

State of Florida



Public Service Commission

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TALLAHASSEE, FLORIDA 32399-0850

-M-E-M-O-R-A-N-D-U-M-

DATE: November 23, 2021

TO: Office of Commission Clerk (Teitzman)

FROM: Division of Accounting and Finance (Higgins) *ALM*
Division of Engineering (Ellis, Wooten) *TB*
Office of the General Counsel (Brownless, Osborn) *JSC*

RE: Docket No. 20210001-EI – Fuel and purchased power cost recovery clause with generating performance incentive factor.

AGENDA: 12/07/21 – Regular Agenda – Post-Hearing Decision – Participation is Limited to Commissioners and Staff

COMMISSIONERS ASSIGNED: All Commissioners

PREHEARING OFFICER: Fay

CRITICAL DATES: None

SPECIAL INSTRUCTIONS: Recommendation B – Duke Energy Florida, LLC.

Case Background

As part of the continuing fuel and purchased power adjustment and generating performance incentive factor clause proceedings, an administrative hearing was held on November 2, 2021. At the hearing, certain stipulated issues for Duke Energy Florida, LLC (DEF or Company), Florida Power & Light Company (FPL), Florida Public Utilities Company (FPUC), Gulf Power Company (Gulf), and Tampa Electric Company (TECO), were approved by bench decision. The Commission approved stipulations on all but one of the issues before it concerning each of the investor-owned utilities (IOUs) actual and projected fuel and capacity costs. The only issue left outstanding is Issue 1C, a company-specific issue with respect to DEF. More specifically, the subject matter of Issue 1C concerns the recoverability of replacement power costs associated with the January 2021 through April 2021 forced outage of Crystal River Unit No. 4 (CR4). CR4 is an approximate 715 megawatt (MW) coal-fired steam unit located in Citrus County, Florida.

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Through Issue 1C, the Commission is being asked to determine if DEF's actions were reasonable and prudent with respect to the factors leading to the forced outage of CR4, and to determine if the associated replacement power costs are recoverable by the Company.

The Florida Industrial Power Users Group (FIPUG), the Florida Retail Federation (FRF), the Office of Public Counsel (OPC), and White Springs Agricultural Chemicals, Inc. d/b/a PCS Phosphate – White Springs (PCS Phosphate) filed a joint brief concerning Issue 1C, as well as DEF, on November 15, 2021.

Staff presents its analysis and recommendation on the prudence of DEF's actions and the recovery of replacement power costs associated with CR4's forced outage (Issue 1C) herein.

The Commission is vested with jurisdiction over the subject matter of this proceeding by the provisions of Chapter 366, Florida Statutes (F.S.), including Sections 366.04, 366.05, and 366.06, F.S.

Discussion of Issues

Issue 1C: Has DEF made appropriate adjustments, if any are needed, to account for replacement power costs associated with the January 2021 to April 2021 Crystal River Unit No. 4 outage? If appropriate adjustments are needed and have not been made, what adjustments should be performed?

Recommendation: No. Failure of the plant operator to follow written procedures, without supervisory approval, directly led to the outage at Crystal River Unit 4. As such, replacement power costs should not be borne by retail ratepayers. DEF should credit its customers \$14.4 million associated with retail replacement power costs for the Crystal River Unit No. 4 outage through its 2021 Final True-Up filing. (Wooten)

Position of the Parties

DEF: No adjustments are necessary because DEF's actions related to the outage were reasonable and prudent. The testimony and exhibits clearly demonstrate that DEF could not have known that the highly reliable Beckwith manual sync check relay failed. While the operating procedures were changed as a result of this incident, it was not reasonably foreseeable for DEF to have planned for this unexpected failure in advance of the incident at issue.

FPL: No position.

FRF, FIPUG, OPC, PCS Phosphate: No. The utility bears the burden of proof for recovery of costs claimed. DEF did not demonstrate that its actions causing damage to the plant and the related outages were reasonable and prudent, or that replacement power costs should be borne by customers.

Gulf: See FPL position stated above.

TECO: No position.

NUCOR: No position.

Staff Analysis:

Parties' Arguments

DEF argues that no adjustments are necessary with respect to replacement power costs associated with the January 2021 to April 2021 forced outage of CR4, and that these costs should be deemed fully recoverable. DEF asserts that the testimony and exhibits presented with respect to this matter clearly demonstrate that it could not have known that a highly-reliable plant component (a Beckwith manual sync check relay) failed, which was identified as a "root cause" of the outage. (DEF BR 5) Further, even though operations procedures were changed as a result of the incident, it is not reasonably foreseeable for DEF to have planned for this unexpected failure of the manual sync check relay in advance of the incident. (DEF BR 3)

FRF, FIPUG, OPC, and PCS Phosphate (Joint Intervenors) argue that DEF did not demonstrate that the actions which led to the forced outage of CR4 were reasonable and prudent, or that replacement power costs should be borne by DEF's customers. Further, the DEF operating team at CR4 failed to follow established start up procedures and thereby damaged the plant when attempting to synchronize the generator to the electric grid. (Joint Intervenors BR 2) The Joint Intervenors argue that the Commission should find that DEF failed to demonstrate that it acted prudently in operating CR4 with respect to the actions leading to the forced outage. (Joint Intervenors BR 15)

Analysis

In its brief, DEF states that the Company's actions leading up to the CR4 outage were prudent and reasonable. DEF is requesting cost recovery of the replacement power costs associated with the CR4 outage. To calculate replacement power costs, DEF ran a simulation model that produced the total system costs assuming CR4 was fully available compared to actual system costs for the outage time period. The difference between the two costs represents the estimated system replacement power cost for the outage time period, which totals \$14.5 million (\$14.4 million retail). (EXH 59, 67) No party disputed the estimated system replacement power costs at the hearing.

The events leading up to the forced outage at CR4 occurred when the operator was attempting to synchronize the unit to the grid, on December 17, 2020. Synchronization is a process by which the generating unit is connected to DEF's power system by matching the generator's electric parameters; such as voltage, frequency, phase angle, and the power system's electric parameters. (TR 335) It is important that the electric parameters of each are matched as closely as possible to avoid excessive torque placed upon the generator rotor, which could lead to machine damage. (TR 436) Standard Operating Procedure (SOP) at CR4 is to synchronize the unit to the grid in automatic mode; but manual synchronization of the unit is permitted and has been done at CR4 before and after the outage event. (TR 335)

DEF's operator unsuccessfully attempted to synchronize CR4 to the grid three times, using the automatic synchronization process. The operator's subsequent actions resulted in an out-of-phase synchronization attempt of CR4 to the grid causing damage to the generator rotor and directly leading to the forced outage event. The unit remained in a forced outage status until all repairs and inspections to the generator had occurred. (TR 335 - 336, 445; EXH 8; EXH 54) This event also caused a relay malfunction that tripped the Citrus Combined Cycle Power Block 1 (Citrus) station offline. (TR 417 - 418) Replacement power costs for Citrus are not at issue here. (EXH 8, EXH 54)

Both DEF and the Joint Intervenors agree that the standard for review of prudence is "what a reasonable utility manager would have done, in light of the conditions and circumstances that were known, or should have been known, at the time the decision was made." (Joint Intervenors BR 2; DEF BR 3) It is also clear that DEF has the burden of proof to meet this standard by

providing credible evidence in the record.¹ The Joint Intervenors argue that DEF has not met this burden in this case, and staff agrees as discussed below.

In keeping with common industry practice, DEF performed a Root Cause Analysis (RCA) that explored the contributing factors of the event, the condition of the impacted unit, and corrective actions to prevent repeat occurrences. (TR 336 – 337; EXH 8) The RCA was performed by a team of DEF employees, including DEF witness Simpson. As determined by the RCA, the two root causes of the CR4 outage were (1) the failure of the Beckwith Manual Sync Check Relay (relay) and (2) the operator’s failure to follow proper operational procedures. The RCA also identified seven contributing causes related to training and communication issues that contributed to the outage. (TR 337; EXH 8)

The first root cause identified in the RCA was the failure of the protective relay. DEF witness Simpson described the relay as a highly reliable protective device, with an exceedingly low failure rate, designed to prevent the unit from attempting to synchronize to the grid in an out-of-phase condition. (TR 338, 451) The relay was originally procured on February 28, 2002. The relay was then relocated to the CR4 unit and was last functionally tested in April 2020. (EXH 8) DEF states the relay has no manufacturer published life expectancy or testing requirements; however, DEF maintains a six-year maintenance interval for protective devices, including the relay. DEF asserts that the relay was properly maintained and received regular calibrations before its failure in 2020. (TR 351 – 352, 354 451; EXH 54) The evidence in the record reflects that the equipment was reasonably maintained and the failure of the relay was reasonably unforeseen by the Company. DEF contends that had this device performed as designed, the outage would not have occurred. (TR 338) Under such a scenario, the operator’s actions would also have gone unnoticed. As stated by DEF witness Simpson:

If he closed it at the correct time and the device was failed, we never would have known. Had he closed prematurely and the device had been good, this event wouldn’t have happened. So when he closed early, the protective device failed to do its job, and that’s what led to the event. (TR 396-397)

This statement highlights the importance of following written procedures for critical operations. Staff recommends that the failure of the operator to follow written procedures, as discussed below, directly and independently led to the outage event at CR4.

The second root cause of the outage is the operator’s failure to follow written operational procedures which led to the out-of-phase synchronization. In interviews conducted as part of the RCA, the operator was not attempting to synchronize in manual mode; but rather, was attempting to reset the synchronization circuit to permit automatic synchronization. (EXH 8, Page 2) According to the RCA, the operator did not follow proper procedures by attempting to reset the synchronization circuit to permit automatic synchronization. The proper written procedure would be to place the unit in a safe condition prior to repositioning the synchronization switch handle. (EXH 8, Page 4) The startup procedures states that, “If [a]uto synchronization is inoperable on [U]nit 4, then use manual sync listed in Enclosure 5.” (EXH 8, Page 4) The procedure that the

¹*Florida Power Corp. v. Cresse*, 413 So. 2d 1187, 1191 (Fla. 1982) (the Commission properly imposed upon the utility the burden of showing that excess costs incurred were reasonable and were not the fault of management).

operator was attempting to perform was neither a manual synchronization nor automatic synchronization and was not SOP for synchronization at CR4. (TR 335, 445; EXH 8, Page 4) The RCA states: “The operator understood the synchronizing relay would not allow an out-of-phase synchronization.” (EXH 8, Page 7) The operator’s understanding of the relay was based on past experience and training. (TR 338) Therefore, the evidence in the record does not suggest the operator acted with malice or intentional disregard for safety. However, the incident does highlight the importance of both following written procedures and not overly relying on protective equipment.

Under certain circumstances deviation from established written procedures may be warranted, albeit with supervisory concurrence. The RCA states: “...the operations crew attempted unsuccessfully to synchronize to the grid four times without a questioning attitude and without consulting the Operations Superintendent and/or Station Manager.” (EXH 8, Page 4) According to DEF witness Simpson, the supervisor was present during the troubleshooting process but was unsure if the operator received supervisory approval to deviate from written procedures. (TR 439 – 440, 445) However, the RCA does not state that the operator received supervisory approval to disregard written procedures. (TR 430, 439 – 440) DEF witness Simpson states there is no written procedure addressing the procedure the operator was attempting. However, this procedure had been utilized at CR4 by the operator prior to the outage event. It is further established that this procedure was not approved or preapproved at any point before the outage event. (TR 446 – 447) DEF witness Simpson testified that the operator was properly trained and had the supporting materials necessary to correctly and safely operate the unit. (TR 339) However, according to the RCA, this is in contrast to the supervisor, who had not received adequate on-the-job training prior to the incident. (TR 385-386; EXH 8, Page 4)

Prior to the outage incident, the operator attempted to synchronize the CR4 unit to the grid three times in automatic mode over an approximate eight-second time period. For two of the three attempts, issues that may have been preventing automatic synchronization were identified, but the third attempt failed for an unknown reason. (EXH 8, Page 3) The RCA did not identify a root cause for the failed third attempt. DEF witness Simpson testified that proper procedure after a failed synchronization attempt is for operators to perform a walkdown for the purpose of discovering any issues, correcting the issues and attempting synchronization again. (TR 401; EXH 54) According to the final version of the RCA, this walkdown process was performed for each of the three automatic synchronization attempts. However, this statement is contradicted by a comment in a draft version of the RCA that states: “The operators did not complete a thorough walkdown after each trip, therefore each time they attempted to sync there was another item holding them out.” (TR 408; EXH 8, 64) DEF witness Simpson did not provide any explanation as to the discrepancy between the statement present in the draft RCA and the final RCA. The brief eight-second timeframe in which the synchronization attempts occurred, and this contradictory statement, leads staff to question whether a thorough walkdown occurred prior to each synchronization attempt. Since the CR4 outage event, the startup procedures have been revised to include guidance to contact either the Operations Superintendent or Plant Manager in the case of multiple failed automatic synchronization attempts. (EXH 54)

If the operator had followed written procedures, staff believes the outage would not have occurred and the failed relay would have gone undetected until DEF performed an inspection. If

the relay had not failed, then the operator's disregard of written procedures would have been inconsequential. The record does not satisfactorily establish that either a thorough walkdown occurred after each synchronization attempt or that the operator received supervisory approval to deviate from the written procedure. Based on the evidence in the record, staff recommends that DEF has not adequately proven that its actions were reasonable and prudent.

Conclusion

Failure of the plant operator to follow written procedures, without supervisory approval, directly led to the outage at Crystal River Unit 4. As such, replacement power costs should not be borne by retail ratepayers. DEF should credit its customers \$14.4 million associated with retail replacement power costs for the Crystal River Unit No. 4 outage through its 2021 Final True-Up filing.

Issue 2: Should this docket be closed?

Recommendation: No. The 20210001-EI docket is an on-going proceeding and should remain open. (Brownless)

Staff Analysis: The fuel docket is on-going and should remain open.