UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 28, 2015

Mr. Michael P. Gallagher
Vice President, License Renewal Projects
Exelon Generation Company, LLC
200 Exelon Way
Kennett Square, PA 19348

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE LASALLE COUNTY STATION, UNITS 1 AND 2 LICENSE RENEWAL APPLICATION – SET 8 (TAC NOS. MF5347 AND MF5346)

Dear Mr. Gallagher:

By letter dated December 9, 2014, Exelon Generation Company, LLC (Exelon) submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, to renew the operating licenses NPF-11 and NPF-18 for LaSalle County Station (LSCS), Units 1 and 2, respectively. The staff of the U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review.

These requests for additional information were discussed with Mr. John Hufnagel, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-3019 or by e-mail at Jeffrey.Mitchell2@nrc.gov.

Sincerely,

/RA/

Jeffrey S. Mitchell, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-373 and 50-374

Enclosure:
As stated

cc: Listserv

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ADAMS Accession Number: **ML15195A338** *Concurred via e-mail

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DATE	7/ 27 /15	8/18/15	8/25/15	8/27/15	8/28/15

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Letter to Michael Gallagher from Jeffrey S. Mitchell dated August 28, 2015

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LASALLE COUNTY STATION, UNITS 1 AND 2
LICENSE RENEWAL APPLICATION
REQUESTS FOR ADDITIONAL INFORMATION – SET 8
(TAC NOS. MF5347 AND MF5346)

RAI 4.2.2-1

Background:

The U.S. Nuclear Regulatory Commission's (NRC) requirements for upper shelf energy (USE) and adjusted reference temperature (ART) of ferritic materials and ferritic welds in the beltline region of the reactor pressure vessel (RPV) are specified in Title 10, *Code of Federal Regulations*, Part 50, Appendix G, "Fracture Toughness Requirements" (10 CFR 50, Appendix G). Regulatory Guide (RG) 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," provides staff approved procedures for calculating the effects of neutron radiation embrittlement, specifically USE and ART, at the end of the licensed operating period. The guidance in RG 1.99, Revision 2, is subdivided into Regulatory Positions depending on the availability and use of relevant RPV surveillance data. The NRC's requirements for collecting and reporting material surveillance results are specified in 10 CFR 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements".

License Renewal Application (LRA) Sections 4.2.2 and 4.2.3 describe the time limited aging analyses (TLAAs) for projecting the USE and ART values, respectively, to the end of the licensed operating period (54 effective full power years (EFPY)). LRA Table 4.2.2-1 and Table 4.2.2-2 provide the USE values calculated for 54 EFPY for each ferritic RPV plate, weld, and nozzle component evaluated as a beltline component in the USE TLAA. These tables also include the unirradiated upper shelf energy (UUSE) values, percent drop in USE, and associated copper content percentages for these RPV beltline components. LRA Tables 4.2.3-1, 4.2.3-2, 4.2.3-3, and 4.2.3-4 provide the 54 EFPY ART values calculated for these components and the applicable information used to calculate the values. The LRA states that the USE and ART values were calculated using methods consistent with RG 1.99, Revision 2.

Issue:

The applicant's most recent application for an extended power uprate (EPU) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML100321303), with supporting documentation (ADAMS Accession No. ML100321327), was approved in an NRC safety evaluation dated September 16, 2010 (ADAMS Accession No. ML101830361). However, the staff is unable to verify whether the USE data provided in LRA Tables 4.2.2-1 and 4.2.2-2 and the ART data provided in Tables 4.2.3-2 and 4.2.3-4 for the N6 low pressure core injection (LPCI) nozzle welds are consistent with those approved for the current licensing basis (CLB) (i.e., in the NRC's approval of the EPU).

The guidance in RG 1.99, Revision 2, provides two methods for projecting USE and ART values to the end of the licensed operating period. The LRA states that the USE and ART values were projected to 54 EFPY based on methods consistent with RG 1.99, Revision 2; however, it is unclear to the staff if surveillance data is used in these projections. The staff is unable to determine which Regulatory Position was used to project the values in LRA Tables 4.2.2-1,

4.2.2-2, 4.2.3-1, 4.2.3-2, 4.2.3-3, and 4.2.3-4. Additionally, these tables provide duplicated entries for certain heats of material that reference Boiling Water Reactor Vessel and Internals Project (BWRVIP)-135, Revision 2. These duplicate entries have different material and chemistry values for a given heat of material. The staff is unable to reconcile the difference in time independent values contained in these duplicate entries.

Request:

1. The staff is unable to verify that the values provided in LRA Tables 4.2.2-1, 4.2.2-2, 4.2.3-2, and 4.2.3-4 for the N6 LPCI nozzle welds are consistent with those approved for the CLB. Provide either:

   a. the references that identify the bases for the UUSE, initial RT_{NDT}, percent copper, and percent nickel values used in the TLAAs for the N6 LPCI nozzles, and whether the values have been approved for use by the NRC, or

   b. the source and technical substantiation of the values if they have not been approved by the NRC. Justify that these values are acceptable inputs for calculating USE and ART at 54 EFPY.

2. The staff is unable to determine which Regulatory Position was used to project the values in LRA Tables 4.2.2-1, 4.2.2-2, 4.2.3-1, 4.2.3-2, 4.2.3-3, and 4.2.3-4. Identify which of the USE calculations in LRA Tables 4.2.2-1 and 4.2.2-2 and which of the ART calculations in LRA Tables 4.2.3-1, 4.2.3-2, 4.2.3-3, and 4.2.3-4 were based on the application of relevant RPV surveillance data from the Electric Power Research Institute (EPRI) BWRVIP integrated surveillance program. Distinguish between values that were calculated using Regulatory Position 1 and Regulatory Position 2 of RG 1.99, Revision 2.

3. Identify any surveillance data reports associated with capsule withdrawals and test results obtained from the integrated surveillance program that are applicable to either Unit 1 or Unit 2.

RAI 4.6.1-1

Background:

Section 54.21 (a)(3) of 10 CFR requires applicants to demonstrate that the effects of aging will be adequately managed so that intended functions will be maintained consistent with the CLB for each structure and component subject to an aging management review. Section 54.2(c)(1) of 10 CFR requires the evaluation of TLAAs to demonstrate that: (i) the analyses remain valid for the period of extended operation, (ii) the analyses have been projected to the end of the period of extended operation; or (iii) the effects of aging on the intended function will be adequately managed for the period of extended operation.

Section 4.6.1 of the LRA, “Primary Containment Liner and Penetration Fatigue Analysis,” describes the analyses of transients predicted for 40 years for the primary containment liner, Class MC components, and containment penetrations. The applicant identified these fatigue analyses as TLAAs. LRA Tables 4.3.1-1 and 4.3.1-2 show the results of 60-years transient cycle projections for Unit 1 and Unit 2, respectively. Transient cycle projections for Unit 1 (LRA

Table 4.3.1-1) show that startup and shutdown cycles are projected to exceed their design limits in 60 years, and transient cycle projections for Unit 2 (LRA Table 4.3.1-2) show that transient cycle limits will not be exceeded in 60 years. The applicant dispositioned the analyses in accordance with 10 CFR 54.21(c)(1)(iii) and stated that "the effects of aging on the intended functions of components analyzed in accordance with ASME Section III, Class 1 requirements will be managed by the Fatigue Monitoring program through the period of extended operation."

Issue:

It is not clear to the staff which transient cycle projections from LRA Tables 4.3.1-1 and 4.3.1-2 are applicable or correspond to each fatigue analysis described in LRA Section 4.6.1 (i.e., primary containment liner plate, containment penetrations, and Class MC components). It is also unclear what the original fatigue design values are for each analysis in LRA Section 4.6.1.

Considering that the TLAA disposition in LRA Section 4.6.1 seems to address components that are in accordance with ASME Section III, Class 1 requirements, it is not clear what the TLAA disposition is for non-Class 1 components or how the transient cycle limits will be maintained below the cumulative usage factor (CUF) design limits for these non-Class 1 components.

Request:

1. Clarify which transient cycle projection(s) from LRA Tables 4.3.1-1 and 4.3.1-2 were considered for each design analysis described in LRA Section 4.6.1 (i.e., primary containment liner plate, containment penetrations, and Class MC components).
2. Clarify what the TLAA dispositions are for non-Class 1 components and describe how the transient limits will be maintained below the design limits for these components.

RAI 3.5.2.1-1

Background:

LRA Tables 3.5.2-1, 3.5.2-4, 3.5.2-5, 3.5.2-7, 3.5.2-8, 3.5.2-9, and 3.5.2-13 state that various stainless steel components exposed to concrete have no aging effects requiring management (AERM) and no aging management program (AMP). These components include: liners, liner anchors, integral attachments, concrete anchors, electrical and mechanical penetration sleeves and assemblies, downcomers, hatches, and plugs. The aging management review (AMR) line items cite SRP-LR Table 3.3.1, item 3.3.1-120 and generic note C.

An analogous request for additional information (RAI) on the topic of AERMs for steel components exposed to concrete is given in RAI 3.3.2.1.1-11, which was issued to Exelon in a letter dated May 29, 2015 (RAI Set 2, ADAMS Accession No. ML15125A198).

Issue:

Generic Aging Lessons Learned (GALL) Report AMR line item AP-19 states that for stainless steel piping and piping components exposed to concrete there are no AERM and no recommended AMP. Other GALL Report AMR line items state that stainless steel components

exposed to concrete or embedded in concrete may be susceptible to loss of material as a result of pitting or crevice corrosion. These AMR line items include: (a) AP-137 and SP-94 for stainless steel piping and piping components exposed to concrete, (b) SP-137 for stainless steel tanks exposed to concrete, and (c) AP-243 and SP-143 for stainless steel bolting exposed to concrete. The staff lacks sufficient information to conclude that the stainless steel structural components exposed to concrete (including potential water seepage entering the concrete) will not be susceptible to loss of material due to pitting or crevice corrosion.

Request:

Provide the basis why loss of material due to pitting and crevice corrosion has not been identified as an AERM for the stainless steel components described above. If loss of material due to pitting and crevice corrosion is an applicable AERM for the exposure of these components to concrete (including potential water seepage into the concrete), identify and justify the aging management program or programs that will be used to manage this aging effect during the period of extended operation.