



January 29, 2014  
L-2014-024

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)

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-2011-029 to the USNRC, dated March 9, 2011, Response to NRC Request for Additional Information Regarding Extended Power Uprate License Amendment Request 205 and Reactor Materials Issues, Round 1, ADAMS Accession No. ML110700068.

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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). The response to RAI-5 was deferred for a later time (Reference 6) due to FPL's participation in the joint industry program through the Pressurized Water Reactor Owners Group to develop responses to RAI-5.

The Staff issued a new request for additional information, RAI-7, and requested FPL to provide responses for RAI-5.b and RAI-7 by January 31, 2014. As discussed with the NRC on January 17, 2014, the due date for the response to RAI-5.a will be determined at a later time (Reference 8).

The FPL responses to NRC's RAI-5.b and RAI-7 are provided in Attachment 1.

The information provided herein does not change the conclusions stated in Reference 1.

Should there be any questions, please contact Mr. Robert J. Tomonto, Licensing Manager at 305 246-7327.

Very truly yours,



Michael Kiley  
Vice President  
Turkey Point Nuclear Plant

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Attachment

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

**NRC REQUEST FOR ADDITIONAL INFORMATION  
AND FPL RESPONSES**

**RAI-5**

As discussed in Section 3.2.5 of Reference 3, A/LAI 1 requires licensee verification that the detailed component state at the end of the period of extended operation is bounded by the detailed assumptions of the MRP. Please provide the following information related to verification of the applicability of MRP-227-A to Turkey Point 3 and 4:

- a. Identify whether the Turkey Point 3 and 4 RVIs include nonweld or bolting austenitic stainless steel components with 20 percent or greater cold work from fabrication and operating surface tensile stresses greater than 30 kilopound force per square inch. Provide a plant-specific evaluation to determine the aging management requirements for the identified components.
- b. Identify whether Turkey Point 3 and 4 used an atypical fuel design or fuel management that could make the assumptions of MRP-227-A regarding core loading/core design nonrepresentative for that unit, including those during power changes and uprates. If so, describe how the differences were reconciled with the assumptions of MRP-227-A, or provide a plant-specific AMP for affected components as appropriate.

**FPL Response to RAI-5.a**

The response to RAI-5.a will be provided at a later time (Reference 8).

**FPL Response to RAI-5.b**

RAI-5.b has previously been addressed by the following submittals to the NRC:

1. FPL provided the NRC with updated fluence values for the RVI components resulting from Extended Power Uprate (EPU), (Reference 9, RAI CVIB-1.5). The estimated fluence value for the upper core plate and upper portions of the BMI columns were elevated above  $1 \times 10^{21}$  n/cm<sup>2</sup> as a result of the core design associated with the EPU. Changes in gamma heating rates of the RVI components resulting from EPU were also evaluated and determined to be less than the design heating rates for the RVI components.
2. Subsequently, FPL evaluated the impact of the updated fluence values on the aging degradation of the upper core plate and BMI Columns in its response to MRP-227-A, LAI 1 (Reference 1). The updated fluence values exceeded the assumptions of MRP-191, a supporting document for MRP-227-A, for the upper core plate but not the BMI Columns. Irradiation assisted stress corrosion cracking (IASCC) concerns for the upper core plate were eliminated by considering a combination of stress and fluence at various regions of the plate. Irradiation embrittlement (IE) was added as a degradation mechanism of concern for the upper core plate in the Turkey Point RVI AMP and must be considered in any future flaw evaluation. No changes to the requirements of MRP-227-A were required to address the aging management of the BMI Columns.

**RAI-7**

As discussed in Section 3.3.7 of Revision 1 to the Safety Evaluation for MRP-227, A/LAI 7 requires that the licensees of Westinghouse reactors develop plant-specific analyses to be applied for their facilities to demonstrate that lower support column cast austenitic stainless steel (CASS) bodies will maintain their function during the extended period of operation. MRP-227-A Table 3-3 (Final disposition of Westinghouse internals) classifies CASS lower support columns as Expansion Components based on susceptibility to irradiation embrittlement (IE) and irradiation assisted stress corrosion cracking (IASCC). In its letter dated December 14, 2012, the licensee stated that the lower support columns were not susceptible to thermal embrittlement (TE) based on calculated ferrite being well below the 20% threshold as described in NRC letter, "License Renewal Issue No. 98-0030, 'Thermal Aging Embrittlement of Cast Stainless Steel Components'"(ADAMS Accession No. ML003717179).

In its letter dated December 14, 2012, the licensee provided the range of ferrite contents (4.29% to 14.83%) for the Turkey Point, Unit 3 and 4 lower support column bodies. To support its review, the staff requires the following additional information:

- For the 136 CASS lower support columns discussed in Reference 1, provide the ferrite content for each lower support column.
- Provide the casting method for the column (static or centrifugal), if known.

**FPL Response to RAI-7**

As stated in L-2012-438, (Reference 1) the ferrite contents of the 136 CASS lower support columns of Turkey Point Units 3 and 4 Reactor Vessel Internals were calculated using Hull's equivalent factors (Ref. NUREG/CR4513). A complete listing of the calculated ferrite content for each of the columns is provided in the table below. The retrieved manufacturing records for the columns did not indicate the casting method (static or centrifugal) used during manufacturing.

Lower Support Column Serial Number	Hull's Ferrite	Lower Support Column Serial Number	Hull's Ferrite
<b>Turkey Point Unit 3</b>		<b>Turkey Point Unit 4</b>	
5,8,15	6.23	50	8.89
23	11.93	145,147	10.17
49,52,57	8.89	152	13.91
59,66	6.40	178,179	6.17
107,108	14.83	194	12.86
109,116,118	7.73	217	9.24
120	10.67	230,232,237	6.89
122-126	7.08	244-246,250	11.73
127,128,130-132	8.57	258,259	7.31
135,139,143,144	4.29	263,265	14.31
166	13.16	274	12.36
171,174,185	6.17	279,280	11.89
189,190-192	6.06	287-290,292,293	8.58
198-200,202,206,207	7.99	298,300-303,305	6.29
210,220,221	9.24	315, 316, 323,327, 330	9.95
6,10,12	6.23	332,334	10.72
17,19,21,24,25,28	11.93	337-339,342,345	10.00
29,33,34	14.33	70	6.40
56	8.89	133	4.29
64,68,71,72	6.40	149	10.17
93	8.14	165,169,170	13.16
105	14.83	173,186	6.17
111,113,117	7.73	189	6.06
		195	12.86
		199,204,208	7.99
		209,212,223	9.24
		234,236	6.89
		252	11.73
		260	7.31
		269	14.31
		276	11.89