

**TURKEY POINT NUCLEAR GENERATING UNITS 3 AND 4 (TURKEY POINT)  
SUBSEQUENT LICENSE RENEWAL APPLICATION (SLRA)  
REQUESTS FOR ADDITIONAL INFORMATION (RAIS)  
SAFETY - SET 9**

**1. Buried and Underground Piping and Tanks, GALL AMP XI.M41**

**RAI B.2.3.28-1**

Background:

SLRA Section B.2.3.28, "Buried and Underground Piping and Tanks," states that the program will be consistent with the 10 elements of NUREG-2191, , Rev. 0, "Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report," dated July 2017, Aging Management Program (AMP) XI.M41, "Buried and Underground Piping and Tanks," without exceptions or enhancements.

As amended by letter dated October 16, 2018, SLRA Section B.2.3.28 states the following:

- a) "[b]ecause of operating experience (OE) related to past corrosion of buried pipe at PTN [Turkey Point], a cathodic protection system will be installed in accordance with the requirements of GALL-SLR Report AMP XI.M41, "Buried and Underground Piping and Tanks," at least 7 years prior to the subsequent period of extended operation (SPEO)."
- b) "[p]reventive Action Category F has been initially selected for monitoring steel piping during the initial monitoring period."
- c) "[t]urkey Point has experienced a number of pipe leaks and/or breaks in buried piping. Most of these pipe breaks have been in the piping for the fire water and service water systems. These breaks have been documented in the corrective action program (CAP). A review of the documentation in the CAP indicates that typically they have been caused by localized corrosion."

GALL-SLR Report AMP XI.M41 states that additional inspections, beyond those in Table XI.M41-2, "Inspection of Buried and Underground Piping and Tanks," may be appropriate if exceptions are taken to program element 2, "preventive actions," or in response to plant-specific operating experience.

During the audit the staff noted that several leaks and locations of localized external corrosion have occurred in buried service water and fire water system piping.

Issue:

- 1. The response to RAI B.2.3.28-1 stated that cathodic protection will be installed at least 7 years prior to the SPEO and GALL-SLR Report AMP XI.M41 recommends that cathodic protection is installed at least 5 years prior to the SPEO. Therefore, the staff's concern in Issue (a) of RAI B.2.3.28-1 is resolved.

2. Regarding Issue (b) of RAI B.2.3.28-1, the staff notes that GALL-SLR Report Table XI.M41-2 states that transitioning from Preventive Action Category E to Preventive Action Category F is dictated in part by plant-specific OE. GALL-SLR Report Table XI.M41-2 states that Preventive Action Category F is applicable when plant-specific OE identifies leaks in buried piping due to external corrosion, significant coating degradation, or significant metal loss. As recommended by AMP XI.M41, additional inspections, beyond those in Table XI.M41-2 may be appropriate in response to plant-specific OE. Although not explicitly stated in the table, the applicability of Preventive Action Category F is limited to instances where plant-specific OE identifies a few (i.e., as opposed to several) instances of leaks or significant degradation. Based on plant-specific OE not being limited to a few instances of leaks or significant degradation, additional inspections, beyond those in Table XI.M41-2, are appropriate.

Request:

State the basis for why additional inspections, beyond those in Table XI.M41-2, are not appropriate for buried steel piping during the 10 year period prior to the SPEO.

**2. Reactor Vessel Internals Aging Management Program, GALL AMP XI.M16A**

Regulatory Basis:

Title 10 of the *Code of Federal Regulation* (CFR) Section 54.21(a)(3) states that for each structure and component identified in paragraph (a)(1) of this section, the applicant shall demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis (CLB) for the subsequent period of extended operation.

Background:

For each structure and component identified in 10 CFR 54.21(a)(1), the applicant for subsequent license renewal (SLR) has the option to demonstrate compliance with 10 CFR 54.21(a)(3), by including in the SLR application (SLRA) an aging management program (AMP) that is consistent with the applicable AMP described in the GALL-SLR Report

The Turkey Point SLRA Section B.2.3.7 states that the reactor vessel internals (RVI) AMP with enhancements will be consistent with GALL-SLR Report AMP XI.M16A. (Note: The AMP enhancements are unrelated to this RAI.) The GALL-SLR Report AMP XI.M16A specifies that for existing RVI AMPs that are based on implementation of MRP-227-A inspection and evaluation guidelines, the guidelines are supplemented through a “gap analysis” that identifies changes to the AMP that are needed to address an 80-year operating period. Further, the GALL-SLR Report AMP “Scope of Program” element specifies that if the SLRA AMP is based on MRP-227-A with a gap analysis, the scope of the program focuses on identification and justification of the following:

- a. RVI components that screen in for additional aging degradation mechanisms (DMs) when assessed for the 60-to-80-year operating period (SPEO);
- b. RVI components that previously screened in for certain DMs, and the severity of these 60-year DMs could significantly increase for the 60-to-80 year SPEO;
- c. Changes to the existing MRP-227-A program characteristics, including but not limited to changes in inspection categories, inspection criteria, or primary-to-expansion component criteria and relationships.

#### **RAI B.2.3.7-F**

##### Issue:

To address item (a) of the "Scope of Program" element for an 80-year operating period, the applicant's MRP-227-A gap analysis in SLRA Appendix C is based in part on an 80-year screening of the RVI components for the eight aging degradation mechanisms (DMs) and an associated failure modes, effects, and criticality analysis (FMECA) to determine the potential need for changes to RVI component inspection criteria for the SPEO. Neutron fluence and fatigue cumulative usage factor (CUF) are the two time-dependent input parameters with the potential to cause additional DMs to be screened in for the 80-year period. With respect to neutron fluence, Attachment 11 in Enclosure 5 of the SLRA provides Electric Power Research Institute (EPRI) Materials Reliability Program (MRP) Document, MRP 2017-038, "Transmittal of Preliminary Results from MRP-191 Expert Panel Review in Support of Subsequent License Renewal at U.S. PWR Plants," December 15, 2017. MRP 2017-038 includes the attachment, "Preliminary Fluence Table to Support MRP-191 Subsequent License Renewal (SLR) Expert Panel Review (EPRI Confidential Information)."

To support its review of the information in MRP 2017-038, the staff audited Westinghouse Document LTR-REA-17-168, Revision 0, "Comparison of Turkey Point Units 3 and 4 Subsequent License Renewal Reactor Internals Fluence to Representative EPRI MRP-191 3-Loop Plant," dated February 2, 2018, including the Attachment to this document. LTR-REA-17-168, Revision 0 describes EPRI MRP "representative reactor internals fluence projections for Westinghouse 3-loop plants."

##### Request:

Please provide a detailed discussion of the representative reactor internals neutron fluence model used to generate the projections cited in LTR-REA-17-168, Revision 0, and a detailed description of the methods used to obtain the projections. As part of this discussion, provide the following:

- a) Confirmation that the fluence analysis methodologies used are consistent with what has been previously reviewed and approved by the NRC.
- b) A description of how the nodal fluxes in the core are modeled in the representative model.

- c) A discussion regarding differences between the fluence models used as a basis for the 60- and 80-year fluence projections and the assessments performed to establish fluence region classifications for each RVI component. As part of this discussion, address the apparent discrepancies in region classifications as shown in Attachment 1 to SLRA Appendix C (i.e., some components appear to have a lower fluence region classification for the 80-year projection than the 60-year projection). Sufficient information should be given for the staff to understand why the differences would be expected to cause the observed changes in region classifications.