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Florida Power
CORPORATION

JAMES A. MCGEE
SENIOR COUNSEL

May 5, 1995

Ms. Blanca S. Bayó, Director
Florida Public Service Commission
101 East Gaines Street
Tallahassee, Florida 32399-0870

Re: Docket No. [redacted]

Dear Ms. Bayó:

Enclosed for filing in the subject docket are fifteem copies of the Rebuttal Testimony of Linda D. Brousseau, for filing in the above-referenced docket.

Please acknowledge your receipt of the above filing on the enclosed copy of this letter and return to the undersigned. A 3.5 inch diskette containing this testimony in WordPerfect format is also enclosed. Thank you for your assistance in this matter.

Very truly yours,

James A. McGee

JAM/jb
Enclosures

cc: Parties of Record

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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that true and correct copies of the Rebuttal Testimony of Linda D. Brousseau have been furnished via Facsimile(*) or regular U.S. Mail on the 5th day of May, 1995 to the following:

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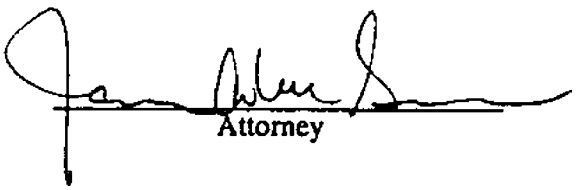


Attorney

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Petition of Florida Power Corporation for determination that its plan for curtailing purchases from Qualifying Facilities in minimum load conditions is consistent with Rule 25-17.086, F.A.C.

Docket No. [redacted]

Submitted for filing: May 5, 1995

REBUTTAL TESTIMONY OF LINDA D. BROUSSEAU

ON BEHALF OF

FLORIDA POWER CORPORATION

FLORIDA POWER CORPORATION

DOCKET NO. 941101-EQ

REBUTTAL TESTIMONY OF LINDA D. BROUSSEAU

I. INTRODUCTION AND PURPOSE

Q. Please state your name and business address.

A. My name is Linda D. Brousseau. My business address is Post Office Box 14042, St. Petersburg, Florida 33733.

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

A. I am employed by Florida Power Corporation ("Florida Power" or "the Company") as Manager of Power Supply.

Q. Please describe your duties as Manager of Power Supply.

A. I am responsible for the day-to-day scheduling of generation and bulk power interchange resources to meet Florida Power's system demand in a reliable and economic manner. I represent Florida Power as a member of the Operating Committee of the Florida Electric Coordinating Group on which I am the designated State Capacity Emergency Coordinator. I also participate in the Operating Committee of the Southeast Electric Reliability Council as the Florida Power alternate member. In these capacities I also serve on various subcommittees and task forces as needed.

Q. Please describe your educational and professional experience.

A. I received a Bachelor of Science Degree in Chemical Engineering from the University of South Florida in 1985.

During the 1981-1985 time period, I was a Co-operative Education student at Florida Power. I performed a variety of assignments in Florida Power's Fossil Engineering Department and also worked at Florida Power's Anclote Plant.

Upon graduation in 1985, I returned to Florida Power as an Engineer 1 in the Engineer In Orientation Program (EIO). I worked again in Fossil Engineering and at the Bartow Plant. My duties included preparation of engineering studies and related activities. At the Bartow Plant, I coordinated and supervised two major projects during a unit maintenance outage.

In 1986, I became a Test Engineer in Florida Power's Plant Performance Department. My duties included the coordination, preparation and testing of fossil steam unit performance.

In 1987, I was promoted to the position of Energy Efficiency Programs Coordinator in Florida Power's Customer Service and Marketing Department. I provided staff support to field engineers on all of Florida Power's residential and commercial conservation programs.

In 1988, I was promoted to Project Engineer at Florida Power's Energy Control Center. My primary responsibilities were to perform daily operational and short-term planning studies to support the activities of the Power Supply Department.

I was promoted in 1991 to Supervisor of Power Supply Scheduling at Florida Power's Energy Control Center. In that capacity I was responsible for the development of the daily system generation and interchange schedules.

In 1992, I was promoted to Supervisor of Power Supply at Florida Power's Energy Control Center. The responsibilities in that position were the same as those I have today; however, I was named Manager of Power Supply in 1995.

Q. Do you hold any professional certifications or licenses?

A. I am a registered Professional Engineer in the State of Florida. I became registered in 1991.

Q. Are you sponsoring any exhibits with this rebuttal testimony?

A. Yes. I am sponsoring Exhibits __ (LDB-1) and __(LDB-2).

Q. What is the purpose of your rebuttal testimony?

A. I will respond to the supplemental testimony filed on April 25, 1995 by Mr. Kenneth Slater on behalf of Orlando Cogen, L.P. and Pasco Cogen,

Ltd. (jointly "OCL/Pasco"). Mr. Slater's testimony questions the Unit Commit simulations which Florida Power developed for each of the first seven curtailment events and the conclusion that negative avoided costs would have existed during each event in the absence of curtailments. The results of those simulations were discussed in the direct testimony of Florida Power witness Henry I. Southwick. Mr. Slater advances his own interpretation of what the Unit Commit runs should have shown, in an effort to establish that negative avoided costs would not have existed for the seven events.

I will respond to Mr. Slater's assertions and results, and I will present and discuss a set of amended computer simulations which we have prepared as a result of our review of Mr. Slater's comments. I will show that OCL/Pasco have not in any way undermined the credibility of the Company's original avoided cost conclusions. The revised simulations continue to demonstrate that negative avoided costs would have been incurred if the QFs were not curtailed.

II. GENERAL REBUTTAL TO OCL/PASCO'S SUPPLEMENTAL TESTIMONY

Q. Please begin by summarizing Florida Power's direct evidence on the question of negative avoided costs.

A. As explained in Mr. Southwick's direct testimony (at pages 35-40), Florida Power used three ways to illustrate that, when a minimum load condition is approaching, its system operating personnel can predict

with a high degree of confidence (if not certainty) that cycling off a coal unit in order to continue the purchase of QF energy would cause the Company to incur higher system costs than it would incur if it curtailed the QF purchases and continued to operate the coal unit at its minimum generation level.

Q. What was the first of these three illustrative approaches?

A. First, we explained in a conceptual way what I believe to be a self-evident proposition -- that cycling off a baseload unit to continue QF purchases necessarily will produce negative avoided costs because the combination of unit start-up costs and replacement power costs must produce a negative avoided cost whenever they exceed the fuel savings from not generating the energy at issue with Company units. We noted that both the FERC and this Commission seemed to accept this proposition as a given when they explained the rationale for their curtailment rules. We also showed that the negative avoided cost impacts can only be increased (*i.e.*, become *more* negative) when one considers the additional per cycle unit impact costs described by Mr. Lefton.

Q. What was the second approach used by the Company to illustrate the negative avoided cost phenomenon?

A. In the second approach, we related the clear conceptual proposition to the seven initial curtailment events to illustrate that the proposition rang true for each event. We did this by examining the actual amount of

excess generation on each of the seven occasions, the amount of baseload generation that would have been curtailed to balance the generation and load without curtailments, and the net avoided cost impacts considering fuel savings, unit start-ups, replacement power costs and unit impact costs. For each of the seven events, we established that cycling off a coal unit to prevent QF curtailments would have cost the Company (and its ratepayers) more money than under the curtailment option.

Q. Please describe the third illustrative approach.

A. Although each of the first two methods of evaluating negative avoided costs seemed logically unassailable, we opted to develop still another way to illustrate the point. This led to the Unit Commit simulations which were described in Mr. Southwick's testimony and challenged in Mr. Slater's testimony. Those simulations were an attempt to illustrate after-the-fact what we knew and were forced to act on before-the-fact -- that the Company would incur greater costs if our dispatchers cycled off baseload generation instead of requesting curtailments in accordance with the Curtailment Plan.

We attempted to illustrate this effect after-the-fact by using readily available Unit Commit runs which had been developed during the normal course of business for as-available energy payment purposes. This "Base Case" set of computer runs was chosen as a reasonable proxy for how the system was operated with the actual curtailments that were

requested. We then compared the Base Case runs to a comparable set of "Change Case" computer runs which were developed to approximate system conditions as if no QF curtailments had been made. A comparison of the Base and Change Cases served as a further corroborating illustration of the principle that we knew to be true -- failure to curtail would have resulted in negative avoided costs for each of the seven curtailment events.

Q. What are your general impressions of Mr. Slater's response to the Company's analysis of the avoided cost issue?

A. I will repeat a point made by both Messrs. Southwick and Dolan. The OCL/Pasco testimony reveals much more in what it *doesn't* say than in what it does say. Neither Mr. Shanker nor Mr. Slater has offered one word of testimony to dispute the basic conceptual point made by Florida Power -- *i.e.*, that we can predict with great confidence the likelihood of negative avoided costs during minimum load conditions whenever the choice is to cycle off baseload generation instead of making QF curtailments. In fact, Mr. Shanker accepts this proposition as being true when he says that the curtailment rules were intended to address conditions "during which a utility would, absent curtailment, have to turn off its own base load generation due to QF purchases, resulting in net increased operating costs (i.e., "negative avoided costs"). (Shanker, page 24).

Similarly, neither Mr. Shanker nor Mr. Slater mentioned or refuted Mr. Southwick's second analytic method for illustrating the negative avoided cost problem -- that is, the case-by-case manual quantification of unit start-ups, replacement power costs and unit impact costs, as described at pages 37-39 of Mr. Southwick's direct testimony and shown numerically in his Exhibit __ (HIS-3), pages 2 of 3.

Because OCL/Pasco were unable to fault the principle established by Florida Power (and accepted by both the FERC and this Commission), Mr. Slater turned his attention to a piecemeal criticism of the Company's illustrative Unit Commit simulations. This shift in focus is simply a back-door attempt to shed doubt on the undisputed principle by attempting to poke holes in one of the illustrative examples offered by Florida Power.

Q. Has Mr. Slater cast any real doubt on the Company's ultimate avoided cost conclusions?

A. No. Even ignoring the fact that Mr. Slater offered no criticism concerning much of Florida Power's avoided cost testimony, his Unit Commit criticisms do not prove his conclusion that the Company was wrong in its evaluation of the negative avoided cost issue. Mr. Slater has suggested a number of changes to the Unit Commit runs. I will discuss each of his proposed changes individually, but I note initially that only one group of his proposed changes, having to do with the correction of minor inconsistencies in the input data for the computer

runs, has any merit at all. Moreover, I would like to re-emphasize the limited purpose for which these simulations were intended in this case, *i.e.*, to illustrate and thereby corroborate the basic point which the Company amply established by other means and which OCL/Pasco have not refuted.

I would also like to emphasize the fact that computer programs do not run the Florida Power system or any other utility system. People run the system using the information they can glean from computers and other sources coupled with their extensive knowledge of system capabilities, reliability issues, cost constraints, and current as well as projected operating conditions. Before a minimum load condition materializes, the Company's system operating personnel have access to planning data, weather service forecasts, real-time information on system conditions, and the hands-on experience of seasoned system operators. When a problem is expected to arise, corrective actions must be taken up-front, based on expected outcomes. This is true of all day-to-day system operating decisions. For example, the state of Florida uses forward-looking procedures to deal with capacity shortages through a specific plan approved by this Commission and implemented through the Florida Electric Coordinating Group. The need for forward-looking decisionmaking is no less critical with respect to curtailment decisions. The Curtailment Plan operates, as it must, from the information which can be reasonably gathered by the system operating personnel *before* the minimum load problem is allowed to materialize, and from the

knowledge that cycling off baseload generation would result in increased net operating costs.

The Unit Commit simulations are not, and could not be, exact snapshots of what happened on the system with curtailments and what would have happened in the hypothetical world where no curtailments took place. Rather, they attempt to simulate reasonable operating scenarios in order to give an unbiased picture of the expected directional effect on avoided costs of curtailing versus not curtailing QF energy deliveries. The biggest difficulty in Mr. Slater's testimony is that he proposes to manipulate the Unit Commit cases in ways that bring them far further from the goal of reflecting actual conditions rather than closer.

Q. Has Florida Power developed new Unit Commit simulations in response to Mr. Slater's testimony?

A. Yes. As I have said, Mr. Slater did correctly identify one type of error which we acknowledge and have therefore corrected. Also, in reviewing the original Unit Commit runs, we discovered several other items which we have adjusted to make the simulations more accurate and realistic. I will discuss these later in my testimony.

Q. Please respond to Mr. Slater's claim that, when "properly" developed, the Unit Commit runs would show a positive avoided cost for each of the seven curtailment events.

A. Mr. Slater is wrong. He could only reach this conclusion by manipulating data in unreasonable and unrealistic ways. When we prepared corrected Unit Commit cases, they again corroborated the conclusion that, without curtailments, Florida Power would have incurred negative avoided costs during each of the curtailment events. The results of the revised Unit Commit runs are summarized in my Exhibit __ (LDB-1).

I will explain why these Unit Commit runs make sense and why Mr. Slater's alternative runs do not make sense. However, the Commission should not lose sight of the fact that OCL/Pasco have focused their efforts and criticisms exclusively on a battle over the minute details of computer simulations that are, in fact, only one of several illustrations offered by the Company to show the negative avoided cost phenomenon.

III. REBUTTAL TO MR. SLATER'S CRITICISMS OF THE UNIT COMMIT SIMULATIONS

Q. What changes did Mr. Slater make to the Unit Commit simulations originally presented in Exhibit __ (HIS-3), page 1 of 3?

A. Mr. Slater made four types of changes to these simulations: (1) changes to the computer source code for the Unit Commit program; (2) correction of inconsistencies in the input data for individual cases; (3) changes that altered the dispatch of units in several of the cases; and

(4) a change that Mr. Slater refers to as "longer time frame analyses." Each of these groups of changes needs to be considered individually.

Q. Did Mr. Slater's changes to the Unit Commit source code have any significant effect on the results of the simulations?

A. No. Mr. Slater revised a number of source code statements to accomplish what he has referred to as "clean up" measures needed to convert Unit Commit from a mainframe to a PC computing environment. However, these changes are irrelevant to Mr. Slater's criticisms because the Unit Commit runs produce virtually the same results with and without these changes. They should therefore be ignored in this case.

Q. Turning to Mr. Slater's second category of adjustments, what inconsistencies did he claim to identify in the input data for individual Unit Commit cases?

A. Mr. Slater utilized a program to automatically compare the input data used for the Base Case versus the Change Case in each of the seven simulations. The results of his automated comparison led him to conclude that there were three differences in input data that had been introduced inadvertently during the original development of these simulations: (1) start-up fuel for coal units appeared to be missing from five cases, including January 1 (Change Case), January 2 (Change Case), January 14 (Base and Change Cases), and January 30 (Change Case); (2) in the January 2 simulation the starting point for the Crystal River 5 heat rate curve was set at 300 MW in the Base Case versus

150 MW in the Change Case; and (3) in the October 19 simulation the University of Florida cogeneration unit showed a 10 MW minimum operating level in the Base Case and a 12 MW minimum operating level in the Change Case in that unit's heat rate curves.

Q. What did Mr. Slater change in the input data to correct for these inconsistencies?

A. Mr. Slater made the following adjustments: (1) he added start-up fuel for coal units in all five of the cases listed above; (2) in the January 2 simulation, he set the starting point for the Crystal River 5 heat rate curve at 300 MW in the Change Case to conform to the number shown in the Base Case; and (3) in the October 19 simulation, he set the minimum operating level for the University of Florida unit at 10 MW in the Change Case, again to conform to the number shown in the Base Case.

Q. Was Mr. Slater correct in believing that he had identified inconsistencies in the input data for individual computer runs?

A. Yes and no. Our review has determined that start-up fuel costs were inadvertently omitted from the input files provided to Mr. Slater for the January 2 Change Case and the January 14 Base and Change Cases, but that the corresponding simulations performed by the Company and used to support Exhibit __ (HIS-3), page 1 of 3, *did* include the correct start-up fuel costs for the coal units.

With this exception, the Company has verified that the remaining inconsistencies identified by Mr. Slater did exist in the runs performed by the Company as reflected in Exhibit __ (HIS-3), page 1 of 3, and as provided to Mr. Slater. The Company agrees that the start-up fuel costs should be included in those cases where the costs were missing. However, we disagree with Mr. Slater's "corrections" for the other two inconsistencies which he identified. The minimum capacity on the heat rate curve for Crystal River 5 should be consistently reflected in the simulations as 150 MW, rather than 300 MW as Mr. Slater assumed. Similarly, the University of Florida unit heat rate curve should be shown consistently with its minimum capacity level of 12 MW, rather than 10 MW as Mr. Slater assumed. The Company has used the correct numbers on its amended Unit Commit runs as I will discuss later.

Q. In his third category of adjustments, what additional changes did Mr. Slater make to alter the dispatch of units in several of the Unit Commit cases?

A. Mr. Slater made three types of changes that affect unit dispatch. First, in several of the Base Case runs he unilaterally removed the must-run status of several units thereby cycling off units that actually were shown to be on-line in the Company's Base Case runs. Second, in three of the Change Case runs, Mr. Slater elected to eliminate an off-on cycle for Crystal River 1. Third, for January 14, Mr. Slater put Crystal River 2 on maintenance status in both the Base and Change Cases.

Q. Why did Mr. Slater remove the must-run status of units in his Base Case runs when they were shown to be operating in the Company's Base Case runs?

A. In Mr. Slater's direct and supplemental testimony he noted the existence of "excess" generation in several of the Base Cases prepared by the Company. He improperly construed this as an opportunity to eliminate the perceived excess generation condition in these Base Case runs by allowing a baseload unit to cycle off although the Company had shown the unit to be operating during that period.

Q. Do you agree with the manner in which Mr. Slater eliminated the perceived excess generation condition?

A. No. I strongly disagree with these changes by Mr. Slater. The baseload units that were allowed to be cycled off by Mr. Slater were actually on-line and operating during the periods in question. Given that the purpose of the Base Cases was to approximate what actually occurred on the Florida Power system during the time period surrounding the curtailment events, it is not appropriate to introduce changes that depart significantly from actual conditions under the guise of correcting a problem with the runs.

The entire purpose of these simulations was to evaluate the curtailment of QF energy as an alternative to cycling off baseload units. Mr. Slater has defeated this purpose by creating Base Cases that erroneously show

operating units to have been cycled off when in fact they were not. For example, two of the modified scenarios prepared by Mr. Slater (for the January 8 and January 14 events) include unit shutdowns and cycling costs that are identical for both the Base Cases and Change Cases. Clearly, it is impossible to carry out the intended comparison if one of the alternatives at issue is falsely assumed to exist identically in both cases.

Having reviewed the Unit Commit simulations in light of Mr. Slater's testimony, the Company has determined that the perceived energy imbalances noted by Mr. Slater can be easily explained if one understands the underlying formulation of these Unit Commit runs. Once understood, it is clear that no adjustments are needed because there is no error in need of correction.

Q. Please explain the nature of these apparent excess generation conditions.

A. The Company has identified two primary factors contributing to the excess generation conditions reported in the Unit Commit runs. The first cause resulted from the fact that baseload generating units in some instances were actually operated *below* their normal minimum generation levels in an effort by our system operators to mitigate the need for curtailments. This is consistent with the procedures in the Curtailment Plan, but the computer simulations did not correctly reflect these mitigation efforts. Instead, the simulations assumed that each

unit was operating at a level no lower than its normal minimum. This discrepancy contributed to the appearance of excess generation and has been corrected in our amended Unit Commit runs, as discussed later in my testimony.

The second contributing factor to the apparent excess generation conditions is the fact that economy sales were excluded from the runs because the cases were derived from as-available billing data. Economy sales have been reviewed and the Company has concluded that it is appropriate to continue to exclude economy sales (with the sole exception of Florida Power's sales to the Southeastern Power Administration's Carters Dam Project) as discussed later in my testimony. Taken together, these factors account for substantially all of the excess energy conditions identified by Mr. Slater.

Q. Mr. Slater suggested in his direct testimony that generation excesses of 11 MW or so presented "significant problems" with the Company's Unit Commit runs. Is there any merit to this contention?

A. No. Even apart from the reasons for apparent energy imbalances that I just explained, I would not consider an overall imbalance of 11 MW or so to be a problem, let alone a significant problem. Given the imprecision in predicting the magnitude of an excess generation condition in advance of the event and the lack of operating control over the QF units, no one should expect that we can always accomplish an exact match between generation and load throughout the minimum load

period. In fact, 11 MW is well within the range of normal control error. Under governing NERC criteria, Florida Power is allowed an operating margin of 30 MW above or below an Area Control Error ("ACE") of zero. Turbine valve fluctuation on generating units, meter errors, and similar operating imprecision can account for discrepancies of 11 MW of more.

Q. What is your response to Mr. Slater's last assertion that Florida Power has used an improper short time frame of analysis to evaluate the curtailment events?

A. Florida Power strongly disagrees with Mr. Slater's assertion. We find the entire concept of a "longer time frame analysis" as advocated by Mr. Slater to be arbitrary, illogical and self-serving. As Mr. Southwick explained in his rebuttal, Florida Power's analyses all were based on a time frame of sufficient length to capture the significant costs related to each curtailment event.

It should be stressed that Mr. Slater is not merely proposing that the comparative cases be run for longer time periods in order to capture possible cost impacts that could be overlooked by a shorter time frame. Mr. Slater is actually proposing that the study analyze the maximum curtailment of QF energy as if Florida Power had asked to have the maximum level of curtailment sustained for an entire week rather than for a few hours as was actually the case. In other words, Mr. Slater maintains that the evaluation must be based on an event that did not take place, that is dramatically different from the curtailment event that

did take place, and that would not have taken place under any plausible set of circumstances. Mr. Slater's analysis would include the curtailment of QF energy around-the-clock and through on-peak periods -- actions that the Company has never taken and does not contemplate taking.

Q. In what way is Mr. Slater's longer time frame analysis self-serving?

A. Mr. Slater's proposed longer time frame analysis could have only one underlying purpose and rationale. By arbitrarily proposing to expand the length of the assumed curtailment event, many hours would be included in the analysis during which the avoided cost of the curtailed energy is undeniably positive. Given that the length of the actual curtailment event is typically only a few hours, the hours that would be included in Mr. Slater's suggested approach during which the avoided cost is positive would greatly outnumber the hours during which the avoided cost is negative. The dominant effect of artificially including many hours when the avoided cost is positive makes the final result virtually certain -- it would be impossible to demonstrate negative avoided costs for an entire week in order to justify a curtailment event with an actual duration of only a few hours; it would also be completely inappropriate.

IV. RESULTS OF FLORIDA POWER'S CORRECTED UNIT COMMIT SIMULATIONS

Q. Why has the Company prepared a revised set of Unit Commit simulations?

A. As I noted earlier, Mr. Slater was correct on a couple of his points. We wanted to correct for those oversights. In doing so, we also discovered that we should make several other adjustments to the data in order to better accomplish the original objective of having a set of comparisons that would generally approximate actual operating conditions in the Base Case. Consequently, we amended our simulations of the seven curtailment events, and I am presenting a summary of these results in Exhibit ___ (LDB-1). My Exhibit ___ (LDB-2) summarizes the revisions which we made in the new runs.

Q. How have you responded to the changes proposed by Mr. Slater?

A. As I alluded to earlier, we have made the following adjustments to eliminate the inconsistencies in the input data among Base and Change Cases: (1) start-up fuel for coal units was added to the two Change Cases (January 1 and 30) where this data actually was missing; (2) in the January 2 simulation, the starting point for the Crystal River 5 heat rate curve was set at the correct level of 150 MW in the Base Case; and (3) in the October 19 simulation, the minimum operating level in the heat rate curve for the University of Florida unit was changed to the correct level of 12 MW in the Base Case.

Q. What additional refinements have been made to the Company's amended simulations?

A. The following six types of refinements have been included in the revised simulations: (1) pre-arranged off-system sales to the Carters Dam Project which occurred during two of the minimum load events have been included; (2) economy purchases which occurred during the time periods covered by the cases were excluded; (3) the initial operating status of units has been revised to reflect the actual status of the units at the start of each simulation; (4) minor adjustments have been made to the level of curtailments in each simulation because of differences in the curtailment amounts requested and actually received; (5) the minimum operating levels of units were adjusted to reflect the fact that the Company was able to reduce some of the baseload units below their normal minimum generation levels during some of the curtailment events; and (6) several miscellaneous adjustments were made to improve the accuracy of the simulations. These refinements are summarized in my Exhibit __ (LDB-2).

Q. Why were the pre-arranged sales to the Carters Dam Project included in the simulations?

A. As I discussed previously, to create a starting point for the Unit Commit simulations, we used the after-the-fact runs regularly prepared by the Company to compute the as-available energy payments to QFs. Mr. Southwick's rebuttal testimony explains that these payments are calculated after considering interchange purchases but before

considering interchange sales. Although this is the accepted methodology for purposes of calculating as-available energy payments, we have concluded that it is not appropriate for present purposes with respect to the Carters Dam sales.

All economy sales were previously excluded from the simulations based on the rationale that the Company could not have anticipated or planned to accommodate those sales. However, the sales to the Carters Dam Project are different insofar as those sales are planned and pre-arranged, and generally can be relied upon as overnight sales for up to a full week. As a result, it is appropriate to reflect those sales in the Unit Commit runs in the same manner as they would have been factored into our before-the-fact planning decisions.

Q. Why do the amended simulations exclude economy purchases?

A. Hourly economy purchases, like economy sales, are scheduled on short notice and cannot be anticipated or relied upon for planning purposes. As a result, these purchases cannot be treated as an available resource when scheduling to meet projected system loads. It is therefore appropriate to exclude these purchases from the Unit Commit runs to be consistent with information that was known and available at the time that actual before-the-fact planning decisions were made.

Q. Why was the initial operating status of units adjusted in the amended simulations?

A. In the course of responding to Mr. Slater's testimony, we discovered that the initial operating status of the Company's units that were shown in the input data did not consistently reflect the actual prior operating status of the units. As a result, the start-up cost of these units did not correctly reflect the actual length of time that a unit had been cycled off prior to being restarted. To correct for this inaccuracy, the data for the initial operating states of all units was reviewed and adjusted for each of the simulations.

Q. Why were some of the curtailment amounts adjusted in the amended simulations?

A. In the original runs, the hourly net interchange increment representing the amount of curtailed energy was based on the lesser of the actual amount of energy curtailed or the requested amount of energy curtailed.

In reviewing the curtailment events, we determined that there were essentially two modes of overall response to curtailment requests. In the first type, QFs either responded consistently as requested, or they responded with curtailments that individually may have been greater or less than the requested curtailments. In these cases, the net effect of all QF responses was substantially in compliance with the curtailment request. In the second type, certain QFs either could not comply with the requested amount of curtailment for technical reasons or chose to over-comply for other reasons. On occasion, the individual instances of over-compliance resulted in total curtailments that were substantially

larger than the amounts that the Company requested or needed to match generation and load.

We have determined that the method of assuming that the curtailed amount was the lesser of the requested amount or the actual amount curtailed was unnecessary for the cases in which the actual total curtailment amount closely approximated the requested amount. Therefore, in this case the actual amount of curtailments has been used in the simulations. By contrast, there were a few instances of the second type which typically resulted from a QF opting to go completely off-line in response to a curtailment request. These instances resulted in substantial total over-compliance and must be viewed as aberrational. They should therefore be excluded from the analysis of the curtailment event because they overstate the total requested curtailment amounts. For these few cases, we have retained the method of assuming that the curtailed amount was the lesser of the requested curtailment or the actual curtailment.

Q. Why were the minimum operating levels of units adjusted to more accurately reflect the actual levels of operation during the curtailment events?

A. As I noted previously, the Company was able to mitigate curtailments on several occasions by operating baseload generating units at levels below their normal minimum generation levels. The original computer runs ignored these extra efforts and incorrectly assumed that the units

were all operating no lower than their normal minimums. For example, Crystal River 2 has a normal minimum operating level of 140 MW, but may have been operating at 135 MW or 130 MW during a particular curtailment hour. This type of discrepancy has been corrected in our revised Unit Commit simulations.

Q. What were the other miscellaneous refinements which the Company made to the amended Unit Commit runs?

A. We made three other miscellaneous refinements to improve the accuracy of the simulations. These were: (1) correction of the normal minimum generation level for the Crystal River 4 unit; (2) correction of the must-run status of two units; and (3) correction of minor discrepancies in the must-take amounts from the Southern Companies.

The first change was needed to reflect the fact that Crystal River 4 has a normal minimum generation level of 300 MW, but that the unit's minimum level was erroneously shown as 150 MW in several of the runs. The second change was needed to correctly show that Suwannee Unit 3 was in a must-run status on January 30, 1995, even though that unit was manually removed from service during the curtailment event, and to correctly show that Crystal River 4 should not have been in a must-run status in the Change Case for January 2, 1995. The third type of miscellaneous refinement was needed to reflect very small discrepancies in the actual amounts of must-take purchases from the Southern Companies during four of the curtailment events.

All of the miscellaneous refinements were appropriate to improve the accuracy of the Unit Commit simulations.

Q. What are the results of your amended Unit Commit simulations of the seven curtailment events?

A. The results of these simulations are summarized in Exhibit __ (LDB-1). As with the prior simulations included in Mr. Southwick's testimony, the amended Unit Commit runs continue to illustrate that the Company would have incurred negative avoided costs in each of the seven curtailment events if it had not requested and obtained QF curtailments in accordance with the Curtailment Plan.

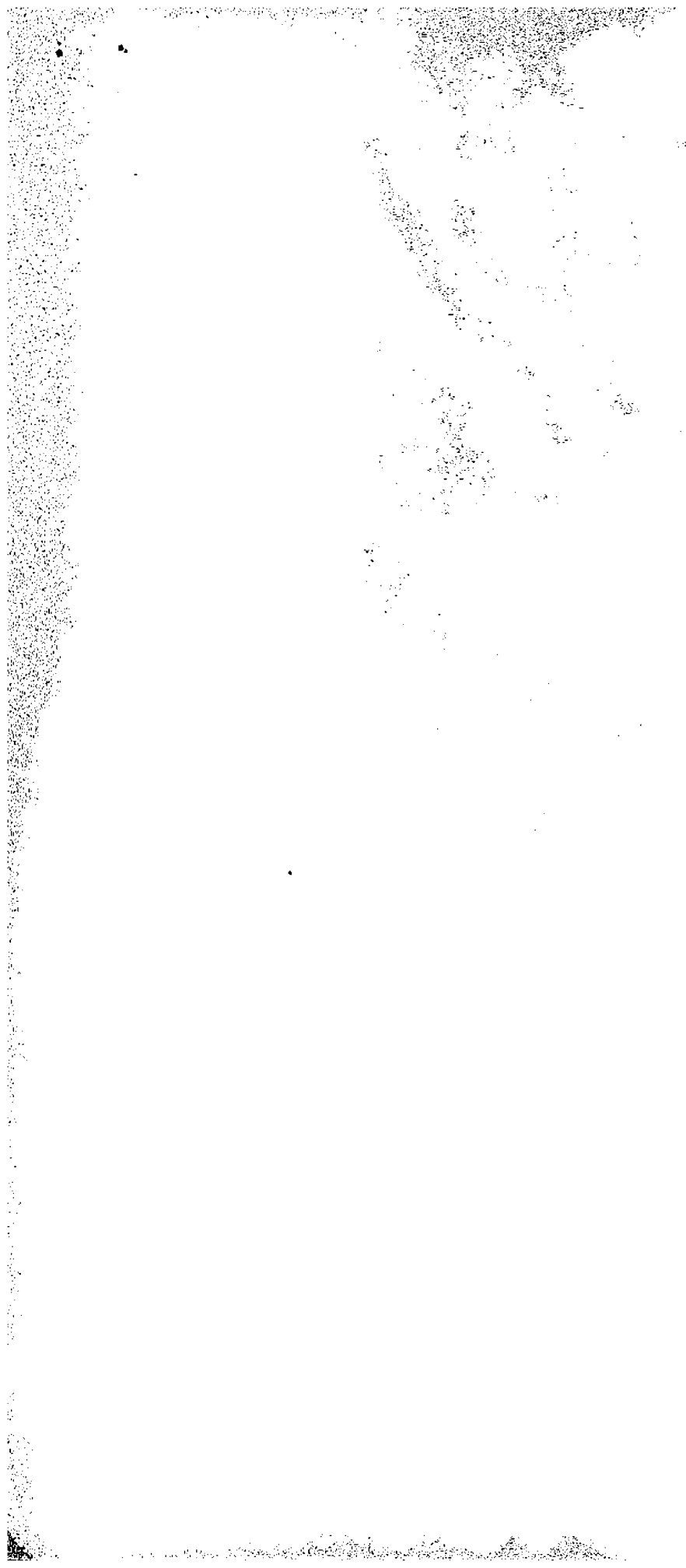
Q. Is it more likely that the revised Unit Commit simulations understate or overstate the magnitude of the negative avoided cost impacts of not curtailing?

A. I consider it much more likely that they understate the extent of the negative impact. For example, the Unit Commit runs do not reflect all of the per cycle unit impact costs identified by Mr. Lefton and described by Mr. Southwick. Also, the runs assume that once a unit is cycled off, it will be available for service immediately after its minimum down time. It is not uncommon for restarts to take longer than the minimum down times reflected in Unit Commit, in which case the cycling costs would become larger.

These examples are not intended to be all-inclusive, yet they suggest that our illustration of negative avoided cost errs, if at all, on the side of understating, not overstating, the negative avoided cost phenomenon.

Q. Does this conclude your rebuttal testimony?

A. Yes.



Summary of Unit Commit
Avoided Cost Simulations

FPSC Docket No. 941101-EQ
FPC Witness: Brousseau
Exhibit No._____, (LDB-1)
Page 1

	Base Case	Change Case	Difference	Base and Change Case Differences
10/19/94 analysis				
Energy $	$902,078	$898,345	$3,731	CR1 cycled off at 1:00 a.m. for 6 hours.
Start-up $	$0	$8,580	($8,580)	
Total $	$902,078	$906,925	($4,849)	
		Avoided Cost Impact	($4,849)	
		Avoided Cost Per MWH	($17.70)	
01/01/95 analysis				
Energy $	$527,238	$529,808	($2,368)	CR-1 cycled off at 1:00 a.m. for rest of day
Start-up $	$0	$53	($53)	
Total $	$527,238	$529,859	($2,421)	
		Avoided Cost Impact	($2,421)	
		Avoided Cost Per MWH	($7.83)	
01/02/95 analysis				
Energy $	$618,519	$596,632	$21,887	CR2 started at hour 6:00 a.m.
Start-up $	$802	$39,461	($38,649)	CR 4 cycled off all day. Bartow 1 started at hour 6:00 a.m.
Total $	$619,321	$636,093	($16,762)	
		Avoided Cost Impact	($16,762.00)	
		Avoided Cost Per MWH	($11.62)	
01/07/95 analysis				
Energy $	$632,093	$618,845	$13,248	CR4 cycled off all day. Bartow 1 cycled on at 6:00 a.m., then off at 8:00 p.m.
Start-up $	$0	$17,025	($17,025)	CR2 cycled off at hour 1:00 a.m. for 6 hours.
Total $	$632,093	$635,870	($3,777)	
		Avoided Cost Impact	($3,777.00)	
		Avoided Cost Per MWH	($2.20)	
01/08/95 analysis				
Energy $	$819,582	$816,375	$3,187	CR4 & Bartow 1 already off. CR 4 restarted at hour 3:00 a.m.
Start-up $	$2,993	$36,225	($33,232)	
Total $	$822,568	$852,600	($30,045)	
		Avoided Cost Impact	($30,045.00)	
		Avoided Cost Per MWH	($110.46)	
01/14/95 analysis				
Energy $	$593,360	$605,589	($12,229)	CR1 cycled off at hour 1:00 a.m. for the rest of the day.
Start-up $	$0	$3,032	($3,032)	Bartow 1 on at 8:00 a.m. for the rest of the day
Total $	$593,360	$608,621	($15,261)	
		Avoided Cost Impact	($15,261.00)	
		Avoided Cost Per MWH	($154.15)	
01/30/95 analysis				
Energy $	$870,356	$860,850	$9,506	CR1 cycled on at 6:00 a.m. for the rest of the day.
Start-up $	$28,390	$38,271	($10,881)	
Total $	$898,746	$900,121	($1,375)	
		Avoided Cost Impact	($1,375.00)	
		Avoided Cost Per MWH	($2.37)	

Base Case - FPC costs considering curtailment occurred.
Change Case - FPC costs had no curtailment been implemented.

Changes Made to Unit Commit Datasets
Table 1

Curtailment Event	10/19	1/1	1/2	1/7	1/8	1/14	1/30
Base Case	1-b 2-d,e,g,h	1-none 2-e,g,h	1-b 2-e,f,g,h,j	1-none 2-e,f,g,j	1-none 2-e,g,j	1-none 2-c,d,e,g,h,j	1-none 2-c,d,e,g,h,i,j
Change Case	1-none 2-d,e,f,g,h	1-a 2-e,f,g,h	1-none 2-e,f,g,h,i,j	1-none 2-e,f,g,j	1-none 2-e,f,g,j	1-none 2-c,d,e,f,g,h,j	1-a 2-c,d,e,f,g,h,i,j

Category 1: Changes made to eliminate inconsistencies between Base and Change Cases
- a Added start-up fuel for coal units where missing
- b Corrected minimum state in heat rate curves for CR5 and UF units

Category 2: Changes made to more accurately represent system conditions
- c Included pre-arranged Carters Dam sales in simulation
- d Excluded economy purchases from simulation
- e Corrected initial unit operating conditions to reflect actuals
- f Reflected actual QF curtailment amounts (including QF decisions to overcurtail)
- g Adjusted unit output to reflect occasional baseload operation below normal minimums
- h Corrected minimum capacities on coal units
- i Corrected must-run status on two units
- j Corrected minor discrepancies in SOU must-take amounts