LimerickNPEm Resource

From: Kuntz, Robert
Sent: Tuesday, April 10, 2012 10:00 AM
To: Christopher.Wilson2@exeloncorp.com
Subject: DRAFT Request for Information
Attachments: DRAFT Fluence and FP RAIs.docx

Chris,

Attached is a DRAFT Request for Information related to the Limerick license renewal application. If Exelon would like clarification on the attached let me know and I will set up a teleconference with the NRC staff.

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LIMERICK GENERATING STATION
LICENSE RENEWAL APPLICATION
REQUESTS FOR ADDITIONAL INFORMATION

DRAI 2.3.3.9-2.1

Background

The response to RAI 2.3.3.9-2, dated February 16, 2012, stated for passive components in lightning plant protection system (NFPA 78, Lightning Protection Code), that Limerick Generating Station (LGS) does not have a lightning plant protection system. Passive lightning protection components (NFPA 78) are provided for equipment and personnel protection. They are not relied upon to demonstrate compliance with 10 CFR 50.48 and as such do not perform an intended function for license renewal. Therefore, the lightning protection components are not in the scope of license renewal.

Issues

The response excluded some passive lightning protection components (NFPA 78). The response stated that the equipment passive lightning protection components have no function that supports 10 CFR 50.48 requirements; therefore, they are not within the scope of license renewal and subject to an AMR.

Request

Provide clarification on how the passive lightning protection components are required per the NFPA 78 Code but are not required for compliance with 10 CFR 50.48. If the components are required for compliance with 10 CFR 50.48 then provide information to 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 for the period of extended operation as required by 10 CFR 54.21(a)(3).

DRAI 4.2.1-1

Background

LRA Section 4.2.1 provides the basis for deriving the 57 effective full power years (EFPY) neutron fluence values for the power operation of LGS, Units 1 and 2, through the period of extended operation. These are inputs to the neutron irradiation embrittlement time-limited aging analyses (TLAA) of the reactor pressure vessel (RPV) beltline shell, nozzle and weld components. The corresponding neutron fluence TLAAs that are derived from these neutron fluence values are in the following LRA sections: (a) Section 4.2.2, “Upper Shelf Energy”; (b) Section 4.2.3, “Adjusted Reference Temperature”; (c) Section 4.2.4, “Pressure – Temperature Limits”; (d) Section 4.2.5, “Axial Weld Inspection”; (e) Section 4.2.6, “Circumferential Weld Inspection,” and (f) Section 4.2.7, “Reactor Pressure Vessel Reflood Thermal [Analysis].”

LRA Section 4.2.1 identifies the RAMA code was used to derive the 57 EFPY neutron fluence values for high energy neutrons with kinetic energies greater than 1.0 MeV

(E > 1.0 MeV) and that the RAMA code conforms to the staff's recommended regulatory position in Regulatory Guide (RG) 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence" [March 2001], for applying neutron fluence methodologies.

Issue

LRA Section 4.2.1 does not identify which industry-based RAMA code is being used in the current licensing basis (CLB) for deriving the high energy neutron fluence values (i.e., E > 1.0 MeV) for the ferritic RPV beltline components in LGS, Units 1 and 2. The LRA only references the methodology in Electric Power Research Institute (EPRI) Report No. BWRVIP-126, "BWR Vessel and Internals Project, RAMA Fluence Methodology Software," Version 1.0, which represents the software that is used at LGS to derive these fluence values. However, the staff noted that it does not represent the fluence methodology used to conform to RG 1.190.

In contrast, the staff has noted that the P-T limits in the applicant's CLB (refer to facility operating license amendment No. 163 to Technical Specification 3.4.6.1, which was approved by NRC safety evaluation dated January 2, 2003) used General Electric (GE) Company Report No. NEDC-32983P-A as the neutron fluence methodology for conforming to RG 1.190.

The LRA does not identify the methodology in GE's report as the basis for the 57 EFPY neutron fluences provided in LRA Section 4.2.1. Thus, the LRA does not present sufficient information to identify the neutron fluence methodology or provide a basis for concluding that the neutron fluence methodology used in the CLB conforms to RG 1.190 and bounds all RPV beltine shell, nozzle, and weld components (including associated axial welds, circumferential welds, and nozzle-to-shell welds).

LRA Section A.4.2.1, which provides the Updated Final Safety Analysis Report (UFSAR) supplement summary description for LRA Section 4.2.1, also does provide this information.

Request

1. Identify the document (include reference number, title, and date) and neutron fluence methodology used in the CLB to conform with RG 1.190. Clarify whether the neutron fluence methodology used has been endorsed for use by the staff. Justify the conclusion that the neutron fluence methodology currently adopted in the CLB for these TLAAs conforms to RG 1.190 and is bounding for all RPV beltine shell, nozzle, and weld components (including associated axial welds, circumferential welds, and nozzle-to-shell welds).

2. Update LRA Section 4.2.1 and A.4.2.1 to identify the document (including reference number, title, and date) and the neutron fluence methodology used in the CLB to conform to RG 1.190. and justify the LGS regulatory basis for using this neutron fluence methodology for the derivation of 57 EFPY neutron fluence values for the ferritic beltline shell, nozzle, and weld components in the LGS, Unit 1 and 2 RPVs.

DRAI 4.2.1-2

Background

10 CFR Part 50, Appendix H identifies that RPV surveillance programs need to be implemented for all ferritic RPV components with projected end-of-life neutron fluences in excess of 1.0 X 10^{17} n/cm^2 (E > 1.0 MeV). The background information in RAI 4.2.1-1 is also applicable to RAI 4.2.1-2.

Issue

The staff is concerned that there may be additional ferritic shell, nozzle, or weld components in the RPV that need to be added to the list of RPV beltine components because the neutron fluences would not be projected to exceed a fluence value of 1.0 X 10^{17} n/cm^2 (E > 1.0 MeV) until some point in the proposed period of extended operation.

Request

Clarify and justify whether there are any additional ferritic shell, nozzle, or weld components (including circumferential, axial or nozzle-to-vessel welds) in the RPV that needs to be added to the components associated with the beltine regions of the LGS, Unit 1 and 2 RPVs.

If additional ferritic shell, nozzle, or weld components need to be added as RPV beltline components, identify the components and provide the 57 EFPY neutron fluences for these components. In addition, address how these components will be assessed for the neutron irradiation embrittlement TLAAs that are identified and evaluated for in Sections 4.2.2 – 4.2.7 of the LRA.

DRAI B.2.1.28-2

Background

The GALL Report recommends that loss of material and degradation of the neutron absorbing material capacity be determined through coupon and/or direct in situ testing.

The response to RAI B.2.1.28-1, provided by letter dated February 28, 2012, stated that the coupons in the Limerick Generating Station (LGS), Unit 2 spent fuel pool had experienced only two cycles of high fluence from freshly discharged fuel. The response also stated that the coupons in the LGS, Unit 1 spent fuel pool had not experienced high fluence from freshly discharged fuel since re-racking.

In order for the coupons to obtain environmental conditions bounding of all Boral spent fuel pool racks, the response to RAI B.2.1.28-1 proposes to resume an accelerated exposure configuration for the Boral coupons (i.e., surround the coupons by freshly discharged fuel assemblies) at each of the next five refueling cycles, beginning with the refueling outage in 2013 and 2014 for LGS, Units 1 and 2, respectively.

Issue

The coupons in the LGS, Units 1 and 2 spent fuel pools have not experienced long exposure to high radiation fluence from freshly discharged fuel, making the exposure time potentially non-conservative and/or not bounding of all the LGS, Unit 1 and 2 Boral spent fuel pool racks. The current environmental conditions of the coupons are not bounding of all Boral racks and; therefore, may not provide acceptable testing data for monitoring loss of material and degradation of the neutron absorbing material capacity.

Request

Provide justification on how resuming a five cycle radiation exposure period will place the coupons in a bounding condition for all Boral spent fuel pool racks for the LGS, Units 1 and 2 now and in the future. If there is not ample justification that the coupons will be bounding of all the Boral panels in the spent fuel pool (SFP) now or in the future, discuss if another method of monitoring will be used, such as in situ testing.