NRR-DMPSPEm Resource

From: Galvin, Dennis
Sent: Wednesday, May 9, 2018 6:22 PM
To: Arthur.Zaremba@duke-energy.com
Cc: Mark Turkal (Mark.Turkal@duke-energy.com); Hon, Andrew; Reisi Fard, Mehdi; Devlin-Gill, Stephanie; Harvey, Brad; Vasavada, Shilp; Quinlan, Kevin; Tiruneh, Nebiyu; Nicole D. Edwards (Nicole.Edwards@duke-energy.com); Grzeck, Lee (Lee.Grzeck@duke-energy.com); Casto, Greg
Subject: RE: Brunswick - Adoption of 10 CFR 50.69 – HWPRA and XFPRA Audit Plan and Setup of Online Reference Portal (EPID: L 2018-LLA-0008)
Attachments: Brunswick 50.69 External Hazards PRA Audit Plan 2018-05-09.pdf

Mr. Zaremba,

By letter dated January 10, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18010A344), Duke Energy Progress, LLC (Duke Energy, the licensee) submitted a license amendment request (LAR) for the Brunswick Steam Electric Plant Unit Nos. 1 and 2 (BSEP). The proposed amendments would revise the licensing basis by adding a license condition to allow for the implementation of the provisions of Title 10 of the Code of Federal Regulations (10 CFR) Section 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors".

The U. S. Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's submittal and determined that a regulatory audit would support its review of the proposed license amendments. The audit will be initially conducted via the use of an online reference portal set up by the licensee. The audit may also include various interactions (e.g., teleconferences, webinars, or face-to-face interactions). The enclosed audit plan is regarding the use of the BSEP high winds and external flood probabilistic risk assessment (HWPRA and XFPRA) models in the proposed 10 CFR 50.69 categorization process. The NRC staff is continuing to review other aspects of the licensee's submittal and may identify the need for additional audit subjects by separate correspondence.

The use of the online reference portal is applicable to the enclosed audit plan and any subsequent audit plans issued. Use of the online reference portal is acceptable as long as the following conditions are met:

- The online reference portal will be password-protected and passwords will be assigned to those directly involved in the review on a need-to-know basis;
- The online reference portal will be sufficiently secure to prevent staff from printing, saving, or downloading any documents; and
- Conditions of use of the online reference portal will be displayed on the login screen and will require concurrence by each user.

The staff may request additional documents be added to online reference portal, which will be transmitted to you by e-mail. Please provide NRC staff access to the portal and send me the information needed to access the portal, such as username and password, as soon as possible.

The conditions associated with the online reference portal must be maintained throughout the duration of the review process. Nicole Edwards of your staff confirmed that Duke Energy Progress, LLC agrees to the terms and conditions during a call dated May 9, 2018. The draft audit plan was also discussed with your staff on May 9, 2018.

If you have any questions, please contact me at (301) 415-6256.

Respectfully,

Dennis Galvin
Project Manager
U.S Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Division of Operating Reactor Licensing
Licensing Project Branch 2-2
301-415-6256

Docket No. 50-325 and 50-324

Hearing Identifier: NRR_DMPS
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AUDIT PLAN

REGARDING HIGH WINDS AND EXTERNAL FLOODS PROBABILISTIC RISK ASSESSMENTS

LICENSE AMENDMENT REQUEST TO ADOPT 10 CFR 50.69 CATEGORIZATION PROCESS

DUKE ENERGY PROGRESS, LLC

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2

DOCKET NOS. 50-325 AND 50-324

I. BACKGROUND

By letter dated January 10, 2018 (Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML18010A344), Duke Energy Progress, LLC (Duke Energy, the licensee) submitted a license amendment request (LAR) regarding the Brunswick Steam Electric Plant Units 1 and 2 (BSEP). The proposed amendment would modify the licensing basis to allow for the implementation of the provisions of Title 10 of the Code of Federal Regulations (10 CFR), Part 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems, and Components (SSCs) for Nuclear Power Reactors." The proposed amendment would use, among other probabilistic risk assessment (PRA) models, the BSEP high winds PRA (HWPRA) and external flood (XFPRA) in the proposed 10 CFR 50.69 categorization process. The U.S. Nuclear Regulatory commission (NRC) staff has reviewed the licensee's submittal and determined that a regulatory audit of the BSEP HWPRA and XFPRA models would assist in the timely completion of the subject LAR review process. The NRC staff is continuing to review other aspects of the licensee's submittal and may identify the need for additional audit subjects by separate correspondence.

II. REGULATORY AUDIT BASES

The purpose of the audit is to (1) gain a more detailed understanding of the licensee's HWPRA and XFPRA models used by the licensee to support the categorization process and to gain more information relevant to the review of the subject LAR, (2) identify additional information that is necessary for the licensee to supplement its application for the staff to reach a licensing or regulatory decision and (3) establish an understanding in the area of HWPRA and XFPRA models to allow the staff to issue clear requests for information and for the licensee to provide quality and timely responses.

An audit was determined to be the most efficient approach toward a timely resolution of issues associated with this portion of the LAR review, since the staff will have an opportunity to minimize the potential for multiple rounds of requests for additional information (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 staff are expected to develop and issue RAIs, as needed 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 audit will be initially conducted via the use of an online reference portal set up by the licensee. The audit may also include various interactions (e.g., teleconferences, webinars, or face-to-face interactions). The NRC staff anticipates the interactions would include discussion of the following: (1) an overview of the HWPRA and XFPRA, (2) the issues related to the acceptability of the licensee's HWPRA and XFPRA for this application, (3) the unique technical aspects of using those models in the licensee's categorization process, and (4) the licensee's approach to identify and address the key assumptions and key sources of uncertainty for this application. Following the initial online portion of the audit, the NRC staff will determine the need for additional face-to-face interactions at the licensee's facilities or other agreed upon locations and refine the issues that need to be addressed in such interactions.

The areas of focus for the regulatory audit are the information contained in the licensee's submittal, the attached audit information needs, and all associated and relevant supporting documentations including methodology, process information, calculations, etc. The relevant supporting documents are identified later in this audit plan.

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).

IV. AUDIT TEAM

The members of the audit team are anticipated to be:

- Andrew Hon, Project Manager, NRC
- Dennis Galvin, Project Manager, NRC
- Mehdi Reisi-Fard, Acting Team Lead, PRA, NRC
- Stephanie Devlin-Gill, Branch Chief Designee, NRC
- Brad Harvey, Team Lead, Meteorological Team, NRC
- Shilp Vasavada, technical reviewer, PRA, NRC
- Kevin Quinlan, technical reviewer, hazard analysis, NRC
- Nebiyu Tiruneh, technical reviewer, hazard analysis, NRC

V. LOGISTICS

The audit will begin once an online reference portal is set up and the documentation is made available to the NRC staff. The online reference portal portion of the audit will be conducted over several weeks. The licensee will be kept informed of the progress of the audit during discussions with the project manager. The audit may include interactions (e.g., teleconferences, webinars, or face-to-face interactions) on a mutually agreeable schedule sufficient to understand or resolve issues associated with the available information. The face-to-face interactions would be conducted either in the vicinity of the NRC headquarters or at the licensee's site, if it is determined such interactions are an effective manner to resolve issues identified during the desk portion of the audit. The NRC staff plans that any onsite portion of the audit would be conducted the same week for all applicable aspects of the review of the 10 CFR 50.69 categorization process, including those aspects beyond the scope of this audit plan.

VI. DOCUMENTS REQUESTED FOR STAFF REVIEW

The information needed for the regulatory audit is listed in the attachment. The licensee will be informed by e-mail if additional supporting documentation is needed.

VII. 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 request for additional information. The NRC staff, if needed, will provide the request for additional information to the licensee in separate docketed correspondence.

VIII. REFERENCES

1. Gideon, W. R., Duke Energy Progress, LLC, letter to U.S. Nuclear Regulatory Commission, “Application to Adopt 10 CFR 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems, and Components (SSCs) for Nuclear Power Reactors", January 10, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18010A344).

2. U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC-111, “Regulatory Audits,” December 29, 2008 (ADAMS Accession No. ML082900195).

3. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.200, Revision 2, “An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities,” March 2009 (ADAMS Accession No. ML090410014).

4. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.201 , Revision 1, "Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants according to Their Safety Significance," May 2006 (ADAMS Accession No. ML061090627).

5. Nuclear Energy Institute, NEI 00-04, “10 CFR 50.69 SSC Categorization Guideline,” July 2005 (ADAMS Accession No. ML052910035).

6. Nuclear Energy Institute, NEI 12-13, “External Hazards PRA Peer Review Process Guidelines”, August 2012 (ADAMS Accession No. ML122400044).

AUDIT INFORMATION NEEDS

Documentation to be Available for NRC Staff Review

- HWRPA and XFPRA Peer Review (Full-scope, Focused-scope, and Close-out) Reports
- HWRPA and XFPRA Self-Assessment Reports
- HWRPA and XFPRA Walkdown Reports
- HWRPA and XFPRA Human Reliability Analysis Notebooks
- HWRPA and XFPRA Equipment List Notebooks
- HWPRA and XFPRA Fragility Notebooks
- HWRPA and XFPRA Plant Response Notebooks
- HWRPA and XFPRA Quantification Notebooks
- Documents that include discussions on identification of key assumptions and sources of uncertainty for the high winds probabilistic risk assessment (HWPRA) and external flooding PRA (XFPRA) with licensee disposition relevant to this application

Other Information Needs

1. Section 3.3 of the Enclosure to the submittal states that the BSEP HWPRA and XFPRA models were subject to a full-scope peer-review in 2012. It is unclear what peer-review process was followed in those peer-reviews.

   Discuss the peer-review process followed to perform a full-scope peer-review of HWPRA and XFPRA models including the consideration of any NRC staff comments on the process.

2. Provide information and analysis related to development of hazard curves for the extreme winds, tornadoes, and hurricanes used in the BSEP HWPRA.

   a. Describe the sources of data for each hazard.
   b. Describe the process used to develop the hazard curves.
   c. Describe how uncertainties in parameter values associated with each hazard are considered.
   d. Describe the sources of model uncertainty and key assumptions associated with each hazard.

3. Provide information on evaluation of hazard from wind-generated missiles.

   a. Discuss the methodology used for high-wind missile hazard analysis.
   b. Discuss the methodology used to identify and assess the number, type and location of potential missiles.

4. Provide information on evaluation of wind fragilities.

    a. Describe the methodologies used to develop plant-specific and realistic wind fragilities.
    b. Describe the basis for screening structures, systems, and components (SSCs) or combinations of SSCs.
    c. Describe the sources of model uncertainty and key assumptions associated with wind fragility analysis.

5. Discuss the scope and methods used to perform walkdowns for developing the BSEP HWPRA.

6. Provide an overview of adaptations made to the licensee's internal events PRA model to produce the BSEP HWPRA. Discuss how wind hazards and fragility evaluations were integrated into the BSEP HWPRA to estimate the risk associated with the hazard.

7. Describe how human error probabilities (HEPs) were adjusted in the licensee's HWPRA considering the potential effect of high winds events human actions.

8. Discuss any screening performed in developing the BSEP HWPRA plant response and the criteria for those screenings.

9. Discuss how recovery models were developed or adjusted in the BSEP HWPRA.

10. Discuss the sources of model uncertainty and key assumptions in the development of the high wind plant response model.

11. Provide information and analysis related to the development of hazard curves for the external flood hazard used in the BSEP XFPRA.

    a. Describe how relevant flood causing mechanisms and combinations of flood causing mechanisms were identified.
    b. Discuss the methods used to screen external flood causing mechanisms.
    c. Discuss the methods used to develop hazard curves based on the flooding hazard estimates.
    d. Describe the sources of data for flooding hazard.
    e. Describe how the uncertainties in the models and parameter values associated with the external flooding hazard were considered.
    f. Describe the sources of model uncertainty and key assumptions associated with the external flooding hazard.
    g. Discuss the nexus between the external flooding hazard analysis performed to develop the external flood hazard curve for this submittal and the reevaluated flood hazard analysis described in the licensee's response to the 10 CFR 50.54(f) request regarding recommendations 2.1, 2.3, and 9.3 of the Near-Term Task Force (NTTF).

12. Provide information on evaluation of external flooding fragilities.

    a. Describe the methodologies used to develop and quantify plant-specific and realistic flooding fragilities.
    b. Describe the basis for screening SSCs or combinations of SSCs.

c. Describe the sources of model uncertainty and key assumptions associated with external flooding fragility analysis.

13. Provide an overview of adaptations made to the licensee's internal events PRA model to produce the BSEP XFPRA. Discuss how flooding hazard and flooding fragility evaluations were integrated into the BSEP XFPRA to estimate the risk associated with the hazard.

14. Describe how HEPs were adjusted in the BSEP XFPRA considering the potential effect of external flood events human actions.

15. Discuss any screening performed in developing the BSEP XFPRA plant response and the criteria for those screenings.

16. Discuss how recovery models were developed or adjusted in the BSEP XFPRA.

17. Discuss the sources of model uncertainty and key assumptions in development of external flood plant response model.

18. Describe how the importance measures are determined from the HWPRA and XFPRA in the context of the 'binning' approach. Clarify how the same basic events, which were discretized by binning during the development of the HWPRA and XFPRA, are then combined to develop representative importance measures.

19. In the context of the "integral assessment" described in Section 5.6 of NEI 00-04, describe how the HWPRA and XFPRA importance measures will be used to calculate the integrated importance measures including how the integrated importance measures will be calculated for HWPRA and XFPRA basic events that may not align with basic events in other PRA models.