, and there were four types of changes made to the outside proposals. I'll first address the assumption changes for the FPL construction options and filler units.

First, since the 2x1 CC filler unit had not been picked as a filler unit in the individual ranking analyses carried out in the 2nd period, it had been dropped from the subsequent expansion plan analyses carried out in the 2nd period. This left the 4x1 CC unit and the CT unit as the filler units for the subsequent 2nd period expansion plan analyses. The 3rd period analyses also utilized these two filler unit types.

Second, the FPL construction option performance data was changed to make it more representative of average performance midway between overhauls instead of representative of the poorer performance right before overhauls.

Third, there were certain changes in the projected costs of the FPL construction projects, particularly in regard to how "common" costs would be shared by the two similar projects.

Fourth, the variable O&M costs were extended to cover the projected megawatthours that would be generated from the duct firing feature of the two FPL options.

Fifth, there was an increase in the capital cost projections for the 4x1 CC filler unit to more accurately reflect the costs associated with a greenfield unit. In addition, the heat rate and MW capability of the 4x1

CC filler unit also was adjusted to mirror the updated assumptions for the Martin and Manatee units.

Finally, there were four types of changes made to various outside proposals. These changes were made after correspondence with certain bidders and consultation with Mr. Taylor. The changes basically addressed duct firing proposals and gas transportation costs. The four changes were:

1) For all proposals based on generating units with duct firing capability, the variable O&M payment was extended to cover the projected megawatthours that would be generated from duct firing operation. This change allowed these duct firing outside proposals to be treated in the same way as the duct fired FPL construction options.
2) Capacity payments were extended to the MW produced by duct firing for various outside proposals that had duct firing capability. This change modified FPL's initial very conservative approach for estimating costs for outside proposals. This change resulted in a more realistic assumption that bidders would expect to be paid for all of the capacity that they proposed.
3) Two proposals had their proposed firm gas transportation payments changed from $0.55/mmBTU to the same $0.60/mmBTU that was used to project costs for all other outside proposals and FPL construction options that could likely utilize

natural gas from the new Gulfstream pipeline. This change was made to put all of the options that would likely utilize the Gulfstream pipeline on a common footing in regard to firm gas transportation costs.

4) Two other proposals had their projected firm gas transportation payments lowered from a price of $ 0.76/mmBTU an assumption used for all options assumed to take FGT gas to a price of $ 0.60/mmBTU (an assumption used for all options assumed to take Gulfstream gas). This change came about after reassessing the likelihood of these proposals utilizing Gulfstream gas.

Q. What were the results of the outside proposal analyses carried out in the 3rd analysis period?

A. As previously mentioned, no attempt was made in the 3rd analysis period to analyze an All Outside expansion plan since both the best Combination and All FPL plans were soundly beating it. Therefore, the emphasis in the 3rd analysis period in regard to the outside proposals was on identifying and further refining the best Combination plans.

Once again, two Combination plan optimization runs were made in order to determine the best Combination plans. In the first (Combination plan run # 1), a number of outside proposals were selected to compete along with the two FPL construction options: the Martin Conversion project and the Manatee 4x1 CC unit. In the second optimization run (Combination plan run # 2), an expanded list of outside proposals was selected to compete and the FPL Manatee 4x1 CC unit was removed. Exhibit ___, Document SRS - 12 shows the outside proposals selected for these final expansion plan runs. (These were the same proposals selected for the final expansion plan runs at the end of the 2nd analysis period.)

Exhibit ___, Document SRS - 13 shows the 5 overall best Combination plans from these two optimization runs and the total CPVRR cost of each plan. As shown in Exhibit ___, Document SRS - 13, the total CPVRR cost of the best Combination plan is projected to be $40,966 million while the next best Combination plan's total CPVRR cost was projected to be $40,995 million.

Q. What were the results of the FPL construction option analyses carried out in the 3rd analysis period?

A. The previously mentioned changes to the cost and performance assumptions of FPL's construction options resulted in a projected total CPVRR cost of the All FPL plan of $40,970 million.

Q. What did FPL do next?

A. FPL's EGEAS analyses to this point were completed. The All Outside plans had been eliminated, leaving only the single best All FPL plan and a handful of best Combination plans. The single best Combination plan and the best All FPL plan ended up in a virtual tie with projected total CPVRR costs of $40,966 million and $40,970 million, respectively. These two plans had achieved separation from the remaining Combination plans since the next best Combination plan's projected total CPVRR cost was $40,995 million or at least $25 million higher than the best Combination and All FPL plans. FPL's evaluation then moved away from EGEAS calculations and turned to calculations of other costs as previously mentioned in the Step 3 analysis discussion.

Q. What type of other costs were computed in the Step 3 analysis?

A. Step 3 was designed to capture not only the capital and production costs analyzed in EGEAS, but also the relevant economic costs that were not included in the EGEAS analyses. There were three types of costs that were now calculated: generator startup costs, transmission integration costs, and capital costs associated with purchased power (equity penalty costs). These costs were calculated and added to the previous EGEAS results.

Q. How would you describe these costs and how were they calculated?

A. I will give a simple description of each type of cost and a brief explanation of how these costs were calculated.

1) <u>Startup costs:</u> Startup costs are basically the costs incurred when starting up a generating unit. These costs can vary depending

largely upon how long the unit has been off-line (i.e., how "cold" the unit is).

Each option, outside proposal and FPL construction project, provided a set of startup costs. Discussions with FPL's System Operations group led FPL to conclude that relatively accurate projections could be made of the number of times a particular type of unit would be started from a "cold" condition (after the unit has been out-of-service for an extended time). However, projections of the number of times per year a unit type would be started after being off-line for a shorter period of time could not be made with much confidence in the accuracy of those projections. Consequently, the startup cost calculations were based on the cost values given for a "cold" condition startup.

FPL used an estimate of 6 startups per year for all of the CC-based outside proposals, the two FPL construction options, and the CC filler units. The number of 6 startups per year for all of these CC-based options was obtained from FPL's System Operations department. They projected that the heat rates of these CC units (that ranged from approximately 6,700 to 7,600 BTU/kwh) would result in these units generally operating in a similar manner to how FPL's existing Martin 3 and 4 CC units (whose heat rates fall within this range) are operated. These existing CC units are only started up from cold conditions approximately a half-dozen times per year.

However, not all of the best Combination plans were based solely on CC units. Two of the best Combination plans were based, in part, on outside proposals offering CT units that had a very high dispatch cost. FPL's System Operations group estimated that such CT units were so expensive that they would only be called on to run a half-dozen times per year during extremely high loads. Other best Combination plans were based, in part, on purchases from another utility system. Since it was assumed that it would be likely that these units would already be operating (and because these proposals provided no startup prices so the number of startups assumed was irrelevant), the number of startups for these proposals was assumed to be zero.

Consequently, all of the CC-based proposals and FPL construction options, plus the two CT-based proposals, were assumed to have 6 "cold" startups per year. The estimates for the CC units were based on a belief that they would generally be in operation during the year since they were relatively inexpensive to run, thus only needing to come back on-line from a "cold" condition 6 times per year. Although the estimates for the two CT-based proposals were identical (6 times per year), the basis for that estimate was different. The dispatch costs for these two proposals were so high that the units would only be run in times of extreme load estimated to be about 6 times per year.

Therefore, an estimate of 6 times per year was used for all options except for the previously mentioned utility system sale proposals and the CT "filler" units. Due to the fact that these CT filler units were assumed to have heat rates similar to the CT units recently installed at FPL's Martin site, FPL's system operators used their recent experience with these Martin CT's to estimate that similar CT units would be started about 100 times per year. Thus, it was assumed that the CT "filler" units would start 100 times per year.

FPL then used these startup annual frequency estimates (0, 6, or 100 times per year) and the "cold" startup cost estimates for all units to compute total startup costs for all units in an expansion plan. FPL selected the most economic Combination expansion plans and the All FPL expansion plan from the EGEAS results and then computed startup costs for the plans. The NPV startup cost totals for each of these expansion plans were then added to the EGEAS results.

2) Transmission integration costs: All of the outside proposals and FPL construction options included a cost for interconnecting the unit with the FPL system. The interconnection cost can be thought of as the transmission capital cost needed to simply interconnect that unit with the electrical grid. However, the RFP directions called for no inclusion of proposed/projected transmission integration costs. If one thinks of the interconnection costs as being the transmission capital expenditures necessary to

get a unit's power <u>to</u> the grid, the integration costs can be thought of as the transmission capital costs necessary to deliver that unit's power output <u>over</u> the grid to the customers.

The calculation of integration costs is currently a difficult undertaking. Much of that difficulty is caused by the fact that two otherwise identical units may have significantly different transmission integration costs depending upon the location of the unit and on the order in which units will come onto the transmission system. Compounding this difficulty is the fact that a transmission interconnection queue system now exists that places new generation capacity additions "in-line" for coming onto the system at various locations and at various times. Some of the options in this evaluation, both outside proposals and FPL construction options, were then listed in the queue while others were not.

A transmission assessment was performed for the same Combination expansion plans and the All FPL expansion plan for which startup costs were computed. In addition, a transmission assessment was made for one other Combination plan developed by Mr. Taylor that did not meet FPL's incremental capacity needs. This "illegal" expansion plan was examined in order to assess the costs of a Combination plan that fell just short of meeting the capacity needs.

Estimates of the transmission integration construction costs for the groups of 2005 and 2006 projects in each of the Combination expansion plans and the All FPL expansion plan were developed. These construction costs were then converted into annual revenue requirements. The CPVRR of these revenue requirements were then added to the EGEAS and startup costs for each expansion plan.

3) Capital (Equity Penalty) Costs: These equity penalty costs are applicable only to outside power purchase proposals, not to FPL construction or outside turnkey project options. They reflect the equivalent financial impact of acquiring more debt through the signing of additional power purchases.

FPL's Finance department, after consulting with Standard & Poors, performed an equity penalty cost calculation for each outside power purchase proposal that appeared in the most economical Combination expansion plans mentioned above. The All FPL expansion plan does not have an equity penalty cost since FPL will own the constructed new units. A risk factor of 40 % was utilized based on the input received from Standard & Poors that they would use a 40-to-50% risk factor. A 40 % risk factor was also used in the Commission's Docket No. 001064-EI concerning a determination of need for a Florida Power Corporation construction project.

The cumulative present value of these equity penalty costs for each outside proposal was then calculated and summed for the groups of outside proposals making up each of these best Combination expansion plans. These equity penalty total costs were then added to the EGEAS, startup, and transmission integration costs described above to derive a total cost estimate for these Combination expansion plans.

The total CPVRR costs for these Combination expansion plans, plus the All FPL expansion plan, were then compared.

Q. Please describe the economic results after accounting for all of these costs.

A. The results for the 5 best Combination plans and the best All FPL Plan are presented in Exhibit ___, Document SRS - 14. I'll discuss the results of each of the four basic cost calculations (EGEAS, startup, transmission integration, and equity penalty) in turn starting with the EGEAS cost results.

1) <u>EGEAS cost results:</u> The EGEAS cost results can basically be summarized by stating that two expansion plans emerged as the clear front runners: the All FPL plan and what is labeled Combination Plan 1 on Exhibit ___, Document SRS - 14. Combination Plan 1 consists of one of the FPL construction options, the Martin Conversion project, and two outside proposals, FC 3 and FC 58.

These two expansion plans were approximately $25 million less expensive than the other 4 best Combination plans. However, these two expansion plans, the All FPL plan and Combination Plan 1, ended up in a virtual tie with only a $4 million cost difference between them.

2) Startup cost results: The startup cost calculation also ended in a virtual tie, but it was a tie not only for the two best plans based on EGEAS costs, but also for all 5 Combination plans and the All FPL plan. This was not unexpected since the type of generating units in these plans are basically the same and these units generally had the same number of startups per year (six). The only significant differences came from the proposed startup costs of each proposal/construction option and the number, type, and timing of the "filler" units comprising each expansion plan for the years 2007 – on. The total startup cost for each of these plans varied by no more than approximately $1 million.

Therefore, after calculating both the EGEAS and startup costs, the same two plans, the All FPL plan and Combination Plan 1, remained very close with only a $5 million cost differential between them. These two plans remained significantly more economical than the other 4 best Combination plans.

3) <u>Transmission integration cost results:</u> Whereas the sum of the EGEAS and startup cost calculations ended up with two plans essentially tied, the transmission integration costs ended the close race between these top two plans.

The transmission integration costs were $58 million for the All FPL plan and were $128 million for Combination Plan 1. (The other Combination plans also had integration costs of approximately $127-to-128 million.) This transmission cost difference of $70 million, when combined with the EGEAS and startup costs, resulted in a net economic advantage for the All FPL plan of $65 million versus Combination Plan 1.

4) <u>Capital (equity penalty) cost results:</u> The equity penalty cost calculation resulted in additional costs of from $56-to-$73 million for the 5 Combination plans. The additional costs attributable to Combination Plan 1 from this calculation were $59 million. Combination Plan 1 still ended up as the best Combination plan. However, the $59 million of equity penalty costs for this plan added to the $65 million higher costs from a combination of the EGEAS, startup, and transmission integration costs, resulted in this plan being $124 million more expensive than the All FPL plan.

Q. Now let's go back and discuss a few of these specific results. First, did the closeness of the results, after the EGEAS and startup costs had been calculated and combined, surprise you?

A. No. Since we were analyzing 80 eligible outside proposals and 13 FPL construction options, and because some combination of at least two of these options would have to used to meet FPL's capacity needs, it would have been surprising to me if any one expansion plan had been able to clearly separate itself from all other plans at this stage. There were just too many outside proposals and FPL construction options that were based on the same CT/CC technology and fuel type (natural gas) to expect much separation. (The initially considered FPL construction option based on a completely different fuel - petroleum coke - <u>did</u> show this separation. However, as previously discussed, this option was eventually withdrawn from further consideration due to questions about the degree of development of the cost and performance assumptions.)

Q. Since the technologies represented in the All FPL plan and the 5 best Combination plans were so similar, why was there such a large differential in the transmission integration costs?

A. All of these plans, the All FPL plan and the 5 best Combination plans, contained a common element: FPL's Martin Conversion project. Therefore, the answer to why the transmission integration costs of the plans vary is due to the <u>other elements</u> of each plan. More specifically, the difference is due to the <u>location</u> of the other elements of each plan given that they all included approximately 800 MW of incremental capacity at Martin due to the Martin Conversion project.

Each of the 5 best Combination Plans contained at least one additional project that is to be located in the same general geographic area of Florida as the Martin site. It was determined that the combination of additional generation (located generally in the proximity of Martin) above that proposed at Martin resulted in a need for significant additional transmission system expenditures. Since all of the 5 Combination plans had at least one project in that general location in addition to the Martin Conversion, all 5 Combination plans resulted in significant additional transmission system expenditures. Furthermore, since all 5 of these Combination plans had approximately the same additional MW beyond those supplied by the Martin Conversion, the transmission integration costs for all of these plans were approximately the same.

However, the All FPL plan's other component is a new CC unit at FPL's Manatee site. The fact that the Manatee site is substantially removed geographically from the Martin site means that these significant additional transmission system expenditures are not required. This accounts for the large differential in the transmission integration costs between the All FPL plan and the 5 Combination plans.

Q. Did FPL select the Manatee site based on knowledge of transmission integration thresholds and the corresponding costs for multiple projects near the Martin site?

A. No. As previously discussed, a decision to put one of any two projects FPL might ultimately build at Manatee instead of both projects at Martin was made in late November/early December and was based on security considerations. Since transmission integration cost estimates were not provided for any of the best Combination plans until early January, the Manatee site selection was <u>not</u> based on considerations of gaining a transmission integration cost advantage.

Q. Your discussion of the extensive analyses FPL conducted through these 3 analysis periods covers a lot of ground. Please summarize the analysis process to this point and the results of the analyses?

A. As previously mentioned, the analysis process through these 3 analysis periods consisted of 3 basic steps. Step 1 consisted of rankings of the 80 eligible individual outside proposals and rankings of the 13 FPL construction options. Step 2 of the analyses consisted of the creation of 3 types of generation expansion plans: All Outside plans in which only outside proposals filled FPL's 2005 and 2006 capacity needs; All FPL plans in which only FPL options filled the 2005 and 2006 needs; and Combination plans in which a mix of both outside proposals and FPL options filled those needs. Steps 1 and 2 were repeated throughout the overall evaluation process as needed as basic inputs and assumptions changed. Step 3 then took the most economic plans resulting from the Step 2 analyses and added in three types of costs not previously captured: startup costs, transmission integration costs, and equity penalty costs.

In regard to the results of each of these 3 analysis steps, the results can be summarized as follows:

Step 1 results: The 14 most competitive outside proposals that eventually emerged, primarily from various Step 1 analyses (but with some input from Step 2 results), were presented in Exhibit ___, Document SRS – 12. The two most competitive FPL construction options were the Martin Conversion project and the new Manatee 4x1 CC unit.

Step 2 results: The analyses showed that the best All Outside plans, as previously presented in Exhibit ___, Document SRS – 10, were not competitive with either the best All FPL plan or the best Combination plans that were presented in Exhibit ___, Document SRS – 14. Consequently, the best All Outside plans were not carried forward into the Step 3 analyses. The best Combination plans and the best All FPL plan were carried over into Step 3.

Step 3 results: As shown in Exhibit ___, Document SRS – 14, once the addition of three types of additional costs (startup costs, transmission integration costs, and equity penalty costs) not captured in the Step 1 and Step 2 analyses were accounted for, the All FPL plan emerged as significantly more economical compared to the best Combination plans.

Q. Was it at this point that FPL publicly announced its plans to meet its 2005 and 2006 capacity needs with its Martin Conversion project and the Manatee CC unit?

A. Yes. Shortly after the 3rd period analyses were completed, FPL made the announcement that it would meet its capacity needs by proceeding with these two projects. Although the Step 4 review and, as needed, adjustment work still remained, it was felt that the cost advantage of the All FPL plan was sufficient to justify announcing FPL's plans to proceed with the two construction options.

D. The Results of the 4th Analysis Period

Q. Did FPL find anything significant in its review of the inputs and outputs?

A. Yes. Although our review of the inputs showed no problems, we did find something unusual in our review of the outputs. In reviewing the outputs we found that certain outside proposals were not being grouped together by EGEAS to form Combination expansion plans with FPL's Manatee CC unit even though such a Combination plan would exactly meet FPL's total capacity needs of 1,722 MW in 2006.

These outside proposals had been included in our Combination plan run # 1 in the 2nd and 3rd analysis periods (and are listed in Exhibit ___, Document SRS – 12). However, as we checked the EGEAS output listing for expansion plans that were evaluated, these Manatee-plus-outside proposal plans that summed exactly to 1,722 MW were not listed. This concerned us for two reasons. First, the model should have evaluated and listed these plans. Second, if these Manatee-inclusive plans were evaluated and found to be cost-competitive in regard to the EGEAS costs, the fact that a Manatee unit (and not a Martin unit) was a component of the expansion plan might result in substantially lower transmission integration costs for the plan.

Q. Why was EGEAS not evaluating these plans?

A. The simple answer is that there was what I'll call a computational "quirk" in the EGEAS analyses that prevented EGEAS from evaluating expansion plans that exactly met the 1,722 MW total capacity needs. This quirk has to do with the "precision" of numbers in computer modeling. Values calculated in a model are typically more "precise" (i.e., carried out to a number of decimal points) than are values that are either inputted into a model for a run or printed out as the results of a model run. Input values are often limited to a small number of decimal points (for example, three decimal points in EGEAS) and printout values are typically rounded to the nearest whole number. Also, "printout" numbers that are the results of one analysis are often used as inputs to another analysis.

In FPL's early work to prepare for the analyses of the outside proposals and FPL construction options, we used the Tie Line Assistance and Generation Reliability (TIGER) model to determine the amount of MW needed to meet FPL's capacity needs in 2005 and 2006. TIGER calculated these MW values, then printed them out in rounded form as 1,122 MW and 600 MW, respectively, for 2005 and 2006.

These rounded values were then input into EGEAS in order to determine the reserve margin "threshold" values EGEAS would use to judge whether a plan met FPL's capacity needs. Looking at the 2006 values, we calculated a 2006 reserve margin of 19.995888% as the correct EGEAS threshold value. Since this number had to be put into EGEAS using no more than 3 decimal points, FPL followed its usual EGEAS practice of inputting a two-decimal point threshold value of 20.00%. (If we had used the largest possible three-decimal places for the input threshold value, we would have used a value of 19.996%.)

In practice, however, when a potential expansion plan emerged that had exactly 1,722 MW by 2006, EGEAS calculated this potential expansion plan as resulting in a 19.995888% reserve margin which did not meet the inputted 20.00% threshold (nor would it have met a 19.996% threshold). Consequently, such a potential expansion plan was rejected by EGEAS as not meeting FPL's capacity needs and was not evaluated further.

In summary, the problem arose because of the different levels of precision inherent between computer models' calculated numbers and the numbers used as inputs.

Q. Had you seen this computational quirk before?

A. No. This quirk has not surfaced since 1993 (when I assumed my present position), and I'm not aware of it surfacing before then. The reason for this is that the capacity offered by the relatively small number of resource options that are typically evaluated in resource planning usually does not fall exactly on the reserve margin MW target. However, in these analyses of outside proposals and FPL construction options, the very high number of options being evaluated happened to result in a possible grouping of options that exactly met the 1,722 MW capacity need.

Q. What did FPL do once this computational quirk was recognized?

A. After recognizing that not all feasible combinations of options had been evaluated, we reset the 2005 and 2006 reserve margin targets lower by 0.01% to 19.98% and 19.99%, respectively. We then made EGEAS test runs using only "dummy" units whose capacities were set exactly at 1,122 MW and 600 MW for 2005 and 2006 to ensure that the model would evaluate plans that exactly met the 2005 and 2006 capacity needs. Once we were satisfied that this was the case, we reran the final cases in which the All Outside plans, the All FPL plans, and the Combination plans had been evaluated.

Q. What were the results of these analyses?

A. There was no change in either the All Outside or All FPL plans. Likewise, the rerun of Combination plan run # 2 was unchanged. However, several new Combination plans emerged from the rerun of Combination plan run # 1. This was expected since this run included FPL's Manatee option plus the outside proposals that could be combined with the Manatee option to exactly meet the 1,722 MW total capacity need.

Exhibit ___, Document SRS – 15 shows the best "new" Combination plans that emerged along with the best and next best Combination plans previously identified. As shown in the document, the best Combination plan coming out of EGEAS was still what has been referred to previously as Combination Plan 1. However, three new Combination plans that all include the FPL's Manatee unit now emerge as better than what had previously been the second best Combination plan.

This document shows two important things. First, the most economic of these new Combination plans (consisting of the Manatee CC unit, FC 11, and FC 65) is still more expensive, by $8 million (CPVRR), than the previously discussed Combination Plan 1. However, the fact that the plan contained an FPL unit at Manatee instead of at Martin meant that the transmission integration costs might be lower for this plan than for any of the previously discussed Combination plans (all of which contained the Martin Conversion project). Therefore, this new Combination plan needed to be further analyzed in order to determine startup costs, transmission integration costs, and equity penalty costs.

Second, the three new Combination plans shown on Exhibit ___, Document SRS – 15 contain, in addition to the FPL Manatee CC unit, the following five outside proposals: FC 3, FC 11, FC 48, FC 49, and FC 65. This is important because it means that these three new Combination plans are essentially the same plan. This is because these five outside proposals represent just two basic proposals. FC 3 and FC 65 represent the same 25-year, CT-based proposal for 465 MW (Summer) with either a 2005 start date (FC 3) or a 2006 start date (FC 65). Likewise, FC 11, FC 48, and FC 49 represent the same basic proposal: a utility sale of 150 MW (Summer). The FC 11 version of this proposal is for a 2005 start date and a 5-year term, FC 48 is for a 2006 start date and a 5-year term, and FC 49 is for a 2006 start date and a 3-year term.

Therefore, evaluating the startup costs, transmission integration costs, and equity penalty costs for one of these plans will essentially define the costs for all three of them. With this in mind, FPL chose the most economic of these plans as shown in Exhibit ___, Document No. SRS – 15: the plan consisting of the Manatee CC unit, FC 11, and FC 65. (I will refer to this plan as the “February Combination Plan”.) We then calculated these other three costs for that plan.

Q. Was the previously mentioned AFUDC adjustment also made at this time?

A. Yes. Several AFUDC calculation adjustments were made at this time. The first AFUDC adjustment was an adjustment in the number of years over which AFUDC was calculated. Our calculations had used a 3-year AFUDC calculation for both the generation capital costs of the FPL generation options and for the transmission integration costs for all options. The FPL generation option AFUDC calculations were adjusted to cover 3 and ½ years while the transmission integration cost AFUDC calculation was adjusted to cover 2 and ½ years with either a 2005 or 2006 in-service year as appropriate. The second AFUDC adjustment involved the AFUDC rate used in the analyses. FPL utilizes an annual incremental AFUDC rate in its planning work and a rate of 9.8% was used in the analyses. However, for purposes of this filing it is necessary to use the embedded AFUDC rate that was last approved by the Commission for FPL. This approved AFUDC rate of 8.26% was applied in a monthly AFUDC calculation for both the FPL generation options and the transmission integration for all options.

The third adjustment in regard to the AFUDC calculation of transmission integration costs was that an updated annual (and monthly) spending curve for the transmission integration costs was used. The last adjustment was to the escalation rate used in the calculation of transmission integration costs. A constant escalation rate of 2.58% replaced varying annual rates of 2.6% to 3.2%. This affected both the AFUDC and non-AFUDC transmission integration costs.

FPL made these adjustments and calculated the total AFUDC additional costs that would apply to the All FPL plan, Combination Plan 1, and the February Combination Plan. These additional costs were then added as a separate line item cost to the total EGEAS, startup, transmission integration, and equity penalty costs that had previously been calculated.

Q. What were the results of these calculations and adjustments?

A. The results of these calculations and adjustments for the February Combination Plan, the All FPL plan, and Combination Plan 1 are presented in Exhibit ___, Document SRS – 16. This document utilizes the same cost presentation format used in Exhibit ___, Document SRS – 14.

The document presents the same information shown before for the All FPL plan and Combination Plan 1. However, the AFUDC additional costs are also added for these two expansion plans to show new total costs (millions, CPVRR) of $41,054 for the All FPL plan and $41,172 for Combination Plan 1. Consequently, the All FPL plan remains $118 million (CPVRR) less expensive than Combination Plan 1.

The document also presents the costs for the February Combination Plan. The total costs (millions, CPVRR) for this plan are $41,066. This plan emerged as the lowest cost Combination plan by a total of $106 million (CPVRR) compared to Combination Plan 1 primarily due to its substantially lower transmission integration costs. (This was expected due to the fact that the February Combination Plan contained an FPL unit at Manatee instead of at Martin as was the case with Combination Plan 1.)

However, the All FPL plan remained the lowest cost plan by being $12 million (CPVRR) less expensive than the February Combination Plan.

Consequently, although the results of the 4th period analyses showed a substantial reduction in the previously calculated cost advantage of the All FPL plan, it affirmed that FPL's announced decision was the correct decision. The All FPL plan consisting of the Martin Conversion project and the new Manatee 4x1 CC unit is the most cost-effective way for FPL to meet its 2005 and 2006 capacity needs.

Q. Would you please summarize your testimony?

A. Yes. FPL's 2001 resource planning work determined that FPL had a need for additional resources in 2005 and 2006. In order to meet FPL's Summer reserve margin criterion of 20% for those years, FPL needed 1,122 MW by mid-2005 and another 600 MW by mid-2006.

Because the types of new power plants that FPL would build (CC units) to meet these needs are those that would require a determination of need, in mid-August of 2001 FPL issued a Request for Proposals (RFP) for new capacity to meet these 2005 and 2006 needs. Fifteen organizations, including utilities and non-utilities, submitted 81 separate proposals for meeting these needs. In addition, FPL submitted 13 construction options to be evaluated.

The evaluation of the 80 eligible outside proposals (one outside proposal was deemed ineligible) and 13 FPL construction options initially established a ranking of the most economic outside proposals, and a separate ranking of the most economic FPL construction options, on an individual basis. The best individual options from these rankings were then analyzed to create 3 types of expansion plans for meeting FPL's needs. One type of plan is the All Outside plan that consists only of outside proposals in 2005 and 2006. A second type of plan is the All FPL plan that consists only of FPL construction options in 2005 and 2006. The third type of plan is the Combination plan that consists of a mixture of outside proposals and FPL construction options for 2005 and 2006.

The evaluation then looked at 4 separate costs associated with these plans: costs calculated by FPL's EGEAS model (primarily costs for new capacity and system fuel costs), generator startup costs for the new units, transmission integration costs, and equity penalty costs.

The first key result was that the EGEAS calculations alone ruled out any All Outside proposal plans as being significantly more expensive than either the best All FPL plan or the best Combination plans.

The second key result is that the EGEAS calculations through January focused attention on two plans; the best All FPL plan and one Combination plan (referred to as Combination Plan 1), as being significantly less expensive than the other Combination plans. FPL's Martin Conversion project was the only element common to both of these best plans (and common to all other top Combination plans to this point). In regard to the All FPL plan and the best Combination plan, these two plans emerged from the EGEAS calculations in a virtual tie.

Although the addition of startup costs to the EGEAS costs failed to clearly separate these two plans, the addition of transmission integration costs did result in this separation. The transmission integration costs for the All FPL plan were $70 million less than the transmission integration costs of Combination Plan 1, resulting in a net cost advantage of $65 million for the All FPL plan. The addition of equity penalty costs to the outside proposals contained in Combination Plan 1 extended the All FPL plan's cost advantage from $65 million to $124 million.

FPL subsequently made a public announcement that it planned to meet its 2005 and 2006 capacity needs with the Martin Conversion project and the new Manatee 4x1 CC unit. FPL then continued with the 4th and final step of its evaluation: the reviewing of inputs and outputs and the incorporation of any needed adjustments.

During the review of the outputs, a computational "quirk" in the EGEAS analyses was discovered that had resulted in EGEAS not fully analyzing at least one potential expansion plan that exactly met FPL's total 1,722 MW capacity need.

Consequently, FPL adjusted the EGEAS model to correct for this computational quirk and reran a number of analyses. The result was that one new Combination plan (the February Combination Plan) emerged that, although more expensive than the previously analyzed Combination Plan 1 in regard to EGEAS costs, held promise for potentially lower transmission integration costs. The transmission integration, startup, and equity penalty costs were then calculated for the February Combination Plan. In addition, several AFUDC calculation adjustments were made to this plan as well as to the All FPL plan and Combination Plan 1.

When all of these calculations and adjustments were incorporated and the total costs for all three plans were summed, the February Combination Plan proved to be less expensive than Combination Plan

1 by $106 million (CPVRR). However, the All FPL plan remained the most economical plan by $12 million (CPVRR).

This difference in total costs between the All FPL plan and the February Combination plan, although relatively small, demonstrate that no other plan is as cost-effective as the All FPL plan in meeting FPL's 2005 and 2006 capacity needs.

Moreover, these two plans have important differences in other respects. The All FPL plan consists solely of generators that FPL owns and operates, while in the February Combination Plan, FPL would have to enter into contracts that would attempt to simulate the advantages of owning and operating FPL's own units. FPL has found this very difficult to achieve. In addition, as Mr. Waters points out in his testimony, all of the lowest cost Combination plans contained a proposal that is, in essence, a "paper MW" proposal. This proposal gave no indication of having a firm gas transportation commitment with a pipeline that either exists or is under construction and has no backup fuel capability. In addition, FPL would only have a right of first call on this generation but at a very high dispatch cost. This type of generation proposal is certainly less desirable than an option with firm gas transportation and that can be dispatched at attractive costs with all system cost savings going to FPL's customers. FPL's Martin and Manatee units represent the latter type of option.

Therefore, the results of FPL's analyses show that FPL's Martin Conversion project and new 4x1 CC unit at Manatee are the most cost-effective alternatives, and the best choices for meeting its 2005 and 2006 capacity needs.

Q. Does this conclude your testimony?

A. Yes it does.

Projection of FPL's 2005 and 2006 Capacity Needs
(without Capacity Additions in those years)

Summer

	(1)	(2)	(3) = (1)+(2)	(4)	(5)	(6)=(4)-(5)	(7)=(3)-(6)	(8)=(7)/(6)	(9)=((6)*1.20)-(3)
August of the Year	Projections of FPL Unit Capability (MW)	Projections of Firm Purchases (MW)	Projection of Total Capacity (MW)	Peak Load Forecast (MW)	Summer DSM Forecast * (MW)	Forecast of Firm Peak (MW)	Forecast of Summer Reserves (MW)	Forecast of Summer Res. Margins w/o Additions (%)	MW Needed to Meet 20% Reserve Margin (MW)
2005	19,135	2,625	21,760	20,719	1,651	19,068	2,692	14.1%	1,122
2006	19,135	2,491	21,626	21,186	1,729	19,457	2,169	11.1%	1,722

Winter

	(1)	(2)	(3) = (1)+(2)	(4)	(5)	(6)=(4)-(5)	(7)=(3)-(6)	(8)=(7)/(6)	(9)=((6)*1.20)-(3)
January of the Year	Projections of FPL Unit Capability (MW)	Projections of Firm Purchases (MW)	Projection of Total Capacity (MW)	Peak Load Forecast (MW)	Winter DSM Forecast * (MW)	Forecast of Firm Peak (MW)	Forecast of Winter Reserves (MW)	Forecast of Winter Res. Margins w/o Additions (%)	MW Needed to Meet 20% Reserve Margin (MW)
2005	20,369	3,487	23,856	20,418	1,738	18,680	5,176	27.7%	(1,440)
2006	20,369	2,591	22,960	20,854	1,786	19,068	3,892	20.4%	(78)

* DSM values shown represent cumulative load management and incremental conservation capability.

List of Organizations Submitting Firm Capacity Proposals

	Organization	Type of Proposal	Technology
1	AES	Purchased Power	CC & CT
2)	Bright Star (Enron)	Purchased Power & Turnkey	CC
3)	Calpine	System Sale	"System" of 4 CC Units
4)	Competitive Power Ventures	Purchased Power & Turnkey	CC
5)	Constellation	Purchased Power	CC
6)	El Paso	Purchased Power	CC
7)	Florida Power Corporation	System Sale	Utility System
8)	Mirant	Purchased Power	CC
9)	PG&E NEG	Purchased Power	CC
10)	Progress Energy Ventures	Purchased Power	CC
11)	Reliant	Purchased Power	CC
12)	Sempra	Purchased Power	CC
13)	Southern Company	Purchased Power	CC
14)	TECO	Purchased Power & System Sale	CC & Utility System
15)	Tractabel	Purchased Power	CC

Summary of Outside Proposals

Firm Capacity Proposal Code Number (FC__)	Location (County)	Incremental Summer Capacity (MW)	Start Date (Year)	Term of Service (No. of Years)
1	Hardee	712	2005	10
2	St.Lucie	618	2005	7
3	Palm Beach	465	2005	25
4	St. Lucie	447	2006	20
5	Lee	650	2006	6
6	Palm Beach	800	2005	3
7	Manatee	220	2004	10
8	St. Lucie	811	2005	10
9	Hardee	300	2003	9
10	Palm Beach	220	2005	10
11	Utility System	150	2005	5
12	Bradford	576	2005	10
13	Palm Beach	220	2004	10
14	De Soto	490	2006	10
15	St. Lucie	224	2005	20
16	Lee/Indian River/Polk (Sustem)	300	2005	3
17	Palm Beach	811	2005	10
18	Palm Beach	257	2005	25
19	Okeechobee	526	2005	3
20	Dade	242	2005	5
21	St. Lucie	447	2006	Turnkey
22	Broward	811	2005	10
23	Volusia	242	2005	5
24	Bahamas	1,200	2006	10
25	Bahamas	1,200	2005	10
26	Bahamas	1,200	2005	10
27	Bahamas	1,200	2005	10
28	Palm Beach	257	2005	10
29	Palm Beach	220	2005	25
30	St.Lucie	1,236	2005	7
31	St. Lucie	811	2005	Turnkey
32	Palm Beach	811	2005	Turnkey
33	Broward	811	2005	Turnkey

Summary of Outside Proposals

Firm Capacity Proposal Code Number (FC__)	Location (County)	Incremental Summer Capacity (MW)	Start Date (Year)	Term of Service (No. of Years)
34	Utility System	300	2003	5
35	Utility System	300	2005	6
36	Utility Unit	250	2004	3
37	Utility Unit	250	2005	3
38	Utility System	150	2005	3
39	"System Sale" - 4 units	300	2005	10
40	Palm Beach	800	2005	10
41	"System Sale" - 4 units	300	2005	5
42	"System Sale" - 4 units	450	2005	3
43	"System Sale" - 4 units	450	2005	5
44	"System Sale" - 4 units	450	2005	10
45	"System Sale" - 4 units	900	2005	5
46	"System Sale" - 4 units	900	2005	10
47	Hardee	712	2006	10
48	Utility System	150	2006	5
49	Utility System	150	2006	3
50	Palm Beach	800	2006	3
51	Palm Beach	800	2006	10
52	Utility System	300	2006	6
53	Palm Beach	220	2005	10
54	Manatee	220	2005	10
55	Palm Beach	220	2006	10
56	Manatee	220	2006	10
57	Bradford	576	2006	10
58	Okeechobee	526	2006	3
59	Volusia	242	2006	5
60	Dade	242	2006	5
61	Utility Unit	250	2006	3
62	St.Lucie	811	2006	10
63	Palm Beach	811	2006	10
64	Broward	811	2006	10
65	Palm Beach	465	2006	25
66	Palm Beach	220	2006	10

Summary of Outside Proposals

Firm Capacity Proposal Code Number (FC__)	Location (County)	Incremental Summer Capacity (MW)	Start Date (Year)	Term of Service (No. of Years)
67	Palm Beach	220	2006	25
68	Palm Beach	257	2006	25
69	Palm Beach	257	2006	10
70	St. Lucie	224	2006	20
71	"System Sale" - 4 units	300	2006	3
72	"System Sale" - 4 units	300	2006	10
73	"System Sale" - 4 units	300	2006	5
74	"System Sale" - 4 units	450	2006	3
75	"System Sale" - 4 units	450	2006	5
76	"System Sale" - 4 units	450	2006	10
77	"System Sale" - 4 units	900	2006	5
78	"System Sale" - 4 units	900	2006	10
79	Broward	811	2006	Turnkey
80	Palm Beach	811	2006	Turnkey
81	St. Lucie	811	2006	Turnkey

Summary of FPL Construction Options

Project	Location (County)	Incremental Summer Capacity * (MW)
1) Ft.Myers CT-to-CC Conversion (2x1)	Lee	237
2) Martin CT-to-CC Conversion (3x1)	Martin	515
3) New Combined Cycle (3x1)	Martin	881
4) New Combined Cycle (3x1)	Martin	833
5) New Combined Cycle (3x1)	Martin	763
6) New Combined Cycle (3x1)	Manatee	833
7) Repowering of Port Everglades Units 3 & 4	Broward	1,238
8) Martin CT-to-CC Conversion (4x1)	Martin	789
9) New Combined Cycle (4x1)	Martin	1,110
10) New Two Petroleum Coke - Fired Units	Martin	600
11) Power Augmentation of Sanford Unit 4	Sanford	214
12) Power Augmentation of Sanford Unit 5	Sanford	214
13) New Combined Cycle (4x1)	Manatee	1,107

* The capacity value shown for each option is the MW value used in FPL's final analysis of that option.

Top Individually Ranked Outside Proposals *
(1st Analysis Period)

Outside Proposal Code Number	In Mr. Taylor's 11/20 Individual Rankings	In FPL's 11/20 Individual Rankings
FC 2		x
FC 8,17&22 * *	x	x
FC 11	x	x
FC 16	x	x
FC 19	x	x
FC 21	x	
FC 24	x	
FC 25,26&27 * * *	x	
FC 31,32&33 * *	x	x
FC 36	x	
FC 38	x	x
FC 39		x
FC 41		x
FC 42	x	x
FC 48	x	x
FC 49	x	x
FC 50	x	
FC 58	x	x
FC 62,63&64 * *	x	x
FC 71	x	x
FC 72		x
FC 73		x
FC 74	x	x
FC 75		x
FC 77	x	
FC 79,80&81 * *	x	x

* Proposals shown were in top 10 in either the 2005 start date rankings or the 2006 start date rankings.

* * Denotes same generating unit & same cost but at different sites.

* * * Denotes same generating units & same total MW but different MW delivery schedules for 2005 and 2006. Evaluations were performed as separate projects, but are grouped together for ranking purposes.

Top 5 All Outside Expansion Plans
(1st Analysis Period)

Rank	2005 Additions	2006 Additions	CPVRR (Millions, 2001$)
1	FC 3, FC 38, FC 19	FC 62, FC 63, FC 64	41,407
2	FC 3, FC 11, FC 19	FC 62, FC 63, FC 64	41,409
3	FC 3, FC 8/17/22	FC 48, FC 71	41,409
4	FC 27	FC 48, FC 74	41,414
5	FC 11, FC 8/17/22, FC 41	FC 58	41,417

Individual Ranking of FPL Construction Options : 2005 Start
(1st Analysis Period)

Rank	Description	Location	Incremental Capacity (Summer MW) *	CPVRR (Millions, 2001$)
1	CT-to-CC Conversion (4x1)	Martin	792	40,838
2	Two Petroleum Coke - Fired Units	Martin	600	40,907
3	Combined Cycle (4x1)	Martin	1,110	40,919
4	Combined Cycle (3x1)	Martin	881	40,922
5	Combined Cycle (3x1)	Manatee	833	40,925
6	Combined Cycle (3x1)	Martin	763	40,958
7	Combined Cycle (3x1)	Martin	833	40,965
8	CT-to-CC Conversion (3x1)	Martin	515	41,160
9	CT-to-CC Conversion (2x1)	Ft.Myers	237	41,202
10	Repowering of Units 3 & 4	Port Everglades	1,288	41,218
11	Power Augmentation of Unit 4	Sanford	214	41,261
12	Power Augmentation of Unit 5	Sanford	214	41,261

* The capacity value shown for each option is the MW value used in the FPL analysis represented above.

Individual Ranking of FPL Construction Options : 2006 Start
(1st Analysis Period)

Rank	Description	Location	Incremental Capacity (Summer MW) *	CPVRR (Millions, 2001$)
1	CT-to-CC Conversion (4x1)	Martin	792	40,816
2	Two Petroleum Coke - Fired Units	Martin	600	40,863
3	Combined Cycle (4x1)	Martin	1,110	40,883
4	Combined Cycle (3x1)	Martin	833	40,893
5	Combined Cycle (3x1)	Manatee	833	40,895
6	Combined Cycle (3x1)	Martin	763	40,930
7	Combined Cycle (3x1)	Martin	881	40,932
8	Repowering of Units 3 or 4	Port Everglades	644 * *	41,042
9	CT-to-CC Conversion (3x1)	Martin	515	41,094
10	CT-to-CC Conversion (2x1)	Ft.Myers	237	41,142
11	Power Augmentation of Unit 4	Sanford	214	41,211
12	Power Augmentation of Unit 5	Sanford	214	41,211

* The capacity value shown for each option is the MW value used in the FPL analysis represented above.
* * MW and CPVRR values shown are for repowering one of these units.

Top 5 All FPL Expansion Plans
(1st Analysis Period)

Rank	2005 Additions	2006 Additions	CPVRR (Millions, 2001$)
1	Martin Conversion (4x1) Martin Pet Coke	Manatee (3x1) CC	41,007
2	Martin Conversion (4x1) Martin (4x1) CC	----	41,084
3	Martin Conversion (4x1) Martin (3x1) CC	Ft. Myers Conversion (2x1) *	41,160
4	Martin (4x1) CC Manatee (3x1) CC	----	41,173
5	Martin Conversion (4x1) Martin (3x1) CC	----	41,208

* The converted unit was assumed to utilize Gulfstream gas in this case.

Top Individually Ranked Outside Proposals *
(2nd Analysis Period)

Outside Proposal Code Number	In Mr. Taylor's 12/11 Individual Rankings	In Mr. Taylor's 12/16 Individual Rankings	In FPL's 12/17 Individual Rankings	In FPL's 12/27 Individual Rankings
FC 2			x	
FC 3	x	x	x	x
FC 8,17&22 * *	x	x		x
FC 11	x	x	x	x
FC 16	x	x	x	
FC 19	x	x	x	x
FC 24	x	x		
FC 25,26&27 * * *	x	x	x	x
FC 29				x
FC 30		x		
FC 31,32& 33 * * *				x
FC 36	x			
FC 38	x	x	x	x
FC 39			x	x
FC 41			x	
FC 42	x	x	x	x
FC 45	x	x		
FC 48	x	x	* * * *	* * * *
FC 49	x	x	* * * *	* * * *
FC 50	x	x	* * * *	* * * *
FC 58	x	x	* * * *	* * * *
FC 62,63&64 * *	x	x	* * * *	* * * *
FC 65	x	x	* * * *	* * * *
FC 71	x	x	* * * *	* * * *
FC 74	x	x	* * * *	* * * *
FC 77	x	x	* * * *	* * * *

* Proposals shown were in top 10 in either the 2005 start date rankings or the 2006 start date rankings
.

* * Denotes same generating unit & same cost but at different sites.

* * * Denotes same generating units & same total MW but with different MW delivery schedules for 2005 and 2006. Evaluations were performed as separate projects, but are grouped together for ranking purposes.

* * * * FPL did not develop individual rankings of 2006 start date proposals due to the closeness of Mr. Taylor's and FPL's individual ranking results for 2005 start date proposals.

Top 5 All Outside Expansion Plans
(2nd Analysis Period)

Rank	2005 Additions	2006 Additions	CPVRR (Millions, 2001$)
1	FC 3, FC 19, FC 38	FC 71, FC 72	41,130
2	FC 3, FC 16, FC 19	FC 49, FC 72	41,133
3	FC 3, FC 11, FC 19	FC 71, FC 72	41,135
4	FC 3, FC 16, FC 19	FC 48, FC 72	41,136
5 (tie)	FC 2, FC 3, FC 11	FC 58	41,145
	FC 27	FC 48, FC 65	41,145
	FC 27	FC 49, FC 65	41,145

Top 5 Combination Expansion Plans
(2nd Analysis Period)

Rank	2005 Additions	2006 Additions	CPVRR (Millions, 2001$)
1	Martin Conversion FC 3	FC 58	40,926
2	Martin Conversion FC 19	FC 65	40,959
3	FC 3, FC 19, FC 38	Martin Conversion	40,966
4	Martin Conversion FC 3	FC 71, FC 72	40,967
5	FC 3, FC 19, FC 11	Martin Conversion	40,974

Outside Proposals Carried Into
Expansion Plan Analysis
(3rd Analysis Period)

Outside Proposal Code Number

FC 3
FC 8,17&22 *
FC 11
FC 16
FC 19
FC 27
FC 38
FC 39
FC 48
FC 49
FC 58
FC 65
FC 71
FC 72

* Denotes same generating unit & same cost but at different sites.

Top 5 Combination Expansion Plans
(3rd Analysis Period)

Rank	2005 Additions	2006 Additions	CPVRR (Millions, 2001$)
1	Martin Conversion, FC 3	FC 58	40,966
2	Martin Conversion, FC 3	FC 71, FC 72	40,995
3	Martin Conversion, FC 19	FC 65	41,001
4	Martin Conversion, FC 38, FC 39	FC 65, FC 71	41,003
5	FC 3, FC 19, FC 38	Martin Conversion	41,010

Results for the Best
Combination and All FPL Expansion Plans
(3rd Analysis Period)

	All FPL Plan	Combination Plan 1	Combination Plan 2	Combination Plan 3	Combination Plan 4	Combination Plan 5
2005 Additions:	Martin Conversion, Manatee CC	Martin Conversion, FC 3	Martin Conversion, FC 3	Martin Conversion, FC 19	Martin Conversion, FC 38, FC 39	FC 3, FC 19, FC 38
2006 Additions:	----	FC 58	FC 71, FC 72	FC 65	FC 65, FC 71	Martin Conversion
Costs (CPVRR, millions, 2001$)						
EGEAS Costs =	40,970	40,966	40,995	41,001	41,003	41,010
Startup Costs =	14	13	13	13	13	13
Transmission Integration Costs =	58	128	127	128	128	128
Equity Penalty Costs =	0	59	73	56	72	60
Total Cost =	**41,042**	**41,166**	**41,208**	**41,198**	**41,216**	**41,211**
Cost Difference from All FPL Plan =	----	**124**	**166**	**156**	**174**	**169**

Top 5 Combination Expansion Plans
(3rd and 4th Analysis Periods)

Rank	2005 Additions	2006 Additions	CPVRR (Millions, 2001$)	When Analyzed ?
1	Martin Conversion, FC 3	FC 58	40,966	3rd Period
2	Manatee CC, FC 11	FC 65	40,974	February
3 (tie)	Manatee CC, FC 3	FC 48	40,980	February
	Manatee CC, FC 3	FC 49	40,980	February
5	Martin Conversion, FC 3	FC 71, FC 72	40,995	3rd Period

Final Results for the Best Combination and All FPL Expansion Plans (4th Analysis Period)

	All FPL Plan	Combination Plan 1	February Combination Plan
2005 Additions:	Martin Conversion, Manatee CC	Martin Conversion, FC 3	Manatee CC, FC 11
2006 Additions:	----	FC 58	FC 65
Costs (CPVRR, millions, 2001$)			
EGEAS Costs =	40,970	40,966	40,974
Startup Costs =	14	13	10
Transmission Integration Costs =	58	128	19
Equity Penalty Costs =	0	59	55
AFUDC additional costs =	12	6	8
Total Cost =	**41,054**	**41,172**	**41,066**
Cost Difference from All FPL Plan =	**----**	**118**	**12**