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FPL

July 24, 1996

Ms. Patricia S. Lee
Utility Systems Engineer Supervisor
Florida Public Service Commission
Capital Circle Office Center
2540 Shumard Oak Blvd.
Tallahassee, Florida 32399-0850

Re: Docket No. 960527-EI

Dear Ms. Lee:

Attached are responses to your questions resulting from your review of Florida Power & Light Company's depreciation studies, for its combined cycle units, that were filed in April 1996. Certain of the responses have been simplified due to the exchange of information on unitization of plant records by phone and during the tour of the Ft Lauderdale combined cycle plant.

If you or your staff have any questions regarding the responses or the filing in general, please call me at (305) 552-4790.

Sincerely,

Donald L. Babka
Manager, Regulatory and Tax Accounting

Attachments

cc: M. M. Childs
W. G. Walker, III (without attachments)
K. M. Davis (without attachments)
Division of Records & Reporting, Florida Public Service Commission

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Q.1. For each of the combined cycle units under review, the estimated capital recovery dates have been revised since the last study. Staff would like to understand how the new estimated recovery dates were determined. Please provide any information which is available relating to these changes.

A.1. Martin Units 3 & 4 and Ft. Lauderdale Units 4 & 5 have similar new technology design criteria. The capital recovery period for the Ft. Lauderdale Units was revised to 25 years, consistent with the 25 year capital recovery period approved by the FPSC for the Martin Units. The capital recovery period for the Putnam Units was revised from 35 years to 30 years. Putnam is an older design and, based on actual operating data, is expected to operate an additional 12 years for Unit 1 and 11 years for Unit 2 or a 30 year total capital recovery period.

These revisions were due to: 1) better knowledge by the manufacturers of the design life criteria of the equipment and 2) economic obsolescence of this equipment resulting from new technology displacement (i.e., new GE-H technology).

1) Design Criteria: The first factor in determining a theoretical operating life is utilization of the manufacturer's expected design life. For example, the Martin Combined Cycle Units have a theoretical design life of 240,000 hours assuming base load operation. Based on this assumption, the Units would operate for 30 years (240,000-lifetime / 8,000 hours per year). The second factor in determining expected operating life is cycling. The manufacturer's expected design life due to cycling is 5,000 cycles per unit. FPL's operating criteria is based on 250 cycles per year, therefore, the Plant has a theoretical design life of 20 years (5,000 cycles per lifetime / 250 cycles per year). Based on the this criteria, FPL believes that the 25 year overall life incorporated into these studies represents a realistic estimate of the anticipated operating life of its facilities.

2) Economic Criteria: A factor in determining economic life is technological obsolescence. At present, FPL's design basis will be obsolete within 5 to 7 years with the introduction of the new H-machine series by General Electric. It is not possible to predict exactly when the current technology will be rendered obsolete, but with the movement to a competitive market FPL would expect that technological obsolescence will result in shorter recovery periods than are currently used today.

Q.2. Please describe the premises and reasoning process used in estimating the replacement intervals.

A.2. FPL engineers selected the intervals based upon their knowledge of life expectancies of equipment, FPL's operating and maintenance practices and engineering judgment. In addition, replacement intervals for individual retirement units at the combined cycle units were analyzed by evaluating the reasonableness of existing retirement intervals, consistency between units and expected life of the units.

Q.3(a). From conversations with the Company, staff understands that the previous Schedule V information for these units cannot be directly compared with the Schedule V information provided in this docket, in part due to the unitization process. Please provide a short summary description of the unitization process, and explain how it gives rise to this situation.

A.3(a). Unitization is a detail process of analyzing and assigning capital expenditures to the appropriate Continuing Property Record location, plant accounts and retirement units. The Schedule V information from previous studies was developed prior to unitization. That information was based on the contractor's final construction reports which represented the contractor's system to accumulate costs to control the construction project. For example, the contractor is concerned with the cost of poured concrete in total for the job. The contractor is not necessarily concerned with how much it cost individually to pour concrete for the turbine deck or other foundations on the project. Absent unitized power plant records, the final construction reports were the best historical records available when the previous depreciation studies were prepared.

The unitization process is not only based on the final construction reports but also incorporates original source documents and drawings to assign the construction costs to the appropriate retirement units of property, as identified in FPL's Property Retirement Unit Catalog. As a result of the unitization process, plant investment that was reported as part of one unit in the previous depreciation studies may have been appropriately reclassified as part of common plant or as part of another unit or even as part of another account. In addition, during the unitization process, vintage years were corrected where appropriate. These factors make the previous studies difficult to compare with the current studies on a line item by line item basis.

A summary of the unitization procedures is listed below.

- Pre-construction contracts were reviewed to determine the construction scope and to assign Property Retirement Unit Catalog Systems and Retirement Unit

quantities and values;

- Pre-construction contracts were reviewed for material purchases for assignment of Property Retirement Unit Catalogue Systems and Retirement Unit quantities and values;

- During construction invoices, contract change orders and labor distributions were reviewed;

- Post-construction as-built drawings, one-line diagrams, cable pulling reports, etc., were reviewed;

- Systems were physically verified;

- Construction indirect costs and overheads were reconciled and allocated to the direct costs to develop a fully costed property unit.

Q.3(b). In some cases, there was detail information in the last Schedule V which is no longer shown. For example, Ft. Lauderdale Unit 4, under Account 341.4, Cooling Systems, had sub-accounts 341.411 and 341.412 in the last study. For the equipment and investment which was related to those sub-accounts, please explain how the information in the Schedule V of the current study relates to the previous Schedule V.

A.3(b). The unitization process resulted in the reclassification of plant investment formerly recorded in Unit 4, Cooling Systems, sub-accounts 341.411 and 341.412 to Common Plant, Cooling Systems, sub-accounts 341.404 and 341.408. The plant investment amount also changed from $434,578 to $537,592 because of the detailed identification of the actual cost of individual retirement units resulting from the unitization effort.

Q. 4. In the last study, the Schedule V for the Ft. Lauderdale Unit 4 Cooling System (Account 341.4) showed investment of $1,773,948 with an age of 9.3 years. The December 31, 1995 data shows investment of $1,528,980 with an age of 2.5 years. Was all of the pre-1993 investment retired after the 1993 filing? Please provide some insight or explanation for this seemingly illogical change in age.

There are similar instances scattered throughout the Schedule V data provided in this study, for the various units at all three sites. That is, a comparison of the Schedule V data in the previous study with the current Schedule V leads to conclusions which

appear questionable. Please provide any information or insight which will go toward alleviating the concern(s) which develop in these cases.

A. 4. The changes in plant investment are the result of unitization of the power plants (see response to Q.3(a). For the example cited in the question, the total 1993 plant investment for Unit 4 Cooling Systems, Acco int 341.4 was $1,773,948. Of that amount, $1,339,370 was in Subaccount 341.413, Open/Intake Cooling System with an of 0.5 years. The corresponding unitized plant investment in the 1995 study is $1,528,980 with an age of 2.5 years. The two year difference in ages is appropriate given the difference in study years (1993 vs. 1995). During unitization, the rest of the Cooling System, $434,578, shown in Subaccounts 341.411 and 341.412 in the 1993 study was reclassified from Unit 4 to Common Plant Subaccount 341.408. The reclassified equipment had an age of 36.5 years in the 1993 study. However, through the unitization effort vintages were corrected reducing the age of that plant investment to 26.5 years. The reclassification of the older equipment from Unit 4, Subaccounts 341.411 and 341.412 in the 1993 study, to Common Plant, Subaccount 341.408 in the 1995 study, had the effect of lowering the composite age for Unit 4 Account 341.4 from 9.3 to 2.5 years.

Q.5. The transmittal letter with this study mentions that there is "better information" concerning the lives of combustion turbine blades incorporated in this study than was previously available. From conversations with the Company, staff understands the turbine blades in use at Martin and Ft. Lauderdale are experiencing shorter lives than had been projected. However, staff understands that a longer life is now associated with the turbine blades installed at Putnam.

a. Regarding the increase in life expectancy for the blades at Putnam, it appears that this is not related to the state-of -the-art technology associated with the turbine blades installed at the other two sites. Staff would like an overview as to the differences between these technologies, and some explanation of the reasons behind the increase in life expectation for the Putnam blades.

A.5(a). Although Martin Units 3 and 4, Ft. Lauderdale Units 4 and 5, and Putnam Units 1 and 2 are all combined cycle generating units, the Martin and Ft. Lauderdale units have newer designs and technological improvements. The Martin and Ft. Lauderdale combined cycle units operate at greater efficiency or lower average net heat rate (approx. 7,500 BTU/KWH - Ft. Lauderdale; 7,100 BTU/KWH - Martin) than Putnam (9,200 BTU/KWH). This is achievable by utilizing more state of the art design and materials that allow higher turbine inlet temperatures at Martin (2,365 degrees) and at Ft. Lauderdale (2,300 degrees) compared to the temperature at Putnam (1,850

degrees). These higher temperatures at Martin and Ft. Lauderdale result in a shorter life for turbine and combustor parts.

Each time a depreciation study is prepared for a plant site, there is more operating information available to form a basis for life expectancies of retirement units. The life expectancies of the blades at Putnam were updated to be more reflective of actual experience. However, given FPL's limited operating experience with the new technology, the life expectancy for the blades at Ft. Lauderdale and Martin are based on the manufacturer's warranty life.

Q.5(b). It is understood that the Martin and Ft. Lauderdale combined cycle installations are state-of-the -art; in fact, staff understands that these installations incorporate numerous designs and technological applications which are still being refined. Staff would like to know, in general, what types of new technologies are being introduced in these installations. Please provide summary information regarding the portions of these installations which represent new technology, and how the real life situation at these installations has varied from what was expected.

A5(b). The combustion turbines are of an advanced design utilizing firing temperatures of 2,300 degrees and greater. These temperatures are significantly higher than previously available for a heavy duty industrial combustion turbine. The Combustion Systems of the Combustion Turbines are an advanced technology application which produces more mass exhaust gas to be recovered by the second cycle. The increase in efficiency resulting from these factors is reflected in lower heat rates.

The major new technologies applied are thermal barrier coatings and advanced impingement cooling in the combustor system. The thermal barrier coatings are like a ceramic material inside the combustors and transition pieces that protect metal from overheating.

The combustion turbine uses advanced metal alloys, serpentine cooling passages and thermal barrier coatings. These allow the machines to operate at higher temperatures and power density which lowers the heat rate.

There are three observations/situations that are noteworthy. (1) the new technology combined cycle units have generally operated at higher capacity with lower heat rates than was expected. (2) The units at Ft. Lauderdale experienced bending of heat recovery steam boiler tubes due to the extreme force of the exhaust gasses. This situation has been corrected. (3) The Martin Unit Row 1 turbine buckets (blades) will only reach warranted life with more frequent repairs/inspections than planned.

Q.6. For some items, the relationship between remaining life and the capital recovery date of the unit raises questions. As an example, the Ft. Lauderdale Common Plant has a capital recovery date of 2018. A small investment in site preparation (Account 341.0051) is shown as retiring in 2007, and the investment relating to foundations for the Yard Lighting System (Account 341.1034) is shown as retiring in 2013. Why is it reasonable to assume these items will be replaced prior to the retirement of the unit?

A.6. The site preparation is shown as retiring before the unit itself, because based on plant experience, plant paving, grading and storm water drainage changes during the course of the Plant life.

Also, based on FPL Plant operation experience, foundations for the yard lighting are assumed to retire before the unit itself because parking lot areas usually are reconfigured or moved sometime during the life of the plant.

Q. 7. In the last study, the Control/Instrumentation (Sub Account 341.4264) portion of the Ft. Lauderdale Unit 4 Cooling System, Account 341.413, was expected to serve without replacement for the life of the unit. In the current study, replacement is expected in 20 years. Please explain the reasoning behind the current view.

A. 7. Control and instrumentation is now one of the most rapidly advancing technologies in power generation today. As a result, there are several reasons for replacing these systems on a more frequent basis: a) Upgrades to new hardware and software are cost effective due to enhanced process control; b) Suppliers do not provide the same level of technical support or spare part inventories for older systems; c)newer systems have higher levels of automation and are more reliable; and d) integration with other systems requires use of more current technology. FPL believes that 20 years is the maximum life for this equipment, however, as technologies change it may be necessary to further shorten the replacement interval.