BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Fuel and purchased power cost recovery clause with generation performance incentive factor (Crystal River 3 1989 outage)	DOCKET NO. 910001-EI ORDER NO. 25455 ISSUED: 12/9/91

The following Commissioners participated in the disposition of this matter:

THOMAS M. BEARD, Chairman
BETTY EASLEY

ORDER APPROVING RECOVERY OF REPLACEMENT FUEL COSTS

BY THE COMMISSION:

In connection with the August 1989 fuel adjustment hearing (Docket No. 890001-EI), the Office of Public Counsel raised an issue regarding Florida Power Corporation's ("FPC's") recovery of replacement fuel costs for outages at the utility's Crystal River 3 nuclear unit ("CR3"). We find that the costs in question were prudently incurred and should be recovered.

Background

At the August 1989 hearing, FPC's witness, Mr. Paul McKee, submitted a short outage report to the Commission. The parties agreed to defer decision on the issue until the February 1990 fuel adjustment hearing in order to allow sufficient time for discovery.

Based on the outage report filed by FPC, Public Counsel's witness, Dr. Stephen Hanauer, filed testimony for the February 1990 hearing. In response, FPC filed rebuttal testimony. Confusion arose concerning which testimony was considered "direct" and which was "rebuttal". Furthermore, FPC was planning a refueling outage at Crystal River 3 which was projected to begin in March 1990 and last four months. FPC anticipated that the refueling outage would make preparation for the hearing difficult or impossible. With the agreement of the parties, the issue was again deferred until after the refueling outage was completed.

After completion of the refueling outage in June 1990, the replacement fuel issue was set for hearing in April 1991, and the parties renewed preparation for the hearing. FPC supplied the supplemental direct testimony of Mr. McKee and the direct testimony of an expert witness, Dr. Elemer Makay. Thereafter, Dr. Hanauer filed revised direct testimony, after which Mr. McKee and Dr. Makay filed rebuttal testimony. The hearing was held on April 22-23, 1991.

During the hearing, Public Counsel moved to strike part of Mr. McKee's rebuttal testimony. We denied the motion to strike, but suspended the hearing to allow Public Counsel to pursue additional discovery. The hearing was reconvened, and concluded, on August 23, 1991.

At issue in the hearing was the recovery of replacement fuel costs resulting from two outages and related deratings:

1. the "high vibration" derating from November 24, 1988 to December 7, 1988;

2. the "high vibration" outage from December 7, 1988 to January 16, 1989;

3. the "broken shaft" derating from January 18, 1989 to February 26, 1989; and

4. the "broken shaft" outage from February 26, 1989 to June 17, 1989.

Facts

CR3 was operating at full power on November 23, 1988 when monitoring equipment sensed that RCP-A, one of the four reactor coolant pumps, was vibrating excessively. Power at CR3 was derated (reduced) to 75% capacity, RCP-A was taken out of service, and the vibration data was analyzed. FPC was unable to determine the cause of the excessive vibration from the data, so it took CR3 off-line on December 7, 1988 to inspect the pump. Studs used to couple the pump and the motor were found to be loose and were retorqued, which did not cure the vibration problem.

Further inspection found several cracked welds on the structural support for RCP-A, which were repaired. At the same time, two different consultants performed ultrasonic tests on RCP-A in an attempt to find whether the shaft was cracked. No major cracks were present, but the tests could not detect very small cracks. A third consultant, using vibration data and a computer model of RCP-A, indicated that the shaft was cracked and would break if the pump was restarted. After the cracked motor support welds were repaired, however, vibration levels returned to normal. Concurrent repair of leaks to the reactor head nozzle flanges was completed and other minor repairs were finished. CR3 was returned to service on January 16, 1989. The "high vibration" outage lasted 40 days.

Two days later, on January 18, 1989, the shaft in RCP-A failed. FPC determined that the unit could continue to operate at

75% of capacity, using three RCP's, to provide capacity during the winter peak period and to provide time for FPC to plan the maintenance outage. CR3 was shut down on February 26, 1989 to replace the failed shaft in RCP-A. The "broken shaft" outage was scheduled to last 49 days.

During the outage, on March 12, 1989, a visual inspection of RCP-A revealed that laminated metal strips on the rotor had slipped, causing significant damage to the rotor. This required the 18-ton rotor to be shipped to General Electric's shop in Memphis, Tennessee for repair. Concurrent inspection revealed similar lamination damage to RCP-B and RCP-C, requiring these two pumps to also be sent to Memphis for repair. Meanwhile, the Nuclear Regulatory Commission (NRC) required two things of FPC: an extensive procedure for testing the performance of decay heat pumps in low-flow conditions, and an upgrade of reactor coolant pump vibration monitoring equipment.

During the week of April 9, 1991, while the decay heat pump testing was occurring, the NRC inspected FPC's equipment qualification program, which insures that certain components within the reactor building are capable of functioning in harsh environmental conditions during extreme emergency situations. The result of the inspection was the NRC's requirement that FPC perform additional work activities prior to returning CR3 to service.

During the week of May 21, 1989, FPC began refilling and heating the reactor coolant system in preparation for start-up of the unit. At that time, a reactor coolant temperature sensor which had no previous problems began to leak. This required the system to be cooled and drained before the leak could be repaired. Upon completion of this repair, FPC again began to refill and heat the system when three of the four RCP seals failed to seat properly, causing further leakage. Again, the system was cooled and drained and the RCP seals were replaced and the reactor coolant system was filled and heated. CR3 was placed on-line on June 17, 1989. The "broken shaft" outage lasted a total of 111 days.

Decision

Reactor coolant pump repairs

We find that repairs on the reactor coolant pumps for motor lamination damage extended the outage for 30 days but did not result from management imprudence. At the hearing, Public Counsel challenged the prudence of management decisions relating to this portion of the outage. However, after the hearing Public Counsel changed its position, and no longer questioned the prudence of replacement fuel costs associated with this extension of the

outage. We find that the evidence in the record is sufficient to show the utility's prudence with respect to this issue.

Low-flow testing of decay heat pumps

We find that testing the low-flow capabilities of decay heat pumps extended the outage for 16 days but did not result from management imprudence. At the hearing, Public Counsel challenged the prudence of management decisions relating to this portion of the outage. However, after the hearing Public Counsel changed its position, and no longer questioned the prudence of associated replacement fuel costs. We find that the evidence in the record is sufficient to show the utility's prudence with respect to this issue.

Equipment qualification requirements

Public Counsel believes that the outage was extended unnecessarily by FPC's imprudent management in regard to its equipment qualification program. Public Counsel comments that the NRC has imposed equipment qualification (EQ) requirements since 1971, which were modified in 1983 with a deadline for compliance by November 30, 1985. Public Counsel notes that, with one exception, Florida Power's failure to comply with the NRC's requirements resulted from deficiencies in FPC's EQ program, evidencing mismanagement.

However, when asked how long the broken shaft outage would have lasted if the EQ work had not been done, Public Counsel's witness, Dr. Hanauer, stated that he did not know. Dr. Hanauer testified that he used only a bar chart and the chronology given in Mr. McKee's testimony, as well as an outage report which used the same chronology in order to compute the days attributable to each outage activity. He stated that the best way to determine whether there are any days of lost generation due to a particular activity during an outage is to create a retrospective "as-built" schedule. However, despite being provided with the information to create such a schedule, Dr. Hanauer did not attempt to construct one.

FPC, on the other hand, prepared an after-the-fact "as-built" outage schedule in accordance with the very method suggested by Dr. Hanauer. Mr. McKee explained how an "as-built" schedule was created:

> Dr. Hanauer stated accurately that the best way to determine whether there are any days of lost generation would be to establish a critical path of the outage, then impact it by deleting the activities evaluated to be unreasonably incurred. Comparison of the two critical

paths would show the net overall time of lost generation. And I concur with that method." (Tr. 875).

FPC's as-built schedule showed that two other activities (repair of motor rotor lamination damage on the three reactor coolant pumps and cleanup of the reactor building) were the controlling events during the outage time at question in this issue. Thus, the overall outage would not have been any shorter even if the EQ work had not been performed.

Public Counsel pointed out that this "as-built" schedule contradicted Mr. McKee's initial testimony, in which he relied on daily outage work activity sheets composed each day during an outage. These outage work activity sheets were created daily to be used during the outage to project the expected length of time to perform each activity, including the EQ work. These sheets were not meant to be used after-the-fact to retrospectively allocate outage time to a particular outage activity. Mr. McKee noted that FPC does not normally prepare "as-built" schedules after an outage, but did so in this case to clarify that other work activities, not the EQ work, extended the outage.

We find that NRC-mandated equipment qualification work, though performed during the outage, did not affect the length of the outage. Because other prudent activities, not the EQ work, extended the broken shaft outage, we will not require FPC to reimburse its ratepayers for associated replacement fuel costs.

Reactor coolant pump seals

Public Counsel took the position that the 16 day outage extension caused by replacement of reactor coolant pump seals was the result of imprudent management by FPC. We disagree.

An investigative report, prepared by FPC after the incident, proposed that the reactor coolant pump seal leaks could have been caused by the excessive use of lubricant, used to facilitate the assembly and installation of the seals which was performed near the end of the broken shaft outage. Dr. Makay noted that although the amount of grease could have caused the seals to fail, he did not accept this reason. He stated that "even when everything was done 'right', these seals have an unfortunate record of failure" (Tr. 271). Dr. Makay stated that at least one industry task force addressed this issue in order to devise a more reliable seal for use in existing pumps. Dr. Makay explained that the reactor coolant pumps at CR3 now contain these new seals, and that "the short in-service record of these seals has been better than their predecessors" (Tr. 271).

Dr. Hanauer believed that the personnel who performed the seal rebuild work during the "broken shaft" outage were less qualified than the personnel who previously performed an identical seal rebuild at CR3 during a previous outage. The record offers no clear explanation of who actually rebuilt the seals that leaked during the "broken shaft" outage. The record shows that both FPC personnel and vendor representatives were present while the actual work was being performed. Mr. McKee stated that FPC personnel were qualified to perform the seal rebuild work, and were familiar with the task as a result of working on previous seal rebuilds. Furthermore, Dr. Makay testified that the vendor representative, who FPC had used in previous work of this type, had superior knowledge and experience with respect to the seals:

> . . .FPC relied upon the vendor to install or supervise installation of the seals. At that time there was no one with greater expertise upon whom the company could have relied. Given the track record of these seals, FPC was wise not to attempt the installation alone. I am aware that FPC did question one facet of the reassembly process (concerning the amount of grease used) but deferred to the vendor's recommendation (Tr. 271).

In this case, we find that FPC acted prudently in relying on the expertise of the seal manufacturer in the installation of the seals.

Dr. Hanauer thought FPC acted imprudently. He based his conclusion on FPC's post-incident report, which mentioned "lack of proper care and caution by pump manufacturer personnel when seal packages were rebuilt". However, he stated that he made no distinction between FPC employees and contractors' employees in his evaluation. We believe that the imprudence or even negligence of third parties should not be attributed to FPC so long as the utility acted prudently in relying on the superior expertise of the vendor representatives.

In discussing an FPC outage report, Dr. Hanauer noted that "FPC and 'pump manufacturer' personnel disagreed over the amount of lubrication" to use in the installation of the seal (Tr. 541), concluding that FPC was imprudent in accepting the recommendation of an experienced seal manufacturer. It should be noted that FPC's report only hypothesized that excess lubricant may have caused the seal failure:

> excess o-ring lubricant used when seals were rebuilt . . . <u>could have</u> led to seal failure if excess lubricant leaked or was inadvertently wiped onto components that should not be lubricated. (Ex. 6) (Emphasis added).

We will not deny FPC recovery of its fuel costs based on this inconclusive statement. We note that FPC bears the burden of proving that replacement fuel costs were prudently incurred. However, it is not necessary to pinpoint the cause of the seal failures in order to prove prudence. Both Dr. Makay and Mr. McKee pointed to the excessive failure rate of this type of seal. Furthermore, the seals functioned the first time the system was pressurized and heated, before FPC discovered the leak at the temperature sensor. Mr. McKee stated that "even properly installed seals often fail on subsequent startups" (Tr. 801). As stated previously, Dr. Makay did not accept that excess grease could have caused the leaks at the seals.

Dr. Hanauer admitted that his only experience in evaluating failures of pump seals was from reading reports. Furthermore, Dr. Hanauer did not conduct any independent investigation to determine the cause of the RCP seal failure, instead relying solely on FPC's post-incident report and Mr. McKee's testimony to base his conclusions.

FPC argued that Dr. Hanauer impermissibly relied upon post-incident reports in concluding that FPC acted imprudently in its installation and repair of the RCP seal. FPC cited the "dropped test weight" cases in support of its claim that such reports cannot form the basis for a finding of imprudence. Florida Power Corp. v. Public Service Commission, 424 So.2d 745 (Fla. 1982) and Florida Power Corp. v. Public Service Commission, 456 So.2d 451 (Fla. 1984). We disagree with FPC's reading of the cases, which dealt not only with the application of hindsight, but with the application of a stringent nuclear safety standard to prove the less stringent standard of management imprudence. However, under the circumstances, Dr. Hanauer's reliance on the report is irrelevant. Whether or not his reliance on after-the-fact conclusions of negligence on the part of third parties is permissible, as discussed above, we will not attribute the imprudence of vendor representatives to FPC in these circumstances. FPC acted prudently in relying upon the superior expertise of the vendor representatives.

It is therefore

ORDERED by the Florida Public Service Commission that Florida Power Corporation's recovery of replacement fuel costs for the 1989 outages of its Crystal River nuclear plants discussed above is hereby approved.

By ORDER of the Florida Public Service Commission, this 9th day of DECEMBER, 1991.

STEVE TRIBBLE, Director
Division of Records and Reporting

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NOTICE OF FURTHER PROCEEDINGS OR JUDICIAL REVIEW

The Florida Public Service Commission is required by Section 120.59(4), Florida Statutes, to notify parties of any administrative hearing or judicial review of Commission orders that is available under Sections 120.57 or 120.68, Florida Statutes, as well as the procedures and time limits that apply. This notice should not be construed to mean all requests for an administrative hearing or judicial review will be granted or result in the relief sought.

Any party adversely affected by the Commission's final action in this matter may request: 1) reconsideration of the decision by filing a motion for reconsideration with the Director, Division of Records and Reporting within fifteen (15) days of the issuance of this order in the form prescribed by Rule 25-22.060, Florida Administrative Code; or 2) judicial review by the Florida Supreme Court in the case of an electric, gas or telephone utility or the First District Court of Appeal in the case of a water or sewer utility by filing a notice of appeal with the Director, Division of Records and Reporting and filing a copy of the notice of appeal and the filing fee with the appropriate court. This filing must be completed within thirty (30) days after the issuance of this order, pursuant to Rule 9.110, Florida Rules of Appellate Procedure. The notice of appeal must be in the form specified in Rule 9.900 (a), Florida Rules of Appellate Procedure.