

**BEFORE THE FLORIDA
PUBLIC SERVICE COMMISSION**

**DOCKET NOS. 020262-EI, 020263-EI
FLORIDA POWER & LIGHT COMPANY**

SEPTEMBER 11, 2002

**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**

REBUTTAL TESTIMONY OF:

WILLIAM L. YEAGER

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION
FLORIDA POWER & LIGHT COMPANY
REBUTTAL TESTIMONY OF WILLIAM L. YEAGER
DOCKET NO. 020262-EI, 020263-EI
SEPTEMBER 11, 2002

Q. Please state your name and business address.

A. My name is William L. Yeager. My business address is Florida Power & Light Company, Power Generation Division, 700 Universe Boulevard, Juno Beach, Florida, 33408-0420.

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

A. I am employed by Florida Power & Light Company ("FPL" or the "Company") as General Manager of Florida Projects.

Q. Have you previously filed testimony in this docket?

A. Yes, I have.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to comment on the assertions on page 9, lines 16-23 of PACE witness Kenneth Slater's testimony that the assumed heat rates for Manatee Unit 3 and Martin Unit 8 are overly optimistic because they appear to describe the units operating in "new and clean" condition and that

1 the projected availability for both units is aggressive because it assumes a
2 maintenance duration of one week per year and a 1% equivalent forced outage
3 rate (EFOR).

4
5 **Q. Is Mr. Slater correct in concluding that FPL used “heat rate assumptions**
6 **for its Martin 8 and Manatee 3 units which appear to describe the units**
7 **operating in ‘new and clean’ condition”?**

8 A. No, he is not. The heat rate assumed for those units is not based on “new
9 and clean” conditions but rather reflects realistic projections of unit
10 performance based upon FPL experience as a “world-class” operator of
11 combined cycle facilities. The 6850 Btu/kWh base heat rate, 8770 Btu/kWh
12 incremental heat rate for duct firing, and 5600 Btu/kWh peak firing
13 incremental heat rate that were assumed for the proposed Martin Unit 8 and
14 Manatee Unit 3 options are all expected average heat rates between overhauls.
15 Each of these heat rates takes into account FPL’s extensive experience and
16 world class knowledge base in combined cycle technology and projects
17 efficiency changes in the unit’s performance following commercial
18 acceptance by FPL.

19
20 **Q. What basis has FPL used for projecting the efficiency changes of Martin**
21 **Unit 8 and Manatee Unit 3 over time?**

22 A. Power plant owners with limited operating experience to draw upon usually
23 rely on the original equipment manufacturer’s (OEM’s) guaranteed

1 performance when projecting the operating characteristics of a facility. Since
2 most OEMs put commercial margins on their guarantees, projections of
3 facility performance in these instances will inherently be conservative unless
4 the operators have poor maintenance programs.

5
6 FPL, on the other hand, has extensive experience with the design, operation
7 and maintenance of combined cycle power plants. Many of our personnel
8 have been intimately involved in the evolution of the GE 7FA DLN II
9 combustion turbine (CT) technology, from the first four Model 7221 CTs to
10 be sold by GE, with their 2,350° F firing temperatures, to the eighteen 3rd
11 generation Model 7241 CTs, with their 2,420° F firing temperatures, that now
12 round out our fleet. FPL personnel also have extensive experience with the
13 design, operation, and maintenance of heat recovery steam generators, steam
14 turbine generators, condensers, main cycle pumps, etc. This world class
15 knowledge base in combined cycle technology affords us the opportunity to
16 predict unit performance using our own historical operating data.

17
18 **Q. Is Mr. Slater correct in stating that the projected unit availability is**
19 **aggressive?**

20 A. When compared to the industry as a whole, these numbers may be aggressive,
21 but FPL's fleet availability numbers have always surpassed the industry norm.
22 For FPL, the projected average EFOR and average maintenance outage
23 duration over 30 years of operation are reasonably achievable.

1 At the heart of our Martin Units 3 and 4 are the first four GE 7FA CTs to enter
2 commercial operation. As with any new cutting edge technology, growing
3 pains were inevitable for a combined cycle unit based on these first-generation
4 7FA CTs. Even so, from January 1, 1996 to August 31, 2002, Martin Units 3
5 and 4 averaged a commendable 1.7% EFOR, with an average planned outage
6 duration of 9.1 days per year.

7
8 Over the years, we have continued to retrofit these units with design
9 enhancements from the 3rd generation 7FA CTs that are proposed for Martin
10 Unit 8 and Manatee Unit 3. Since these retrofit jobs have accounted for many
11 of the historical planned outage days at Martin Units 3 and 4, going forward
12 FPL expects that the planned outage factor associated with non-routine CT
13 maintenance would be lower for the proposed units than historically
14 experienced with Martin Units 3 and 4.

15
16 The duration of routine maintenance outages for the proposed units should
17 also be better than the historical average of Martin Units 3 and 4 due to design
18 evolution in the 3rd generation 7 FA CT and the maturation of FPL's
19 combined cycle outage processes. For example, refinements in the
20 compressor wash system have reduced a typical maintenance outage by 18
21 hours (0.75 days) over that possible with Martin Units 3 and 4. Also, the
22 maturation of FPL's own outage processes has led to efficiency improvements
23 with dramatic step-change reductions in outage duration. As an example of

1 one of these improvements, FPL is now able to perform a combustor
2 inspection, which occurs approximately every 1-2 years, in about 4 days less
3 than in the past. Since the CT water wash enhancements and combustor
4 outage process improvements alone equate to an average annual reduction of
5 3 days per year (assuming a combustor outage every 1.5 years) as compared to
6 the annual average historical Martin 3 and 4 outage duration of 9.1 days, it is
7 reasonable to project that the maintenance outage duration for Martin Unit 8
8 and Manatee Unit 3 will average 1 week per year.

9
10 With the recent incorporation of 3rd generation CT technology into the
11 existing Martin 3 and 4 machines, the already commendable reliability of
12 these units has improved. Also, with eight years of operating experience, our
13 personnel are more than ever attuned to the nuances of operating these units.
14 These factors, in addition to many others, have contributed to outstanding
15 annual forced outage rates for Martin Units 3 and 4 in recent years. For 2000
16 and 2001, the EFOR for these units averaged 0.14%, a substantial
17 improvement over the 6-yr average of 1.7% described above. These recent
18 performance improvements should be indicative of the performance of Martin
19 Unit 8 and Manatee Unit 3. Accordingly, our view going forward is that
20 EFOR targets of 1% are reasonable and achievable for the proposed units.

1 **Q. What role does FPL's practice of collecting real-time data from its**
2 **combined cycle units play in bolstering the validity of FPL's projected**
3 **base heat rate and unit availability?**

4 A. As I mentioned in my pre-filed direct testimony, FPL operates an award-
5 winning Fleet Performance and Diagnostic Center (FPDC) in Juno Beach,
6 Florida. The proposed Martin Unit 8 and Manatee Unit 3 will be connected to
7 the FPDC, allowing for real-time centralized monitoring of key unit operating
8 parameters. Live video links between the FPDC and plant control rooms will
9 allow for immediate discussion, prevention, and resolution of problems.

10

11 With this capability, and our extensive lessons-learned knowledge base, we
12 are able to maximize the time that our units are capable of operating at peak
13 efficiency. Identifying a problem in its incipient stage affords us the
14 opportunity to perform proactive maintenance before the situation progresses
15 to a partial or full forced outage, which will help us to achieve our projected
16 1% forced outage rate for the proposed Martin Unit 8 and Manatee Unit 3.

17

18 **Q. Does that conclude your rebuttal testimony?**

19 A. Yes it does.