



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

April 10, 2014

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
BYRON STATION, UNITS 1 AND 2, AND BRAIDWOOD STATION, UNITS 1
AND 2, LICENSE RENEWAL APPLICATION, SET 18 (TAC NOS. MF1879,
MF1880, MF1881, AND MF1882)

Dear Mr. Gallagher:

By letter dated May 29, 2013, Exelon Generation Company, LLC, submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, to renew the operating licenses NPF-37, NPF-66, NPF-72, and NPF-77 for Byron Station, Units 1 and 2, and Braidwood Station, Units 1 and 2, respectively, for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). 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 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 301-415-4115 or by e-mail at Lindsay.Robinson@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "L.R.", is positioned above the typed name of the sender.

Lindsay R. Robinson, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-454, 50-455, 50-456, and 50-457

Enclosure:
Request for Additional Information

cc w/encl: Listserv

April 10, 2014

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

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/RA/

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Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-454, 50-455, 50-456, and 50-457
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NAME	IKing	LRobinson	YDiazSanabria	LRobinson
DATE	4/7/14	4/9/14	4/10/14	4/10/14

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Letter to M.P. Gallagher from Lindsay R. Robinson dated April 10, 2014

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**BYRON STATION, UNITS 1 AND 2,
AND BRAIDWOOD STATION, UNITS 1 AND 2,
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION, SET 18
(TAC NOS. MF1879, MF1880, MF1881, AND MF1882)**

RAI 3.1.2.3.4-1

Applicability:

Byron Station (Byron) and Braidwood Station (Braidwood), Unit 1

Background:

License renewal application (LRA) Table 3.1.2-4 addresses loss of fracture toughness in steam generator internal structural supports exposed to treated water > 482 °F at Byron and Braidwood, Unit 1. The LRA states that the steam generator tube support lattice bar is fabricated from SA-240 410S martensitic stainless steel (SS), and the steam generator tube support lattice bar attachment component is fabricated from SA-351 CF3M cast austenitic SS. The LRA Table provides a note H for this component, material, and environment. Note H states that this aging effect (i.e., loss of fracture toughness) is not in NUREG-1801 for the component, material, and environment combination. Visual inspections and eddy current testing were proposed to manage this degradation mechanism.

Issue:

The staff needs additional information concerning the degradation mechanism and the component/environment to ascertain whether the proposed aging management program is adequate.

Request:

Please provide a description of these components (including their function) and the extent to which they are used throughout the steam generator. Please discuss the susceptibility of these particular components to thermal aging embrittlement (Reference: Letter from C.I. Grimes, NRC, to Douglas J. Walters, Nuclear Energy Institute, License Renewal Issue No. 98-0030, "Thermal Aging Embrittlement of Cast Stainless Steel Components," dated May 19, 2000, ML003717179). Discuss how visual inspections and eddy current testing will be adequate to ensure any loss of fracture toughness that does occur will be limited such that the component will continue to be able to perform its intended safety function during normal operation, transient, and accident conditions. That is, discuss the possibility that the loss of fracture toughness would render the component incapable of performing its function without the component showing any visual evidence of cracking, deformation, or damage.

ENCLOSURE

RAI 3.0.3-3a

Applicability:

Byron and Braidwood

Background:

In a letter dated January 13, 2014, the responses to RAIs 3.0.3-3 and B.2.1.23-1 state that cracking due to stress corrosion cracking is not an aging effect in outdoor air environments for stainless steel and aluminum components that have jacketed insulation.

In regards to potential cracking due to halides in the atmosphere, the responses stated that (a) halide accumulation from the environment is not expected on components that are shielded by jacketed insulation and (b) insulated components located outdoors do not operate at high temperatures where concentration of environmental halides is expected to occur due to evaporation of any present moisture.

The Generic Aging Lessons Learned (GALL) Report age management program (AMP) XI.M36, "External Surfaces Monitoring of Mechanical Components," recommends visual inspections for leakage to detect cracking on external surfaces that are exposed to an air environment containing halides.

Issue:

The staff recognizes that proper jacketing configuration can be a preventive measure for atmospheric halide intrusion; however, the staff considers a one-time inspection of exposed metal for evidence of cracking as necessary to ensure that the jacketing at Byron and Braidwood is an effective barrier. Also, it is not clear to the staff why the absence of high operating temperatures would prevent moisture from evaporating on an outdoor component's surface.

Request:

For insulated stainless steel and aluminum piping and piping components exposed to outdoor air, provide the technical justification for why insulation does not need to be removed to conduct visual inspections to detect cracking in order to confirm the effectiveness of the insulation jacketing in preventing halide intrusion. Alternatively, propose to remove insulation during a baseline inspection for cracking that may be used to validate the subsequent use of insulation-only inspections and revise the associated AMR items to include cracking as an applicable aging effect. For nonwater-filled piping and piping components, state how potential leakage will be identified.

RAI B.2.1.7-3

Applicability:

Byron and Braidwood

Background:

LRA Appendix C discusses the applicant's response to Action/License Action Item (A/LAI) No.3. The applicant stated that the original equipment alloy X-750 control rod guide tube (CRGT) split pins were proactively replaced at Byron and Braidwood, Unit 1 and 2, with cold worked 316 stainless steel split pins based on industry guidance. In addition, the applicant explained that there are currently no vendor specific requirements to inspect the replacement CRGT split pins; however, through the station's participation in industry groups and the evaluation of industry operating experience, this position may change as warranted.

The staff noted that Section 3.5.2.3 of the NRC's safety evaluation, Revision 1, for the topical report, MRP-227-A, "Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227-A)," states that applicants "shall evaluate the adequacy of their plant-specific existing program and ensure that the aging degradation is adequately managed during the period of extended operation" for type 316 stainless steel split pins. MRP-227 further states, in part, that it is recommended that the evaluation performed by the applicant, in response to A/LAI No. 3, "consider the need to replace the Alloy X-750 support pins (split pins), if applicable, or inspect the replacement Type 316 stainless steel support pins (split pins) to ensure that cracking has been mitigated and that aging degradation is adequately monitored during the extended period of operation."

Issue:

Since the applicant has already replaced all of its X-750 split pins at Byron and Braidwood and the applicant is not proposing to inspect the replacement Type 316 stainless steel support pins (split pins), it is not clear to the staff how the applicant will ensure that cracking has been mitigated and that aging degradation is adequately monitored during the period of extended operation.

Request:

1. Describe in detail (e.g., inspection scope, frequency, technique, etc.) and justify how it will be ensured by the applicant that cracking has been mitigated for the replacement Type 316 stainless steel support pins (split pins) and that age-related degradation is adequately monitored during the period of extended operation.
2. If inspection of the replacement Type 316 stainless steel support pins (split pins) are not proposed, provide the basis that Section 3.5.2.3 of the NRC's safety evaluation, Revision 1, for the topical report, MRP-227-A, and A/LAI No.3 are adequately addressed in the LRA and that age-related degradation, including cracking due to stress corrosion cracking of the CRGT split pins, will be adequately managed during the period of extended operation.

RAI 2.3.4.2-1

Applicability:

Byron

Background:

In LRA Section 2.1.5.2, the applicant stated for nonsafety related piping connected to safety related piping, the nonsafety related piping is assumed to provide structural support to the safety-related piping if the nonsafety related is within the analytical boundary of the current licensing basis (CLB) seismic analysis

Issue:

LRA drawing LR-BYR-M-41 Sheet 3 (E5) shows a "TSI" label to indicate the 10 CFR 54.4(a)(2) spatial interaction termination for lines 1HD32BB 14 and 1HD32BD 14. However, for Unit 2 drawing LR-BYR-M-125 Sheet 3B (C/D-4), the staff could not locate the "TSI" labels to show the 10 CFR 54(a)(2) spatial interaction termination for similar lines 2HD32BB 14 and 2HD32BD 14.

Request:

The staff requests the applicant provide additional information to clarify the 10 CFR 54.4(a)(2) spatial interaction termination for lines 2HD32BB 14 and 2HD32BD 14.

RAI 2.3.4.4-1

Applicability:

Byron

Background:

LRA Section 2.1, "Scoping and Screening Methodology," describes the applicant's scoping methodology, which specifies how systems or components were determined to be included in scope of license renewal. The staff confirmed the inclusion of all components subject to AMR by reviewing the results of the screening of components within the license renewal boundary.

Issue:

License renewal drawing LR-BYR-M-35 Sheet 3 (C5) shows several lines, including line 1M502EE 8, to be in scope for 10 CFR 54.4(a)(2). However, a portion of line 1M502EE 8 upstream of valve 1WG17DH ¾ is shown as out of scope for license renewal.

Request:

The staff requests the applicant provide additional information to clarify the scoping classification of the 1M502EE 8 line upstream of valve 1WG17DH ¾.