

## NRR-PMDAPEm Resource

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**From:** Saba, Farideh  
**Sent:** Tuesday, April 08, 2014 5:30 PM  
**To:** Bob.Tomonto@fpl.com; Czaya, Paul (Paul.Czaya@fpl.com)  
**Cc:** Poehler, Jeffrey; Rich, Daniel; Butcavage, Alexander; Klett, Audrey; Regner, Lisa  
**Subject:** 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)  
**Attachments:** RAI's Turkey Point 3 Heater Sleeve RR - Revised 4-8-2014 (TAC No. MF3834).docx  
**Importance:** High

Bob/Paul,

Please see attached the NRC staff's revised RAIs for the subject relief request.

Thanks,

Farideh

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**Hearing Identifier:** NRR\_PMDA  
**Email Number:** 1216

**Mail Envelope Properties** (Farideh.Saba@nrc.gov20140408172900)

**Subject:** 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)

**Sent Date:** 4/8/2014 5:29:53 PM

**Received Date:** 4/8/2014 5:29:00 PM

**From:** Saba, Farideh

**Created By:** Farideh.Saba@nrc.gov

**Recipients:**

"Poehler, Jeffrey" <Jeffrey.Poehler@nrc.gov>

Tracking Status: None

"Rich, Daniel" <Daniel.Rich@nrc.gov>

Tracking Status: None

"Butcavage, Alexander" <Alexander.Butcavage@nrc.gov>

Tracking Status: None

"Klett, Audrey" <Audrey.Klett@nrc.gov>

Tracking Status: None

"Regner, Lisa" <Lisa.Regner@nrc.gov>

Tracking Status: None

"Bob.Tomonto@fpl.com" <Bob.Tomonto@fpl.com>

Tracking Status: None

"Czaya, Paul (Paul.Czaya@fpl.com)" <Paul.Czaya@fpl.com>

Tracking Status: None

**Post Office:**

Files	Size	Date & Time
MESSAGE	313	4/8/2014 5:29:00 PM
RAI's Turkey Point 3 Heater Sleeve RR - Revised 4-8-2014 (TAC No. MF3834).docx		
23660		

**Options**

**Priority:** High

**Return Notification:** No

**Reply Requested:** Yes

**Sensitivity:** Normal

**Expiration Date:**

**Recipients Received:**

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)

By letter dated April 4, 2014, Florida Power & Light company (FPL, the licensee) requested approval to use an alternative to the American Society of Mechanical Engineers, Boiler and Pressure Vessel Code (ASME Code), Section XI, 2007 Edition, including Addenda through 2008. During the Turkey Point, Unit 3 refueling outage, the licensee observed evidence of leakage in the annulus between the outer surface of one heater sleeve and the pressurizer bottom head bore. The licensee specifically requested relief from the requirements of the ASME Code, Section XI, IWB-3142.3, "Acceptance by Corrective Measures or Repair/Replacement Activity," which states that a component containing relevant conditions is acceptable for continued service if the relevant conditions are corrected by a repair/replacement activity or by corrective measures to the extent necessary to meet the acceptance standards of Table IWB- 3410-1. The licensee stated that it had determined that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, therefore requested relief pursuant to 10 CFR 50.55a(a)(3)(ii). The licensee proposed to perform a "half-nozzle" repair which relocates the pressure boundary weld to the outside of the pressurizer bottom head shell and thus leaves the flaw that caused the leakage in place, which is assumed to exist in the original J-groove weld attaching the heater sleeve to the pressurizer cladding. The licensee requested relief for one 18-month operating cycles. The licensee's relief request is supported by a qualitative assessment of the potential for the growth of an assumed flaw in the original J-groove weld into the pressurizer bottom head shell. In support of its qualitative assessment the licensee cited experience with previous fatigue flaw growth analyses for Combustion Engineering (CE) -design pressurizers that are documented in References 1 and 2.

The staff requires the following addition information to complete its review of the relief request:

1. Under "Reason for Request," the relief request states manual nondestructive examination (NDE) was conducted from the sleeve bore using the eddy current method after the heater was removed from the heater sleeve, and that the examination did not reveal any flaw in the sleeve, the licensee stated that therefore, the most likely location of the flaw is located in the stainless steel weld between the heater sleeve and the stainless steel cladding buildup.

Confirm that the entire length of the original pressurizer heater sleeve bore was examined with eddy current testing.

2. Was the pressurizer shell bore visually examined after the lower portion of the original heater sleeve was removed, and if so was any corrosion or degradation of the carbon steel pressurizer bottom head noted in this area? If so describe the type and extent of degradation including the amount of material lost.
3. The qualitative flaw assessment relies on the assumption that the existing flaw is completely contained within the pressurizer stainless steel cladding, that crack growth from the cladding into the inside surface of the pressurizer lower head carbon steel

material will not occur over the next fuel cycle, and that there are no flaw(s) existing driven by fatigue into the lower head carbon steel base material. However, the licensee stated that in the unlikely event that these assumptions are untrue, quantitative analysis of a similar configuration has demonstrated that a flaw starting at the cladding to base metal interface can grow for a significant length of time and remain stable with appropriate factors of safety. To enable the staff to determine whether these quantitative analyses in Reference 1 and 2 would bound the Turkey Point 3 heater sleeve, the staff requires the following additional information:

- a. To enable the staff to determine whether the driving force for crack growth and the stability determination of the final flaw in the Turkey Point, Unit 3 J-groove weld is bounded by the analyses in References 1 and 2:
    - i. Provide the number and type of operating transients applicable for the life of the plant to the pressurizer heater sleeve J-groove weld, similar to the information contained in Table 4-3 of Reference 2. Discuss whether any of the transients applicable to the Turkey Point, Unit 3 heater sleeve would be significantly more severe than the corresponding transients evaluated in the fatigue crack growth analyses documented in References 1 and 2.
    - ii. Identify the key parameters in determining the driving force for crack growth and final flaw stability of the postulated flaw in the Turkey Point, Unit 3 heater sleeve assembly, and demonstrate these parameters are bounded by the corresponding parameters of the CCNPP-1 heater sleeve assembly evaluated in Reference 1 and the generic heater sleeve assembly evaluated in Reference 2.
  - b. Demonstrate that the material resistance to fracture (J-R curve) of the Turkey Point, Unit 3 pressurizer bottom head is equal to or greater than the material resistance to fracture used in the crack stability evaluations in Reference 1 and 2.
4. FPL concluded the leak occurred since the last inspection, since no leakage was observed during the previous refueling outage. However, since the original heater sleeve was roll expanded into the pressurizer bottom head shell, discuss the possibility that throughwall cracking of the J-groove weld may have occurred in earlier fuel cycles, since the tight fit might delay boric acid leakage from reaching the outer surface of the bottom head. If so, revise the qualitative assessment of flaw growth accordingly since the original postulated weld flaw would have had additional cycles to grow into the cladding and pressurizer bottom head.

## 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)