FOLLOW-UP REQUEST FOR ADDITIONAL INFORMATION TURKEY POINT UNIT 3 FIFTH INSPECTION INTERVAL RELIEF REQUEST NO. 1 REVISION 0 REPAIR OF PRESSURIZER STAINLESS STEEL HEATER SLEEVE WITHOUT FLAW REMOVAL DOCKET NO. 50-250 (TAC NO. MF3834)

Saba, Farideh

Sent: Thursday, April 10, 2014 5:21 PM

To: Bob.Tomonto@fpl.com; Czaya, Paul (Paul.Czaya@fpl.com)

Cc: Rich, Daniel; Hoeg, Tim; Butcavage, Alexander; Klett, Audrey; Regner, Lisa

Importance: High

Attachments: Follow up RAI Turkey Poin~1.docx (23 KB)

Bob/Paul,

Please see attached the staff's follow up RAIs. Please let me know if you need to discuss these RAIs with the staff in a conference call.

Thanks,

Farideh

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FOLLOW-UP REQUEST FOR ADDITIONAL INFORMATION
TURKEY POINT UNIT 3 FIFTH INSPECTION INTERVAL
RELIEF REQUEST NO. 1 REVISION 0
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RAI 5 (Follow up to RAI 3a)

The response to Request for Additional Information (RAI) 3a in FPL's April 9, 2014 letter emphasizes that heatup and cooldown transients with insurge/outsurge transients dominate fatigue crack growth in the generic evaluation for Combustion Engineering (CE) designed pressurizers (Ref. 1, 2). In Table 1 of the RAI response, transients were listed that were not considered in the generic CE evaluation. Some of these transients have very large numbers of cycles over the life of the plant, such as plant loading at 5% per minute, plant unloading at 5% per minute, and steady state fluctuations (initial and random). The temperature range for some of these cycles, although less than that of the insurge/outsurge during heatup and cooldown, is around 100 degrees F for some of these transients.

Would any of the transients listed in Table 1 that were not considered in the generic CE evaluation be expected to contribute significantly to fatigue crack growth? If not, provide an explanation for why these transients would not be expected to be significant contributors to fatigue crack growth. If any of the other transients would contribute significantly to fatigue crack growth, provide justification that fatigue crack growth for the Turkey Point, Unit 3 pressurizer would remain bounded by the generic evaluation.

RAI 6 (Follow up to RAI 3b)

In response to RAI 3, Item b, FPL provided a graph of fracture toughness (K_{IC}) versus temperature for the Turkey Point, Unit 3 pressurizer bottom head material. However, both of the heater sleeve flaw evaluations referenced in the relief request (Ref. 1, 2) used elastic-plastic fracture mechanics (EPFM) techniques to demonstrate stability of the final flaw, because the American Society of Mechanical Engineers, Boiler and Pressure Vessel Code (ASME Code), Section XI linear elastic fracture mechanics (LEFM) acceptance criteria were not met. This is specifically noted in Section 6.3.3.2 of Reference 3. Also in Reference 2, EPFM was used as the basis for accepting the final flaws.

Therefore, the staff requests that FPL (1) provide the material resistance (J-R) curve for the Turkey Point, Unit 3 pressurizer bottom head material (2) justify the use of the J-R curve in this application if it is not based on test data, and (3) demonstrate that the J-R curve is bounded by (i.e., provides equivalent or greater resistance to fracture) the J-R curve used in Refs 1 and 2.

References

1. WCAP-15973-P-A Rev 0, "Low-Alloy Steel Component Corrosion Analysis Supporting Small-Diameter Alloy 600/690 Nozzle Repair/Replacement Programs" (ML050700433) (non-proprietary version available at ML050700431)

2. Areva Calculation 32-9156231-000, "CCNPP-1 PZR Heater Sleeve As-Left J-Groove Weld Flaw Evaluation for IDTB Repair - Non-Proprietary," (ML11132A183)

3. Calculation CN-CI-02-71, Rev 1, "Summary of Fatigue Crack Growth Evaluation Associated with Small Diameter Nozzles In CEOG Plants." (ADAMS Accession No. ML041540237)