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SUBJECT: Forwards response to Insp Repts 50-250/87-06 & 50-251/87-06. New procedures written governing conditions adverse to quality, check valves replaced & addl safety concerns discussed. Full compliance will be achieved by 870529.

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FLORIDA POWER & LIGHT COMPANY

MAY 15 1987
L-87-216

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Gentlemen:

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Inspection Report 87-06

Florida Power & Light has reviewed the subject inspection report and a response to Finding A is attached. FPL's response to Finding B was previously issued in L-87-162 on April 10, 1987.

There is no proprietary information in the report.

Very truly yours,

W. N. Paduano Jr.
for C. O. Woody
Group Vice President
Nuclear Energy

COW/SDF/gp

Attachment

cc: Dr. J. Nelson Grace, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant

IE01

SDF1/016/1

ATTACHMENT

RE: TURKEY POINT UNITS 3 AND 4
DOCKET NO. 50-250, 50-251
IE INSPECTION REPORT 250-87-06 & 251-87-06

FINDING A:

10 CFR 50, Appendix B, Criterion XVI, as implemented by FPL Topical Quality Assurance Report FPLTQAR 1-76A; Revision 9, and TQR 16.0, Revision 5, entitled Corrective Action, requires, in part, that measures be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected.

FPL Quality Assurance Manual, Quality Procedure 16.1, Revision 8, delineates requirements for assuring that conditions adverse to quality are corrected.

Contrary to the above, the licensee did not take prompt and adequate corrective action to identify and correct a deficient condition in that, after if was determined in August 1986 that broken keys, damaged keyways and a damaged shaft contributed to the degraded condition of Intake Cooling Water (ICW) check valve 3-321, necessitating both key and shaft replacement, insufficient action was taken to evaluate the safety significance of operating ICW check valve 4-311 while it exhibited symptoms of internal key and keyway damage. Consequently, between October 29, 1986, and January 16, 1987, when Region II management questioned valve operability, no written analysis or empirical inspection was performed to determine the root cause of the observed deficiency, no action was taken to repair the deficiency and no determination was initiated as to whether the discrepancy increased the potential for valve failure.

RESPONSE:

1) After careful review of the sequence of events surrounding this issue and careful consideration of the NRC's concerns as described in this report, FPL does not take issue with this finding.

2) During the weekly testing of the intake cooling water (ICW) check valves on October 29, 1986 as per non conformance report (NCR) 391-86 it was noticed that while valve 4-50-311 satisfactorily passed the test, the piston rod extension for the valve was less than normal. This was brought to the attention of the Technical Department system engineers, Power Plant Engineering (JPE) site personnel and an Operations Department member. They observed the condition of the check valve in operation. They also observed that the check valve exhibited partial slippage between the valve shaft and disc during initial valve opening and followed by rotation of the shaft and disc in unison. The same type of valve operation was experienced earlier with valve 3-50-311 (ICW pump 3A) and it had operated successfully for seven to eight months until this time.

At this time the safety evaluation (SE), JPE-M-86-017, written on March 12, 1986 concerning the operability of the Unit 3 ICW check valves was reviewed and it was felt that the safety evaluation was still valid and only a clarification was needed to state that the evaluation applied to Unit 4 also. This clarification was issued on October 30, 1986. Therefore, based on the observed condition of the valve and the combined expertise of the individuals involved, an engineering judgement was made that the condition did not prevent the valve from performing its intended function as indicated by successfully passing its weekly operability test and no immediate inspection and/or repair of the valve was warranted. A plant work order was issued to document this condition and to have the valve inspected during the next outage of sufficient duration.

In addition NCR-86-325 was written on August 17, 1986, to evaluate a repair method for the 3B ICW check valve (3-50-321). When this valve was disassembled it was found to have keys and keyways installed. The keys had worn away from the disc and had allowed the disc to rotate around the keys. Prior to removal, the valve had been verified operable in that it functioned as required. The valve disc was verified intact and stable. When disassembled no new factors which could invalidate the SE were found (i.e., no shaft or disc integrity failures) and the root cause of disc rotation was addressed as a keyway/key failure. The safety evaluation originally written continued to apply since it was based on free rotation of the disc regardless of the exact root cause. The failure of this valve was in the mechanism used to hold the disc to the shaft; whether this was a friction fit, as first thought, or keys and keyways, as found to be the case, had no impact. The failure of either has the same result. The only requirements for acceptability of free rotation of the valve, are verification of valve operability and integrity by testing. The NCR did not require any additional inspections of the ICW check valves but required the weekly operability testing to continue.

On February 16, 1987, Power Plant Engineering issued a clarification letter to their previous SE, JPE-M-86-017, Operability Assessment of ICW Check Valves. It stated that operability of the valve is determined by valve "functionality" as it opens with pump operation and closes when the pump is shut down, verifying that the disc is "intact and stable". Mention is made in the SE of the disc being held onto the shaft by friction forces. This information was supplied in addition to the operability assessment. It was not intended to be a basis for the evaluation.

After additional review of the sequence of events surrounding this finding, FPL acknowledges that additional documentation of the condition found on October 29, 1986 should have been done to clarify the decisions made at that time.

3) a) The subject check valves were replaced with valves similar to the old valves, however, the new valves have incorporated design improvements which reduce the potential for corrosion that caused jamming of the air cylinders, and the potential for cold-working that caused key, keyway, and shaft failures.

b) A safety evaluation has been performed to evaluate the past deficiencies identified in the ICW check valves to determine if a unreviewed safety question existed for the original valves in place prior to January 1987, and to verify, with respect to these deficiencies the acceptability of the replacement valves recently installed. For each of the deficiencies, the failure mechanism, failure mode, and failure mode effects were established. The following describes the causes of the deficiences and results:

1) Shaft damage and round keyway deterioration are caused by cold-working of the key against the keyway. This results in loosening of the disc-to-shaft fit but has no adverse effect on the system safety related function.

2) Round key failure in shear is also caused by cold-working; however, this will result in a free swinging disc and increased water hammer. It was determined that this free swinging disc and associated water hammer will not impact the safety related function of the system.

3) Shaft seal leakage results from inadequate sealing provisions and contributes to corrosion of the valve air cylinder. Corrosion of the air cylinders has not prevented the valve from closing or opening. Therefore, loss of system safety related function is not supported by operating data.

4) A bent and cracked shaft was determined to be caused by excessive torque due to binding at the air cylinder which leads to wedging of broken keys in the keyways. The failure mode that could result is disc misalignment which could prevent proper seating; however, the disc would still open or close as required. The effect of this failure mode will not impact the safety related function of the system.

5) Retainer plate screws failed in tension, due to binding about the keyway and as a result of over-torquing during valve disassembly. There are no failure modes or effects as a result of this deficiency.

6) Retainer plate wear was caused by rubbing with the shaft. There are no failure modes or effects as a result of this deficiency.

7) The results of square key failure are similar to, but less likely to occur than the round key failure in shear. The failure process is initiated by key corrosion leading to shearing due to torque.

8) The linear indication in the valve disc was determined by NCR 66-87 to be a fold within acceptable limits and, therefore, is not a deficiency.

It was determined that the deficiencies are process related which develop over time, that the causes of failure modes are corrosion and wear, and that no potential for common mode failure exists. Therefore, the failure modes are not accident or event initiated but occur randomly, and any potential for further valve degradation will be controlled by the level of plant inspections and maintenance. The safety evaluation also concludes that no unreviewed safety question existed for the original valves or exists for the replacement valves.

4) a) Plant change/modifications (PC/Ms) 86-210 (Unit 3) and 86-211 (Unit 4) are under preparation to replace the existing wafer-type tilting check valves with air closing cylinders with dual plate wafer-type check valves with internally mounted closure assist springs. The schedule for implementation of these PC/Ms will be in accordance with the Integrated Schedule.

b) This finding and the importance of providing the additional documentation to clarify the decisions made on October 29, 1986 for the condition found, will be discussed with the cognizant engineers.

5) a) Full compliance for item 3 above was achieved by May 5, 1987.

b) Full compliance for item 4.b above will be achieved by May 29, 1987.