



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

January 19, 2022

Ms. Kim Maza
Site Vice President
Shearon Harris Nuclear Power Plant
5413 Shearon Harris Road
Mail Code NHP01
New Hill, NC 27562-9300

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 - ISSUANCE OF AMENDMENT NO. 188 REGARDING REVISION OF THE 10 CFR 50.69, "RISK-INFORMED CATEGORIZATION AND TREATMENT OF STRUCTURES, SYSTEMS AND COMPONENTS FOR NUCLEAR POWER REACTORS," CATEGORIZATION PROCESS TO REFLECT AN ALTERNATIVE SEISMIC APPROACH (EPID L-2021-LLA-0003)

Dear Ms. Maza:

The U.S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 188 to Renewed Facility Operating License No. NPF-63 for the Shearon Harris Nuclear Power Plant, Unit 1. This amendment is in response to your application dated January 14, 2021, as supplemented by letter dated June 8, 2021.

The amendment revises the facility operating license condition associated with the adoption 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" to reflect an alternative approach to the one provided in the Nuclear Energy Institute's (NEI) guidance document, NEI-00-04, "10 CFR 50.69 SSC Categorization Guideline," Revision 0 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML052910035), for evaluating the impact of seismic hazards in the 10 CFR 50.69 categorization process, and to also delete the license condition that required the completion of certain implementation items prior to the implementation of 10 CFR 50.69.

K. Maza

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A copy of our related Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's regular monthly *Federal Register* notice.

Sincerely,

/RA/

Michael Mahoney, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-400

Enclosures:

1. Amendment No. 188 to NPF-63
2. Safety Evaluation

cc: Listserv



UNITED STATES
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DUKE ENERGY PROGRESS, LLC

DOCKET NO. 50-400

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 188
Renewed License No. NPF-63

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Duke Energy Progress, LLC (the licensee), dated January 14, 2021, as supplemented by letter dated June 8, 2021, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to Appendix D, Additional Conditions of the Renewed Facility License No. NPF-63 as indicated by changes in the attachment to this license amendment.
3. This license amendment is effective as of the date of its issuance and shall be implemented within 120 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David J. Wrona, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to Appendix D, Additional Conditions,
of Renewed Facility License No. NPF-63

Date of Issuance: January 19, 2022

ATTACHMENT TO LICENSE AMENDMENT NO. 188

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

RENEWED FACILITY OPERATING LICENSE NO. NPF-63

DOCKET NO. 50-400

Replace the following page of the Renewed Facility Operating License NPF-63, Appendix D, Additional Conditions, with the revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change:

Remove
Page 1

Insert
Page 1

APPENDIX D
ADDITIONAL CONDITIONS
RENEWED LICENSE NO. NPF-63

Duke Energy Progress, LLC shall comply with the following conditions on the schedule noted below:

<u>Amendment Number</u>	<u>Additional Conditions</u>	<u>Implementation Date</u>
474, 188	<p>Duke Energy is approved to implement 10 CFR 50.69 using the processes for categorization of Risk Informed Safety Class (RISC)-1, RISC-2, RISC-3, and RISC-4 structures, systems, and components (SSCs) using: Probabilistic Risk Assessment (PRA) models to evaluate risk associated with internal events, including internal flooding, and internal fire; the shutdown safety assessment process to assess shutdown risk; the Arkansas Nuclear One, Unit 2 (ANO-2) passive categorization method to assess passive component risk for Class 2 and Class 3 SSCs and their associated supports; and the results of non-PRA evaluations that are based on the IPEEE Screening Assessment for External Hazards, i.e., seismic margin analysis (SMA) to evaluate seismic risk, and a screening of other external hazards updated using the external hazard screening significance process identified in ASME/ANS PRA Standard RA-Sa-2009; as specified in Unit 1 License Amendment No. 174 dated September 17, 2019.</p> <p>In addition, Duke Energy is approved to implement 10 CFR 50.69 using the alternative seismic approach for categorization of RISC-1, RISC-2, RISC-3, and RISC-4 SSCs as described in Duke Energy letter RA-20-0311, dated January 14, 2021, and as specified in License Amendment No. 188 dated January 19, 2022.</p> <p>Prior NRC approval, under 10 CFR 50.90, is required for a change to the categorization process specified above (e.g., change from the alternate seismic approach (referenced above) to a seismic probabilistic risk assessment approach).</p>	Upon implementation of Amendment No. 188.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 188 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-63

DUKE ENERGY PROGRESS, LLC

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-400

1.0 INTRODUCTION

By letter to the U.S. Nuclear Regulatory Commission (NRC, the Commission) dated January 14, 2021 (Reference 1), as supplemented by a letter dated June 8, 2021 (Reference 2), Duke Energy Progress, LLC (Duke Energy, the licensee) submitted a license amendment request (LAR) for the Shearon Harris Nuclear Power Plant, Unit No. 1 (Harris). The proposed amendment would modify the Harris licensing basis to implement a change to the approved voluntary implementation of the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.69, "Risk-Informed categorization and treatment of structures, systems, and components (SSCs) for nuclear power reactors." Specifically, the proposed amendment would revise the license condition to allow the use of an alternative seismic approach in addition to the use of the seismic margin assessment to evaluate seismic risk for categorization of SSCs under the licensee's previously approved 10 CFR 50.69 program, and also delete the license condition that required the completion of certain implementation items prior to the implementation of 10 CFR 50.69.

The supplemental letter dated June 8, 2021, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on April 20, 2021 (86 FR 20529). The licensee's letter dated June 8, 2021 provided information in response to an NRC staff audit (Reference 3) conducted to support the NRC staff's review of the LAR.

2.0 REGULATORY EVALUATION

2.1 Background

In the safety evaluation (SE) to License Amendment No. 174 to Renewed Facility Operating License No. NPF-63 for Harris dated September 17, 2019, the NRC staff concluded that the licensee's process was consistent with the NRC-endorsed guidance in the Nuclear Energy Institute (NEI) 00-04, "10 CFR 50.69 SSC Categorization Guideline," Revision 0 (Agencywide

Documents Access and Management System (ADAMS) Accession No. ML052910035) and thus satisfies the requirements of 10 CFR 50.69(c) (Reference 4). In the previously approved categorization process, the licensee used the seismic margin assessment for the consideration of seismic risk in the categorization process. A license condition incorporated into the license as part of the NRC staff's decision to approve the licensee's original 10 CFR 50.69 LAR states that "Prior NRC approval, under 10 CFR 50.90, is required for a change to the categorization process specified above (e.g., change from a seismic margins approach to a seismic probabilistic risk assessment approach)."

In the current LAR (Reference 1), the licensee proposed to allow the use of an alternative seismic approach for evaluating seismic risk in addition to the seismic margin assessment for categorization of SSCs described in the licensee's previously approved 10 CFR 50.69 program.

2.2 Description of Changes

The affected license condition was added to the Harris license when the NRC approved the licensee's use of 10 CFR 50.69 on September 17, 2019. As stated in 10 CFR 50.69, a licensee may voluntarily comply with 10 CFR 50.69 as an alternative to compliance with the following requirements for RISC-3 and RISC-4 structures, systems, and components (SSCs) after it submits, and the NRC approves, an application for license amendment: (i) 10 CFR Part 21; (ii) a portion of 10 CFR 50.46a(b); (iii) 10 CFR 50.49; (iv) 10 CFR 50.55(e); (v) certain requirements of 10 CFR 50.55a; (vi) 10 CFR 50.65, except for paragraph (a)(4); (vii) 10 CFR 50.72; (viii) 10 CFR 50.73; (ix) 10 CFR Part 50, Appendix B; (x) certain containment leakage testing requirements in 10 CFR Part 50, Appendix J; and (xi) certain requirements of 10 CFR Part 100, Appendix A.

The current license condition (added by License Amendment No. 174) is as follows:

Duke Energy is approved to implement 10 CFR 50.69 using the processes for categorization of Risk Informed Safety Class (RISC)-1, RISC-2, RISC-3, and RISC-4 structures, systems, and components (SSCs) using: Probabilistic Risk Assessment (PRA) models to evaluate risk associated with internal events, including internal flooding, and internal fire; the shutdown safety assessment process to assess shutdown risk; the Arkansas Nuclear One, Unit 2 (ANO-2) passive categorization method to assess passive component risk for Class 2 and Class 3 SSCs and their associated supports; and the results of non-PRA evaluations that are based on the [individual plant examination of external events] IPEEE Screening Assessment for External Hazards, i.e., seismic margin analysis (SMA) to evaluate seismic risk, and a screening of other external hazards updated using the external hazard screening significance process identified in ASME/ANS PRA Standard RA-Sa-2009; as specified in Unit 1 License Amendment No. 174 dated September 17, 2019.

Duke Energy will complete the implementation items listed in Attachment 1 of Duke Energy letter to the NRC dated April 23, 2019 prior to implementation of 10 CFR 50.69. All issues identified in the attachment will be addressed and any associated changes will be made, focused-scope peer reviews will be performed on changes that are PRA upgrades as defined in the PRA standard (ASME/ANS RA-Sa-2009, as endorsed by [Regulatory Guide] RG 1.200, Revision 2), and any findings will be resolved and reflected in the PRA of record prior to implementation of the 10 CFR 50.69 categorization process.

Prior NRC approval, under 10 CFR 50.90, is required for a change to the categorization process specified above (e.g., change from a seismic margins approach to a seismic probabilistic risk assessment approach).

The licensee proposed in the supplement to the LAR to amend the above license condition to the Shearon Harris Nuclear Power Plant renewed facility operating license, to read as follows:

Duke Energy is approved to implement 10 CFR 50.69 using the processes for categorization of Risk Informed Safety Class (RISC)-1, RISC-2, RISC-3, and RISC-4 structures, systems, and components (SSCs) using: Probabilistic Risk Assessment (PRA) models to evaluate risk associated with internal events, including internal flooding, and internal fire; the shutdown safety assessment process to assess shutdown risk; the Arkansas Nuclear One, Unit 2 (ANO-2) passive categorization method to assess passive component risk for Class 2 and Class 3 SSCs and their associated supports; and the results of non-PRA evaluations that are based on the IPEEE Screening Assessment for External Hazards, i.e., seismic margin analysis (SMA) to evaluate seismic risk, and a screening of other external hazards updated using the external hazard screening significance process identified in ASME/ANS PRA Standard RA-Sa-2009; as specified in Unit 1 License Amendment No. 174 dated September 17, 2019.

In addition, Duke Energy is approved to implement 10 CFR 50.69 using the alternative seismic approach for categorization of RISC-1, RISC-2, RISC-3, and RISC-4 SSCs as described in Duke Energy letter RA-20-0311, dated January 14, 2021, and as specified in License Amendment No. [188] dated [DATE].

Prior NRC approval, under 10 CFR 50.90, is required for a change to the categorization process specified above (e.g., change from the alternate seismic approach (referenced above) to a seismic probabilistic risk assessment approach).

2.3 Applicable Regulatory Requirements and Guidance

Regulations

The provisions of 10 CFR 50.69 allow adjustment of the scope of SSCs subject to special treatment requirements. Special treatment refers to those requirements that provide increased assurance beyond normal industry practices that SSCs perform their design basis functions. For SSCs categorized as low safety significance (LSS), alternative treatment requirements may be implemented in accordance with the regulation. For SSCs determined to be of high safety significance (HSS), the requirements may not be changed.

Section 50.69 of 10 CFR contains requirements regarding how a licensee categorizes SSCs using a risk-informed process; adjusts treatment requirements consistent with the relative significance of the SSC; and manages the process over the lifetime of the plant. A risk-informed categorization process is employed to determine the safety significance of SSCs and place the SSCs into one of four RISC categories.

SSC categorization does not allow for the elimination of SSC functional requirements or allow equipment that is required by the deterministic design basis to be removed from the facility. Instead, 10 CFR 50.69 enables licensees to focus their resources on SSCs that make a

significant contribution to plant safety. For SSCs that are categorized as HSS, existing treatment requirements are maintained or potentially enhanced. Conversely, for SSCs categorized as LSS that do not significantly contribute to plant safety on an individual basis, the regulation allows an alternative risk-informed approach to treatment that provides a reasonable level of confidence that these SSCs will satisfy functional requirements. Implementation of 10 CFR 50.69 allows licensees to improve focus on equipment that is HSS.

Regulatory Guidance

The NRC staff considered the following regulatory guidance during its review of the proposed changes:

- Regulatory Guide (RG) 1.201, Revision 1 (Reference 5);
- RG 1.200, Revision 2, “An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities” (Reference 6);
- RG 1.174, Revision 3, “An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis” (Reference 7);
- NUREG-1855, Revision 1, “Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decisionmaking” (Reference 8); and
- NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition,” (SRP), Chapter 19, Section 19.2, “Review of Risk Information Used to Support Permanent Plant-Specific Changes to the Licensing Basis: General Guidance” (Reference 9).

Industry Guidance

NEI 00-04, Revision 0, “10 CFR 50.69 SSC Categorization Guideline” (Reference 10).

Electric Power Research Institute (EPRI) Report 3002012988, “Alternative Approaches for Addressing Seismic Risk in 10 CFR 50.69 Risk-Informed Categorization,” dated July 2018 (Reference 11).

EPRI Report 3002017583, “Alternative Approaches for Addressing Seismic Risk in 10 CFR 50.69 Risk-Informed Categorization,” dated February 2020 (Reference 12).

3.0 TECHNICAL EVALUATION

The NRC staff reviewed the proposed change to the previously approved Harris 10 CFR 50.69 program. In its LAR, the licensee stated that, except for the addition of a new methodology for evaluating seismic risk, all other previously approved screening and categorization methods are not affected by this LAR. The NRC staff’s review confirmed that the current LAR does not change any other aspect of the licensee’s categorization process except for the addition of the alternative seismic approach to consider the seismic risk. Therefore, the NRC staff’s determinations in the letter dated September 17, 2019 (Reference 4) concerning the licensee’s categorization process, other than the addition of the alternative seismic approach related to

the consideration of the seismic risk, remain unchanged and valid. Consequently, the NRC staff did not separately review the licensee's categorization process other than the change requested in the LAR.

As stated in RG 1.201, Revision 1, if a licensee wishes to change its categorization approach, the staff's review of the resulting license amendment request will focus on the acceptability of the methodology and analyses relied upon in the application. Section 3.1 below summarizes the NRC staff's review of the acceptability of the proposed alternative seismic approach as described in the LAR and its supplement.

In Section 3 of its letter dated January 14, 2021, the licensee stated that the implementation items listed in the previously approved amendment in Attachment 1 of Duke Energy's letter to the NRC (Reference 13) were completed, that model changes to the PRA have been assessed as maintenance or upgrades, that identified upgrades have been peer reviewed, and that findings have been resolved and closed. Section 3.2 below summarizes the NRC staff's review of the PRA implementation items listed in the previously approved amendment and which would now be removed from the license condition as described in the LAR.

3.1 Alternative Seismic Approach

In its letter dated January 14, 2021, for the seismic risk contributors, the licensee stated that the proposed process allows for the following non-PRA methods for the risk characterization as follows:

- Seismic hazard is assessed using the seismic margins assessment in accordance with NEI 00-04, and as approved in the letter dated September 17, 2019 (Reference 4);
- Seismic hazard is assessed using an alternative approach supported by EPRI Report 3002017583 (Reference 12), as described in this LAR and its supplement.

The NRC staff notes that use of the alternative seismic approach is an alternative method not endorsed by the NRC in NEI 00-04. A detailed NRC staff review of the licensee's proposed alternative seismic approach follows.

As part of its proposed process to categorize SSCs according to safety significance, the licensee proposed to use a non-PRA method to consider seismic hazards. The regulations in 10 CFR 50.69(b)(2)(ii) and 50.69(c)(1)(ii) permit the use of systematic evaluation techniques in the risk-informed categorization process. The licensee provided a description of its proposed alternative seismic approach for considering seismic risk in the categorization process and described how the proposed alternative seismic approach would be used in the categorization process in Section 3 of the enclosure to its letter dated January 14, 2021, and its supplement dated June 8, 2021. In part, the licensee based its plant-specific evaluation on the case studies performed in EPRI Report 3002017583. The licensee stated that the case studies are applicable to Harris and are used in the alternative seismic approach. The licensee further stated how the proposed alternative seismic approach would be used in the categorization process, and that the measures for assuring the quality and level of detail for the licensee's proposed alternative seismic approach were adequate for the categorization of SSCs. Based on the above, the NRC staff finds that the requirements in 10 CFR 50.69(b)(2)(ii) for the proposed alternative seismic approach are met.

EPRI Report 3002017583 includes the results from case studies performed to determine the extent and type of unique HSS SSCs from seismic PRAs (SPRAs). In its letter dated January 14, 2021, the licensee indicated that aside from two exceptions (the site-specific Calvert Cliffs information and the configuration control checklist described in the Calvert Cliffs response) the licensee will follow the same alternative seismic approach in its proposed 10 CFR 50.69 categorization process as the approved Calvert Cliffs 10 CFR 50.69 amendment. Therefore, it is understood by the NRC staff that the technical criteria in EPRI Report 3002017583 are unchanged from its predecessor report EPRI Report 3002012988 (Reference 11) and that the case studies are applicable to Harris and are used in the alternative seismic approach. The NRC staff's review confirmed that the case studies in EPRI Report 3002017583 used by the licensee to support its proposed alternative seismic approach, as well as the information in its supplements, provided sufficient plant-specific evaluation of the applicability and differences for Harris as compared to the approach (Reference 14) approved by the NRC for Calvert Cliffs. The information presented in the LAR and supplement, as well as in EPRI Report 3002017583, provided a sufficient description of, and basis for, acceptability of the evaluations to be conducted to satisfy 10 CFR 50.69(c)(1)(iv) for the alternative seismic approach. Therefore, the NRC staff finds that the requirements in 10 CFR 50.69(b)(2)(iv) are met for the proposed alternative seismic approach.

Based on the information provided in the LAR, the NRC staff finds it can base its approval of the licensee's alternative seismic approach based on the reasons provided for its approval of the Calvert Cliffs' alternative seismic approach because (1) the differences between the licensee's proposed alternative seismic approach and the alternative seismic approach previously approved are addressed, (2) there are no differences in the technical criteria used in EPRI Report 3002017583 and its predecessor, EPRI Report 3002012988, used in the previous review, and (3) all references needed to support the NRC staff's finding on the proposed alternate seismic approach have been cited by the LAR as supplemented.

Evaluation of Technical Acceptability of the PRAs Used for Case Studies Supporting the Proposed Alternative Seismic Approach

In its letter dated January 14, 2021, the licensee included a discussion of the precedent including the case studies, mapping approach, and conclusions on the determination of unique HSS SSCs from the case studies which were used by the licensee to support its proposed alternative seismic approach. The licensee stated that the case study for Plants A, C, and D, pertaining to the technical acceptability of the PRAs used, as well as the technical adequacy of certain technical details of the conduct of the case studies are applicable to Harris. The NRC staff reviewed and evaluated the technical acceptability of the PRAs used in the case studies for Plants A, C, and D in EPRI Report 3002017583 and the licensee's assertion of plant-specific applicability to the precedent. The NRC staff also evaluated the peer review process, resolution of peer-review findings, and key assumptions and sources of uncertainty for Plants A, C, and D.

Based on the above, the NRC staff's finds the technical acceptability of PRAs used for the Plant A, C, and D case studies in EPRI Report 3002017583, the mapping approach used in those case studies, and the conclusions on the determination of unique HSS SSCs from the case studies in the precedent (Reference 14) are applicable to Harris's proposed plant-specific alternative seismic approach. Therefore, the NRC staff concludes that the Plant A, C, and D PRAs were technically acceptable and applicable for use in support of the licensee's proposed alternative seismic approach; the mapping of SSCs between the SPRA, the full-power Internal Events Probabilistic Risk Assessment (IEPRA), and, as applicable, the fire PRA (FPRA) for the

Plant A, C, and D case studies. The licensee's plant-specific evaluation is technically justifiable to support conclusions on the determination of unique HSS SSCs from SPRAs in Plant A, C, and D case studies in the EPRI Report 3002017583, and the licensee's proposed alternative seismic approach is applicable to Harris.

Evaluation of the Criteria for the Proposed Alternative Seismic Approach

In its letter dated January 14, 2021, the licensee proposed the following Tier 1 criteria for the applicability and use of the proposed alternative seismic approach:

The Ground Motion Response Spectrum (GMRS) peak acceleration is at or below approximately 0.2g, or where the GMRS is below or approximately equal to the Safe Shutdown Earthquake (SSE) between 1.0 Hz and 10 Hz.

In its letter dated January 14, 2021, the licensee further stated that the GMRS-to-SSE comparison demonstrates that Harris qualifies as a Tier 1 plant under the criteria in the EPRI report and this comparison confirms that the expected seismic risk at Harris would be very low. The NRC staff notes that the licensee's plant specific evaluation is supported by its 10 CFR 50.54(f) response dated March 27, 2014 (Reference 15). The NRC staff reviewed the licensee's letter dated January 14, 2021, supplement dated June 8, 2021, and plant-specific evaluation and concludes that the licensee meets the criteria of GMRS peak acceleration below or approximately equal to the SSE between 1.0 and 10 Hz. Therefore, licensee's proposed criteria to determine the applicability and use of the proposed alternative seismic approach is acceptable.

Evaluation of Applicability of Criteria for this Application

In Section 3 of the enclosure to its January 14, 2021, letter the licensee compared the GMRS from the reevaluated seismic hazard for Harris, developed and submitted by the licensee in response to Near-Term Task Force (NTTF) Recommendation 2.1, against the site's design-basis SSE in the March 27, 2014, response to the NRC 10 CFR 50.54(f) letter associated with NTTF Recommendation 2.1 (Reference 15). This comparison was conducted to demonstrate that the site meets the criteria for application of the proposed alternative seismic approach. In Section 3 of the enclosure, the licensee stated that the NRC concluded that the methodology used by the licensee in determining the GMRS was acceptable and that the GMRS determined by the licensee adequately characterized the reevaluated hazard for the Harris site. The NRC staff's review confirmed the licensee's statements and the comparison of the GMRS from the reevaluated seismic hazard against the SSE. Based on its review, the NRC staff finds that the licensee's seismic hazard meets the criteria for the proposed alternative seismic approach.

In Section 3 of the enclosure to its letter dated January 14, 2021, the licensee stated that the contribution of seismic risk to the integral assessment will be low such that seismic risk is unlikely to influence a HSS decision. The licensee emphasized the low site seismic risk and seismic capacity margins beyond the GMRS seismic level. Additionally, the licensee provided an estimate of the seismic core damage frequency and seismic large early release frequency to support its determination.

The NRC staff evaluated the licensee's estimate during the licensee's Technical Specifications Task Force (TSTF)-505 review and concluded that the seismic Core Damage Frequency (CDF) and seismic large early release frequency (LERF) are insignificant contributors to configuration

risk (Reference 16). Based on the low contribution to risk and the technical acceptability of the EPRI Report 3002017583 case studies supporting the proposed alternative seismic approach, the NRC staff concludes that the seismic risk contribution Harris would not solely result in an SSC being categorized as HSS.

In summary, the NRC staff's review finds that the licensee's basis for applying the proposed alternative seismic approach is acceptable because: (1) the reevaluated hazard meets the criteria for use of the proposed alternative seismic approach, and (2) the seismic risk contribution is not expected to solely result in an SSC being categorized as HSS.

Evaluation of the Implementation of Conclusions from the Case Studies

The categorization conclusions from the EPRI Report 3002017583 case studies indicated that seismic-specific failure modes resulted in HSS categorization uniquely from SPRAs. Therefore, seismic-specific failure modes, such as correlated failures, relay chatter, and passive component structural failure modes, can influence the categorization process. The NRC staff reviewed the proposed alternative seismic approach to evaluate whether the categorization-related conclusions from EPRI Report 3002017583 were appropriately included and implemented.

In Section 3 of the enclosure to its letter dated January 14, 2021, the licensee discussed the proposed alternative seismic approach. The licensee stated that the proposed categorization approach for seismic hazards includes qualitative consideration of the mitigation capabilities of SSCs during seismically-induced events and seismic failure modes, based on insights obtained from prior seismic evaluations performed for Harris. Additional information on the prior evaluations performed for Harris was discussed by the licensee in the enclosure to the LAR.

In the LAR, the licensee stated that its plant-specific evaluation considered differences in the proposed alternative seismic approach between Harris and the precedent previously reviewed and approved by the NRC staff (Reference 14). The NRC staff's review of the licensee's proposed alternative seismic approach determined that the Calvert Cliffs approach is applicable to the proposed alternative seismic approach and the plant-specific evaluation on the implementation of the alternative seismic approach is acceptable. Based on its review of the licensee's proposed alternative seismic approach, in conjunction with the requirements in 10 CFR 50.69 and the corresponding statement of consideration, the NRC staff finds that the proposed alternative seismic approach provides reasonable confidence in the evaluations required by 10 CFR 50.69(c)(1)(ii) as well as 10 CFR 50.69(c)(1)(iv) because:

1. The proposed alternative seismic approach includes qualitative consideration of seismic events at several steps of the categorization process, including documentation of the information for presentation to the Integrated Decision-making Panel (IDP) as part of the integrated, systematic process for categorization.
2. The proposed alternative seismic approach presents system-specific seismic insights to the IDP for consideration as part of the IDP review process as each system is categorized, thereby providing the IDP a means to consider potential impacts of seismic events in the categorization process.
3. The insights presented to the IDP include potentially important seismically-induced failure modes, as well as mitigation capabilities of SSCs during seismically-induced design basis and severe accident events consistent with the conclusions on the

determination of unique HSS SSCs from SPRAs in EPRI Report 3002017583. The insights will use prior plant-specific seismic evaluations, and therefore, in conjunction with performance monitoring for the proposed alternative seismic approach, reasonably reflect the current plant configuration. Further, the recommendation for categorizing civil structures in the alternative seismic approach provides appropriate consideration of such failures from a seismic event.

4. The proposed alternative seismic approach presents the IDP with the basis for the proposed alternative seismic approach, including the low seismic hazard for the plant and the criteria for use of the proposed alternative seismic approach.
5. The proposed alternative seismic approach includes qualitative considerations and insights related to the impact of a seismic event on SSCs for each SSC that is categorized and does not limit the scope to SSCs from the case studies supporting this application.

Consideration of Changes to Seismic Hazard

An important input to the NRC staff's evaluation of the proposed alternative seismic approach is the current knowledge of the seismic hazard at the plant. The possibility exists for the seismic hazard at the site to increase such that the criteria for use of the proposed alternative seismic approach are challenged. In such a situation, the categorization process may be impacted from a seismic risk perspective either solely due to the seismic risk or by the integrated importance measure determination.

In Section 3 of the enclosure to its letter dated January 14, 2021, the licensee stated that "U.S. nuclear power plants that utilize the 50.69 Seismic Alternative Approach (EPRI 3002017583) will continue to compare GMRS to SSE." Since the proposed alternative seismic approach explicitly cites and is based on EPRI Report 3002017583, the continued comparison of GMRS to SSE applies to Harris. The licensee also stated that the seismic hazard at the plant is subject to periodic reconsideration as new information becomes available through industry evaluations.

The NRC staff finds that the consideration of changes to the seismic hazard in the licensee's proposed alternative seismic approach is consistent with the NRC staff's approval of the Calvert Cliffs LAR (Reference 14). Therefore, the NRC staff's evaluation of the proposed changes to the seismic hazard against the requirements in 10 CFR 50.69(e)(1), 10 CFR 50.69(e)(3), and 10 CFR 50.69(d)(2)(ii), as well as the resulting conclusion on consideration of changes to the seismic hazard for Calvert Cliffs is applicable to this licensee's proposed alternative seismic approach. Consequently, the NRC staff finds that the consideration of changes to the seismic hazard at Harris is acceptable because: (1) the criteria for use of the proposed alternative seismic approach are clear and traceable, (2) the proposed alternative seismic approach includes periodic reconsideration of the seismic hazard as new information becomes available, (3) the proposed alternative seismic approach satisfies the requirements in 10 CFR 50.69 discussed above, and (4) the licensee has included a proposed license condition in the LAR to require NRC approval for a change to the specified seismic categorization approach.

Monitoring of Inputs to and Outcome of Proposed Alternative Seismic Approach

In Section 3 of the enclosure to its letter dated January 14, 2021, the licensee described its feedback and adjustment process. The licensee provided a description of its periodic review process to review the impact of plant changes and a list of items included in the design effects and consideration review. Further, the licensee cited precedent for its proposed alternative seismic approach (Reference 14) with the exception that a specific configuration control checklist was not developed for 10 CFR 50.69 reviews.

The NRC staff found that consideration of the feedback and adjustment process in the licensee's proposed alternative seismic approach is acceptable. The NRC staff finds that (1) the licensee's programs provide reasonable assurance that the existing seismic capacity of LSS components would not be significantly impacted, and (2) the monitoring and configuration control program ensures that potential degradation of seismic capacity would be detected and addressed before significantly impacting the plant risk profile. Therefore, the NRC staff finds that the potential impact of the seismic hazard on the categorization of RISC-3 and RISC-4 SSCs is maintained acceptably low and the requirements in 10 CFR 50.69(c)(1)(iv) are met for the proposed alternative seismic approach.

3.2 PRA Implementation Items

In its letter dated January 14, 2021, the licensee indicated that it was necessary to disposition the PRA implementation items that are referenced in its existing 10 CFR 50.69 license condition before assessing the technical adequacy of the alternative seismic approach. The existing license condition states, in part:

Duke Energy will complete the implementation items listed in Attachment 1 of Duke Energy letter to the NRC dated April 23, 2019 (Reference 13), prior to implementation of 10 CFR 50.69.

The implementation items in Attachment 1 of the licensee's letter dated April 23, 2019, are as follows:

- i. Perform a detailed analysis in accordance with current methods for the four significant [human failure events] HFEs identified and incorporate the analysis into the Harris fire PRA model, as indicated in the Duke Energy letter dated October 18, 2018 (Reference 17).
- ii. Update the fire PRA model to credit incipient detection per NUREG-2180 or other NRC acceptable methodology, as described in the Duke Energy letter dated October 18, 2018.
- iii. Update the fire PRA model to account for scenarios to address fire induced failure of structural steel in the Turbine Building, as indicated in response to [Request for Additional Information] RAI 02.f contained in the Duke Energy letter dated October 18, 2018.
- iv. Update the PRA models to account for isolation of the reactor coolant system accumulators and steam generator safety relief valves, as indicated in response to RAI 5.01 of Duke Energy letter dated April 23, 2019.

In its LAR, the licensee confirmed that all the implementation items have been completed. The licensee stated that the model changes to resolve the PRA implementation items have been assessed as maintenance or upgrade, that any identified upgrades have been peer reviewed, and resulting findings have been resolved and closed. The licensee discussed the status of its PRA models and indicated that focused scope peer reviews were conducted in 2019 and that there were no open finding level facts and observations (F&Os) from these peer reviews for the IEPRA or FPRA. The licensee stated that any updates to the IEPRA, Internal Flooding Probabilistic Risk Assessment (IFPRA), and FPRA have not introduced any new key uncertainties or assumptions for the 10 CFR 50.69 application.

As discussed in the SE dated September 17, 2019 (Reference 4), the completion of the implementation items by the licensee does not change or impact the bases for the safety conclusions made by the NRC staff. The NRC staff may choose to examine, through an onsite audit or future inspections, the closure of the implementation items with the expectation that any concerns regarding adequate completion of the implementation items would be tracked and dispositioned appropriately under the licensee's corrective action program and could be subject to appropriate NRC enforcement action. Based on this consideration, as well as the licensee's affirmation that the implementation items have been completed, and the information provided by the licensee in the LAR the NRC staff finds that the license condition requiring completion of implementation items can be removed.

3.3 Technical Evaluation Summary

Based on the above, the NRC staff finds the licensee's non-PRA methods for assessing risk for seismic hazards, a deviation from NEI 00-04, acceptable; and determines that the licensee's proposed 10 CFR 50.69 program, with the proposed license condition, continues to meet the requirements in 10 CFR 50.69.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of North Carolina official was notified of the proposed issuance of the amendment on November 9, 2021. The State of North Carolina official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes the requirements with respect to installation or use of a facility's components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration in the *Federal Register* on April 20, 2021 (86 FR 20529), and there has been no public comment on such finding. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need to be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there

is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

7.0 REFERENCES

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3. Mahoney, M., U.S. Nuclear Regulatory Commission letter to Kim Maza, Shearon Harris Nuclear Power Plant, "Shearon Harris Nuclear Power Plant, Unit 1 – Regulatory Audit for the Review of License Amendment Request to Revise the 10 CFR 50.69 (EPID L-2019-LLA-0269)," dated April 26, 2021 (ADAMS Accession No. ML21099A274).
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6. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.200, Revision 2, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment for Risk-Informed Activities," March 2009 (ADAMS Accession No. ML090410014).
7. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.174, Revision 3, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," January 2018 (ADAMS Accession No. ML17317A256).
8. U.S. Nuclear Regulatory Commission, NUREG-1855, Revision 1, "Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decisionmaking," March 2017 (ADAMS Accession No. ML17062A466).
9. U.S. Nuclear Regulatory Commission, NUREG-0800, Chapter 19, Section 19.2, "Review of Risk Information Used to Support Permanent Plant-Specific Changes to the

Licensing Basis: General Guidance," June 2007 (ADAMS Accession No. ML071700658).

10. Nuclear Energy Institute, NEI 00-04, Revision 0, "10 CFR 50.69 SSC Categorization Guideline," July 2005 (ADAMS Accession No. ML052910035).
11. Electric Power Research Institute, Report 3002012988, "Alternative Approaches for Addressing Seismic Risk in 10 CFR 50.69 Risk-Informed Categorization," July 2018 (ADAMS Accession No. ML21067A092).
12. Electric Power Research Institute, Report 3002017583, "Alternative Approaches for Addressing Seismic Risk in 10 CFR 50.69 Risk-Informed Categorization," February 2020 (ADAMS Accession No. ML21082A170).
13. Snider, Steve, letter from Duke Energy Progress, LLC, "Response to NRC Request for Additional Information (RAI) Regarding Application to Adopt 10 CFR 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems, and Components (SSCs) for Nuclear Power Reactors," April 23, 2019 (ADAMS Accession No. ML19113A285).
14. Marshall, M. L., U.S. Nuclear Regulatory Commission, letter to Bryan C. Hanson, Exelon Generation Company, LLC, "Calvert Cliffs Nuclear Power Plant, Units 1 and 2 – Issuance of Amendment Nos. 332 and 210 Re: Risk-informed Categorization and Treatment of Systems, Structures, and Components (EPID L-2018-LLA-0482)," February 28, 2020 (ADAMS Accession No. ML19330D909).
15. Kapopoulos, Jr. E., Duke Energy Progress, Inc., letter to U.S. Nuclear Regulatory Commission, "Seismic Hazard and Screening Report (CEUS Sites), Response to NRC 10 CFR 50.54(f) Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) regarding Recommendations 2.1, 2.3, and 9.3 of the Near-Term Task Force Review," March 27, 2014 (ADAMS Accession No. ML14090A441).
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Date: January 19, 2022

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 - ISSUANCE OF AMENDMENT NO. 188 REGARDING REVISION OF THE 10 CFR 50.69, "RISK-INFORMED CATEGORIZATION AND TREATMENT OF STRUCTURES, SYSTEMS AND COMPONENTS FOR NUCLEAR POWER REACTORS," CATEGORIZATION PROCESS TO REFLECT AN ALTERNATIVE SEISMIC APPROACH (EPID L-2021-LLA-0003) DATED JANUARY 19, 2022

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