



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

January 8, 2018

Ms. Tanya M. Hamilton  
Site Vice President  
Shearon Harris Nuclear Power Plant  
5413 Shearon Harris Road  
M/C HNP01  
New Hill, NC 27562-0165

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 – REQUEST FOR  
ADDITIONAL INFORMATION REGARDING LICENSE AMENDMENT  
REQUEST FOR SPENT FUEL STORAGE POOL CRITICALITY ANALYSES  
(CAC NO. MF9996; EPID L-2017-LLA-0303)

Dear Ms. Hamilton:

By application dated June 28, 2017 (Agencywide Documents Access and Management System Accession No. ML17193B165), Duke Energy Progress, LLC (the licensee) submitted a license amendment request for the Shearon Harris Nuclear Power Plant, Unit 1, regarding spent fuel storage pool criticality analyses. The U.S. Nuclear Regulatory Commission staff has determined that additional information is needed in order to complete its review. The enclosed request for additional information was e-mailed to the licensee in draft form on December 19, 2017, and the licensee determined no clarification call was needed. A response to the request for additional information is due by January 18, 2018. Please note that if a response to this letter is not received by this date, or an acceptable alternate date is not provided in writing, we may deny the application for amendment under the provisions of Title 10 of the *Code of Federal Regulations* Section 2.108, "Denial of application for failure to supply information."

If you have any questions, please contact me at 301-415-2760 or by e-mail to [Martha.Barillas@nrc.gov](mailto:Martha.Barillas@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to be "MB", is located above the typed name of Martha Barillas.

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

Docket No. 50-400

Enclosure:  
Request for Additional Information

cc w/enclosure: Listserv

DUKE ENERGY PROGRESS, LLC  
SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1  
DOCKET NUMBER 50-400  
REQUEST FOR ADDITIONAL INFORMATION  
REGARDING A LICENSE AMENDMENT REQUEST FOR  
SPENT FUEL STORAGE POOL CRITICALITY ANALYSES  
CAC NUMBER MF9996; EPID L-2017-LLA-0303

By application dated June 28, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17193B165), Duke Energy Progress, LLC (the licensee) submitted a license amendment request (LAR) for the Shearon Harris Nuclear Power Plant, Unit 1 (HNP), regarding spent fuel storage pool criticality analyses. The U.S. Nuclear Regulatory Commission staff determined the following request for additional information (RAI) is needed in order to complete its review.

**MCCB RAI 1**

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.68, "Criticality accident requirements," provides the regulatory requirements for maintaining sub-criticality in the spent fuel pool (SFP). Specifically, 10 CFR 50.68(b)(4) states, in part, that the k-effective ( $k_{eff}$ ) in the SFP:

...must not exceed 0.95, at a 95 percent probability, 95 percent confidence level, if flooded with borated water, and the k-effective must remain below 1.0 (subcritical), at a 95 percent probability, 95 confidence level, if flooded with unborated water.

The HNP Technical Specification (TS) 5.6.1.3, "BWR [Boiling-Water Reactor] Storage Racks in Pools 'A' and 'B'," ensures that the sub-criticality requirements of 10 CFR 50.68(b)(4) are met. The calculated  $k_{eff}$  found in the Holtec International Report No. HI-2177590, "Licensing Report for Use of DREAM Neutron Absorber Inserts in the Spent Fuel Pools 'A' and 'B' at Shearon Harris NPP," Revision 1 (Nonproprietary), is used to demonstrate compliance with the TS requirement for  $k_{eff}$ . The  $k_{eff}$  found in the Holtec Licensing Report is, in part, calculated using a value for the Boron-10 areal density (B-10 AD), as well as the thickness and width of the Metamic inserts, provided in the Holtec Licensing Report. In order to verify the assumed values for the B-10 AD and the condition of the material, the licensee has proposed to institute a Metamic Surveillance Program.

During the LAR pre-submittal meeting for the "BWR Storage Rack Inserts, Updated NCS [Nuclear Criticality Safety] Analysis at Harris Nuclear Plant," held September 29, 2016 (ADAMS Accession No. ML16267A029, meeting summary ML16286A015), the licensee provided a list of affected TSs. One of the bullets described a change to TS 6.8, "Procedures and Programs," to add "BWR Boraflex Storage Racks – Metamic Rack Insert Monitoring Program." Controlling the Metamic Rack Insert Monitoring Program in the TSs would appear to provide an approach to

Enclosure

demonstrate reasonable assurance that the requirements of 10 CFR 50.68(b)(4) will be met. This is because if certain elements of the monitoring program, such as neutron attenuation testing, frequency of testing, or the acceptance criteria, are altered, it may cause the program to become ineffective, which would then impact the assumptions used to calculate  $k_{eff}$ , TS 5.6.1.3, and ultimately compliance with 10 CFR 50.68(b)(4). As noted in the Holtec Licensing Report included with the LAR, the Holtec Metamic inserts are relied upon for criticality control in the SFP storage racks.

As discussed in the pre-submittal meeting, the proposed change to TS 6.8 would appear to provide an approach that demonstrates reasonable assurance of compliance with 10 CFR 50.68(b)(4), with respect to monitoring the condition of the Metamic inserts. Given that the LAR did not include the change to TS 6.8 as noted in the pre-submittal meeting, explain how Duke Energy intends to demonstrate compliance with 10 CFR 50.68(b)(4), as it relates to controlling the proposed Monitoring Program that will monitor the condition of the Metamic inserts.

### **MCCB RAI 2**

In order to determine if there is any degradation of the Metamic, acceptance criteria are to be established in a surveillance program. Appropriate acceptance criteria provide reasonable assurance that the assumptions made regarding the neutron absorbing material in the fuel storage criticality analysis are maintained.

Section 3.6 of the LAR, "Metamic Surveillance Program," does not list the acceptance criteria associated with the surveillance program. However, the LAR does provide certain test parameters that will be included in the surveillance program (i.e., visual observation and photography, neutron attenuation testing, dimensional measurements, and weight and specific gravity measurements). Provide the acceptance criteria that will be used in the surveillance program including criteria for the parameters measured as part of the surveillance program. In addition, describe how measurement uncertainty of the coupons is incorporated into the acceptance criteria.

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FOR ADDITIONAL INFORMATION REGARDING LICENSE AMENDMENT  
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(CAC NO. MF9996; EPID L-2017-LLA-0303) DATED JANUARY 8, 2018

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**ADAMS Accession No.: ML18005A548**

\*by email

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|--------|----------------------|--------------------|----------------|
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| NAME   | MBarillas            | BClayton           | SBloom         |
| DATE   | 1/8/2018             | 1/5/2018           | 12/7/2017      |
| OFFICE | NRR/DORL/LPL2-2/BC   | NRR/DORL/LPL2-2/PM |                |
| NAME   | UShoop (RSchaaf for) | MBarillas          |                |
| DATE   | 1/5/2018             | 1/8/2018           |                |

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