



July 15, 2015
L-2015-186

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Re: Turkey Point Nuclear Generating Station
Docket Nos. 50-250 and 50-251
License Renewal (LR) Reactor Vessel Internals (RVI) Inspection Program
Response to Request for Additional Information (RAI-8)

References:

1. Florida Power & Light Company (FPL) letter L-2012-438 to the USNRC, dated December 14, 2012, License Renewal (LR) Reactor Vessel Internals (RVI) Commitment Implementation Report and Inspection Plan, Agencywide Documents and Access Management System (ADAMS) Accession No. ML12363A103.
2. Electric Power Research Institute (EPRI) Materials Reliability Program Report 1022863 (MRP-227-A), "Pressurized Water Reactor Internals Inspection and Evaluation Guidelines," ADAMS Accession Nos. ML12017A194, ML12017A196, ML12017A197, ML12017A191, ML12017A192, ML12017A195, and ML12017A199.
3. Revision 1 to the Final Safety Evaluation of EPRI Materials Reliability Program Report 1016596 (MRP-227), Revision 0, "Pressurized Water Reactor Internals Inspection and Evaluation Guidelines," dated December 16, 2011, ADAMS Accession No. ML11308A770.
4. EPRI Report 1013234, "Materials Reliability Program: Screening, Categorization, and Ranking of Reactor Internals Components for Westinghouse and Combustion Engineering PWR Design (MRP-191)," ADAMS Accession No. ML091910130.
5. NRC Email from Farideh Saba to Bob Tomonto, Olga Hanek, Stavroula Mihalakea, "RAIs for Turkey Point-MF1485/86," dated September 27, 2013, ADAMS Accession No. ML13274A144.
6. NRC email from Audrey Klett to Stavroula Mihalakea, "Turkey Point RAI Due Date for MF 1485/86," dated October 30, 2013.
7. Florida Power & Light Company (FPL) letter L-2013-287 to the USNRC, License Renewal (LR) Reactor Vessel Internals (RVI), Response to Request for Additional Information, dated October 30, 2013, ADAMS Accession No. ML13325A973.
8. NRC email from Audrey Klett to Stavroula Mihalakea, Request for Additional Information - Turkey Point 3 & 4 RVI Inspection (TACs MF1485/86), dated January 22, 2014, ADAMS Accession No. ML14022A189.
9. Florida Power & Light Company (FPL) letter L-2014-024 to the USNRC, dated January 29, 2014, License Renewal (LR) Reactor Vessel Internals (RVI) Inspection Program Response to NRC Request for Additional Information (RAI, ADAMS Accession No. ML14069A084.

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10. Florida Power & Light Company (FPL) letter L-2014-335 to the USNRC, dated December 29, 2014, License Renewal (LR) Reactor Vessel Internals (RVI) Inspection Program Response to NRC Request for Additional Information (RAI-5a), ADAMS Accession No. ML14069A084.
11. NRC email from Audrey Klett to Stavroula Mihalakea, Request for Additional Information - Turkey Point 3 & 4 RVI Inspection (TACs MF1485/86), dated February 20, 2015, ADAMS Accession No. ML15049A247.
12. Westinghouse Report No. PWROG-15043-NP, Revision 1, Turkey Point Units 3 and 4 Evaluation of Turkey Point Lower Core Supports Exposure, Materials Committee, PA-MSC-0983 Revision 1, Task 8, issued June 2015.
13. Westinghouse Calculation Note CN-REA-14-51, Rev. 1, "Lower Core Support Fluence Evaluation for Aging Management at Turkey Point Units 3 and 4," June 2015.

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated December 14, 2012 (Reference 1), Florida Power & Light Company (FPL) submitted its License Renewal Reactor Vessel Internals (RVIs) Commitment Implementation Report and Inspection Plan that credits the implementation of Materials Reliability Program (MRP)-227-A (Reference 2) at Turkey Point Units 3 and 4 for NRC staff review. The NRC staff reviewed Revision 0 of MRP-227 and issued a final safety evaluation on December 16, 2011 (Reference 3) to incorporate technical changes required to ensure the final approved version of MRP-227 (i.e. MRP-227-A) included all NRC required changes. MRP-227-A was issued in December 2011.

The NRC staff reviewed the information provided by FPL in its submittal and requested additional information to complete their review (Reference 5). FPL submitted the responses to RAIs 1-4 and RAI-6 (Reference 7), RAI-5.b and RAI-7 (Reference 9), and to RAI-5.a (Reference 10). The NRC reviewed the information provided and requested additional information (RAI-8) to complete their review (Reference 11). RAI-8 identifies the need for Turkey Point to modify the RVI Inspection Plan to provide a link to Primary component or components that is appropriate predictor of irradiation embrittlement (IE) and Irradiation Assisted Stress Corrosion Cracking (IASCC) of the lower support column bodies.

FPL's response to RAI-8 is attached. This response is based on the non-proprietary Westinghouse Report that evaluated lower core supports fluence for Turkey Point Units 3 and 4 (References 12 and 13).

Should there be any questions, please contact Mr. Mitch Guth, Licensing Manager at 305 246-6698.

Sincerely,



Thomas Summers
Vice President
Turkey Point Nuclear Plant

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Attachments

cc: USNRC Regional Administrator, Region II
USNRC Project Manager, NRR
USNRC Senior Resident Inspector, Turkey Point Nuclear Plant

**NRC REQUEST FOR ADDITIONAL INFORMATION RAI-8
AND FPL RESPONSE**

NRC RAI-8:

Applicant/Licensee Action Item 7 from MRP-227A requires that applicants/licensees of Westinghouse reactors develop plant-specific analyses to be applied for their facilities to demonstrate that cast austenitic stainless steel lower support column bodies will maintain their functionality during the period of extended operation, and states that these analyses should also consider the possible loss of fracture toughness in these components caused by thermal embrittlement (TE) and irradiation embrittlement (IE). This requirement applies to Turkey Point 3 and 4 based on the design of the RVI at Turkey Point 3 and 4.

By letters dated December 14, 2012, and January 29, 2014, the licensee provided plant-specific information on the ferrite content and susceptibility to TE for the Turkey Point 3 and 4 lower support column bodies. Based on its evaluation of the plant-specific information, the licensee concluded that the Turkey Point 3 and 4 lower support column bodies are not susceptible to TE.

The licensee's conclusion related to TE notwithstanding, the lower support column bodies remain susceptible to IE. The NRC staff is concerned that the linked Primary component for the lower support column bodies - the control rod guide tube (CRGT) assembly lower flange welds - is not a good predictor of IE for the lower support column bodies because the CRGT lower flange welds receive substantially lower neutron fluence than the lower support column bodies based on the estimated neutron fluence tabulated in MRP-191 for the two components. Irradiation assisted stress corrosion cracking (IASCC) is the only mechanism of cracking that is screened for the lower support column bodies. The CRGT lower flange welds are also not a good predictor for IASCC of the lower support column bodies, because the lower flange welds are susceptible to stress corrosion cracking (SCC) and fatigue cracking, but not IASCC.

The NRC staff, therefore, requests that the licensee modify its RVI Inspection Plan to provide a link to a Primary component or components that is an appropriate predictor of IE and IASCC of the lower support column bodies.

FPL Response to RAI-8

Examination of neutron fluence data from the Turkey Point units indicates that there is a general correspondence between the peak neutron fluence in the lower core barrel girth weld and the fluence range in the top centimeter of the lower support columns (Reference 13). The fast neutron fluence projected in the lower core barrel girth weld after 48 EFPY of operation will be approximately 4.4×10^{21} n/cm² (E > 1MeV) \approx 7 dpa. After the same period of operation, the peak fast neutron fluence at the top surface of the lower support columns near the core centerline will be approximately 5.8×10^{21} n/cm² (E > 1MeV) \approx 8 dpa. However, the attenuation of fluence below the core is steep and the peak fast neutron fluence in the lower support columns at a distance of one centimeter below the lower core plate will be 4.7×10^{21} n/cm² (E > 1MeV) \approx 7 dpa.

On this basis the lower core barrel girth weld is a more appropriate predictor of IE and IASCC of the lower support columns than the CRGT lower flange welds. The lower core barrel girth weld is therefore selected as the appropriate IE and IASCC primary inspection component for linking to the lower support column expansion components. The CRGT lower flange weld remains the SCC primary inspection component for the lower support column expansion components.