



Tanya M. Hamilton  
Vice President  
Harris Nuclear Plant  
5413 Shearon Harris Road  
New Hill, NC 27562-9300

10 CFR 50.90

June 6, 2019  
Serial: RA-19-0252

ATTN: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

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

Subject: Supplemental Information for License Amendment Request to Modify Departure  
from Nucleate Boiling Ratio Safety Limit to Address Transition to New Fuel Type

Ladies and Gentlemen:

By letter dated April 10, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19100A442), Duke Energy Progress, LLC (Duke Energy), requested a license amendment for the Shearon Harris Nuclear Power Plant, Unit 1 (HNP). The proposed license amendment would modify Technical Specification (TS) 2.1.1.a to add the departure from nucleate boiling ratio safety limit associated with the transition to the GAIA fuel design from the current HTP fuel in the HNP reactor core. In addition, TS 6.9.1.6.2 would be revised to include the topical report (TR) approved by the Nuclear Regulatory Commission (NRC) for the critical heat flux (CHF) correlation associated with the fuel design transition. Duke Energy also requested the review and approval of Revision 6 of DPC-NE-2005-P, "Thermal-Hydraulic Statistical Core Design Methodology," for the addition of Appendix J addressing the application of the ORFEO-GAIA critical heat flux correlation.

The NRC staff has reviewed the application and concluded that the information delineated in the enclosure to their letter dated May 28, 2019 (ADAMS Accession No. ML19136A271), is necessary to enable the staff to make an independent assessment regarding the acceptability of the proposed amendment as it relates to use of a TR that has not yet been approved. In response to the request for supplemental information, Duke Energy is submitting the enclosed additional information to support the acceptance review of the proposed amendment.

The content of this supplemental correspondence does not change the No Significant Hazards Consideration provided in the original submittal.

No regulatory commitments are contained in this letter.

In accordance with 10 CFR 50.91(b), HNP is providing the state of North Carolina with a copy of this supplemental correspondence.

Should you have any questions regarding this submittal, please contact Art Zaremba, Fleet Licensing Manager, at (980) 373-2062.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 6, 2019.

Sincerely,

A handwritten signature in cursive script, reading "Tanya M. Hamilton".

Tanya M. Hamilton

Enclosure: Supplemental Information for License Amendment Request to Modify Departure from Nucleate Boiling Ratio Safety Limit to Address Transition to New Fuel Type

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

U.S. Nuclear Regulatory Commission  
Serial: RA-19-0252  
Enclosure

RA-19-0252

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1  
DOCKET NO. 50-400 / RENEWED LICENSE NO. NPF-63

SUPPLEMENTAL INFORMATION FOR LICENSE AMENDMENT REQUEST  
TO MODIFY DEPARTURE FROM NUCLEATE BOILING RATIO SAFETY  
LIMIT TO ADDRESS TRANSITION TO NEW FUEL TYPE

Enclosure  
(5 pages including cover)

By letter dated April 10, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19100A442), Duke Energy Progress, LLC (Duke Energy), requested a license amendment for the Shearon Harris Nuclear Power Plant, Unit 1 (HNP). The proposed license amendment would modify Technical Specification (TS) 2.1.1.a to add the departure from nucleate boiling ratio safety limit associated with the transition to the GAIA fuel design from the current HTP fuel in the HNP reactor core. In addition, TS 6.9.1.6.2 will be revised to include the topical report (TR) approved by the Nuclear Regulatory Commission (NRC) for the critical heat flux (CHF) correlation associated with the fuel design transition. Duke Energy also requested the review and approval of Revision 6 of DPC-NE-2005-P, "Thermal-Hydraulic Statistical Core Design Methodology," for the addition of Appendix J addressing the application of the ORFEO-GAIA critical heat flux correlation.

During the NRC staff's acceptance review of the requested license amendment, the NRC staff determined that supplemental information was needed to enable the NRC staff to make an independent assessment regarding the acceptability of the proposed amendment as it relates to the use of an unapproved topical report. In response to the request for supplemental information, Duke Energy is submitting the enclosed additional information to support the acceptance review of the proposed amendment.

### **NRC Request**

Duke's license amendment request (LAR), Attachment 6, "Application of the ORFEO-GAIA Correlation to the GAIA Fuel Design," references TR ANP-10342P, Revision 0, "GAIA Fuel Assembly Mechanical Design Topical Report," dated December 2016. The draft SE (DSE) was issued on June 25, 2018 (ADAMS ML18138A356). The DSE, section 4, lists the limitations and conditions on the use of the TR. The licensee is requested to address how the DSE limitations and conditions are met for implementation of the GAIA fuel in the Harris core.

### **Duke Energy Response**

Duke Energy's use of TR ANP-10342P in Attachments 6 and 7 of the LAR was to provide a referenceable source for the design description of the GAIA fuel assembly. The scope of the LAR was to address the application of the ORFEO-GAIA CHF correlation within the Duke Energy methodology report DPC-NE-2005-P, "Thermal-Hydraulic Statistical Core Design Methodology," for the GAIA fuel design. The LAR was not intended to address the mechanical design or the evaluation of its mechanical performance per the ANP-10342 TR, as this will be addressed outside of the scope of this LAR per the Duke Energy Engineering Change process and the associated application of the 10 CFR 50.59 process, after the TR has been approved by the NRC for generic use.

As such, Duke Energy has revised proposed DPC-NE-2005-P Appendix J Reference J-2 to reflect a source other than TR ANP-10342 for the design description of the GAIA fuel design. Attachment 1 to this enclosure reflects the revised page from the proposed Appendix J provided in Attachments 6 and 7 of the original submittal, referencing ANP-3389P, Revision 0, "Shearon Harris Unit 1 GAIA Lead Test Assembly Licensing Analysis Summary Report," a generic mechanical design criteria evaluation summary provided by Framatome to the NRC on June 23,

2015, in support of the GAIA Lead Test Assembly Project at HNP (ADAMS Accession Nos. ML15188A171 – letter, and ML15188A172 – non-proprietary version). Since the revised page (i.e., J-5) does not contain any proprietary information, it will serve as the replacement page (i.e., for page J-5) for both the proprietary and non-proprietary versions of the appendix provided in Attachments 6 and 7 of the original submittal, respectively. This change in reference does not impact the scope or technical content of the original LAR, nor does it change the No Significant Hazards Consideration provided in the original submittal.

As it relates to mechanical design, on April 29, 2019, the NRC issued Amendment No. 171 to the HNP operating license (ADAMS Accession No. ML18288A139), allowing for the use of the NRC-approved TR BAW-10231P-A, "COPERNIC Fuel Rod Design Computer Code," by HNP for self-performance of fuel rod mechanical analyses. As provided in the safety evaluation (SE) for the amendment, "The addition of COPERNIC to the list of topical reports and the revision of the fuel centerline melt safety limit to that used in COPERNIC will allow the licensee to self-perform fuel rod mechanical analyses for HNP and RNP." The SE also discusses that the COPERNIC code is used for fuel rod design and analysis of natural, slightly enriched (up to 5 percent) uranium dioxide fuels and urania-gadolinia fuels with the advanced cladding material, and that the 62 GWD/MTU burnup limit will be verified as part of the normal reload design process. Implementation of this license amendment is scheduled for the upcoming refueling outage in Fall 2019.

As Duke Energy is no longer referencing ANP-10342, the need to address the limitations and conditions of the DSE is not required under the scope of this LAR. Duke Energy will assess the general applicability of TR ANP-10342 to HNP once it has been approved by the NRC.

U.S. Nuclear Regulatory Commission  
Serial: RA-19-0252  
Enclosure: Attachment 1

ATTACHMENT 1

REPLACEMENT PAGE J-5 TO PROPOSED APPENDIX J OF DPC-NE-2005-P,  
APPLICATION OF THE ORFEO-GAIA CORRELATION TO THE GAIA FUEL DESIGN

## References

- J-1 DPC-NE-2005-PA, Revision 5, Thermal-Hydraulic Statistical Core Design Methodology, March 2016.
- J-2 ANP-3389P, Revision 0, Shearon Harris Unit 1 GAIA Lead Test Assembly Licensing Analysis – Summary Report, June 2015.
- J-3 EPRI NP-2511-CCM-A, Revision 4.6, VIPRE-01: A Thermal-Hydraulic Code For Reactor Cores, Vol. 1-4, Battelle Pacific Northwest Laboratories, February 2017.
- J-4 ANP-10341P-A, Revision 0, The ORFEO-GAIA and ORFEO-NMGRID Critical Heat Flux Correlations, September 2018.