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

April 3, 2014

LICENSEE: Exelon Generation Company, LLC

FACILITY: Byron Station, Units 1 and 2
Braidwood Station, Units 1 and 2

SUBJECT: SUMMARY OF TELEPHONE CONFERENCE CALL HELD ON FEBRUARY 12, 2014, BETWEEN THE U.S. NUCLEAR REGULATORY COMMISSION AND EXELON GENERATION COMPANY, LLC, CONCERNING DRAFT REQUEST FOR ADDITIONAL INFORMATION PERTAINING TO THE BYRON STATION AND BRAIDWOOD STATION, LICENSE RENEWAL APPLICATION (TAC NOS. MF1879, MF1880, MF1881, MF1882)

The U.S. Nuclear Regulatory Commission (NRC or the staff) and representatives of Exelon Generation Company, LLC (Exelon or the applicant), held a telephone conference call on February 12, 2014, to discuss and clarify the staff's draft request for additional information (DRAI), Set 14, concerning the Byron Station, Units 1 and 2, and the Braidwood Station, Units 1 and 2, license renewal application. The telephone conference call was useful in clarifying the intent of the staff's DRAIs.

Enclosure 1 provides a listing of the participants, and Enclosure 2 contains a listing of the DRAIs discussed with the applicant, including a brief description on the status of the items.

The applicant had an opportunity to comment on this summary.

Lindsay 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

Enclosures:
1. List of Participants
2. List of Draft Request for Additional Information

cc w/encls: Listserv

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/RA/
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SUBJECT: SUMMARY OF TELEPHONE CONFERENCE CALL HELD ON FEBRUARY 12, 2014, BETWEEN THE U.S. NUCLEAR REGULATORY COMMISSION AND EXELON GENERATION COMPANY, LLC CONCERNING DRAFT REQUEST FOR ADDITIONAL INFORMATION PERTAINING TO THE BYRON STATION AND BRAIDWOOD STATION, LICENSE RENEWAL APPLICATION (TAC NOS. MF1879, MF1880, MF1881, MF1882)

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TELEPHONE CONFERENCE CALL
BYRON STATION, UNITS 1 AND 2, AND BRAIDWOOD STATION, UNITS 1 AND 2
LICENSE RENEWAL APPLICATION

LIST OF PARTICIPANTS
February 12, 2014

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Lindsay Robinson	U.S. Nuclear Regulatory Commission (NRC)
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DRAFT REQUEST FOR ADDITIONAL INFORMATION
BYRON STATION, UNITS 1 AND 2, AND BRAIDWOOD STATION, UNITS 1 AND 2
LICENSE RENEWAL APPLICATION

February 12, 2014

The U.S. Nuclear Regulatory Commission (NRC or the staff) and representatives of Exelon Generation Company, LLC (Exelon or the applicant), held a telephone conference call on February 12, 2014, to discuss and clarify the following draft request for additional information (DRAI) concerning the Byron Station, Units 1 and 2, and the Braidwood Station, Units 1 and 2, license renewal application (LRA).

DRAI B.3.1.2-1

Applicability:

Byron Station (Byron) and Braidwood Station (Braidwood), all units

Background:

License renewal application (LRA) Section B.3.1.2 states that the "Concrete Containment Tendon Prestress" aging management program (AMP) is consistent with an enhancement with the Generic Aging Lessons Learned (GALL) Report, Revision 2, AMP X.S1, "Concrete Containment Tendon Prestress." The "monitoring and trending" program element of the GALL Report AMP X.S1 states that "the trend line represents the trend of prestressing forces based on the actual measured forces" and that NRC Information Notice (IN) 99-10, "Degradation of Prestressing Tendon Systems in Prestressed Concrete Containments," provides guidance for constructing the trend line.

LRA Section B.3.1.2 also states that the "[t]rend line regression analysis is consistent with NRC Information Notice (IN) 99-10." The LRA further states that the "[t]rend lines, one for each tendon group, are constructed using the measured tendon forces and represent the changes in mean vertical, hoop and dome prestressing forces with time" and that "the analysis evaluates force trends by group (dome, hoop, vertical) and shows that group mean forces will not fall below applicable [minimum required values] MRV's prior to the end of the period of extended operation."

Issue:

Table IWL-2521-1 in Subsection IWL of the ASME Code, Section XI, states that for each tendon group the number of tendons to be examined varies between 2 to 5 percent of the tendon population. IN 99-10 discusses that for a small sample size, using the average of the tendon force (TF) for each surveillance test masks the true variation between TF and time (T) (i.e., the tendency of the TF to vary systematically with T, where the scattering of points about the "curve" represents the true relationship between TF and T). The staff noted that LRA Figures 4.5-1 through 4.5-12 show that multiple tendon values are plotted for past ISI years. It is not clear whether the applicant uses average/mean TF or individual lift-off values when developing the trend lines.

Request:

Clarify the methodology used for the construction of the regression analysis. Specifically, state whether the Byron and Braidwood regression analyses use the individual lift-off forces for the development of statistically validated trend lines.

Discussion: The applicant requested clarity on the staff's request. No edits were made to the DRAI. This question will be sent as a formal RAI titled "RAI B.3.1.2-1."

DRAI B.3.1.2-2

Applicability:

Byron and Braidwood

Background:

LRA Section B.3.1.2 states that the "Concrete Containment Tendon Prestress" AMP is consistent with an enhancement with the GALL Report, Revision 2, AMP X.S1, "Concrete Containment Tendon Prestress." The GALL Report AMP X.S1, in its program description, states that "[t]he program consists of an assessment of inspections performed in accordance with the requirements of Subsection IWL of the ASME Code, Section XI, as supplemented by the requirements of 10 CFR 50.55a(b)(2)(viii)" and that the parameters monitored are the prestressing tendon forces (TF) in prestressed concrete containments.

LRA Section B.3.1.2 states that "[t]he program requires measurement of prestressing forces on an initial 2% sample of each tendon group (dome, hoop, vertical) every five years, as specified in IWL-2400." The LRA also states in the "operating experience" program element:

> In 2009 and 2011, Byron and Braidwood, respectively, performed the 25th year interval ASME Section XI, Subsection IWL, examinations of the concrete containment tendons. These examinations included testing to assess the loss of prestressing forces in select containment tendons, consistent with IWL requirements.

Issue:

The audited procedure ER-AA-330-006, "ISI and Testing of the Prestressed Concrete Containment Post Tensioning System, Rev. 6," indicates that Byron and Braidwood alternate every ten years between visual and full examinations which include testing and measurements of TF. Subsection IWL-2421 of Section XI of the ASME Code allows the examination frequency to be modified if the containments are essentially identical in design, utilize the same prestressing systems, and post tensioning operations were completed within 2 years apart. If all criteria are met, then full examinations as required by IWL-2500 shall be performed at 1, 3, and 10 years and every 10 years thereafter for the first containment unit; and for each subsequent containment constructed at the site, examinations shall be performed at 1, 5, and 15 years and every 10 years thereafter. It is not clear whether Byron and Braidwood follow the modified ISI intervals as stated in IWL-2421 and procedure ER-AA-330-006 to perform measurement of TF at alternating time frames for each unit (e.g., one unit fully examined per IWL-2500 on year 20 while the other on year 25) or examines, tests, and measures TF for both units at each site every five years, as stated in the LRA.

Request:

Clarify the frequency of measuring the prestressing tendon forces for each selected tendon group (dome, hoop, vertical) sample examined during ISIs for Byron and Braidwood, all units.

Discussion: The applicant requested clarity on the staff's request. No edits were made to the DRAI. This question will be sent as a formal RAI titled "RAI B.3.1.2-2."

DRAI B.2.1.34-1

Applicability:

Byron and Braidwood

Background:

LRA Section B.2.1.34 states that the "Structures Monitoring" AMP is consistent with enhancements with the GALL Report, Revision 2, AMP XI.S6, "Structures Monitoring." During a walkdown of Byron and Braidwood's main steam and tendon gallery tunnels, the staff observed white material deposits, or efflorescence, on some below-grade reinforced concrete walls. The conditions at Byron are far more evident than at Braidwood. A review of operating experience revealed similar conditions in the auxiliary feedwater tunnel concrete walls. Through discussions with the applicant, the staff learned that the cracks through which the material appears to be leaching have existed since initial plant construction, and the material deposits are considered to be the result of the limestone backfill migrating through these cracks. The staff noted that the groundwater at both Byron and Braidwood is considered to be an aggressive environment due to high chloride levels (i.e., >500 ppm).

Issue:

10 CFR 54.21(a)(3) requires that the applicant demonstrate that the effects of aging will be adequately managed so that the intended function will be maintained consistent with the current licensing basis for the period of extended operation. However, without knowing the source of the material deposits in the main steam, auxiliary feedwater, and tendon gallery tunnels (i.e., whether the material deposits are a result of the limestone backfill migrating through the cracks or material leaching from the concrete structures), the staff does not have sufficient information to conclude that the proposed LRA AMP, "Structures Monitoring," will be adequate to manage the effects of aging during the period of extended operation.

Requests:

1. State what actions, if any, have been taken to determine the composition of the material (white deposits). State whether an evaluation has been performed to determine the source of the material deposits. If so, provide the technical basis for that conclusion.
2. Considering that the groundwater at Byron and Braidwood is aggressive, state what actions, if any, have been taken to evaluate the condition of the concrete in these below-grade structures.

Discussion: The applicant requested clarification on the staff's requests. No edits were made to the DRAI. This question will be sent as a formal RAI titled "RAI B.2.1.34-1."

DRAI B.2.1.30-1

Applicability:

Byron and Braidwood

Background:

LRA Section B.2.1.30 states that the ASME Section XI, Subsection IWL AMP is an existing program that, following enhancements, will be consistent with the GALL Report AMP XI.S2, "ASME Section XI, Subsection IWL." During Byron and Braidwood onsite AMP audits, the staff reviewed operating experience regarding a crack found on the Braidwood Unit 1 primary containment. The crack was found in 2006 during the 25th ASME Section XI, Subsection IWL visual inspection of the containment concrete. Based on the description in the applicant's action request, the crack is diagonal and located on the upper right corner of the concrete patch placed after the Unit 1 containment concrete was cut out for the steam generator (SG) replacement in 1998. Grease leakage was also observed through the crack. During the Braidwood onsite audit, the staff performed a walkdown to look at the condition of the concrete where the crack was located and noted that there was also a similar crack on the upper left corner of the SG replacement patch in Unit 1's primary containment. Also during the audit, the applicant stated that a similar condition exists for the Byron Unit 1 primary containment concrete at the SG replacement patch.

Issue:

The GALL Report states that "[o]perating experience involving the AMP, including past corrective actions resulting in program enhancements or additional programs, should provide objective evidence to support a determination that the effects of aging will be adequately managed so that the structure and component intended functions will be maintained during the period of extended operation." GALL Report AMP XI.S2 states that the frequency and scope of examinations specified in 10 CFR 50.55a and ASME Section XI, Subsection IWL, should ensure that aging effects would be detected before they would compromise the design-basis requirements. The GALL Report also states that areas that indicate suspect conditions receive a more rigorous detailed visual examination (as defined by the ASME Code). The staff requires additional information on whether the applicant has made a determination as to (1) whether more rigorous detailed visual examinations are needed per the IWL acceptance criteria for crack width; (2) whether the cracking indicates an adverse condition has occurred with the prestressed tendons in that location; and (3) if grease leakage from the cracks has been evaluated against IWL limits.

Request:

Describe the actions taken to assess the condition of the cracks, type and frequency of inspections performed (if any), and corrective actions (if any) in accordance with the ASME Section XI, Subsection IWL Program. Also state whether there has been an evaluation per the IWL Code to assess the amount of grease leakage coming through the cracks and to determine if the leakage has any adverse effect on the ability of the affected tendons to perform their intended function.

Discussion: The applicant stated that it had responded on the docket to a similar request from a previously issued RAI. The reviewers agreed to review the docketed information.

After review of the docketed information, the staff determined that this question needed to be reevaluated and was resubmitted as part of DRAI Set 20. Therefore, this DRAI has been removed and will not be issued as a formal RAI in Set 14.

DRAI B.2.1.30-2

Applicability:

Byron and Braidwood

Background:

LRA Section B.2.1.30 states that the ASME Section XI, Subsection IWL AMP is an existing program that, following enhancements, will be consistent with the GALL Report AMP XI.S2, "ASME Section XI, Subsection IWL." During its onsite audit at both Byron and Braidwood, the staff reviewed operating experience regarding suspected areas of degradation in the primary containment tendon access gallery tunnel ceilings. The staff noted that, in June 2006, while performing visual examinations of Braidwood's tunnel ceilings concrete surfaces, 11 locations in Unit 1 and 14 locations in Unit 2 were identified as suspect areas with degradation. The suspected areas were covered in white deposits and rust. In addition, during the 2006 20th ASME Section XI, Subsection IWL, concrete examinations at Braidwood Units 1 and 2, degradation was found in the tendon tunnel ceilings near seven vertical tendon anchorage cans. The degradation was within a previously placed patch that extended from the outer wall to the inner wall in the tendon tunnel and consisted of a combination of the following: wet stalactites, surface concrete cracks exceeding .04", heavy accumulation of minerals, corrosion staining, moisture "wetting," accumulation of efflorescence in localized areas, "minor" cracking, and "hollow" sound emitted from the area when tapped with a hammer. In 2012, while performing augmented examinations of suspect areas identified during the 2011 25th year ASME IWL examinations, the following conditions were found at Braidwood Unit 2 tendon tunnel ceilings near six additional vertical tendon anchorage cans: buildup of minerals, efflorescence with evidence of moisture, 8" and 5" long stalactites, and surface corrosion on embedded plates.

During the onsite audits at both Byron and Braidwood, the staff performed walkdowns of the tendon access gallery tunnels to observe the overall condition of the area. The staff observed white deposits or efflorescence, stalactites, surface corrosion on embedded plates, and surface cracks in the tunnel ceilings near some of the vertical tendon anchorage cans.

The staff noted that the conditions of concrete degradation at the tendon gallery tunnel ceilings are present at both sites. In addition, based on its review of operating experience, the staff noted that the groundwater at both Byron and Braidwood is considered to be an aggressive environment due to high chloride levels (i.e., > 500 ppm).

Issue:

Per 10 CFR 54.21(a)(3), the applicant is required to demonstrate that the effects of aging will be adequately managed so that the intended function will be maintained consistent with the current licensing basis for the period of extended operation. The staff is concerned that some below-grade areas of the concrete containment are exposed to aggressive groundwater, which may be causing chemical attack and leaching of the concrete. It is not clear whether an evaluation has been performed to assess this condition per the requirements of the IWL Code. The staff needs additional information to determine whether the LRA ASME Section XI,

Subsection IWL, AMP will be adequate to manage the effects of aging during the period of extended operation (PEO).

Request:

State whether the concrete in the tunnel ceiling is subject to chemical attack or leaching and provide results of any evaluation conducted or planned to determine the composition of the material (e.g., mineral build-up, white efflorescence) and to evaluate the condition of the concrete at the tendon gallery tunnel ceilings.

Discussion: The applicant requested clarification on the staff's request. No edits were made to the DRAI. This question will be sent as a formal RAI titled "RAI B.2.1.30-1."

DRAI B.2.1.30-3

Applicability:

Braidwood

Background:

LRA Section B.2.1.30 states that the ASME Section XI, Subsection IWL AMP is an existing program that, following enhancements, will be consistent with the GALL Report AMP XI.S2, "ASME Section XI, Subsection IWL." During its review of Braidwood operating experience, the staff noted that ASME Section XI, Subsection IWL inspections have revealed that the sealant and cover are significantly degraded or missing at some of the drain assemblies in the dome area of the containment. Plant operating experience has documented that there is separation, chips, and loose concrete at some of the dome drains; accumulation of white deposits or efflorescence on concrete surfaces near all of the drains; and accumulation of water at the dome drains. The staff noted that the applicant performed a detailed visual examination of the suspected areas of concrete deterioration in accordance with Subsection IWL-2310 of the ASME Code. During the detailed visual examinations, additional signs of deterioration were found on suspected areas of concrete in the form of "minor" spalls near the drains and cracks extending from all six dome drain penetrations (one reported as being more than 6" long and .8" wide at the concrete surface), efflorescence within the cracks, and corrosion staining.

Issue:

Per 10 CFR 54.21(a)(3), the applicant is required to demonstrate that the effects of aging will be adequately managed so that the intended function will be maintained consistent with the current licensing basis for the period of extended operation. The staff noted that issues with degradation of the dome drainage system and suspected areas of concrete deterioration have been identified during previous ASME Section XI, Subsection IWL examinations at Braidwood. The staff is concerned that the conditions observed by the applicant near the dome drains (accumulation of white deposits, water accumulation, spalling, cracks, and corrosion staining) may be indicative of, or may result in, degradation. The water accumulated may leak through the cracks and reach the concrete rebar which can result in degradation of the rebar. The staff needs additional information regarding the condition of concrete suspected areas of degradation and methods of evaluation to conclude that the LRA ASME Section XI, Subsection IWL AMP will be adequate to manage the effects of aging during the period of extended operation.

Request:

Regarding the reported conditions of the containment concrete at the dome drainage system, state whether further actions have been taken or are needed per appropriate programs such that concrete degradation can be evaluated and appropriate mitigating actions are implemented to prevent loss of intended function during the period of extended operation. Also, provide a summary of actions that have been taken to date to correct the degraded condition of the dome drainage system such that water does not accumulate in the suspected areas of concrete degradation near the dome drains.

Discussion: The applicant noted an incorrect reference, which is underlined, in the Background section; the correct reference is "IWL-3210." This and other minor grammatical edits will be made prior to final issuance. The applicant also requested clarification on the staff's request. This question will be sent as a formal RAI titled "RAI B.2.1.30-2."

DRAI B.2.1.30-4

Applicability:

Braidwood

Background:

LRA Section B.2.1.30 states that the ASME Section XI, Subsection IWL AMP is an existing program that, following enhancements, will be consistent with the GALL Report AMP XI.S2, "ASME Section XI, Subsection IWL." LRA Section B.2.1.30 states that "free-water has been found in 3-8%of the tendon inspections at Braidwood Unit 2...the presence of free water has been consistently detected in specific horizontal, vertical, and dome tendons, and this type of condition has also been detected [at] Braidwood Unit 1." The LRA further states that, since Braidwood construction, free water has been found in a "few, specific horizontal and vertical tendon anchorages located below grade." The LRA also states that the water in the dome tendons is due to the degraded dome drainage system and that the water found at vertical tendons and below-grade horizontal tendons is due to the high water table, which is about 20 to 25 feet higher than the bottom of the containment.

LRA Section B.2.1.30 states that to address the presence of water in the tendon sheaths, the applicant has performed augmented inspections on additional tendons beyond those selected for the ASME Section XI, Subsection IWL Program. These augmented inspections are performed every 5 years in conjunction with the ASME Section XI, Subsection IWL examinations. The LRA also states that due to the history of water found in containment tendons, the applicant included Enhancements 2 and 3 to the ASME Section XI, Subsection IWL AMP.

Enhancement 2 states:

> A one-time inspection of one (1) vertical and one (1) horizontal tendon on each unit will be performed prior to the period of extended operation. The inspection will consist of visually examining one (1) wire from each of the two (2) types of tendons at a worst-case location based on evidence of free water, grease discoloration, and grease chemistry results. This location will serve as a leading indicator for potential degradation or tendon surface corrosion (Braidwood only).

Enhancement 3 states:

> In order to monitor for tendon exposure to free water and moisture and manage any potential adverse effects, a periodic tendon water monitoring and grease sampling program will be implemented (Braidwood only). The program will consist of:
>
> (a) A baseline inspection of tendon grease caps at the bottom of all vertical and dome tendons, as well as all below-grade horizontal tendons, prior to the period of extended operation. The baseline inspection will check for evidence of free water and grease discoloration, with further actions taken based on the condition of the grease.
> (b) A follow-up tendon grease cap inspection of all vertical and dome tendons, as well as all below-grade horizontal tendons, will be performed within 10 years of the initial inspection, using the same approach as the baseline inspection.
> (c) For those tendons where free water, moisture, and grease did not meet acceptance criteria during the two (2) previous inspections, periodic monitoring of grease chemistry and moisture, free water, and grease discoloration will be performed on a frequency not to exceed 10 years.
>
> Corrective actions will be taken as necessary to ensure that the tendon grease meets ASME Section XI, Subsection IWL requirements.

Issue:

The GALL Report states that "the conditions and operating experience at the plant must be bound by the conditions and operating experience for which the GALL program was evaluated, otherwise it is incumbent on the applicant to augment the GALL program as appropriate to address the additional aging effects." The GALL Report also states that "[o]perating experience involving the AMP, including past corrective actions resulting in program enhancements or additional programs, should provide objective evidence to support a determination that the effects of aging will be adequately managed so that the structure and component intended functions will be maintained during the period of extended operation." The staff noted that the applicant has augmented and will enhance (Enhancements 2 and 3) its IWL AMP to address its plant-specific operating experience regarding the historical exposure of tendons to free water at Braidwood. However, the staff needs additional information regarding how the augmented inspections and enhancements will adequately manage the effects of aging during the period of extended operation. The staff has the following concerns:

- For the augmented inspections of additional tendons, performed every 5 years in conjunction with the ASME Section XI, Subsection IWL examinations, it is unclear how the locations for additional tendon inspections will be identified.
- Enhancement 2 proposes a one-time inspection of one horizontal and vertical tendon prior to the period of extended operation. It is not clear what the acceptance criteria will be for the one-time inspection of the corrosion protection medium and tendon wires and what further actions will be taken if the acceptance criteria are not met. Additionally, the enhancement does not include inspection of dome tendons, and the basis for this exclusion is not clear.
- Enhancement 3 states that a follow-up inspection will be performed within 10 years after the first baseline inspection. The enhancement also states that tendons that do not meet the acceptance criteria during the two previous inspections will be subject to periodic monitoring

at a frequency not to exceed 10 years. The staff is concerned that tendons that meet the acceptance criteria during the baseline inspection but do not meet the acceptance criteria in the follow-up inspection will not be subject to periodic monitoring. For sites with multiple plants, IWL-2421(b) states that when the conditions on IWL-2421(a) are met, the examinations required by IWL-2500 can be performed at a 10-year frequency instead of every 5 years. A 10-year frequency is the maximum frequency (less conservative approach) allowed by the IWL Code for a site with multiple plants. It is unclear as to how a frequency of examinations not to exceed 10 years will be adequate to address the additional aging effects at Braidwood.

Request:

1. Describe how the locations for augmented inspections of additional tendons will be identified.

2. Regarding Enhancement 2, state (1) the acceptance criteria for the one-time inspections, (2) what actions will be taken if the acceptance criteria are not met, and (3) the justification for not performing a one-time inspection of the dome tendons.

3. Regarding Enhancement 3, state (1) what actions will be taken for those tendons where the corrosion protection medium meets the acceptance criteria during the baseline inspection but are found not acceptable during the follow-up inspection, and (2) how the proposed frequency of inspections (not to exceed 10 years) will ensure that possible age-related degradation due to water inleakage to the tendons will be detected in a timely manner and managed such that the tendons will continue to perform their intended functions during the PEO.

Discussion: The applicant requested clarification on the staff's requests. No edits were made to the DRAI. This question will be sent as a formal RAI titled "RAI B.2.1.30-3."

DRAI B.2.1.29-1

Applicability:

Byron

Background:

LRA Section B.2.1.29 states that the ASME Section XI, Subsection IWE AMP is an existing program that, following enhancement, will be consistent with the GALL Report, Revision 2, AMP XI.S1. The "detection of aging effects" program element recommends, in accordance with IWE-1240, that augmented examinations should be performed for containment surface areas subject to degradation. In addition, the GALL Report states that operating experience involving the AMP should provide objective evidence to support a determination that the effects of aging will be adequately managed so that the structure and component intended functions will be maintained during the PEO.

During the audit, the staff performed walkdowns of the Byron main steam and tendon gallery tunnels and observed white material deposits on the concrete walls and tendon gallery tunnel ceilings, indicative of water leakage or seepage through the containment concrete. Through

discussions with the applicant, the staff learned that the cracks, through which the material appears to be leaching, have existed since initial plant construction. The staff noted during its review that on the south side of Byron Unit 1 and north side of Unit 2, the below grade areas between the main steam tunnels and containment structures were in-filled with limestone during the original construction. According to plant operating experience, this area has allowed groundwater infiltration to the below-grade containment concrete. The staff noted that the groundwater at both Byron and Braidwood is considered to be an aggressive environment due to high chloride levels (i.e., >500 ppm).

IWE-1240 states that interior and exterior containment surface areas that are subject to accelerated corrosion, with no or minimal corrosion allowance, require augmented examinations.

Issue:

With the history of aggressive water infiltrating the containment concrete, as evidenced by signs of water intrusion at the tendon gallery ceilings, there is the potential that elevated moisture levels at the outside of the containment concrete could cause moisture to travel through the concrete and come in contact with the carbon steel containment liner. This condition could result in degradation of the containment liner plates caused by accelerated corrosion at exterior surfaces of the containment liner. The applicant has not provided information, based on examination or analysis, on a determination as to whether water has been in contact with the outer surface of the liner or whether there has been any loss of thickness in the carbon steel due to accelerated corrosion in order to ensure the requirements of IWE-1240 are met.

Request:

With regards to the operating experience indicating that water is infiltrating the containment concrete, state whether there has been (or will be) an evaluation in accordance with IWE to determine (1) if the moisture could come into contact with the liner plate and (2) any resulting loss of material thickness due to corrosion. Describe how the IWE AMP will be able to ensure that the liner is not degraded such that the leak-tight integrity of the carbon steel is maintained through the PEO.

Discussion: The applicant requested clarification on the staff's requests. No edits were made to the DRAI. This question will be sent as a formal RAI titled "RAI B.2.1.29-1."

DRAI B.2.1.29-2

Applicability:

Braidwood

Background:

LRA Section B.2.1.29 states that the ASME Section XI, Subsection IWE AMP is an existing program that, following enhancement, will be consistent with the GALL Report, Revision 2, AMP XI.S1. The "detection of aging effects" program element recommends, in accordance with IWE-1240, that augmented examinations of containment surface areas should be performed for containment surface areas subject to degradation. The GALL Report states that operating experience involving the AMP, including past corrective actions resulting in program

enhancements or additional programs, should provide objective evidence to support a determination that the effects of aging will be adequately managed so that the structure and component intended functions will be maintained during the PEO.

During the audit, the staff reviewed action request (AR) 00105204, dated April 24, 2002, and noted that during a Braidwood Station Unit 2 IWE visual examination the applicant observed several localized bulges or buckles in the liner. The staff also noted that AR 1433284, dated October 29, 2012, states that some of the bulges were corroded.

Issue:

IWE-1240 states that interior and exterior containment surface areas that are subject to accelerated corrosion, with no or minimal corrosion allowance, require augmented examinations. IWE-3511 states that the condition of an examined area is acceptable if the Responsible Individual determines that there is no evidence of damage or degradation sufficient to warrant further evaluation or performance of a repair/replacement activity. Suspect conditions shall be evaluated to the extent necessary to ensure that the component function is not impaired.

Continued loss of material coupled with the state of stress at the liner may warrant further evaluation during the PEO to ensure that the corrosion has not impacted the liner function. It is not clear whether an evaluation has been conducted, in accordance with ASME Section XI, Subsection IWE to assess the impact of corroded bulges in the containment liner. The staff needs additional information to determine whether the ASME Section XI, Subsection IWE AMP will provide reasonable assurance of the integrity and leak-tightness of the liner when monitoring aging and degradation due to corrosion (loss of material), bulging, and their combined effect during the PEO.

Request:

1. State whether evaluation or testing was performed in accordance with ASME Section XI, Subsection IWE. State the results of any evaluation or testing with regards to the observed bulging of the containment, including the impact of corrosion at the bulged areas.

2. If applicable, describe what monitoring and trending measures at the corroded and bulged areas of the liner will be taken to trend the condition and ensure that the ASME Section XI, Subsection IWE AMP will provide reasonable assurance of the liner integrity and leak-tightness during the PEO.

Discussion: The applicant noted errors in the DRAI Background section and requested the staff review AR1433284. After further review, the staff noted the errors and determined that the request was not necessary. Therefore, this DRAI has been removed and will not be issued as a formal RAI.

DRAI B.2.1.29-3

Applicability:

Byron and Braidwood

Background:

LRA Section B.2.1.29 states that the ASME Section XI, Subsection IWE AMP is an existing program that, following enhancement, will be consistent with the GALL Report, Revision 2, AMP XI.S1. The "operating experience" program element recommends that the ASME Section XI, Subsection IWE program consider operating experience regarding liner plate and containment shell corrosion. The applicant should demonstrate that it utilizes industry operating experience in development of the AMP.

There is recent industry operating experience which has indicated that at some plants, the implementation of the IWE program has been ineffective in identifying moisture intrusion into the leak chase channel areas and potential leakage to the containment shell and liner seam welds. This issue is discussed in NRC Integrated Inspection Report 05000348/2012003 and 05000364/2012003 (Joseph M. Farley Nuclear Plant); NRC Integrated Inspection Report 05000395/2011003 (Virgil C. Summer Nuclear Station); and NRC Integrated Inspection Report 05000327/2012005 and 05000328/2012005 (Sequoyah Nuclear Plant). Some licensees were not performing general visual examinations of 100 percent of the containment liner plate leak chase systems in accordance with ASME Code Section XI, Subsection IWE requirements; and upon inspection, moisture was discovered in the leak chase channel system. Moisture intrusion into the leak chase channel system could reach the containment seam welds. This has the potential to cause corrosion at the welds and affect leak-tightness at the containment or liner pressure boundary.

Issue:

Regarding the recent industry operating experience concerning implementation of the 100 percent visual inspection requirements of the ASME Code IWE and the GALL Report recommendation that the applicant consider industry operating experience in development of the ASME Section XI, Subsection IWE AMP, the staff needs additional information for applicability to Byron and Braidwood.

Request:

Considering the recent industry operating experience described above regarding implementation of the IWE visual examinations, inspections of the leak chase channel system, and concerns of standing water or moisture intrusion to the containment liner plate, state what actions have been or will be taken to (1) determine whether there is moisture in the leak chase channel area and (2) ensure the IWE program will be effective in ensuring moisture intrusion and corrosion do not affect the carbon steel containment liner through the PEO.

Discussion: The applicant requested clarification on the staff's requests. No edits were made to the DRAI. This question will be sent as a formal RAI titled "RAI B.2.1.29-2."