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10 CFR 50
10 CFR 51
10 CFR 54

RS-14-079

March 04, 2014

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Braidwood Station, Units 1 and 2
Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and STN 50-457

Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: Response to NRC Requests for Additional Information, Set 11, dated February 18, 2014 related to the Braidwood Station, Units 1 and 2 and Byron Station, Units 1 and 2 License Renewal Application

References: 1. Letter from Michael P. Gallagher, Exelon Generation Company LLC (Exelon) to NRC Document Control Desk, dated May 29, 2013, "Application for Renewed Operating Licenses."

2. Letter from Lindsay R. Robinson, US NRC to Michael P. Gallagher, Exelon, dated February 18, 2014, "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)

In the Reference 1 letter, Exelon Generation Company, LLC (Exelon) submitted the License Renewal Application (LRA) for the Byron Station, Units 1 and 2, and Braidwood Station, Units 1 and 2 (BBS). In the Reference 2 letter, the NRC requested additional information to support the staffs' review of the LRA.

Enclosure A contains the responses to these requests for additional information.

Enclosure B contains updates to sections of the LRA (except for the License Renewal Commitment List) affected by the responses.

March 04, 2014
U.S. Nuclear Regulatory Commission
Page 2

Enclosure C provides an update to the License Renewal Commitment List (LRA Appendix A, Section A.5). There are no other new or revised regulatory commitments contained in this letter.

If you have any questions, please contact Mr. Al Fulvio, Manager, Exelon License Renewal, at 610-765-5936.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 3-4-2014

Respectfully,



Michael P. Gallagher
Vice President - License Renewal Projects
Exelon Generation Company, LLC

Enclosures: A: Responses to Requests for Additional Information
B: Updates to affected LRA sections
C: License Renewal Commitment List Changes

cc: Regional Administrator – NRC Region III
NRC Project Manager (Safety Review), NRR-DLR
NRC Project Manager (Environmental Review), NRR-DLR
NRC Senior Resident Inspector, Braidwood Station
NRC Senior Resident Inspector, Byron Station
NRC Project Manager, NRR-DORL-Braidwood and Byron Stations
Illinois Emergency Management Agency - Division of Nuclear Safety

Enclosure A

**Byron and Braidwood Stations, Units 1 and 2
License Renewal Application (LRA) updates resulting from the responses to the
following RAIs:**

RAI 4.1.2-1
RAI B.2.1.17-3
RAI 4.7.3-1

Note: To facilitate understanding, the original LRA pages have been repeated in this Enclosure, with revisions indicated. Existing LRA text is shown in normal font. Changes are highlighted with ***bold italics*** for inserted text and ~~strikethroughs~~ for deleted text.

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

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/cm² versus 1.92E19 n/cm² 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.

Exelon Response:

1. The methodology used for the WCAP-15316, Revision 1, calculations followed the guidance documented in Draft Regulatory Guide DG-1053 (later issued in March 2001 as Regulatory Guide 1.190 "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence") and consistent with the USNRC-approved methods in WCAP-14040-NP-A, Revision 2. In the application of the methodology described in these documents, an adjoint neutron transport approach was used with three-dimensional synthesis of the solution based on Equation 3 of the draft regulatory guide. The adjoint approach along with the use of Equation 3 from the draft regulatory guide introduces the following three conservatisms into the analysis:
 - a. The use of the adjoint methodology does not allow cycle-to-cycle water density variations in the peripheral fuel assemblies, bypass region, or downcomer region. Therefore, in the analysis, water densities were chosen to conservatively envelope actual plant operation.
 - b. The use of Equation 3 from DG-1053 does not account for the flattening of the axial flux distribution that naturally occurs as a function of increasing distance from the reactor core. This tends to result in an overestimate in the high fluence areas of the surveillance capsule and pressure vessel.
 - c. The use of Equation 3 from DG-1053 does not account for the shielding effect introduced by the former plates located at several axial elevations between the core baffle plates and the core barrel.

The methodology used in the updated neutron fluence calculations done for license renewal follows the guidance of Regulatory Guide 1.190 and has been reviewed and approved by

the NRC. The methodology used is consistent with WCAP-14040-A, Revision 4. This updated methodology used a forward neutron transport approach with the three-dimensional synthesis of the solution based on Equation 4 of Regulatory Guide 1.190. The use of the forward transport methodology allows water density to be varied on a cycle-specific basis. As described in Regulatory Guide 1.190, Equation 4 accounts for flattening of the axial flux distribution as it propagates from the core to the reactor vessel as well as the shielding effect of the former plates. This is more representative of the actual axial neutron flux distribution and reduces the overestimation of the high fluence areas (mid core region).

In addition to the methodology changes noted above, the updated neutron fluence calculations done for license renewal accounted for several cycles of actual plant operation (cycle specific) that were treated as projections in the WCAP-15316, Revision 1, calculations. The following table shows the differences in cycle specific and projections used as the basis for input to the analyses for Braidwood Unit 1:

Operating Periods/Input	Braidwood Unit 1 Analysis Input Basis	
	WCAP-15316 Analysis	License Renewal Analysis
Cycle-Specific	0 – 7.61 EFPY (7.61 EFPY are based on actual operating data)	0 – 20.55 EFPY (20.55 EFPY are based on actual operating data)
Projections	7.61 – 32 EFPY (24.39 EFPY are based on projected operating data)	20.55 – 32 EFPY (11.45 EFPY are based on projected operating data)
Neutron Flux Projection Basis	Average of Fuel Cycles 5-7	MUR Uprate Fuel Cycle

The data in the above table show that the amount of cycle-specific operating period that was included in the analysis more than doubled from 7.61 EFPY in the WCAP-15316, Revision 1, analysis to 20.55 EFPY in the updated neutron fluence analysis completed for license renewal. The projected operating period in the license renewal analysis was conversely one half of that used in the WCAP-15316 analysis. In addition, the neutron flux projection basis used to determine the future vessel and capsule exposures was based on different fuel cycle designs. The neutron flux projection basis used for the analysis completed for license renewal was based on a MUR Uprate Fuel Cycle. As discussed in the LRA on page 4.2-3, “the MUR flux levels were used to calculate fluence for cycles occurring after the completion of the last full operating cycle prior to November, 2012.”

The methodology differences and updated cycle-specific calculations for license renewal result in an axial flux profile at the pressure vessel with reduced peaking in the mid-core region compared to that in WCAP-15316, Revision 1. The reduced peaking in the mid-core region is due to the more refined analysis methodology and is more representative of actual plant operation. This refined analysis approach removed some previous dependency on over-conservatism, and utilized more data based on actual plant operating history.

2. There are also differences in the reported 32 EFPY fluence values for the reactor vessel welds of Byron Units 1 and 2, and Braidwood Unit 2 in the License Renewal analyses compared with those reported in docketed documents. The reasons for the differences are the same as those provided in the answer to the request above for Braidwood Unit 1. As a result, the axial flux peaking in the mid-core region is also reduced for Byron Unit 1, Byron Unit 2, and Braidwood Unit 2 in the License Renewal analysis at 32 EFPY.

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, 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 mostly 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 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 above described indication 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.

Exelon Response:

An internal inspection of the Braidwood Unit 2 condensate storage tank in 2008, using video equipment, identified an indication on the internal tank wall just below the tank roof and above the water line. A subsequent inspection was performed in 2009, using a high resolution camera, providing additional documentation of the physical appearance of the indication. This inspection found no change in the length, width, or physical appearance of the indication.

A recurring maintenance activity was initiated to re-inspect this indication on a 5-year frequency with a scheduled start date of 2014. In the event the physical dimension of this indication

changes, the as-found condition will be entered into the corrective action program for further evaluation.

This condition monitoring activity is incorporated into the Aboveground Metallic Tank (B.2.1.17) aging management program. As an alternative option, a physical repair may be performed to remove the indication, thereby eliminating the need for this condition monitoring activity.

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 AMP. 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).

Exelon Response:

The condition monitoring requirements that are required to establish reasonable assurance that the affected mechanical components and subcomponents will meet their qualified lives including those condition monitoring requirements discussed by the staff in the *Background* and *Issue* sections, will be incorporated into the Environmental Qualification (EQ) of Electric Components aging management program (AMP) (B.3.1.3). The condition monitoring requirements contained in the mechanical Byron and Braidwood EQ binders are implemented by the Byron and Braidwood site EQ Program. The condition monitoring activities contained in the mechanical Byron and Braidwood EQ binders will be managed by the Environmental Qualification (EQ) of Electric Components AMP (B.3.1.3). Some condition monitoring activities are conducted concurrently during ASME Code Section XI Subsection IWP testing, or as part of the ASME Code Section XI, Inservice Inspection program.

The Environmental Qualification (EQ) of Electric Components AMP (B.3.1.3) is enhanced to expand the scope of the program to include mechanical environmental qualification (MEQ) components.

Consistent with this response, the following LRA sections are revised to address this enhancement and are shown in Enclosure B.

LRA Sections 2.5.2.1, 2.5.2.2, and 2.5.2.4 are revised to identify “mechanical environmental qualification (MEQ) components” as an electrical commodity.

LRA Section 3.6.2.4 is revised to identify LRA Section 4.7.3 as the TLAA addressing the “mechanical environmental qualification (MEQ) components” commodity.

LRA Table 3.6.2-1 is revised to identify “mechanical environmental qualification (MEQ) components” as an electrical commodity.

Section A.1.3 is revised to conform to Section A.3.1.3.

Section A.3.1.3 is revised to enhance the scope of the Environmental Qualification (EQ) of Electric Components aging management program to include mechanical environmental qualification (MEQ) components.

Section B.1.6 is revised to conform to Section B.3.1.3.

Section B.3.1.3 is revised to enhance the scope of the Environmental Qualification (EQ) of Electric Components aging management program to include mechanical environmental qualification (MEQ) components.

Consistent with this response, the Byron and Braidwood LRA Table A.5 Commitment List, Item 45 is revised as shown in Enclosure C.

Enclosure B

**Byron and Braidwood Stations, Units 1 and 2
License Renewal Application (LRA) updates resulting from the response to the
following RAI:**

RAI 4.7.3-1

Note: To facilitate understanding, the original LRA pages have been repeated in this Enclosure, with revisions indicated. Existing LRA text is shown in normal font. Changes are highlighted with ***bold italics*** for inserted text and ~~strikethroughs~~ for deleted text.

As a result of the response to RAI 4.7.3-1 provided in Enclosure A of this letter, LRA Section 2.5.2.1, page 2.5-2, is revised as shown below. Additions are indicated with ***bolded italics***.

2.5.2.1 Identification of Electrical Commodities

The first step of the screening process for electrical commodities is to use plant documentation to identify the electrical components and commodities within the electrical, I&C, and mechanical systems based on plant design documentation, drawings, and the plant equipment database (PassPort), as well as by interfacing with the parallel mechanical and civil screening efforts. The electrical components and commodities identified at BBS are listed below. This list includes electrical components and commodities identified in NEI 95-10 Appendix B in addition to components and commodities added per NUREG-1800 Table 2.1-5.

Electrical Components and Commodities for In Scope Systems:

- Annunciators
- Batteries
- Cable Connections (Metallic Parts)
- Cable Tie-Wraps
- Chargers
- Circuit Breakers
- Communication Equipment
- Connection Contacts
- Connector Contacts for Electrical Connectors Exposed to Borated Water Leakage
- Converters
- Electric Heaters
- Electrical Controls and Panel Internal Assemblies
- Electrical Penetrations
- Elements, RTDs, Sensors, Thermocouples, Transducers
- Fuse Holders
- Fuses
- Generators, Motors
- Heat Trace
- High Voltage Insulators
- Indicators
- Insulation Material for Electrical Cables and Connections
- Inverters
- Isolators
- Light Bulbs
- Loop Controllers
- ***Mechanical Environmental Qualification (MEQ) Components***
- Metal Enclosed Bus

- Meters
- Motor Generator Sets
- Power Supplies
- Radiation Monitors
- Recorders
- Regulators
- Relays (and Bistables)
- Signal Conditioners
- Solenoid Operators
- Solid State Devices
- Splices
- Surge Arresters
- Switches
- Switchgear, Load Centers, Motor Control Centers, Distribution Panels
- Switchyard Bus and Connections

As a result of the response to RAI 4.7.3-1 provided in Enclosure A of this letter, LRA Section 2.5.2.2, page 2.5-3, is revised as shown below. Additions are indicated with ***bolded italics***.

2.5.2.2 Application of Screening Criterion 10 CFR 54.21 (a)(1)(i) to the Electrical Components and Commodities

Following the identification of the electrical components and commodity groups, the criterion of 10 CFR 54.21(a)(1)(i) is applied to identify electrical commodity groups that perform their functions without moving parts or without a change in configuration or properties. The following electrical commodity groups meet the screening criteria of 10 CFR 54.21 (a)(1)(i):

- Cable Connections (Metallic Parts)
- Cable Tie-Wraps
- Connector Contacts for Electrical Connectors Exposed to Borated Water Leakage
- Electrical Penetrations
- Fuse Holders (Not Part of Active Equipment)
- High Voltage Insulators
- Insulation Material for Electrical Cables and Connections
- ***Mechanical Environmental Qualification (MEQ) Components***
- Metal Enclosed Bus
- Splices
- Switchyard Bus and Connections
- Terminal Blocks
- Transmission Conductors
- Transmission Connectors
- Uninsulated Ground Conductors

As a result of the response to RAI 4.7.3-1 provided in Enclosure A of this letter, LRA Section 2.5.2.4, page 2.5-4, is revised as shown below. Additions are indicated with **bolded italics** and ~~strikethroughs~~ for deleted text.

2.5.2.4 Application of Screening Criteria 10 CFR 54.21 (a)(1)(ii) to Electrical Commodities

The 10 CFR 54.21 (a)(1)(ii) screening criterion was applied to the specific commodities that remained following application of the 10 CFR 54.21 (a)(1)(i) criterion. 10 CFR 54.21 (a)(1)(ii) allows the exclusion of those commodities that are subject to replacement based on a qualified life or specified time period. The only electrical commodities identified for exclusion by the criteria of 10 CFR 54.21 (a)(1)(ii) are electrical, ~~and~~ I&C, **and mechanical** components, and **electrical, I&C, and mechanical** commodities included in the Environmental Qualification (EQ) Program. This is because electrical, ~~and~~ I&C, **and mechanical** components, and **electrical, I&C, and mechanical** commodities included in the EQ Program have defined qualified lives and are replaced prior to the expiration of their qualified lives. No electrical, ~~and~~ I&C, **and mechanical** components ~~and~~ **or electrical, I&C, and mechanical** commodities within the EQ Program are subject to aging management review in accordance with the screening criteria of 10 CFR 54.21 (a)(1)(ii).

Electrical Penetrations

Electrical penetrations at BBS are environmentally qualified. They are evaluated as a time-limited aging analysis (**TLAA**) (**Section 4.4**) and ultimately managed by the Environmental Qualification (EQ) of Electric Components (B.3.1.3) program. The electrical continuity of electrical penetration pigtailed that could potentially be exposed to an adverse localized environment is included in the evaluation for Insulation Material for Electrical Cables and Connections, Section 2.5.2.5.5. The shelter, protection and pressure boundary intended functions of electrical penetrations are included in the evaluation for Containment Structure, Section 2.4.4.

Mechanical Environmental Qualification (MEQ) Components

The Byron and Braidwood Environmental Qualification (EQ) Binders are described in UFSAR Section 3.11, "Environmental Design of Mechanical and Electrical Equipment." A review of the Byron and Braidwood EQ Binders identified mechanical EQ equipment, and surveillance schedules associated with sub-components such as O-rings and gaskets. As a result of this review, the sub-components identified in the EQ Binders are designated in a commodity group called "Mechanical Environmental Qualification (MEQ) Components."

"MEQ components" is an electrical commodity group that consists of short-lived elastomer sub-components on in scope mechanical EQ equipment. MEQ components are periodically replaced to maintain their environmental qualification and are associated with the TLAA evaluated in Section 4.7.3, which establishes the replacement intervals for the MEQ components. MEQ components serve a pressure boundary intended function.

MEQ components at BBS are environmentally qualified. They are evaluated as a TLAA (Section 4.7.3) and ultimately managed by the Environmental Qualification (EQ) of Electric Components (B.3.1.3) program.

As a result of the response to RAI 4.7.3-1 provided in Enclosure A of this letter, LRA Section 3.6.2.4, page 3.6-17, is revised as shown below. Additions are indicated with ***bolded italics***.

3.6.2.4 Time-Limited Aging Analysis

The time-limited aging analyses identified below are associated with Electrical Commodities:

- Section 4.4, Environmental Qualification (EQ) of Electric Components.
- ***Section 4.7.3, Mechanical Environmental Qualification***

As a result of the response to RAI 4.7.3-1 provided in Enclosure A of this letter, LRA Table 3.6.2-1, page 3.6-29, is revised as shown below. Additions are indicated with ***bolded italics***.

Table 3.6.2-1 Electrical Commodities (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Item	Table 1 Item	Notes
<i>Mechanical Environmental Qualification Components</i>	<i>Pressure Boundary</i>	<i>Various Organic Elastomers</i>	<i>Adverse Localized Environment</i>	<i>Various Aging Effects</i>	<i>Environmental Qualification (EQ) of Electric Components (B.3.1.3)</i>			<i>J, 9</i>

As a result of the response to RAI 4.7.3-1 provided in Enclosure A of this letter, LRA Table 3.6.2-1, page 3.6-32, is revised as shown below. Additions are indicated with ***bolded italics***.

9. This AMR Line Item is for the in-scope mechanical environmental qualification (MEQ) components that are short-lived and periodically replaced to maintain their environmental qualification. These components are associated with the TLAA evaluated in Section 4.7.3, which establishes the replacement intervals for the MEQ components. The Environmental Qualification (EQ) of Electric Components (B.3.1.3) aging management program will manage the replacement of the MEQ components and condition monitoring activities during the period of extended operation.

As a result of the response to RAI 4.7.3-1 provided in Enclosure A of this letter, LRA Section A.1.3, page A-7, is revised as shown below. Additions are indicated with ***bolded italics***.

A.1.3 NUREG-1801 Chapter X Aging Management Programs

The NUREG-1801 Chapter X Aging Management Programs (AMP) associated with Time-Limited Aging Analyses are described in the following sections. The AMPs are either consistent with generally accepted industry methods as discussed in NUREG-1801 Chapter X or require enhancements. The following list reflects the status of these programs at the time of the License Renewal Application (LRA) submittal. Commitments for program additions and enhancements are identified in Appendix A.5 License Renewal Commitment List.

1. Fatigue Monitoring (Section A.3.1.1) [Existing - Requires Enhancement]
2. Concrete Containment Tendon Prestress (Section A.3.1.2) [Existing - Requires Enhancement]
3. Environmental Qualification (EQ) of Electric Components (Section A.3.1.3) [Existing - ***Requires Enhancement***]

As a result of the response to RAI 4.7.3-1 provided in Enclosure A of this letter, LRA Section A.3.1.3, pages A-46 and A-47, is revised as shown below. Additions are indicated with **bolded italics**.

A.3.1.3 Environmental Qualification (EQ) of Electric Components

The Environmental Qualification (EQ) of Electric Components is an existing program that manages the aging of electrical equipment within the scope of 10 CFR 50.49, "Environmental Qualification of Electrical Equipment Important to Safety for Nuclear Power Plants." The program establishes, demonstrates, and documents the level of qualification, qualified configurations, maintenance, surveillance, and replacements necessary to meet 10 CFR 50.49. A qualified life is determined for equipment within the scope of the program and appropriate actions such as replacement or refurbishment are taken prior to or at the end of the qualified life of the equipment so that the aging limit is not exceeded. The various aging effects addressed by this program are adequately managed so that the intended functions of components within the scope of 10 CFR 50.49 are maintained consistent with the current licensing basis during the period of extended operation.

The Environmental Qualification (EQ) of Electric Components aging management program will also manage the aging of mechanical environmental qualification (MEQ) components. Qualified lives for MEQ components are established based on aging concerns in accordance with the provisions of Criterion 4 of Appendix A to 10 CFR Part 50. As part of the qualification, replacement intervals were identified as required either on the basis of aging performed during an IEEE 323-1974 qualification test program or on the basis of published material aging data. The program establishes, demonstrates, and documents the level of qualification, qualified configurations, maintenance, surveillance, and replacements necessary to meet UFSAR Section 3.11. The various aging effects on the MEQ components included under Environmental Qualification requirements are adequately managed so that the intended functions of the MEQ components are maintained consistent with the current licensing basis during the period of extended operation.

The Environmental Qualification (EQ) of Electric Components aging management program will be enhanced:

- 1. To expand the scope of the program to include mechanical environmental qualification (MEQ) components.***

This enhancement will be implemented prior to the period of extended operation.

As a result of the response to RAI 4.7.3-1 provided in Enclosure A of this letter, LRA Section B.1.6, page B-11, is revised as shown below. Additions are indicated with ***bolded italics***.

B.1.6 NUREG-1801 Chapter X Aging Management Programs

The following NUREG-1801 Chapter X AMPs are described in Section B.3 of this appendix as indicated. These Chapter X AMPs are existing programs.

1. Fatigue Monitoring (Section B.3.1.1) [Existing - Requires Enhancement]
2. Concrete Containment Tendon Prestress (Section B.3.1.2) [Existing - Requires Enhancement]
3. Environmental Qualification (EQ) of Electric Components (Section B.3.1.3) [Existing - ***Requires Enhancement***]

As a result of the response to RAI 4.7.3-1 provided in Enclosure A of this letter, LRA Section B.3.1.3, page B-287, is revised as shown below. Additions are indicated with ***bolded italics*** and ~~strikethroughs~~ for deleted text.

B.3.1.3 Environmental Qualification (EQ) of Electric Components

Program Description

The Environmental Qualification (EQ) of Electric Components is an existing program that manages the aging of electrical equipment within the scope of 10 CFR 50.49, "Environmental Qualification of Electrical Equipment Important to Safety for Nuclear Power Plants." The program includes electric equipment important to safety, which are composed of various polymeric and metallic materials. This electric equipment is subject to adverse environments caused by heat, radiation, oxygen, moisture, or voltage. The program establishes, demonstrates, and documents the level of qualification, qualified configurations, maintenance, surveillance and replacements necessary to meet 10 CFR 50.49. A qualified life is determined for equipment within the scope of the program and appropriate mitigative actions such as replacement or refurbishment are taken prior to or at the end of the qualified life of the equipment so that the aging limit is not exceeded. The various aging effects addressed by this program are adequately managed so that the intended functions of components within the scope of 10 CFR 50.49 are maintained consistent with the current licensing basis during the period of extended operation.

The Environmental Qualification (EQ) of Electric Components aging management program will be enhanced to manage the aging of mechanical environmental qualification (MEQ) components. Qualified lives for MEQ components are established based on aging concerns in accordance with the provisions of Criterion 4 of Appendix A to 10 CFR Part 50. As part of the qualification, replacement intervals were identified as required either on the basis of aging performed during an IEEE 323-1974 qualification test program or on the basis of published material aging data. The results of qualification tests or other published material aging data have been documented in individual mechanical component EQ Binders. The program establishes, demonstrates, and documents the level of qualification, qualified configurations, maintenance, surveillance, and replacements necessary to meet UFSAR Section 3.11. The various aging effects on the MEQ components included under Environmental Qualification requirements are adequately managed so that the intended functions of the MEQ components are maintained consistent with the current licensing basis during the period of extended operation.

NUREG-1801 Consistency

The Environmental Qualification (EQ) of Electric Components aging management program ~~is~~ ***will be*** consistent with the ten elements of aging management program X.E1, "Environmental Qualification (EQ) of Electric Components," specified in NUREG-1801.

Exceptions to NUREG-1801

None.

Enhancements

~~None.~~

The Environmental Qualification (EQ) of Electric Components aging management program will be enhanced:

- 1. To expand the scope of the program to include mechanical environmental qualification (MEQ) components.***

Program Elements Affected: Scope of Program (Element 1), Parameters Monitored/Inspected (Element 3), Detection of Aging Effects (Element 4), Monitoring and Trending (Element 5), Acceptance Criteria (Element 6), Corrective Actions (Element 7), Confirmation Process (Element 8), Administrative Controls (Element 9)

This enhancement will be implemented prior to the period of extended operation.

Enclosure C

Byron and Braidwood Stations (BBS) Units 1 and 2 License Renewal Commitment List Changes

This Enclosure identifies commitments made or revised in this document and is an update to the Byron and Braidwood Station (BBS) LRA Appendix A, Table A.5 License Renewal Commitment List. Any other actions discussed in the submittal represent intended or planned actions and are described to the NRC for the NRC's information and are not regulatory commitments. Changes to the BBS LRA Appendix A, Table A.5 License Renewal Commitment List are as a result of the Exelon response to the following RAI:

RAI 4.7.3-1

Notes:

- To facilitate understanding, portions of the original License Renewal Commitment List have been repeated in this Enclosure, with revisions indicated.
- Existing LRA text is shown in normal font. Changes are highlighted with ***bold italics*** for inserted text and ~~strikethroughs~~ for deleted text.

As a result of the response to RAI 4.7.3-1, Item 45 on page A-93 of the License Renewal Commitment List is revised as shown below. The RAI that led to this commitment modification are listed in the "SOURCE" column. Any other actions described in this submittal represent intended or planned actions. They are described for the NRC's information and are not regulatory commitments.

A.5 License Renewal Commitment List

NO.	PROGRAM OR TOPIC	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE
45	Environmental Qualification (EQ) of Electric Components	<p>Existing program is credited.</p> <p><i>The Environmental Qualification (EQ) of Electric Components aging management program will be enhanced:</i></p> <p><i>1. To expand the scope of the program to include mechanical environmental qualification (MEQ) components.</i></p>	<p>Ongoing</p> <p><i>Program to be enhanced prior to the period of extended operation.</i></p>	<p>Section A.3.1.3</p> <p><i>Exelon letter RS-14-079 3/04/2014</i></p> <p><i>RAI 4.7.3-1</i></p>