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

February 18, 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 11 (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 e-mail Lindsay.Robinson@nrc.gov.

Sincerely,

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:
Requests for Additional Information

cc w/encl: Listserv

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Vice President, License Renewal Projects
Exelon Generation Company, LLC
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Letter to M.P. Gallagher from Lindsay R. Robinson dated February 18, 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 11

RAI 4.1.2-1

Applicability:

Byron Station (Byron) and Braidwood Station (Braidwood)

Background:

License renewal application (LRA) Section 4.2.1 addresses the applicant's neutron fluence analysis for reactor vessels. During the Braidwood aging management program (AMP) audit, the staff noted that the applicant updated the maximum fluence values of Braidwood, Unit 1, reactor vessel circumferential welds projected for 32 effective full power years (EFPYs). These fluence updates were made as part of the applicant's neutron fluence time-limited aging analysis (TLAA) for license renewal (reference: WCAP-17607-NP, Braidwood Station, Units 1 and 2, Reactor Vessel Integrity Evaluation to Support License Renewal TLAA, Revision 0, December 2012). The staff also noted that the following reactor vessel surveillance report describes the 32-EFPY maximum fluence values of Braidwood, Unit 1, reactor vessel welds as the current docketed information.

- WCAP-15316, Revision 1, Analysis of Capsule W from Commonwealth Edison Company Braidwood Unit 1 Reactor Vessel Radiation Surveillance Program, December 1999 (ADAMS Accession No. ML003713874)

Table 1 lists the updated fluence values (E >1 MeV) of the reactor vessel welds in comparison with the current docketed information.

Table 1. Comparison of 32-EFPY Maximum Fluence Values (E > 1 MeV) of Braidwood Unit 1 Reactor Vessel Circumferential Welds

Weld	**32-EFPY Maximum Fluence (E > 1 MeV), n/cm^2**	
	Current Docketed Reactor Vessel Surveillance Report (WCAP-15316, Rev. 1)	Updated Neutron Fluence Calculations for License Renewal
WR-20	2.72E16	5.38E16
WR-19	3.84E16	7.10E16
WR-34	5.85E18	6.18E18
WR-18	1.92E19	1.69E19
WR-29	2.64E15	1.85E15

ENCLOSURE

Issue:

The updated 32-EFPY maximum fluence values (E > 1 MeV) of Braidwood, Unit 1, reactor vessel welds are different from those described in the docketed reactor vessel surveillance report (e.g., 1.69E19 n/cm^2 versus 1.92E19 n/cm^2 for WR-18). In addition, clarification is necessary on whether the updated fluence calculations changed the axial flux profile in a manner to reduce the axial flux peaking in the mid-core region.

Request:

1. Explain why the updated 32-EFPY maximum fluence values of the Braidwood, Unit 1, reactor vessel welds are different from those described in the docketed reactor vessel surveillance report (i.e., WCAP-15316, Rev. 1) as compared in Table 1. As part of the response, clarify whether the updated fluence calculations changed the axial flux profile in a manner to reduce the axial flux peaking in the mid-core region.

2. Clarify whether the updated 32-EFPY fluence values for the reactor vessel welds of Byron, Units 1 and 2, and Braidwood, Unit 2, are different from those reported in docketed documents such as the data described in Table 1 for Braidwood, Unit 1. If so, explain why the updated 32-EFPY maximum fluence values are different from those reported in the docketed documents and clarify whether the updated fluence calculations reduced the axial flux peaking in the mid-core region.

RAI B.2.1.17-3

Applicability:

Braidwood

Background:

An internal indication exists in the tank wall above the water line of the Unit 2 condensate storage tank (CST). The evaluation of the indication, as documented in the corrective action program, is as follows:

> As discussed in the original followup, the indication appears to start away from the edge of the top plate element, stays in a straight line configuration down to the seam weld, projects over the surface of the weld, and then changes to a curved shape below the seam weld until it stops approximately even with the bottom flange of the roof support structural member. In addition, it appears by color/darkness changes that the width of the indication changes. These characteristics, along with the apparent width on the photos, do not represent a normal crack profile or propagation path. Also of note is the fact that this is the first internal inspection performed on the Unit 2 CST. This is most likely an indication that has existed the life of the tank.

Issue:

The staff lacks sufficient information to determine that the indication is not a crack. The LR-ISG-2012-02, "Aging Management of Internal Surfaces, Firewater Systems, Atmospheric Storage Tanks, and Corrosion under Insulation," recommends that a one-time inspection be

conducted for the internal surfaces of an aluminum tank exposed to treated water. The staff believes that with a known indication as described above, periodic inspections would be appropriate if the indication is not repaired prior to the period of extended operation.

Request:

If the indication described above is not repaired prior to the period of extended operation, state either (a) the basis for why no condition monitoring activities are required to provide reasonable assurance that the indication will not affect the condensate storage tank's current licensing basis intended function(s), or (b) state what condition monitoring activities will be conducted for the indication during the period of extended operation.

RAI 4.7.3-1

Applicability:

Byron and Braidwood

Background:

During the AMP audit, the staff reviewed Tab E, "Installation, Maintenance, and Surveillance Schedule," from the following Byron and Braidwood Station Equipment Qualification (EQ) binders:

- EQ-BB-044 and EQ-BB-045 state that inspections of exposed parts should be conducted every fuel load outage. The binders also stated that, "[a]ny indication of aging related degradation must be investigated, and necessary maintenance and replacement requirements shall be added. Arrangements shall be made to replace the affected component immediately." The staff noted that the scope of binders EQ-BB-044 and EQ-BB-045 include the containment spray pumps and main steam power-operated relief valves.
- EQ-BB-051 states that visual inspections should be conducted for packing and gasket leaks. The staff noted that the scope of binder EQ-BB-051 includes the main feed isolation valves.
- EQ-BB-056 states that during maintenance activities the operator assembly should be checked for oil leakage. The staff noted that the scope of binder EQ-BB-056 includes the main steam power-operated relief valve hydraulic operators.
- EQ-BB-025 states that visual inspections of the area of the coupling for oil leaks should be conducted quarterly, the leak monitoring hole should be inspected quarterly for hydraulic fluid and pneumatic leakage, the hydraulic oil should be sampled quarterly, and the hydraulic fluid should be replaced and analyzed during every refueling outage. The staff noted that the scope of binder EQ-BB-025 includes the main feed isolation valve hydraulic operators.

Issue:

The staff noted that, while the containment spray pumps are within the scope of license renewal, LRA Table 3.2.2-2 states that there are no aging effects requiring management and no AMP is recommended. The staff also noted that components such as the main steam power-operated relief valve and main feed isolation valve hydraulic operators are not included in the respective system aging management review (AMR) tables.

The staff noted that the above EQ binders include active components, and the surveillance schedules are associated with subcomponents that would typically be identified as consumable items such as O-rings and gaskets. The staff also noted that the consumable items all have specified replacement frequencies. Standard Review Plan for License Renewal (SRP-LR) Table 2.1-3, "Specific Staff Guidance on Screening," states in part that some categories of consumables, "are usually short-lived and periodically replaced, and can normally be excluded from an AMR on that basis." However, TLAA 4.7.3 specifically addresses these components and subcomponents.

It appears to the staff that the surveillance (condition monitoring) activities described in the EQ binders are required to be performed to ensure that the subcomponents will meet the qualified lives described in general in TLAA Section 4.7.3. It is not clear to the staff that the above surveillance (condition monitoring) requirements, as described in the EQ binders, have been incorporated into AMPs.

Request:

State the basis for why the condition monitoring activities described in the EQ binders are not required to be performed in order to establish reasonable assurance that the affected components and subcomponents will meet their qualified lives, or state how the above condition monitoring requirements will be incorporated into AMPs. Additionally, state whether there are other mechanical Byron and Braidwood EQ binders that contain condition monitoring requirements whose activities are not (a) accounted for in an AMP, (b) conducted during ASME Code Section XI Subsection IWP testing, or (c) conducted as part of the ASME Code Section XI, Inservice Inspection program. If so, respond to the above request for the applicable binder(s).