

**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 25-17.006, F.A.C.

---

Docket No. 941101-EQ

Submitted for filing:  
May 2, 1995

**ORIGINAL  
FILE COPY**

---

**REBUTTAL TESTIMONY OF  
STEVEN A. LEFTON**

---

**ON BEHALF OF  
FLORIDA POWER CORPORATION**

DOCUMENT NUMBER-DATE

04278 MAY-2 1995

FPSC-RECORDS/REPORTING

**FLORIDA POWER CORPORATION  
DOCKET No. 941101-EQ**

**REBUTTAL TESTIMONY OF  
STEVEN A. LEFTON**

**I. INTRODUCTION AND PURPOSE**

1  
2  
3 **Q. Please state your name and business address.**

4 **A. My name is Steven A. Lefton. My business address is 1282 Reamwood**  
5 **Avenue, Sunnyvale, California 94089.**

6  
7 **Q. Have you previously testified in this proceeding?**

8 **A. Yes. I filed direct testimony on behalf of Florida Power Corporation**  
9 **("Florida Power" or "the Company") on February 20, 1995.**

10  
11 **Q. What is the purpose of your rebuttal testimony?**

12 **A. I will respond to the direct testimony of Mr. Kenneth Slater on behalf of**  
13 **Orlando Cogen, L.P. and Pasco Cogen, Ltd. (jointly "OCL/Pasco"). Mr.**  
14 **Slater's testimony questions the validity of avoided cost comparisons**  
15 **which account for the incremental costs of cycling baseload generating**  
16 **units during minimum load conditions. He also challenges APTECH's**  
17 **methodology for determining these "unit impact" costs of cycling. I will**  
18 **demonstrate that it is appropriate for Florida Power to capture these unit**  
19 **impact costs in its comparison of the system operating costs with and**

1 without QF purchases. I will also rebut Mr. Slater's contention that  
2 these costs have not been properly estimated.

3  
4 **II. REBUTTAL TO OCL/PASCO'S TESTIMONY**

5  
6 **Q. Mr. Slater states that including "unit impact" costs in a comparison of  
7 production costs that would be incurred with and without QF generation  
8 penalizes the QF purchase scenario. (Slater, page 14). Do you agree?**

9 **A. I strongly disagree with Mr. Slater's choice of the loaded word "penalty"  
10 to suggest that a correct comparison of costs is somehow inappropriate  
11 or punitive. There is no "penalty" involved in my assessment of unit  
12 impact costs of cycling or in Florida Power's use of those cost estimates  
13 in its evaluation of negative avoided costs during minimum load  
14 conditions.**

15  
16 Mr. Slater concedes that "[i]n calculating utility avoided costs, it is  
17 wholly appropriate to capture all recognizable costs associated with the  
18 utility meeting the demands of its customers." (Slater, page 17). This  
19 is exactly what we are doing when we capture the incremental unit-  
20 related costs of cycling a baseload unit under minimum load conditions.

21  
22 **Q. Is it fair to say, as Mr. Slater does at page 15 of his testimony, that the  
23 unit impact costs which you have measured are simply the results of  
24 planning choices made years ago by Florida Power?**

1 A. No, that is not a valid observation. The unit impacts which I have  
2 evaluated are current costs tied specifically to current instances of unit  
3 cycling. Each time that a unit is forced to cycle when it would not  
4 otherwise have been cycled, incremental costs would be incurred in the  
5 range of magnitude I have testified to. Of course, current costs are  
6 related to the way in which units were operated in the past. But this  
7 does not alter the fact that the costs I have identified will be incurred  
8 today during each cycling event.

9  
10 If a QF purchase during a minimum load condition forces a cycling event  
11 that would not otherwise have occurred, then the attendant costs  
12 should be attributed to the cause of that cycling event -- *i.e.*, the QF  
13 purchase. Whatever decisions were made in the past regarding the  
14 intended operation of Florida Power's units, the present QF purchases  
15 are contributing directly to the present cycling costs. Therefore, any  
16 valid comparison of system production costs with and without QF  
17 purchases should take these costs into account.

18  
19 Q. Mr. Slater describes a situation where "a unit which has not been  
20 designed for cycling duty is called upon to perform cycling on a regular  
21 basis . . ." (Slater, pages 16-17). To your knowledge, does this  
22 accurately portray Florida Power's situation?

23 A. No. Mr. Slater is correct when he observes that regularly cycling a unit  
24 that was not designed for cycling duty would result in added  
25 maintenance and capital costs. But I am concerned that Mr. Slater has

1 mischaracterized the facts as they apply to Florida Power. First, I would  
2 note that Florida Power's baseload units, as is typical in the industry,  
3 were designed to perform some transient cycling duty in order to  
4 economically follow load fluctuations. Second, we are not dealing with  
5 a radical change in operating practices whereby Florida Power would  
6 have to begin cycling off its baseload units "on a regular basis" to  
7 handle the minimum load problem, because that problem is expected to  
8 be intermittent and to diminish over time. The important point to draw  
9 from the APTECH analysis is that, even without such a dramatic change  
10 in operating practice, any additional instances of on/off cycling will  
11 cause Florida Power to incur the unit impact costs which we have  
12 identified. This is because we have examined the incremental costs of  
13 each added on/off cycling event.

14  
15 **Q. Mr. Slater states that the unit impact costs, as calculated by APTECH,**  
16 **should be factored into an avoided capacity cost calculation, but not an**  
17 **avoided energy cost calculation. (Slater, page 19). Do you agree with**  
18 **this evaluation?**

19 **A. No. Mr. Slater draws this conclusion only because he mischaracterizes**  
20 **APTECH's quantification of the cost of cycling baseload generating**  
21 **units.**

22  
23 Mr. Slater incorrectly states that APTECH's "largest single category of  
24 these [unit impact] costs relate to plant capital expenditures and plant  
25 lives." In fact, APTECH concluded that the largest single category of

1 cycling costs for Florida Power was plant maintenance of which over  
2 90% is attributable to "Variable O&M" dollars. Less than 10% of these  
3 maintenance costs are classified as capital expenditures. The plant life  
4 shortening impact was another separate category in the APTECH  
5 analysis and was much smaller. By leaving out the word maintenance,  
6 Mr. Slater has completely mischaracterized these costs. These  
7 maintenance costs are energy-related variable costs and are properly  
8 considered in the avoided energy cost comparison.

9  
10 The "capital expenditures" referred to in the APTECH analyses include  
11 Replacement Units of Property, which are discrete items of property  
12 replaced in power plants. They are treated in capital accounts, rather  
13 than being expensed, because of regulatory accounting principles which  
14 require a consistent treatment of replacement items of property between  
15 all utilities. The "capital expenditures" also include costs to improve  
16 performance of the units when they cycle, but do not include costs  
17 associated with capacity additions which would be included in a  
18 capacity charge.

19  
20 Since the largest cost component of APTECH's unit impact costs  
21 consists of incremental maintenance and a much smaller capital expense  
22 that really should be called maintenance, and since the maintenance  
23 predominantly is variable or energy-related, Mr. Slater's statement that  
24 "[s]uch costs are included in capacity costs, not avoided energy costs"  
25 is not correct.

1 Q. Mr. Slater further contends that APTECH's unit impact costs of cycling  
2 include "costs of ongoing analyses, studies and computer software"  
3 which are fixed costs and therefore belong in an avoided capacity cost  
4 calculation as opposed to an avoided energy cost calculation. (Slater,  
5 page 19). Are such costs included in the unit impact costs which  
6 APTECH quantified for Florida Power?

7 A. No. Such costs certainly are real and should be included as additional  
8 variable or energy-related costs when Florida Power is satisfied that they  
9 have been accurately measured. However, this is a moot point for now.  
10 APTECH did not include such costs in its analyses because they are very  
11 difficult to estimate with a significant degree of confidence. Because  
12 this cost component is not included in the APTECH estimates, this is a  
13 good example illustrating the fact that cycling cost estimates being used  
14 by Florida Power are conservatively low.

15  
16 Q. Do you agree with Mr. Slater's assertion that these cycling-related costs  
17 should not be used on a per-start basis for short-term optional decision  
18 making (Slater, page 19)?

19 A. No. The APTECH analyses developed reliable estimates of cycling  
20 impact costs that will be incurred with each additional cycling event.  
21 In other words, these estimates are reflective of per-start costs and  
22 therefore do provide an appropriate basis for short-term (*i.e.*, per-start)  
23 decision making.

1 The unit impact costs are neither "past costs" nor "future costs."  
2 Instead, they reflect the current cost of an additional cycle based on  
3 past known and measurable costs (e.g., start-up fuel, auxiliary power,  
4 past capital costs, past maintenance costs, past efficiency losses, past  
5 low load operation at higher than optimum heat rate). Only the  
6 unavoidable shortening of unit life despite Florida Power's best-efforts  
7 maintenance could be considered a future cost. But, even this item is  
8 derived from and, therefore, representative of the damage incurred to  
9 date, and this item represents only a small fraction of the total cost of  
10 cycling. Thus, APTECH determined a conservative cost per start, based  
11 mainly on past history of the units under review.

12  
13 **Q. Mr. Slater asserts that your approach is speculative and**  
14 **methodologically unsound. (Slater, page 19). He then cites examples**  
15 **from your Exhibit No. \_\_\_ (SAL-2) to support his claims. How do you**  
16 **respond to these claims?**

17 **A. The examples cited by Mr. Slater refer to Figures 4 and 5 in Exhibit**  
18 **No. \_\_\_ (SAL-2). Neither of those figures nor the data which they depict**  
19 **were relied upon in APTECH's analysis of Florida Power's cycling costs.**  
20 **The figures have been provided in this case strictly as background**  
21 **information on and qualitative support for the fact that older generating**  
22 **equipment is susceptible to high maintenance and EFOR impacts.**

23  
24 **Mr. Slater's resume shows that his work experience has been based on**  
25 **predictive modeling incorporating probability and statistics. This may**



1 help to explain his apparent concern that the costs identified by  
2 APTECH are speculative. APTECH's approach, in contrast, focuses on  
3 state-of-the-art mechanical hardware modeling. APTECH applies  
4 established technology on creep-fatigue interaction effects, corrosion,  
5 stress induced corrosion, finite element analysis and advanced  
6 temperature, heat flux and strain monitoring techniques. The APTECH  
7 cost estimates are based mainly on historic cost experience and known  
8 equipment responses to given operating conditions.

9  
10 Since the APTECH estimates are based on past history, and generating  
11 units tend to be used for increasingly severe cycling duty as they age,  
12 these estimates are conservative.

13  
14 **Q. Please address Mr. Slater's claim that the APTECH study is an**  
15 **incomplete exercise resulting in preliminary and uncertain results and**  
16 **that the lack of supportable results is not surprising given that Florida**  
17 **Power funded only three out of the original eleven phases that were**  
18 **proposed. (Slater, pages 21-22).**

19 **A. There is no merit to Mr. Slater's criticism. The APTECH analysis began**  
20 **with a "top down" examination of data relating to Florida Power's unit**  
21 **operation, cost, and equipment characteristics, as well as industry data**  
22 **on similar units. APTECH used engineering models to determine cycling**  
23 **costs and then a statistical modeling approach to account for**  
24 **uncertainty, and this resulted in the statistical bounds (i.e., upper and**  
25 **lower bounds) and expected values (i.e., best estimates) of cycling**

1 costs. In addition, APTECH then performed a "bottom up" analysis  
2 based on an extensive review of actual plant records and Florida Power  
3 cost experience for the largest cost items. This work validated the  
4 results of the previous APTECH analysis and increases our confidence  
5 in the overall result.

6  
7 I am confident that completion of the remaining tasks in the original  
8 APTECH proposal would only serve to increase the probability that our  
9 existing unit cycling costs are within conservative bounds. The  
10 additional tasks would not change our basic conclusions, but would only  
11 serve to refine our estimates within the previously established  
12 boundaries. The additional analysis would most probably raise the lower  
13 bound and the best estimate. This would ultimately increase our  
14 confidence that the best estimate results of the completed Phase 1 Task  
15 1 through 3 are conservative.

16  
17 **Q. Does this conclude your rebuttal testimony, Mr. Lefton.**

18 **A. Yes, it does.**