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

November 17, 2017

Mr. Robert Coffey
Site Vice President
NextEra Energy Point Beach, LLC
6610 Nuclear Road
Two Rivers, WI 54241

SUBJECT: POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2 – AUDIT PLAN FOR LICENSE AMENDMENT REQUEST TO RESOLVE NONCONFORMANCES RELATING TO CONTAINMENT DOME TRUSS (EPID L-2017-LLA-0209)

Dear Mr. Coffey:

By letter dated March 31, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17090A511), NextEra Energy Point Beach, LLC (NextEra, the licensee) submitted a license amendment request (LAR) for the Point Beach Nuclear Plant PBNP), Units 1 and 2. The proposed amendment uses a risk-informed resolution strategy to resolve legacy design code nonconformances associated with construction trusses in the containment buildings of PBNP, Units 1 and 2.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's submittal and determined that a regulatory audit would assist in the timely completion of the subject LAR review process. The NRC staff has developed request for information needed to conduct the site audit.

The initial request for technical information was provided to the licensee via email sent on October 30, 2017 (ADAMS Accession No. ML17307A040). A follow up public teleconference was held on November 14, 2017 (ADAMS Accession No. ML17311A084), to discuss the requested technical information. At the conclusion of the meeting it was decided to include this information in the audit plan to be discussed during the site audit, scheduled to be conducted at the NextEra headquarters in Jupiter, Florida, on November 29 and 30, 2017.

Upon completion of the audit, the NRC staff will develop and issue the final request for information (RAI), as needed, and the licensee will be expected to provide the necessary information on the docket. The enclosed audit plan outlines the process that the NRC staff will follow.

If you have any questions, please contact me, at (301) 415-8371.

Sincerely,

Chaw Mahesh

Mahesh, Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-266 and 50-301

Enclosure:
Audit Plan

cc: ListServ

AUDIT PLAN

LICENSE AMENDMENT REQUEST 278 TO

FACILITY OPERATING LICENSE NOS. DPR-24 AND DPR-27

RISK-INFORMED APPROACH TO RESOLVE

CONSTRUCTION TRUSS DESIGN CODE NONCONFORMANCES

NEXTERA ENERGY POINT BEACH, LLC

POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

I. BACKGROUND

By letter dated March 31, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17090A511), NextEra Energy Point Beach, LLC (NextEra, the licensee) submitted a license amendment request (LAR) for the Point Beach Nuclear Plant PBNP), Units 1 and 2. The proposed amendment uses a risk-informed resolution strategy to resolve legacy design code nonconformances associated with construction trusses in the containment buildings of PBNP, Units 1 and 2.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's submittal and determined that a regulatory audit would assist in the timely completion of the subject LAR review process. Upon completion of the audit, the NRC staff will develop and issue final RAI, as needed, and the licensee will be expected to provide the necessary information on the docket.

The following audit plan outlines the process that the NRC staff will follow.

II. REGULATORY AUDIT BASES

The audit will be performed consistent with NRC Office of Nuclear Reactor Regulation Office Instruction LIC-111, "Regulatory Audits," dated December 29, 2008 (ADAMS Accession No. ML082900195). The purpose of this audit is to gain a more detailed understanding of the analysis which is credited in the subject LAR. An audit was determined to be the most efficient approach toward a timely resolution of issues associated with this LAR review, since the staff will have an opportunity to minimize the potential for multiple rounds of RAIs and ensure no unnecessary burden will be imposed by requiring the licensee to address issues that are no longer necessary to make a safety determination. Upon completion of this audit, the NRC staff are expected to develop and issue RAIs, as needed to ensure that the information requested will be sufficient to allow the staff to complete the LAR review, and the licensee will be expected to provide the necessary information on the docket. The final RAIs will be issued after the audit.

III. REGULATORY AUDIT SCOPE AND METHODOLOGY

The scope of the audit includes key components of the risk-informed methodology including:

- The definition of the proposed change to the licensing basis,
- The engineering evaluations which support the licensee's conclusions with respect to the five principles of risk-informed decision making, and
- The proposed implementation and monitoring strategies.

The audit will be conducted on November 29 and 30, 2017.

IV. INFORMATION AND OTHER MATERIAL NECESSARY FOR THE REGULATORY AUDIT

The information needed for the regulatory audit is listed in the enclosure to this audit plan. Any supporting documentation that may be pertinent and useful for elaboration and/or clarification of the information needed to address the NRC staff's questions are also requested to be made available for staff review (paper copy or electronic copy on a licensee-provided laptop are both satisfactory). Key licensee personnel involved in the development of the draft RAI responses should be made available to respond to any questions from the NRC staff. The audit team will not remove nondocketed information from the audit site.

V. NRC AUDIT TEAM

The members of the audit team will be:

- Mahesh Chawla, Project Manager, NRC
- Shilp Vasavada, Technical Reviewer, Probabilistic Risk Assessment (PRA), NRC
- Sara Lyons, Technical Reviewer, PRA, NRC
- Ching Ng, Technical Reviewer, PRA, NRC
- Dan Hoang, Technical Reviewer, Structural Engineering, NRC

VI. LOGISTICS

The audit will be conducted on November 29 and 30, 2017, at the NextEra engineering offices in Jupiter, Florida. A conference room should be provided for use by the NRC staff during the audit. The NRC project manager will coordinate any changes to the audit schedule and location with the licensee.

VII. SPECIAL REQUESTS

The NRC staff would like access to the following equipment and services:

- Telephone with a speaker or speaker phone
- Enclosed conference room (or comparable space) with a table, chairs, and white board
- A projector and screen
- Wireless internet access (if available in the work space)

VIII. DELIVERABLES

An audit summary will be prepared within 90 days of the completion of the audit. If information evaluated during the audit is needed to support a regulatory decision, the NRC staff will identify it in a RAI. The NRC staff, if needed, will provide the RAI to the licensee in separate docketed correspondence.

IX. INFORMATION REQUEST FOR THE AUDIT

1. Section 2.4 of Enclosure 1 of the submittal proposes "[a]cceptance of the final modified configuration of the Unit 1 construction truss and associated equipment, and the current configuration of the Unit 2 construction truss and associated equipment, using a risk-informed approach for resolution." The current licensing basis for the trusses is the code of record against which noncompliance is noted for certain truss members. It appears that the licensing basis change includes the use of a different analysis method and acceptance criteria, such as those listed in Tables 4-1 and 4-2 of Enclosure 5 of the submittal, for certain truss members. Enclosure 3 of the submittal includes the text for the new section (Section A.5.10) of the updated final safety analysis report (UFSAR), which also appears to change the licensing basis for certain truss members to a different code and/or acceptance criteria by incorporating the submittal by reference. However, Section 3.4 of Enclosure 1 of the submittal states that "[t]he alternative evaluation methods and acceptance criteria are not proposed as part of the license basis revision" which appears to be contradictory in that it seeks acceptance of the final proposed configurations of the trusses and associated equipment without any change to the current licensing basis.

    a. Clarify the change(s) to the licensing basis being sought by the submittal and provide a tabular comparison of the current licensing basis and the proposed change, including any specific changes to the current code of record.

    b. Clarify whether the intent of reference to the submittal in the proposed text of the new Section A.5.10 of the UFSAR, as shown in Enclosure 3 of the submittal, is to include the alternative evaluation methods and acceptance criteria used in the submittal as part of the proposed new licensing basis or explain which sections of the submittal are intended to be incorporated by reference.

    c. Explain how the cited non-conformances can be reconciled if "[t]he alternative evaluation methods and acceptance criteria are not proposed as part of the license basis revision" as stated in Section 3.4 of Enclosure 1 of the submittal.

2. Enclosure 2 of the submittal identifies the regulatory commitments made by the licensee in conjunction with the submittal. One of the commitments states that the licensee will "implement new seismic operating limits applicable to both Units...Site procedures will be revised..." Section 3.2 of Enclosure 1 of the submittal provides the proposed "new seismic operating limits" and Section 2.2.2 of the same enclosure provides the maximum ground accelerations in the horizontal and vertical directions for the operational basis earthquake (OBE). It appears that the

"new seismic operating limit" for the vertical direction exceeds the corresponding value for the OBE.

a. Provide the basis and justification for the selection of the "new seismic operating limits."

b. Clarify the purpose of the "new seismic operating limits" as compared to the OBE limits when the "new seismic operating limit" for the vertical direction appears to exceed the corresponding value for the OBE.

3. According to Section 3.1.1 of Enclosure 1 and Section 1.3 of Enclosure 4 of the submittal, the initiating events considered are seismic events and thermal loading arising from postulated accidents. These initiators are used in the risk assessments for both the "bounding" and the "demonstrably conservative" analyses. The focus on these initiators is presumably due to the source of the nonconformances. However, a risk assessment needs to consider events and hazards that can credibly impact the structural integrity of the truss and the equipment supported from it. Provide quantitative or qualitative technical justification for the exclusion of internal and external initiating events other than those already considered in the analysis.

4. Section 3.1.3 of Enclosure 1 of the submittal (page 15 of 26) discusses how sufficient safety margins are maintained with the proposed change to the licensing basis. According to Regulatory Guide (RG) 1.174, Revision 2, assurance of sufficient safety margins following risk-informed licensing basis changes needs to consider whether, "[s]afety analysis acceptance criteria in the [licensing basis] LB (e.g., final safety analysis report (FSAR), supporting analyses) are met..." Containment integrity analysis is documented in Section 14.3.4 of the PPNP UFSAR (ADAMS Accession No. ML16251A166). Table 14.3.4-27 in the UFSAR provides the list of the containment heat sinks credited in the analysis.

a. Clarify whether the truss material was credited as part of the cited analysis.

b. If the truss material is credited for containment analysis, clarify whether the credited material reflects the as-designed or the as-built trusses indicating the difference between the two in case the as-designed truss material is credited.

c. Provide details about the amount of truss material that is to be removed as part of the modifications and justification for not reassessing the safety analyses, the cited one as well as other pertinent ones, to ensure that the assumptions are valid and the acceptance criteria are met.

5. According to Enclosure 2 and Section 1.2 of Enclosure 4 of the submittal, no modifications are to be performed for the trusses in Unit 2. However, Section 6.4.2.2 of Enclosure 5 states that "[t]rimming the first panel point at ...11 locations for Unit 2..." and "[t]he Unit 2 truss was analyzed..."

a. Clarify whether any modifications are going to be performed to the Unit 2 trusses including the rationale for not performing such modifications if they were initially planned or considered.

b. Confirm that the configuration of the Unit 2 truss that was analyzed to determine the seismic and thermal fragility and the results of which are used in the submittal did not include any modifications and is consistent with the configuration of the Unit 2 trusses as proposed in the submittal. If differences are found between the two configurations, provide and propagate the updated values or justify the continued use of the values in Section 6.4.2.2 of Enclosure 5 (and throughout Enclosure 4).

6. Section 3.1.2 of Enclosure 1 of the submittal states that "the peer review of the PRA analysis was conducted...and the peer review of the seismic and thermal fragility analyses was conducted..." The risk calculations presented in Enclosure 4 of the submittal do not include all the technical elements of a PRA as defined in RG 1.200, Revision 2 (ADAMS Accession No. ML090410014). Attachment C of Enclosure 4 of the submittal provides a "statement of compliance" against the supporting requirements (SRs) in the 2009 American Society of Mechanical Engineers (ASME)/American Nuclear Society (ANS) PRA Standard for external hazard screening (Part 6 of the Standard) and seismic PRA (Part 5 of the Standard). Further, Table 1 and Section 6 of Enclosure 4 of the submittal includes core damage frequency (CDF) and large early release frequency (LERF) values from different hazards. However, the sources of those values are not mentioned.

   a. Provide details of the peer reviews referred to in Section 3.1.2 of Enclosure 1 of the submittal including information on the peer-review guidance that was followed, the specific part(s) of the ASME/ANS PRA Standard, and finding-level Facts and Observations (F&Os) and their corresponding resolution.

   b. Explain the intent and relevance to the current application of the "statement of compliance" against the SRs in Parts 5 and 6 of the 2009 ASME/ANS PRA Standard provided in Attachment C to Enclosure 4 of the submittal.

   c. Provide in a tabular format, information on the source for the CDF and LERF estimates for each hazard listed in Table 1 and Section 6 of Enclosure 4 of the submittal. If the source is a PRA model, include information on the status of the technical adequacy determination such as whether a full-scope peer-review against the ASME/ANS PRA Standard has been performed per an RG 1.200-endorsed peer review process, and the version of the Standard against which the peer review was performed. Include any findings-level F&Os which has not been closed per an NRC-approved process, any subsequent modifications to the associated PRA model indicating which modifications are considered "upgrades," and the results of any follow-on or focused scope peer-reviews.

   d. If the seismic CDF and LERF values are from a seismic PRA model, justify not exercising that model for the current submittal.

   e. Clarify whether the CDF and LERF values in Table 1 and Section 6 of Enclosure 4 of the submittal represent mean estimates. If not, provide mean estimates for each hazard per RG 1.174 or justify the use of point estimates for risk-informed decision-making.

7. Section 1.6 and Attachment C of Enclosure 4 of the submittal cites Part 6 of the 2009 ASME/ANS PRA Standard (ASME RA-Sa-2009) and states that "the bounding and demonstrably conservative analyses show that [Delta] CDF and [Delta] LERF are acceptably low for hazards challenging the [Containment Truss] CT design." Section 6-2.1 of the 2009 ASME/ANS Standard states that "the term "screening out" is used here for the process whereby an external hazard is excluded from further consideration in the PRA analysis." Section 6-1.2 states that "the term 'other external hazard' refers to external hazards other than earthquakes." The submittal is requesting a change to the plant's licensing basis. RG 1.174, Revision 2, states that "[t]racking changes in risk (both quantifiable and nonquantifiable) that are due to plant changes would provide a mechanism to account for the cumulative and synergistic effects of these plant changes..." Further, seismic events are identified as being directly relevant to the risk analysis. Based on the foregoing discussion,

   a. Explain the intent of citing Part 6 of the 2009 ASME/ANS PRA Standard and its relevance to the current application.

   b. Clarify whether the results of the risk calculations, which represent the incremental risk to the facility from the proposed permanent change, will be included in the baseline risk of the plant to determine the cumulative impact of changes to the licensing basis per the guidance in RG 1.174.

8. The fragility of the truss is used in both the "bounding" and "demonstrably conservative" analyses presented in Enclosure 4 of the submittal. Details of the conservative deterministic failure margin (CDFM) calculation used to determine the high confidence of low probability of failure (HCLPF) capacity of the truss are provided in Section 5.7 of Enclosure 5 of the submittal. According to that information, the CDFM uses the site-specific ground motion response spectrum (GMRS). According to the licensee's submittal of the reevaluated hazard in response to Near Term Task Force (NTTF) Recommendation 2.1 (ADAMS Accession No. ML14090A275), which is referred to as "Ref. 6.1" in Enclosure 5 of the submittal, the peak ground acceleration (PGA) is 0.14 g for the GMRS. This same value is used in the capacity calculation in Section 6.4.2 of Enclosure 5 of the submittal. That value appears to be based on the mean hazard curve. The CDFM approach, as described in Table 2-5 of the Electric Power Research Institute (EPRI) report NP-6041-SL, Revision 1, requires the use of the 84 percent non-exceedance hazard curve.

   Section 2.1.3 of Enclosure 4 of the submittal provides the calculation for the change in (or delta) CDF due to the seismic hazard. The calculation provided uses the difference between the CDF for the current configuration of the truss (with thermal modifications) and that from a configuration that includes all modifications which would be required to "fully meet seismic and thermal design requirements". The same approach for calculating the delta CDF is applied to the "bounding" and "demonstrably conservative" analyses.

   The analysis described in Section 2 of Enclosure 4 of the submittal assumes that the initiators of interest, seismic and thermal events, are independent. However, seismic events can result in consequential events such as loss-of-coolant accidents (LOCAs) which can, in turn, result in thermal loading of the trusses.

Such consequential events have been excluded from the "bounding" and "demonstrably conservative" analyses without justification.

a. Provide the HCLPF and median failure probability for the unmodified and modified configuration of the trusses following the methodology in Table 2-5 of the EPRI report NP-6041-SL and Section 5 of EPRI report TR-103959, Revision 1 or justify the calculation in Section 5.7 of Enclosure 5 of the submittal.

b. Confirm that the calculation based on the truss "modified to fully meet seismic and thermal design requirements," such as in Table 5 of Section 2.1.3 of Enclosure 4 of the submittal, represents a truss that is fully compliant, without exceptions, with the current code of record.

c. Provide details of the modifications that are credited for the calculation based on the truss "modified to fully meet seismic and thermal design requirements," such as in Table 5 of Section 2.1.3 of Enclosure 4 of the submittal.

d. Provide a seismic event tree to capture the structural failure of the truss along with other possible consequential events, including LOCAs, due to seismic initiators.

e. Provide qualitative or quantitative technical justification for the exclusion of any sequences from the seismic event tree that are not expected to impact the risk assessment for the trusses. Include information on any generic component fragilities used in the process.

f. Provide the requantified seismic CDF for the "bounding" and "demonstrably conservative" analyses including any changes due to the responses to parts (a) through (d) of this request or justify the need to not perform such a re-quantification.

9. Section 2.1.4 of Enclosure 4 of the submittal discusses the convolution approach wherein the individual plant examination of external events (IPEEE) "plant fragility" is used. The same approach is also cited in Section 5.2.1 of Enclosure 4 of the submittal. Therefore, the "convolution" approach is used for both the "bounding" and "demonstrably conservative" analyses. Section 2.1.4 of Enclosure 4 of the submittals states that "[a] more accurate characterization of the CT risk can be obtained by combining the IPEEE seismic and the CT bounding results." However, the result of the convolution continues to include the seismic CDF from various failures which are not due to CT failure. It is unclear how the result represents "[a] more accurate characterization of the CT risk" because it is not straightforward to differentiate the contribution of CT failure from the "plant" level contribution in the final result. Clarify how the approach discussed in Section 2.1.4 of Enclosure 4 of the submittal provides a more accurate representation of the risk due to seismic failure of the trusses or provide a revised estimate for the same.

10. Sections 5.2.1 through 5.2.3 of Enclosure 4 of the submittal provides the risk calculations for the "demonstrably conservative" analysis. Those sections provide "event trees" for various initiating events impacting the trusses. The split fractions

at each node are the failure probabilities, based on a "target assessment" described in Section 5 of Enclosure 4 of the submittal, of that particular equipment from the falling truss members. The final result is termed the "conditional core damage probability" and multiplied with the initiating event frequency. However, the "event trees" represent the component failure probabilities and do not appear to describe the sequences which would potentially lead to core damage following a seismic event resulting in failure of the truss. The event tree does not appear to be modeled based on the logic in the internal events PRA model. In addition, human actions related to the impact of the failure of each component, including the impact of the seismic event on such actions do not appear to have been considered. Therefore, the "event tree" does not appear to provide the conditional core damage probability (CCDP). It appears that deriving such a CCDP would require integration of the component failure probabilities in Sections 5.2.1 through 5.2.3 of Enclosure 4 of the submittal with a plant-specific PRA model (internal events and/or seismic).

a. Describe the logic used to develop the "event trees" in Sections 5.2.1 through 5.2.3 of Enclosure 4 of the submittal focusing on the approach used to capture and evaluate the sequences which can potentially lead to core damage following truss failure due to the selected initiating events.

b. Considering the factors identified above, demonstrate that the analysis in Sections 5.2.1 through 5.2.3 of Enclosure 4 of the submittal can bound any integration of the failure probabilities into a PRA model or provide the mean seismic CDF and significant cutsets from such an integration.

c. Figures 4, 5, and 6 in Enclosure 4 of the submittal show that the second steam line break (event "No SLB2") is dependent on the first steam line break (event "no SLB"). It is unclear why "No SLB2" event cannot occur independent of the "no SLB" event (i.e., why the falling truss member cannot cause a break on the second line if the first line is not broken). Further, the 'split fractions' used for the current "No SLB2" representation appear to be independent probabilities in contrast to the definition of "No SLB2." Provide justification for the "event tree" representation for "No SLB2" currently used or provide results from considering an independent and a dependent SLB2 event.

d. The failure probabilities from the "target assessment" described in Section 5 of Enclosure 4 of the submittal that are used for the "event trees" do not change based on the seismic acceleration. It is expected that at a certain threshold seismic acceleration level the fragility of the individual components will dominate the corresponding failure. The convolution with the IPEEE performed in Section 5.2.1 of Enclosure 4 of the submittal appears to be performed to account for such cases. However, the convolution is based on the "plant fragility" and there is no comparison of the fragility of each impacted component against the "plant fragility." Justify that use of the "plant fragility" is bounding for all the components that are found to be impacted by truss failure in the "target assessment".

11. Attachment B to Enclosure 4 of the submittal provides a description of the human reliability analysis (HRA) used for the "demonstrably conservative" analysis by

inclusion in the "event trees" used in Sections 5.2.1 through 5.2.3 of Enclosure 4 of the submittal. The description in Attachment B states that the operators will have more than 30 minutes to perform feed and bleed (F&B). Further, the analysis also uses "simplified [performance shaping factor] PSF adjustments" based on the seismic acceleration level. However, Section 5.2 of Enclosure 4 of the submittal states that the "PORVs [pilot-operated relief valve]" top "event" uses the baseline internal events value for F&B human error probability (HEP).

a. Justify the time available to initiate F&B used for the HRA analysis including a summary of any relevant engineering evaluations.

b. Justify the multipliers used for the PSF adjustments including the basis and methodology used to derive the multipliers.

c. Clarify whether the baseline internal events HEP for F&B is used across all seismic acceleration levels in the analysis in Sections 5.2.1 through 5.2.3 of Enclosure 4 of the submittal and if so, justify such an approach given the analysis in Attachment B to Enclosure 4 of the submittal.

d. The baseline HEP for F&B is expected to assume the availability of instrument air for the PORVs. The determination of the impact of truss failure on instrument air availability does not appear to have been performed as part of the "target assessment" described in Section 5 of Enclosure 4 of the submittal for the "demonstrably conservative" analysis. However, it appears that instrument air is considered unavailable during a seismic event. Describe and justify the assumption regarding the availability of instrument air following truss failure.

e. If the response to part (d) of this RAI credits the planned nitrogen supply modifications for F&B to justify the use of the baseline HEP, justify the credit taken for the planned nitrogen supply modification as a method that maintains appropriate safety margins as mentioned in Section 3.1 of Enclosure 1 of the submittal.

f. Attachment B to Enclosure 4 of the submittal states that removing the dependency for instrument air reduces the HEP. However, the reduction seems to be based on a simple removal of the step in the procedure ("step 36 in the current procedure") for restoration of instrument air. Justify the HEP accounting for any actions and/or steps necessary to be performed for entering into and following the procedure for using the nitrogen supply subsequent to not restoring instrument air including the consideration of dependencies in intra- and inter-procedure actions or provide and use a different value.

12. The seismic and/or thermal failure of the equipment supported from the trusses in the "bounding" analysis in Section 2 of Enclosure 4 of the submittal may increase the overall risk contribution. Enclosure 5 of the submittal compared the supported equipment and the supporting mechanism (e.g., anchors) against the design criteria using the GMRS and thermal loading. However, the risk assessment is not confined to the GMRS or the design basis. According to Enclosure 2 of the submittal, the licensee is also committing to a modification to the containment

spray pipe support. It is unclear if a fragility for the supporting equipment was determined which in turn, can be used to obtain the risk from corresponding failures across the seismic hazard curve as well as the thermal loading.

Further, the mitigating systems employed for the thermal loading mitigation calculations provided in Section 2.2.4 of Enclosure 4 of the submittal are based solely on the random failure probability without consideration of failure due to the thermal or seismic hazard (such as through an operating reactor gate). The thermal loading mitigation calculations are applicable to both the "bounding" and the "demonstrably conservative" analyses.

Section 2.2.2 of Enclosure 4 of the submittal uses information from EPRI report 302000079, Revision 3, "Pipe Rupture Frequencies for Internal Flooding Probabilistic Risk Assessments," to determine the initiating frequency for steam line breaks and feedwater line breaks inside containment. The initiating frequencies are then used in both the "bounding" and the "demonstrably conservative" analyses. Section 5.1 ("PWR [pressurized-water reactor] High-Energy Piping Systems") of the cited EPRI report states that the feedwater piping "...system boundary considered in this evaluation consists of the piping from the low-pressure heaters...up to the outboard containment isolation valves." Similarly, the high pressure steam piping is considered to be "...upstream of the [high pressure] HP turbine throttle valve and extends to the outboard containment isolation valves." Therefore, the initiating frequencies for the piping from the cited EPRI report are for breaks outside containment and are inapplicable to the risk assessment in the submittal.

a. Provide a quantitative assessment of the impact on the submitted risk calculations of the failure of the supported equipment due to the seismic hazard and thermal loading or justify not including such impacts for the "bounding" as well as the "demonstrably conservative" cases.

b. Provide an estimate, preferably using quantitative approaches such as the median fragility, of the extent to which the defense-in-depth due to containment sprays and containment air recirculation cooling systems is preserved beyond the plant's seismic design basis.

c. Provide the results of the thermal analysis using relevant initiating frequencies for the breaks of interest. If the updated initiating frequencies are partitioned by break size, provide the technical justification and methodology for the partitioning. Consider the responses to previous parts of this request in the re-quantification. Include any initiating frequency determined from the development of the seismic event tree as requested in a separate RAI.

13. Section 2.5 of RG 1.174, Revision 2, discusses uncertainties in risk analysis and states that "...comparison of the PRA results with the acceptance guidelines must be based on an understanding of the contributors to the PRA results and on the robustness of the assessment of those contributors and the impacts of the uncertainties." Section 9 of Enclosure 4 to the submittal states that "[t]he uncertainties are addressed by the simple bounding case and sensitivity analyses applied in this evaluation..." However, neither the impact of the quantifiable uncertainties in the seismic hazard and seismic fragility is captured in the submittal

nor is it demonstrated that the "qualitative factors" in Section 4 of Enclosure 4 to the submittal adequately capture such uncertainties. The "thermal sensitivity analysis" in Section 2.2.6 of Enclosure 4 to the submittal expands the initiating event frequency but does not address the uncertainties in those frequencies. Further, the submittal does not include a discussion of the sources of uncertainty and their impact for the "demonstrably conservative analysis".

Justify the lack of sensitivity studies to capture the impact of key sources of uncertainties on the analyses presented in the submittal, considering the guidance in NUREG-1855, Revision 1. Alternately, describe, with justification, the approach used and provide the results (CDF, delta CDF, LERF, and delta LERF) from the following:

a. A sensitivity study to address the uncertainty in the seismic hazard and in the seismic fragility for the "bounding case",

b. A sensitivity study to address the uncertainty in the initiating events identified for the thermal analysis and in the thermal fragility for the "bounding case." Include justification for the uncertainty bounds and distribution selected for the thermal fragility for use in the sensitivity study.

c. A sensitivity study to address the uncertainty in the calculation inputs, such as the seismic hazard, the seismic fragility, the "target assessment" results described in Section 5 of Enclosure 4 of the submittal, and the HEP, for the "demonstrably conservative case" of seismic evaluation. Include justification for the uncertainty bounds and distribution selected for the "target assessment" results and the HEP for use in the sensitivity study.

d. A sensitivity study to address the uncertainty in the calculation inputs, such as initiating events identified for the thermal analysis, in the thermal fragility, in the "target assessment" results, and the HEP, for the "demonstrably conservative case" of thermal evaluation. Include justification for the uncertainty bounds and distribution selected for the thermal fragility, "target assessment" results, and the HEP for use in the sensitivity study.

In addressing the above requests, consider the responses to separate RAIs on the base CDF determination, the integration of the "demonstrably conservative" case with a PRA model, and the LERF determination approach.

14. Section 6 of Enclosure 4 of the submittal discusses the LERF calculation which uses a CLERP [conditional large early release probability] of 0.2 based on the information for different hazards. The CLERP is then applied to the results for the change in CDF from the "bounding" and the "demonstrably conservative" analyses. It appears that the impact of the truss failure on LERF via component failures has not been considered. Further, it is expected that instrument air will be required for containment isolation valves and the determination of the impact of truss failure on instrument air availability does not appear to have been performed as part of the "target assessment" described in Section 5 of Enclosure 4 of the submittal. Such failures can be accounted for by exercising the Level 2 or simplified LERF model in conjunction with the component failure probabilities. In light of the factors identified above, provide an estimate of LERF that quantitatively considers the failure of

components and systems that can impact containment integrity or justify that the current approach bounds such impacts.

15. Section 5 of Enclosure 4 to the submittal discusses the "demonstrably conservative analysis" and summarizes the results of the assessment performed in support of that analysis. The discussion cites a proprietary assessment report, Reference 3, in Enclosure 4 to the submittal. The following are related to the assessment:

    a. Based on the discussion in Section 5.1 of Enclosure 4 to the submittal it appears that "perforation/penetration" is the only failure mode considered as part of the assessment. However, the rationale for the selection has not been provided. Discuss the various structural failure modes that were considered in the assessment for structures, system and components (SSCs) impacted by falling truss debris and provide the basis for the determination of a single failure mode, such as perforation/penetration, as being dominant and, therefore, the focus of the assessment.

    b. It is unclear from the discussion how it was determined that falling truss debris cannot cause structural damage. Describe how qualitative or quantitative or a combination of both approaches was used in the assessment and if any equations/formulae were used to determine the ability of falling debris to damage a particular SSC, provide the basis to support the applicability of those equations/formulae to the current assessment.

    c. One of the assumptions made in the assessment appears to be that "...debris targeting critical SSCs are assumed to be oriented in a way that maximizes damage to targeted SSCs."

        i. Describe the approach followed to determine the orientation(s) of the falling truss debris that "maximizes damage to targeted SSC."

        ii. Justify any assumptions made in determining the orientation(s) of the falling truss debris that "maximizes damage to targeted SSC" and for any other orientations of the falling truss debris.

        iii. Describe whether and how the probability of a particular orientation of the falling truss debris was determined, and provide details of the approach used to incorporate those probabilities in the "qualitative evaluation of the impact of trusses and cross members" performed in the assessment.

16. The NRC staff noted that in Section 6.4.2.1 of Enclosure 5, the licensee discussed the development of seismic fragility for Unit 1 with Limited Modification and Unit 2 Unmodified. The licensee applied additional capacity adjustment factors, such as those for load redistribution and inelastic energy absorption, to the calculations of the equivalent PGA (licensee uses PGAc in the submittal) and indicated that those factors are reasonable for the calculations. The licensees concluded that the PGAc calculated from the equivalent static analysis is higher than that calculated from the elastic analysis. Using the higher PGAc, the licensee derived the delta CDFs for both the "bounding" and "demonstrably conservative" analyses presented in Enclosure 4 of the submittal. However, the staff noted that the lower PGAc

calculated from the elastic analysis would yield a larger delta CDF result that may be greater 1E-05. The licensee has not justified why the PGAc calculated from the elastic analysis should not be used. Furthermore, the licensee has not provided the explanation about the differences in applying the capacity adjustment factors in the PGAc calculations.

a. Clarify the differences in the capacity adjustment factors applied in the PGAc calculations.

b. Provide justification for using the higher PGAc from the equivalent static analysis as opposed to that from the elastic analysis.

17. LAR Section 3.1.1, "PRA Analysis Summary," second bullet states, "demonstrated that the construction trusses will retain their structural stability and will not catastrophically fail or result in a seismic II/I interaction (dropped object) as a result of a design basis seismic or thermal event"

    a. Clarify in detail whether the proposed resolution of the containment dome trusses non-conformances will restore the containment dome structures to the original intended seismic criteria.

18. The construction trusses in each unit were originally installed to provide support for the containment dome liner and initial dome concrete pour during original station construction. After the initial concrete pour cured, the truss structures were lowered a few inches away from the containment liner, no longer providing structural support to the dome, and remained in place. The trusses were then used as an attachment point for containment spray piping, ventilation ductwork, post-accident containment ventilation (PACV) piping, and miscellaneous lights and associated conduits. An initial analysis of seismic adequacy was performed by the construction vendor. LAR Section 2.1.1 stated that "the trusses were not included in the original FSAR seismic classification tables. They were subsequently added to the UFSAR in 2013 as a Seismic Class I structure supporting Class I piping and ductwork."

    a. LAR Section 2.1.1 indicates that the containment dome truss is now qualified as a Seismic Class I structure. This statement contradicts the information in Section 1.0of the LAR. Please clarify whether the containment dome trusses are qualified as Seismic Cat I or the original intended seismic criteria. Describe the assessments and modifications that were performed for qualification.

19. LAR Section 2.0 "Detailed Description" states that "The construction trusses were subsequently reanalyzed and walkdowns and reviews of plant photos discovered a discrepancy between the as-built configuration of the trusses and the design drawing that the analysis was based on. Specifically, the lower diagonal bracing framework of the trusses, and the bottom lower diagonal bracing location on the truss, were different than shown on the design drawing.

    Consequently, these activities and the refinements of the analysis resulted in identifying nonconformances to the design code of record, "AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings," April 1963, 6th Edition, for postulated seismic loads. Follow-on inspection of the trusses during initial resolution activities further identified a nonconformance with regard to the available clearance between a limited number of locations on the construction trusses and the containment liner in each Unit."

Enclosure 5 of the LAR, Reference 5.2 "6904-15-TR, Rev. 0, Calculation for Adequacy of Containment Construction Truss," Section 3.0, "Field Verification" states: "A field examination of the Unit 2 truss was performed by WEPCO and Sargent & Lundy (S&L) engineer ...This examination consisted of general comparison between the as-installed configuration of the truss and the configuration as-detail on drawing C-125 .... These items were found to be in order. Dimensions of specific bolt, weld, and structural plate/shape details were not inspected." LAR Section 2.1.1 "Construction Trusses" stated that "The trusses were not included in the original FSAR seismic classification tables. They were subsequently added to the UFSAR in 2013 as a Seismic Class I structure supporting Class I piping and ductwork."

a. Clarify whether structural assessments and modifications were performed consistent with licensing basis AISC, April 1963, 6th Edition. If other criteria was used, discuss the rational for selecting criteria other than the licensing basis.

20. LAR Section 3.3.2 stated that "Upon approval of this LAR, a modification will be made to the Unit 1 construction truss to improve clearance between the truss and the containment liner to achieve reduced stress levels. The modification includes a small amount of material removal at truss upper chord structural tee flanges. The modification will be performed at six specified locations around the circumference of containment." However, Calculation No. 11Q0060-C-038, Revision 0, "Seismic Strength Capacity of Units 1 and 2 Containment Dome Trusses with Modifications to meet AISC N690 Acceptance Criteria," (LAR – Enclosure 5, Reference 5.24), states that "trimming the first panel point at...11 locations for Unit 2 [(5) for T1 and (6) for T2 trusses]..."

   a. Clarify the location(s) in Units 1 and provide technical justification to all intended truss modifications that will be performed in accordance with AISC N690.

   b. Discuss rational for not performing modifications to Unit 2 truss locations identified as needing trimming modification in Calculation No. 11Q0060-C-038.

21. Confirm that the UFSAR, Chapter 15, analyses have adequately considered the following as a result of the abandonment of the containment dome truss in place:

   a. change in the containment available volume,

   b. change in the containment total heat sink, or

   c. provide adequate justification that the UFSAR, Chapter 15, analyses remains bounding.

22. RG 1.174, Revision 2, indicates that in implementing risk-informed decision making, licensing basis changes are expected to meet a set of key principles. One of the five principles states that "the proposed change maintains sufficient safety margins." The NRC staff noted that in Table 4-2 of Enclosure 5, the licensee identified the alternative criteria/methods for the licensee's risk-informed approach.

    a. Section 2 of Enclosure 5 of the March 31, 2017, submittal, indicates that damping factor used in the design of welded steel framed and bolted steel framed structures are 2 percent and 5 percent for the Hypothetical Earthquake in the UFSAR. In Section 5.3, the applicant stated that the damping value used in the analyses is 7 percent for bolted steel with bearing connections. The applicant stated that while each of the individual 18 trusses is a welded planar truss assembly, the transfer of load between the 18 trusses is through a bolted brace system and concluded that the use of 7 percent damping is appropriate.

        i. Justify that the as-built conditions of each of those 18 truss assemblies are consistent with the assumption that the transfer of load is through a bolted brace system.

        ii. Explain how the safety margins are impacted by the use of a 7 percent damping factor and whether sufficient safety margins are maintained.

    b. Section 6.2.1 of the March 31, 2017, submittal, stated that the development of the ground motion time histories for the soil structure interaction analysis met Section 2.4 of ASCE/SEI 43-05 with the limitations identified in NUREG/CR-6926. The NRC staff noted that NUREG/CR-6926 identified three requirements related to damping selection, power spectral density check, and the correlation coefficient for statistical independence are not consistent with the NUREG-0800, SRP. Clarify whether those three requirements identified in NUREG/CR-6926 related to computing time histories have been addressed.

    c. Results in Section 6.5.1.2 of Enclosure 5 of the March 31, 2017, submittal, identify locations that would exceed the AISC N690 allowable stress. The licensee explained in Section 5.5 of Enclosure 5 of the March 31, 2017, submittal, that it is acceptable to use a strain-based acceptance criteria. The NRC staff noted that NUREG-0800, SRP, Section 3.8.4.III.5, states that the staff should evaluate the justification provided to show that structural integrity will not be affected if the applicant proposes to exceed some of these limits.

        i. Justify the use of the proposed 1.5 percent strain acceptance criterion as it relates to structural integrity.

        ii. Explain how the safety margins are impacted by the proposed 1.5 percent strain acceptance criterion and whether sufficient safety margins are maintained.

REFERENCES:

1. Letter NRC 2017-0017, dated March 31, 2017, from Robert Coffey, Site Vice President to NRC regarding the "License Amendment Request 278, Risk-Informed Approach to Resolve Construction Truss Design Code Non-conformances" (ADAMS Accession No. ML17090A511).

2. "AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings," American Institute of Steel Construction, 6th Edition, April 1963.

3. ACI 318-63, "Building Code Requirements for Reinforced Concrete," American Concrete Institute, 1963.

SUBJECT: POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2 – AUDIT PLAN FOR LICENSE AMENDMENT REQUEST TO RESOLVE NONCONFORMANCES RELATING TO CONTAINMENT DOME TRUSS (EPID L-2017-LLA-0209) DATED NOVEMBER 17, 2017

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DATE	11/15/17	11/15/17	11/17/17	11/16/17
OFFICE	NRR/DE/ESEB/BC	NRR/DORL/LPL3/BC	NRR/DORL/LPL3/PM	
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