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10 CFR 50.90

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Shearon Harris Nuclear Power Plant, Unit 1  
Docket No. 50-400/Renewed License No. NPF-63

Subject: License Amendment Request to Revise 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

Ladies and Gentlemen:

Pursuant to 10 CFR 50.90, Duke Energy Progress, LLC (Duke Energy) hereby requests an amendment to the Shearon Harris Nuclear Power Plant, Unit 1 (HNP) Renewed Facility Operating License (FOL). The proposed change would revise the 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," that was added to the HNP FOL upon the issuance of Amendment No. 174 (Agencywide Document Access and Management System (ADAMS) Accession No. ML19192A012). Specifically, the proposed change would revise the license condition to reflect an alternative approach to the one provided in NEI 00-04, "10 CFR 50.69 SSC Categorization Guideline," Revision 0, for evaluating the impact of the seismic hazard in the 10 CFR 50.69 categorization process.

The proposed alternative seismic approach for Tier 1 plants (e.g., HNP) is described in Electric Power Research Institute (EPRI) 3002017583, "Alternative Approaches for Addressing Seismic Risk in 10 CFR 50.69 Risk-Informed Categorization, February 2020," and is a risk-informed, graded approach that has demonstrated categorization insights equivalent to a seismic probabilistic risk assessment (PRA). For Tier 1 plants such as HNP, the EPRI approach relies on insights from seismic PRAs examined in EPRI 3002017583, along with confirmation that the site Ground Motion Response Spectrum (GMRS) is acceptably low. The EPRI approach demonstrates that seismic risk is adequately addressed for Tier 1 sites by the results of other elements in the 10 CFR 50.69 categorization process.

The Enclosure provides a description and assessment of the proposed change. Attachment 1 provides the existing HNP FOL pages marked to show the proposed change.

The proposed change has been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c), and it has been determined that the proposed change involves no significant hazards consideration. The basis for this determination is included in the Enclosure.

Duke Energy requests approval of the proposed amendment within one year of the date this submittal is accepted by the NRC staff for review. Once approved, Duke Energy will implement the license amendment within 120 days.

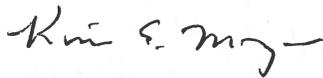
There are no regulatory commitments contained in this submittal.

In accordance with 10 CFR 50.91, Duke Energy is notifying the State of North Carolina of this license amendment request by transmitting a copy of this letter and enclosure to the designated State Official.

If there are any questions or if additional information is needed, please contact Mr. Art Zaremba, Manager – Nuclear Fleet Licensing, at 980-373-2062 or [Arthur.Zaremba@duke-energy.com](mailto:Arthur.Zaremba@duke-energy.com).

I declare under penalty of perjury that the foregoing is true and correct. Executed on January 14, 2021.

Sincerely,



Kim E. Maza  
Site Vice President  
Harris Nuclear Plant

Enclosure: Description and Assessment of the Proposed Change

Attachment:

1. Facility Operating License Markup

cc (with Enclosure/Attachment):

L. Dudes, NRC Regional Administrator, Region II  
J. Zeiler, NRC Senior Resident Inspector, HNP  
M. Mahoney, NRC Project Manager, HNP  
W. L. Cox, III, Section Chief N.C. DHSR

## **ENCLOSURE**

### **Description and Assessment of the Proposed Change**

Subject: License Amendment Request to Revise 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

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1. Facility Operating License Markup

## 1. SUMMARY DESCRIPTION

Duke Energy Progress, LLC (Duke Energy) hereby requests an amendment to the Shearon Harris Nuclear Power Plant, Unit 1 (HNP) Renewed Facility Operating License (FOL). The proposed change would revise the 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," that was added to the HNP FOL upon the issuance of Amendment No. 174 (Reference 1). Specifically, the proposed change would revise the license condition to reflect an alternative approach to the one provided in NEI 00-04, "10 CFR 50.69 SSC Categorization Guideline," Revision 0 (Reference 3), for evaluating the impact of the seismic hazard in the 10 CFR 50.69 categorization process.

The proposed alternative seismic approach for Tier 1 plants (e.g., HNP) is described in Electric Power Research Institute (EPRI) 3002017583, "Alternative Approaches for Addressing Seismic Risk in 10 CFR 50.69 Risk-Informed Categorization, February 2020," (Reference 2) and is a risk-informed, graded approach that has demonstrated categorization insights equivalent to a seismic probabilistic risk assessment (PRA). For Tier 1 plants such as HNP, the EPRI approach relies on insights from seismic PRAs examined in Reference 2, along with confirmation that the site Ground Motion Response Spectrum (GMRS) is acceptably low. The EPRI approach demonstrates that seismic risk is adequately addressed for Tier 1 sites by the results of other elements in the 10 CFR 50.69 categorization process.

## 2. DETAILED DESCRIPTION

### 2.1 Current Regulatory Requirements

In Reference 1, the NRC issued Amendment No. 174 to the FOL for HNP, which added a new license condition to allow for the implementation of the provisions of 10 CFR 50.69. The provisions of 10 CFR 50.69 allow adjustment of the scope of structures, systems and components (SSCs) subject to special treatment requirements (e.g., quality assurance, testing, inspection, condition monitoring, assessment and evaluation) based on a method of categorizing SSCs according to their safety significance.

Consistent with the guidance in NEI 00-04, as endorsed by Regulatory Guide 1.201, Revision 1, "Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants according to their Safety Significance," (Reference 4) the existing HNP categorization process uses PRAs to assess risk from internal events (including internal flooding) and fire. For other applicable hazard groups, the HNP process uses non-PRA methods for risk categorization. HNP uses the Seismic Safe Shutdown Equipment List (SSEL) from the seismic margin analysis (SMA) to assess seismic risk, the individual plant examination of external events (IPEEE) screening process to assess other external hazards (high winds and external floods), and a qualitative defense-in-depth shutdown model to assess shutdown risk.

Regarding the subject license amendment request and the assessment of seismic risk in the 10 CFR 50.69 categorization process, HNP currently uses the SMA screening method. HNP currently follows the approach in Reference 3 using the SSEL to identify credited equipment as high safety significance (HSS), regardless of the equipment's capacity, frequency of challenge or level of functional diversity. Consistent with Reference 3, the HNP 10 CFR 50.69 categorization process considers all components in the SSEL as HSS based on seismic risk.

All components not listed in the SSEL are considered preliminary low safety significant (LSS) with respect to seismic risk.

## 2.2 Reason for Proposed Change

Reference 4 clarifies that the NRC staff expects that licensees proposing to use non-PRA approaches in the 10 CFR 50.69 categorization process provide a basis in the submittal for why the approach and the accompanying method employed to assign safety significance to SSCs is technically adequate. The guidance further states that as part of the NRC's review and approval of an application requesting to implement 10 CFR 50.69, the NRC staff intends to impose a license condition that will explicitly address the scope of the PRA and non-PRA methods used in the categorization approach. To that end, the NRC imposed a license condition on HNP in Reference 1 that requires use of the SMA to evaluate seismic risk in the 10 CFR 50.69 categorization process.

Since Duke Energy desires to change the categorization approach specified in the HNP FOL with respect to the assessment of seismic risk (i.e., switch from a seismic margins analysis to the alternative EPRI approach in Reference 2), NRC approval of the new approach in the categorization process must be requested pursuant to 10 CFR 50.90, in accordance with the license condition that was added upon issuance of HNP Amendment No. 174.

## 2.3 Description of the Proposed Change

Duke Energy proposes to revise the 10 CFR 50.69 license condition that was added to the HNP FOL by Amendment No. 174 to the following.

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; the results of the non-PRA evaluations that are based on the IPEEE Screening Assessment for External Hazards updated using the external hazard screening significance process identified in ASME/ANS PRA Standard RA-Sa-2009 for other external hazards except seismic; and the alternative seismic approach as described in Duke Energy letter to the NRC dated January 14, 2021, as specified in License Amendment No. [XXX] 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).

Duke Energy proposes to revise the "Implementation Date" associated with the license condition to the following:

Upon implementation of Amendment No. [XXX]

A markup of the HNP FOL to describe the proposed change is provided in Attachment 1. Note that the proposed change is only regarding the method in which seismic risk is assessed in the 10 CFR 50.69 categorization process. There are no other changes being proposed in this license amendment request (LAR) to the 10 CFR 50.69 categorization process that was approved in Reference 1 for HNP.

### **3. TECHNICAL EVALUATION**

#### Status of PRA Implementation Items from Existing 10 CFR 50.69 License Condition

Before providing the technical adequacy of the alternative seismic approach proposed to be used in the HNP 10 CFR 50.69 categorization process, it is necessary to disposition the PRA implementation items that are referenced in the existing HNP 10 CFR 50.69 license condition. The existing license condition that was added with the issuance of Amendment No. 174 to the HNP FOL states the following, in part:

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

Duke Energy confirms that PRA implementation items “i.” through “iv.” listed in the April 23, 2019 Duke Energy letter (Reference 5), as described in the NRC Safety Evaluation (SE) approving 10 CFR 50.69 for HNP (Reference 1), are complete.

The model changes to resolve the PRA implementation items listed in Reference 5 have been assessed as maintenance or upgrade. Any identified upgrades have been peer reviewed and resulting findings have been resolved and closed. Refer to the detailed peer review discussion below.

Thus, the proposed change removes the discussion of the Reference 5 PRA implementation items.

Duke Energy also confirms that all other previously approved 10 CFR 50.69 categorization methods for HNP in Reference 5, except for the proposed adoption of an alternative approach for assessing seismic risk, are not impacted by this license amendment request.

#### Technical Adequacy Evaluation (10 CFR 50.69(b)(2)(ii)) – Seismic Hazards

The overall process to categorize each system will continue to be consistent with the guidance in NEI 00-04, as endorsed by RG 1.201, with the exception of the evaluation of impact of the seismic hazard, which will use the EPRI 3002017583 (Reference 2) approach for seismic Tier 1 sites to assess seismic hazard risk for 10 CR 50.69. Inclusion of additional process steps to address seismic considerations, as discussed below, will ensure that reasonable confidence in the evaluations required by 10 CFR 50.69(c)(1)(iv) is achieved.

For the seismic hazard, given that HNP is a seismic Tier 1 (low seismic hazard) plant as defined in Reference 2, components having seismic functions may be HSS or LSS based on the Integrated Decision-making Panel’s (IDP) consideration of the seismic insights applicable to the system being categorized. The IDP will consider available seismic information pertinent to the components being categorized and can, at its discretion, determine that a component should be

HSS based on that information. The seismic risk assessment does not drive associated functions as defined in NEI 00-04.

10 CFR 50.69(c)(1) requires the use of PRA to assess risk from internal events. For other risk hazards such as seismic, 10 CFR 50.69(b)(2) allows, and NEI 00-04 summarizes, the use of other methods for determining SSC functional importance in the absence of a quantifiable PRA (such as SMA or IPEEE Screening) as part of an integrated, systematic process. For the HNP seismic hazard assessment, Duke Energy proposes to use a risk-informed graded approach that meets the requirements of 10 CFR 50.69(b)(2), as an alternative to those requirements listed in NEI 00-04, sections 1.5 and 5.3. This approach is specified in Reference 2 and includes additional qualitative considerations that are discussed in this section.

HNP meets the Tier 1 criteria for a “Low Seismic Hazard/High Seismic Margin” site. The Tier 1 criteria are as follows:

Tier 1: Plants where the GMRS peak acceleration is at or below approximately 0.2g or where the GMRS is below or approximately equal to the SSE [Safe Shutdown Earthquake] between 1.0 Hz and 10 Hz. Examples are shown in Figures 2-1 and 2-2. At these sites, the GMRS is either very low or within the range of the SSE such that unique seismic categorization insights are not expected.

Note: EPRI 3002017583 applies to the Tier 1 sites in its entirety except for sections 2.3 (Tier 2 sites), 2.4 (Tier 3 sites), Appendix A (seismic correlation), and Appendix B (criteria for capacity-based screening).

The Tier 1 criterion (i.e. basis) in EPRI 3002017583 is a comparison of the GMRS (derived from the seismic hazard) to the SSE (i.e., seismic design basis capability). U.S. nuclear power plants that utilize the 10 CFR 50.69 Seismic Alternative (EPRI 3002017583) will continue to compare GMRS to SSE.

The trial studies in EPRI 3002017583 show that seismic categorization insights are overlaid by other risk insights even at plants where the GMRS is far beyond the seismic design basis. Therefore, the basis for the Tier 1 classification and resulting criteria is not that the design basis insights are adequate. Instead, it is that consideration of the full range of the seismic hazard produces limited unique insights to the categorization process. That is the basis for the following statements in Table 4-1 of the EPRI report:

At Tier 1 sites, the likelihood of identifying a unique seismic condition that would cause an SSC to be designated HSS is very low.

Therefore, with little to no anticipated unique seismic insights, the 10 CFR 50.69 categorization process using the FPIE [Full Power Internal Events] PRA and other risk evaluations along with the required Defense-in-Depth and IDP qualitative considerations are expected to adequately identify the safety-significant functions and SSCs required for those functions and no additional seismic reviews are necessary for 50.69 categorization.

The proposed categorization approach for HNP is a risk-informed graded approach that is demonstrated to produce categorization insights equivalent to a seismic PRA. For Tier 1 plants, this approach relies on the insights gained from the seismic PRAs examined in Reference 2

along with confirmation that the site GMRS is low. Reference 2 demonstrates that seismic risk is adequately addressed for Tier 1 sites by the results of an additional qualitative assessment discussed in the remainder of this section and by existing elements of the 10 CFR 50.69 categorization process specified in NEI 00-04.

For example, the 10 CFR 50.69 categorization process, as defined in NEI 00-04, includes an Integral Assessment that weighs the hazard-specific relative importance of a component (e.g., internal events, internal fire, seismic) by the fraction of the total Core Damage Frequency (CDF) contributed by that hazard. The risk from an external hazard can be reduced from the default condition of HSS if the results of the integral assessment meet the importance measure criteria for LSS. For Tier 1 sites, the seismic risk (CDF/LERF) will be low such that seismic hazard risk is unlikely to influence an HSS decision. In applying the EPRI 3002017583 process for Tier 1 sites to the HNP 10 CFR 50.69 categorization process, the IDP will be provided with the rationale for applying the EPRI 3002017583 guidance and informed of plant-specific SSC seismic insights for their consideration in the final HSS/LSS determinations.

Reference 2 recommends a risk-informed graded approach for addressing the seismic hazard in the 10 CFR 50.69 categorization process. There are a number of seismic fragility fundamental concepts that support a graded approach and there are important characteristics about the comparison of the seismic design basis (represented by the SSE) to the site-specific seismic hazard (represented by the GMRS) that support the selected thresholds between the three evaluation Tiers in the EPRI report. The coupling of these concepts with the categorization process in NEI 00-04 are the key elements of the approach defined in Reference 2 for identifying unique seismic insights.

The seismic fragility of an SSC is a function of the margin between an SSC's seismic capacity and the site-specific seismic demand. References such as EPRI NP-6041 (Reference 6) provide inherent seismic capacities for most SSCs that are not directly related to the site-specific seismic demand. This inherent seismic capacity is based on the non-seismic design loads (pressure, thermal, dead weight, etc.) and the required functions for the SSC. For example, a pump has a relatively high inherent seismic capacity based on its design and that same seismic capacity applies at a site with a very low demand and at a site with a very high demand. At sites with lower seismic demands such as HNP, there is no need to perform more detailed evaluations to demonstrate the inherent seismic capacities documented in industry sources such as Reference 6. Low seismic demand sites have lower likelihood of seismically-induced failures and lesser challenges to plant systems. This, therefore, provides the technical basis for allowing use of a graded approach for addressing seismic hazards at HNP.

There are some plant features such as equipment anchorage that have seismic capacities more closely associated with the site-specific seismic demand, since those specific features are specifically designed to meet that demand. However, even for these features, the design basis criteria have intended conservatisms that result in significant seismic margins within SSCs. These conservatisms are reflected in key aspects of the seismic design process. The SSCs used in nuclear power plants are intentionally designed using conservative methods and criteria to ensure that they have margins well above the required design bases. Experience has shown that design practices result in margins to realistic seismic capacities of 1.5 or more.

The following provides the basis for establishing Tier 1 criteria in Reference 2.

- a. SSCs for which the inherent seismic capacities are applicable, or which are designed to the plant SSE will have low probabilities of failure at sites where the peak spectral acceleration of the GMRS  $< 0.2g$  or where the GMRS  $< SSE$  between 1 and 10 Hz.
- b. The low probabilities of failure of individual components would also apply to components considered to have correlated seismic failures.
- c. These low probabilities of failure lead to low seismic CDF and LERF estimates, from an absolute risk perspective.
- d. The low seismic CDF and LERF estimates lead to reasonable confidence that seismic risk contributions would allow reducing a HSS to LSS due to the 50.69 Integral Assessment if the equipment is HSS only due to seismic considerations.

Test cases described in Section 3 of Reference 2 showed that it would be unusual even for moderate hazard plants to exhibit any unique seismic insights, including due to correlated failures. The test case information from Reference 2 that Duke Energy is incorporating by reference into this application for HNP is described in Case Study A (Reference 18), Case Study C (References 27 and 28) and Case Study D (References 19, 20, 21). Hence, while it is prudent to perform additional evaluations to identify conditions where correlated failures may occur for Tier 2 sites, for Tier 1 sites such as HNP, correlation studies would not lead to new seismic insights or affect the baseline seismic CDF in any significant way.

The Tier 1 to Tier 2 threshold, as defined in EPRI 3002017583, provides a clear and traceable boundary that can be consistently applied, plant site to plant site. Additionally, because the boundary is well defined, if new information is obtained on the site hazard, a site's location within a particular Tier can be readily confirmed. In the unlikely event that the HNP seismic hazard changes to medium risk (i.e., Tier 2) at some future time, Duke Energy will follow its categorization review and adjustment process procedures to review the changes to the plant and update, as appropriate, the SSC categorization in accordance with 10 CFR 50.69(e).

The following provides the basis for concluding that HNP meets the Tier 1 site criteria.

In response to the NRC 50.54(f) letter associated with post-Fukushima recommendations (Reference 7), Duke Energy submitted a seismic hazard screening report for HNP (Reference 8) to the NRC.

The GMRS for HNP is below or approximately equal to the SSE between 1 Hz and 10 Hz and therefore meets the Tier 1 criterion in Reference 2.

The HNP SSE and GMRS curves from the seismic hazard and screening response in Reference 8 are shown in Figures 2.4-1 and 3.2-1 of the Attachment to that submittal. The NRC's staff assessment of the HNP seismic hazard and screening response is documented in Reference 9. In section 3.4 of Reference 9, the NRC concluded that the methodology used by Duke Energy in determining the GMRS was acceptable and that the GMRS determined by Duke Energy adequately characterizes the reevaluated hazard for the HNP site.

Section 1.1.3 of Reference 2 cites various post-Fukushima seismic reviews performed for the U.S. fleet of nuclear power plants. For HNP, the specific seismic reviews prepared by the licensee and the NRC's staff assessments are provided here. These licensee documents were submitted under oath and affirmation to the NRC.

1. Near Term Task Force (NTTF) Recommendation 2.1 seismic hazard screening (References 8, 9)
2. NTTF Recommendation 2.3 seismic walkdowns (References 10, 11, 12)
3. NTTF Recommendation 4.2 seismic mitigation strategy assessment (S-MSA) (References 13, 14)

The following additional post-Fukushima seismic reviews were performed for HNP.

4. NTTF Recommendation 2.1 seismic high frequency evaluation (References 15, 16)
5. NTTF Recommendation 2.1 screening and prioritization (Reference 17)

The small percentage contribution of seismic to total plant risk makes it unlikely that an integral importance assessment for a component, as defined in NEI 00-04, would result in an overall HSS determination. Further, the low hazard relative to plant seismic capability makes it unlikely that any unique seismic condition would exist that would cause an SSC to be designated HSS for a Tier 1 site such as HNP.

As an enhancement to the EPRI study results as they pertain to HNP, the proposed HNP categorization approach for seismic hazards will include 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 HNP. For example, as part of the Duke Energy categorization team's preparation of the System Categorization Document (SCD) that is presented to the IDP, a section will be included in the SCD that summarizes the identified plant seismic insights pertinent to the system being categorized and will also state the basis for applicability of the EPRI 3002017583 study and the bases for HNP being a Tier 1 plant. The discussion of the Tier 1 bases will include such factors as:

- The low seismic hazard for the plant, which is subject to periodic reconsideration as new information becomes available through industry evaluations; and
- The definition of Tier 1 in the EPRI study.

At several steps of the categorization process, the categorization team will consider the available seismic insights relative to the system being categorized and document the team's conclusions in the SCD. Integrated importance measures over all modeled hazards (i.e., internal events, including internal flooding, and internal fire for HNP) are calculated per Section 5.6 of NEI 00-04, and components for which these measures exceed the specified criteria are preliminary HSS and cannot be changed to LSS.

For SSCs not uniquely identified as HSS by the HNP PRA models that have design-basis functions during seismic events or functions credited for mitigation and prevention of severe accidents caused by seismic events, those SSCs will be addressed using non-PRA based qualitative assessments in conjunction with any seismic insights provided by the seismic insights review described below.

For components that are HSS due to fire PRA but not HSS due to internal events PRA, the Duke Energy categorization team will review design-basis functions during seismic events or functions credited for mitigation and prevention of severe accidents caused by seismic events and characterize those functions for presentation to the IDP as additional qualitative inputs, which will also be described in the SCD.

The categorization team will review available HNP plant-specific seismic reviews and other resources such as the NTTF documents identified above. The objective is to identify plant-specific seismic insights derived from the above sources, relevant to the components in the system being categorized, that might include potentially important impacts such as:

- Impact of relay chatter
- Implications related to potential seismic interactions such as with block walls
- Seismic failures of passive SSCs such as tanks and heat exchangers
- Any known structural or anchorage issues with a particular SSC
- Components that are implicitly part of PRA-modeled functions (including relays)
- Components that may be subject to correlated failures

Such impacts would be compiled on an SSC basis. As each system is categorized, the system-specific seismic insights will be provided to the IDP for consideration as part of the IDP review process. As such, the IDP can challenge, from a seismic perspective, any candidate LSS recommendation for any SSC if they believe there is basis for doing so. Any decision by the IDP to downgrade preliminary HSS components to LSS will also consider the applicable seismic insights in that decision. These insights will provide the IDP a means to consider potential impacts of seismic events in the categorization process.

Use of the EPRI approach to assess seismic hazard risk for 50.69, along with the additional reviews discussed above, will ensure that reasonable confidence in the evaluations required by 10 CFR 50.69(c)(1)(iv) is achieved.

Based on the above, the Summary/Conclusion/Recommendation from Section 2.2.3 of Reference 2 applies to HNP, i.e., HNP is a Tier 1 plant for which the GMRS is very low such that unique seismic categorization insights are expected to be minimal. As discussed in Reference 2, the likelihood of identifying a unique seismic insight that would cause an SSC to be designated HSS is very low. Therefore, with little to no anticipated unique seismic insights, the 50.69 categorization process using the FPIE PRA and other risk evaluations, along with the defense in-depth and qualitative assessment by the IDP, adequately identify the safety significant functions and SSCs.

#### Seismic Risk for HNP

Relative to overall plant risk, the seismic risk for HNP is low, therefore the likelihood of identifying a unique seismic condition that would cause an SSC to be designated HSS is very low, such that the categorization results will not be significantly impacted. An estimate of seismic core damage frequency (SCDF) and seismic large early release frequency (SLERF) for HNP were calculated to be 4.98E-07 and 9.97E-08, respectively. Duke Energy hereby incorporates by reference for the present application, the description of SCDF and SLERF calculations provided in the letter to the NRC staff dated November 11, 2020 (Reference 29; see response to RAI-05 and RAI-06).

The current PRA model results are also noted in the table below for comparison.

<b>Model</b>	<b>Baseline CDF</b>	<b>Baseline LERF</b>
<b>Full Power Internal Events</b>	2.06E-6	4.19E-7
<b>Internal Flood</b>	2.36E-6	1.70E-7
<b>Fire PRA</b>	3.39E-05	3.04E-6
<b>Total without Seismic</b>	3.83E-05	3.63E-6
<b>Seismic</b>	4.98E-07	9.97E-08
<b>Total with Seismic</b>	3.88E-05	3.73E-06

Status of HNP PRA Models

Since the original HNP 10 CFR 50.69 LAR was reviewed and approved by the NRC staff, model updates, peer reviews, and finding closures have since occurred.

The HNP Internal Events PRA model was subject to a focused-scope peer review conducted in September 2019. The scope included High-Level Requirements (HLRs) IE, AS, SC, SY, QU, and LE conducted to the ASME/ANS RA-Sa-2009 PRA standard with NRC clarifications from RG 1.200 Revision 2. This peer review, combined with the focused scope peer review conducted in 2007, form the review of record for the HNP Internal Events PRA model and cover all HLRs in the ASME/ANS RA-Sa-2009 PRA standard, superseding the 2002 peer review.

Finding level Facts and Observations (F&Os) generated from the September 2019 focused-scope peer review were reviewed and closed in June 2020 using the process documented in Appendix X to NEI 05-04, NEI 07-12 and NEI 12-13, "Close-out of Facts and Observations," as accepted by the NRC in the letter dated May 3, 2017.

There are no open finding level F&Os from the 2019 peer review. Further, there are no open finding level F&Os for the HNP Internal Events PRA model.

Updates have occurred to the internal events model and all are considered maintenance. None of the updates to the internal events model were deemed to be upgrades.

Updates have occurred to the internal flooding model and all are considered maintenance. None of the updates to the internal flooding model were deemed to be upgrades. No additional peer reviews or F&O closures have occurred.

The HNP Fire PRA model was subject to a focused scope peer review in June 2019 conducted to the ASME/ANS RA-Sa-2009 PRA standard with NRC clarifications from RG 1.200 Revision 2. This peer review addressed implementation of two upgrades to the model: incorporating credit for obstructed plume and resolution of finding FSS-F3.

Finding level F&Os generated from the June 2019 focused-scope peer review were reviewed and closed in June 2019 using the process documented in Appendix X to NEI 05-04, NEI 07-12 and NEI 12-13.

There are no open finding level F&Os from the June 2019 focused scope peer review of the HNP Fire PRA model. There are no additional finding level F&Os for the HNP Fire PRA model beyond those identified in the original 50.69 LAR, which was reviewed and approved by the NRC staff.

Updates have occurred to the fire model and, other than the two upgrades noted in the peer review summary, all are considered maintenance.

The updates to the HNP internal events, internal flood, and fire PRA models have not introduced any new key uncertainties or assumptions for this application. The process to review these changes is consistent with that identified in the HNP 50.69 RAI response dated April 23, 2019 (Reference 5).

#### Feedback and Adjustment Process Impacts

To more specifically address the feedback and adjustment (i.e., performance monitoring) process as it pertains to the proposed HNP Tier 1 approach discussed above, implementation of the Duke Energy design control and corrective action programs will ensure the inputs for the qualitative determinations for seismic continue to remain valid to maintain compliance with the requirements of 10 CFR 50.69(e).

The performance monitoring process is described in Duke Energy's 10 CFR 50.69 program documents. The program requires that the periodic review assess changes that could impact the categorization results and provides the IDP with an opportunity to recommend categorization and treatment adjustments. Personnel from Engineering, Operations, Risk Management, Regulatory Affairs, and others have responsibilities for preparing and conducting various performance monitoring tasks that feed into the performance monitoring process. The intent of the performance monitoring reviews is to discover trends in component reliability, to help catch and reverse negative performance trends and to take corrective action if necessary.

The Duke Energy configuration control process ensures that changes to the plant, including a physical change to the plant and changes to documents, are evaluated to determine the impact to drawings, design bases, licensing documents, programs, procedures, and training.

Duke Energy has a comprehensive problem identification and corrective action program that ensures that issues are identified and resolved. Any issue that may impact the 10 CFR 50.69 categorization process will be identified and addressed through the problem identification and corrective action program, which would encompass seismic-related issues.

The Duke Energy 10 CFR 50.69 program requires that SCDs cannot be approved by the IDP until the panel's comments have been resolved to the satisfaction of the IDP. This includes issues related to system-specific seismic insights considered by the IDP during categorization.

All other aspects of the HNP 50.69 Feedback and Review process remain as stated in the original HNP 10 CFR 50.69 LAR which was reviewed and approved by the NRC staff.

The Periodic Review process, as described in the original HNP 50.69 LAR and RAI responses, assesses system/component performance changes and plant operation or design changes that have occurred for categorized systems on a frequency no longer than once every two refueling outages, as required by 10 CFR 50.69(e) to review the impact of plant changes on RISC-1, RISC-2, RISC-3, and RISC-4 SSCs. The review is implemented by station procedure.

The Duke Energy design process includes, but is not limited to, the following:

- Requirements for redundancy, diversity, and separation of structures, system and components are met, including seismic interactions
- Review of impact to seismic loading, SSE seismic requirements
- Review of seismic dynamic qualification of components if the configuration change adds, relocates, or alters Seismic Category I mechanical or electrical components

#### Technical Information Incorporated by Reference

Duke Energy will follow the same alternative seismic approach in the 10 CFR 50.69 categorization process for HNP as the approach that was approved by the NRC staff for Calvert Cliffs Nuclear Power Plant (CCNPP) (ADAMS Accession No. ML19330D909) with two exceptions:

- 1) The site-specific Calvert Cliffs information (e.g. seismic capacity discussions, etc.) from the 50.69 and other Calvert Cliffs licensing responses do not apply to HNP. HNP-specific seismic capacity information is described herein. The categorization team will provide the IDP with additional insights from previous seismic evaluations at HNP, as described in this LAR.
- 2) The configuration control checklist described in the Calvert Cliffs response implies that a specific checklist was developed for 50.69 reviews. Refer to the discussion above for the configuration control and periodic review processes.

To that end and to support the proposed alternative seismic approach for HNP, Duke Energy hereby incorporates by reference the following relevant information, with the exceptions noted, that was provided to the NRC staff in docketed CCNPP 10 CFR 50.69 LAR correspondence. Incorporating relevant CCNPP 10 CFR 50.69 docketed correspondence by reference into this Duke Energy application for HNP is identical to the approach taken in the Hope Creek Generating Station 10 CFR 50.69 precedent for adopting the alternate seismic approach (Reference 22; see response to APLC RAI 05).

- CCNPP LAR supplement dated May 10, 2019 (Reference 23); contains additional information related to the alternate seismic approach including docketed information related to case study Plants A, C, and D.
- CCNPP RAI response dated July 1, 2019 (Reference 24); further clarifies the information related to the alternate seismic approach (see CCNP response to RAI 4).

- CCNPP RAI response dated July 19, 2019 (Reference 25); provides responses to support the technical acceptability of the PRAs used for the Plant A, C, and D case studies, as well as the technical adequacy of certain details of the conduct of the case studies (see CCNPP responses to RAI questions 1, 2, and 3).
- CCNPP RAI response dated August 5, 2019 (Reference 26); clarifies the response to RAI 3 in the Reference 24 RAI response.

Note that the above CCNPP supplements incorporated by reference into this HNP application refer to EPRI report 3002012988 instead of EPRI 3002017583. EPRI 3002017583, which is referred to in the other portions of this LAR for HNP, is a technical update that incorporated updates submitted to the NRC staff in a CCNPP 10 CFR 50.69 RAI response into EPRI 3002012988. Aside from those updates, the technical criteria in EPRI 3002017583 is identical to EPRI 3002012988.

#### **4. REGULATORY EVALUATION**

##### **4.1 Applicable Regulatory Requirements/Criteria**

The following regulatory requirement and guidance document are applicable to the proposed change.

- The regulations in Title 10 of the Code of Federal Regulations (10 CFR) Part 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors."
- NRC Regulatory Guide 1.201, "Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants According to their Safety Significance," Revision 1, May 2006.

The proposed change is consistent with the applicable regulations in 10 CFR 50.69. The proposed change represents a deviation from the NEI 00-04 guidance endorsed in RG 1.201, Revision 1. However, the NRC staff specifies that licensees may use either PRAs or alternative approaches for hazards other than internal events in the 10 CFR 50.69 categorization process. The guidance in RG 1.201, Revision 1, clarifies that the NRC staff expects that licensees proposing to use non-PRA approaches (e.g., the alternative seismic approach proposed in this LAR) in their categorization should provide a basis in the submittal explaining why the approach and the accompanying method employed to assign safety significance to SSCs is technically acceptable. The intent of the technical evaluation provided above in Section 3 of the subject LAR is to satisfy the NRC expectation cited in RG 1.201, Revision 1 regarding the proposed alternative seismic approach to be used in the HNP categorization process.

##### **4.2 Precedent**

The NRC has previously approved a change similar to the proposed change in this HNP LAR for Calvert Cliffs Nuclear Power Plant, Units 1 and 2 and Hope Creek Generating Station:

Calvert Cliffs Nuclear Power Plant, Units 1 and 2: Application dated November 28, 2018 (ADAMS Accession No. ML18333A022); NRC Safety Evaluation dated February 28, 2020 (ADAMS Accession No. ML19330D909).

Hope Creek Generating Station: Application dated November 25, 2019 (ADAMS Accession No. ML19330C961); NRC Safety Evaluation dated September 29, 2020 (ADAMS Accession No. ML20231A632).

#### 4.3 No Significant Hazards Consideration Analysis

Duke Energy Progress, LLC (Duke Energy) requests an amendment to the Shearon Harris Nuclear Power Plant, Unit 1 (HNP) Renewed Facility Operating License (FOL). The proposed change would revise the 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," that was added to the HNP FOL upon the issuance of Amendment No. 174 (Agencywide Document Access and Management System (ADAMS) Accession No. ML19192A012). Specifically, the proposed change would revise the license condition to reflect an alternative approach to the one provided in NEI 00-04, "10 CFR 50.69 SSC Categorization Guideline," Revision 0, for evaluating the impact of the seismic hazard in the 10 CFR 50.69 categorization process.

The proposed alternative seismic approach for Tier 1 plants (e.g., HNP) is described in Electric Power Research Institute (EPRI) 3002017583, "Alternative Approaches for Addressing Seismic Risk in 10 CFR 50.69 Risk-Informed Categorization, February 2020," and is a risk-informed, graded approach that has demonstrated categorization insights equivalent to a seismic probabilistic risk assessment (PRA). For Tier 1 plants such as HNP, the EPRI approach relies on insights from seismic PRAs examined in EPRI 3002017583, along with confirmation that the site Ground Motion Response Spectrum (GMRS) is acceptably low. The EPRI approach demonstrates that seismic risk is adequately addressed for Tier 1 sites by the results of other elements in the 10 CFR 50.69 categorization process.

Duke Energy has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below:

**1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?**

Response: No.

The proposed change would revise the HNP license condition that was added with the issuance of HNP license amendment No. 174 to reflect use of an alternative seismic approach in the 10 CFR 50.69 categorization process. The approach is described in EPRI 3002017583. With the proposed change, HNP will continue to be permitted to use a risk-informed categorization process to modify the scope of structures, systems and components (SSCs) subject to NRC special treatment requirements and to implement alternative treatments per the regulations. The process used to evaluate SSCs for changes to NRC special treatment requirements and the use of alternative requirements will continue to ensure the ability of the SSCs to perform their design function. The potential change to special treatment requirements using the alternative seismic methodology in the categorization process does not change the design and operation of the SSCs. As a result, the proposed change to revise the 10 CFR 50.69 categorization process to reflect alternative seismic methodology does not significantly affect any initiators to accidents previously evaluated or the ability to mitigate any

accidents previously evaluated. The consequences of the accidents previously evaluated are not affected because the mitigation functions performed by the SSCs assumed in the safety analysis are not being modified. The SSCs required to safely shut down the reactor and maintain it in a safe shutdown condition following an accident will continue to perform their design functions.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

**2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?**

Response: No.

The proposed change would revise the HNP license condition that was added with the issuance of HNP license amendment No. 174 to reflect use of an alternative seismic approach in the 10 CFR 50.69 categorization process. The approach is described in EPRI 3002017583. With the proposed change, HNP will continue to be permitted to use a risk-informed categorization process to modify the scope of SSCs subject to NRC special treatment requirements and to implement alternative treatments per the regulations. The proposed change does not change the functional requirements, configuration, or method of operation of any SSC. Under the proposed change, no additional plant equipment will be installed.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

**3. Does the proposed change involve a significant reduction in a margin of safety?**

Response: No.

The proposed change would revise the HNP license condition that was added with the issuance of HNP license amendment No. 174 to reflect use of an alternative seismic approach in the 10 CFR 50.69 categorization process. The approach is described in EPRI 3002017583. With the proposed change, HNP will continue to be permitted to use a risk-informed categorization process to modify the scope of SSCs subject to NRC special treatment requirements and to implement alternative treatments per the regulations. The proposed change does not affect any Safety Limits or operating parameters used to establish the safety margin. The safety margins included in analyses of accidents are not affected by the proposed change. The regulation requires that there be no significant effect on plant risk due to any change to the special treatment requirements for SSCs and that the SSCs continue to be capable of performing their design basis functions, as well as to perform any beyond design basis functions consistent with the categorization process and results.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, Duke Energy concludes that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of “no significant hazards consideration” is justified.

#### 4.4 Conclusions

In conclusion, based on the considerations discussed above: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner; (2) such activities will be conducted in compliance with the Commission’s regulations; and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

### 5. ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

### 6. REFERENCES

1. NRC letter to Duke Energy, “Shearon Harris Nuclear Power Plant, Unit 1 – Issuance of Amendment No. 174 RE: Adopt Title 10 of the Code of Federal Regulations 50.69, “Risk-Informed Categorization and Treatment of Structures, Systems, and Components (SSCs) for Nuclear Power Reactors” (EPID L-2018-LLA-0034),” September 17, 2019 (ADAMS Accession No. ML19192A012).
2. Electric Power Research Institute (EPRI) 3002017583, “Alternative Approaches for Addressing Seismic Risk in 10 CFR 50.69 Risk-Informed Categorization,” February 2020.
3. NEI 00-04, “10 CFR 50.69 SSC Categorization Guideline,” Revision 0, Nuclear Energy Institute, July 2005.
4. NRC Regulatory Guide 1.201, “Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants According to their Safety Significance,” Revision 1, May 2006.
5. Duke Energy letter to NRC, “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).

6. Electric Power Research Institute (EPRI) NP-6041-SL, "A Methodology for Assessment of Nuclear Plant Seismic Margin, Revision 1," August 1991.
7. U.S. Nuclear Regulatory Commission, "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 of Insights from the Fukushima Dai-Ichi Accident," March 12, 2012 (ADAMS Accession No. ML12053A340).
8. Duke Energy letter to NRC, "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 of Insights from the Fukushima Dai-ichi Accident," March 27, 2014 (ADAMS Accession No. ML14090A441).
9. NRC letter to Duke Energy, "Shearon Harris Nuclear Power Plant, Unit 1 – Staff Assessment of Information Provided Pursuant to Title 10 of the Code of Federal Regulations Part 50, Section 50.54(f), Seismic Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident (TAC No. MF3952)," December 18, 2015 (ADAMS Accession No. ML15349A149).
10. Duke Energy letter to NRC, "Shearon Harris Nuclear Power Plant, Unit No. 1 Response to Recommendation 2.3 Seismic Walkdown of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," November 27, 2012 (ADAMS Accession No. ML12340A286).
11. Duke Energy letter to NRC, "Response to Request for Additional Information Regarding the Seismic Hazard Walkdowns Associated with Near-Term Task Force Recommendation 2.3, Seismic Walkdowns," November 26, 2013 (ADAMS Accession No. ML13338A164).
12. NRC letter to Duke Energy, "Shearon Harris Nuclear Power Plant, Unit 1 – Staff Assessment of the Seismic Walkdown Report Supporting Implementation of Near-Term Task Force Recommendation 2.3 Related to the Fukushima Dai-ichi Nuclear Power Plant Accident (TAC No. MF0129)," June 2, 2014 (ADAMS Accession No. ML14136A109).
13. Duke Energy letter to NRC, "Mitigating Strategies Assessment (MSA) Report for the New Seismic Hazard Information – NEI 12-06, Appendix H, Revision 2, H.4.2 Path 2: GMRS < SSE with High Frequency Exceedances," October 13, 2016 (ADAMS Accession No. ML16287A166).
14. NRC letter to Duke Energy, "Shearon Harris Nuclear Power Plant, Unit 1 – Staff Review of Mitigation Strategies Assessment Report of the Impact of the Reevaluated Seismic Hazard Developed in Response to the March 12, 2012, 50.54(f) Letter," October 19, 2016 (ADAMS Accession No. ML16291A158).

15. Duke Energy letter to NRC, "High Frequency Supplement to Seismic Hazard Screening Report, Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," December 17, 2015 (ADAMS Accession No. ML15351A170).
16. NRC letter to Multiple Power Reactor Licensees, "Staff Review of High Frequency Confirmation Associated with Reevaluated Seismic Hazard in Response to March 12, 2012 50.54(f) Request for Information," February 18, 2016 (ADAMS Accession No. ML15364A544).
17. NRC letter to All Power Reactor Licensees, "Screening and Prioritization Results Regarding Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Seismic Hazard Re-Evaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," May 9, 2014 (ADAMS Accession No. ML14111A147).
18. Exelon Generation letter to NRC, "Seismic Probabilistic Risk Assessment Report, Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," August 28, 2018 (ADAMS Accession No. ML18240A065).
19. Tennessee Valley Authority letter to NRC, "Seismic Probabilistic Risk Assessment for Watts Bar Nuclear Plant, Units 1 and 2 – Response to NRC Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," June 30, 2017 (ADAMS Accession No. ML17181A485).
20. Tennessee Valley Authority letter to NRC, "Tennessee Valley Authority (TVA) – Watts Bar Nuclear Plant Seismic Probabilistic Risk Assessment Supplemental Information," April 10, 2018 (ADAMS Accession No. ML18100A966).
21. Tennessee Valley Authority letter to NRC, "Watts Bar Nuclear Plant, Units 1 and 2, Application to Adopt 10 CFR 50.69, 'Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors' (WBN-TS-17-24)," November 29, 2018 (ADAMS Accession No. ML18334A363).
22. Hope Creek Generating Station Letter to NRC, "Response to Request for Additional Information, Re: Adopt 10 CFR 50.69 LAR," June 25, 2020 (ADAMS Accession No. ML20177A535).
23. Calvert Cliffs Nuclear Power Plant, Units 1 and 2 Letter to NRC, "Revised submittal to Application to Adopt 10 CFR 50.69, 'Risk-informed categorization and treatment of structures, systems, and components for nuclear power reactors'," May 10, 2019 (ADAMS Accession No. ML19130A180).
24. Calvert Cliffs Nuclear Power Plant, Units 1 and 2 Letter to NRC, "Response to Request for Additional Information Regarding the Application to Adopt 10 CFR 50.69, 'Risk-informed categorization and treatment of structures, systems, and components for nuclear power reactors,'" July 1, 2019 (ADAMS Accession No. ML19183A012).

25. Calvert Cliffs Nuclear Power Plant, Units 1 and 2 Letter to NRC, "Response to Request for Additional Information Regarding the Application to Adopt 10 CFR 50.69, 'Risk-informed categorization and treatment of structures, systems, and components for nuclear power reactors'," July 19, 2019 (ADAMS Accession No. ML19200A216).
26. Calvert Cliffs Nuclear Power Plant, Units 1 and 2, "Revised Response to Request for Additional Information Regarding the Application to Adopt 10 CFR 50.69, 'Risk-Informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors,' letter dated July 19, 2019," August 5, 2019 (ADAMS Accession No. ML19217A143).
27. Southern Nuclear letter to NRC, "Vogtle Electric Generating Plant – Units 1 and 2 License Amendment Request to Modify Approved 10 CFR 50.69 Categorization Process," June 22, 2017 (ADAMS Accession No. ML17173A875).
28. NRC letter to Southern Nuclear, "Vogtle Electric Generating Plant, Units 1 and 2 – Issuance of Amendments Regarding Application of Seismic Probabilistic Risk Assessment into the Previously Approved 10 CFR 50.69 Categorization Process," August 10, 2018 (ADAMS Accession No. ML18180A062).
29. Duke Energy letter to NRC, "Response to Request for Additional Information Regarding License Amendment Request to Revise Technical Specifications to Adopt Technical Specifications Task Force (TSTF) Traveler TSTF-505, Revision 2, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b," November 11, 2020 (ADAMS Accession No. ML20316A007).

U.S. Nuclear Regulatory Commission  
RA-20-0311

Shearon Harris Nuclear Power Plant, Unit 1  
Docket No. 50-400 / Renewed License No. NPF-63

License Amendment Request to Revise 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

Attachment 1

Facility Operating License Markup

APPENDIX D

ADDITIONAL CONDITIONS

RENEWED LICENSE NO. NPF-63

Replace with "FOL INSERT"

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>
174	<p><del>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.</del></p> <p><del>Duke Energy will complete the implementation items list 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 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.</del></p> <p><del>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).</del></p>	<p>Upon implementation of Amendment No. [XXX]</p> <p>Prior to implementation of 10 CFR 50.69.</p>

## **FOL INSERT**

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; the results of the non-PRA evaluations that are based on the IPEEE Screening Assessment for External Hazards updated using the external hazard screening significance process identified in ASME/ANS PRA Standard RA-Sa-2009 for other external hazards except seismic; and the alternative seismic approach as described in Duke Energy letter to the NRC dated January 14, 2021, as specified in License Amendment No. [XXX] 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).