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

October 26, 2016

Mr. John Elnitsky
Senior Vice President
Nuclear Engineering
Duke Energy Progress, LLC
526 South Church Street, EC-07H
Charlotte, NC 28202

SUBJECT: DUKE ENERGY PROGRESS, LLC, FOR SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1, AND H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 – REQUEST FOR ADDITIONAL INFORMATION REGARDING APPLICATION TO ADOPT DPC-NF-2010, REVISION 3, "NUCLEAR PHYSICS METHODOLOGY FOR RELOAD DESIGN," AND DPC-NE-2011-P, REVISION 2, "NUCLEAR DESIGN METHODOLOGY REPORT FOR CORE OPERATING LIMITS OF WESTINGHOUSE REACTORS" (CAC NOS. MF7693 AND MF7694)

Dear Mr. Elnitsky:

By letter dated August 19, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15236A044), Duke Energy Progress, LLC (formerly known as Duke Energy Progress, Inc.) (Duke Energy, the licensee), submitted a license amendment request (LAR) requesting U.S. Nuclear Regulatory Commission (NRC) review and approval of its nuclear design methodology, documented in DPC-NE-1008-P, "Nuclear Design Methodology Using CASMO-5/SIMULATE-3 for Westinghouse Reactors," and incorporation of this methodology into the Shearon Harris Nuclear Power Plant, Unit 1 (HNP), and H. B. Robinson Steam Electric Plant, Unit No. 2 (RNP) Technical Specifications (TSs). By letter dated May 4, 2016 (ADAMS Accession No. ML16125A420), Duke Energy submitted a supplement to the LAR that superseded the August 19, 2015, submittal in its entirety. The purpose of the supplement was to also request plant-specific review and approval of reactor core design methodology reports DPC-NF-2010, Revision 3, "Nuclear Physics Methodology for Reload Design," and DPC-NE-2011-P, Revision 2, "Nuclear Design Methodology Report for Core Operating Limits of Westinghouse Reactors," for adoption into the HNP and RNP TSs.

The NRC staff has determined that additional information is needed to complete its review. The enclosed request for additional information (RAI) was e-mailed to the licensee in draft form on October 6, 2016, and your staff determined that no clarification call was needed. In addition, the licensee staff agreed to provide its RAI response by November 21, 2016. The NRC staff considers that timely response to RAIs helps ensure sufficient time is available for staff review and contributes toward the NRC's goal of efficient and effective use of staff resources.

Enclosure 1 contains Sensitive Unclassified Non-Safeguards Information. When separated from Enclosure 1, this letter is DECONTROLLED.

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Please note that if you do not respond to this request by the agreed upon date or provide an acceptable alternate date, we may deny your application for amendment under the provisions of Section 2.108 of Title 10 of the *Code of Federal Regulations* (10 CFR).

The NRC staff has determined that its documented RAIs (Enclosure 1) contain proprietary information pursuant to 10 CFR 2.390, "Public inspections, exemptions, requests for withholding." Accordingly, the NRC staff has prepared a redacted, non-proprietary version (Enclosure 2).

If you have any questions, please contact me at (301) 415-2760 or Martha.Barillas@nrc.gov.

Sincerely,



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

Docket Nos. 50-261 and 50-400

Enclosures:

1. Request for Additional Information (Proprietary)
2. Request for Additional Information (Nonproprietary)

cc w/enclosures:

Mr. Benjamin C. Waldrep
Site Vice President
Shearon Harris Nuclear Power Plant
5413 Shearon Harris Road, M/C HNP01
New Hill, NC 27562-0165

Mr. Richard Michael Glover
Site Vice President
H. B. Robinson Steam Electric Plant
3581 West Entrance Road, RNPA01
Hartsville, SC 29550

cc w/Enclosure 2: Distribution via Listserv

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REQUEST FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST TO ADOPT DPC-NF-2010, REVISION 3, “NUCLEAR
PHYSICS METHODOLOGY FOR RELOAD DESIGN,” AND DPC-NE-2011-P, REVISION 2,
“NUCLEAR DESIGN METHODOLOGY REPORT FOR CORE OPERATING LIMITS OF
WESTINGHOUSE REACTORS”

DUKE ENERGY PROGRESS, LLC

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

DOCKET NOS. 50-400 AND 50-261

By letter dated August 19, 2015,¹ Duke Energy Progress, LLC (formerly known as Duke Energy Progress, Inc.) (Duke Energy, the licensee) submitted a license amendment request (LAR) seeking U.S. Nuclear Regulatory Commission (NRC) review and approval of its nuclear design methodology, documented in DPC-NE-1008-P, “Nuclear Design Methodology Using CASMO-5/SIMULATE-3 for Westinghouse Reactors,” and incorporation of this methodology into the Shearon Harris Nuclear Power Plant, Unit 1 (HNP) and H. B. Robinson Steam Electric Plant, Unit No. 2 (RNP) Technical Specifications (TSs). By letter dated May 4, 2016,² the licensee submitted a supplement to the LAR that superseded the August 19, 2015, submittal in its entirety. The purpose of the supplement was to also request plant-specific review and approval of reactor core design methodology reports DPC-NF-2010, Revision 3, “Nuclear Physics Methodology for Reload Design,” and DPC-NE-2011-P, Revision 2, “Nuclear Design Methodology Report for Core Operating Limits of Westinghouse Reactors,” for adoption into the HNP and RNP TSs. The supplement did not identify any changes to DPC-NE-1008-P.

1. In DPC-NF-2010, Revision 3, Duke Energy indicates that the hot zero power and hot full power isothermal temperature coefficient (ITC) and moderator temperature coefficient (MTC) are used to support startup and operation. The report also states that the ITC may be used to determine the MTC. The MTC is governed by limiting condition for operation (LCO) 3.1.1.3 in the HNP TSs and LCO 3.1.3 in the RNP TSs. Section 10.4.1 of Revision 3 of the DPC-NF-2010 methodology, as proposed in the LAR, added a new means of measuring the ITC. Please clarify how the new method of ITC measurement in Revision 3 differs from the method in Revision 2 of the report.

¹ Agencywide Documents Access and Management System (ADAMS) Accession No. ML15236A044.

² ADAMS Accession No. ML16125A420.

Enclosure 2

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2. Axial flux difference (AFD), which is a measure of how much power is generated in the top of the core versus the bottom of the core, is a key core power distribution parameter. AFD is controlled in LCO 3.2.1 in the HNP TSs and LCO 3.2.3 in the RNP TSs. One of the primary changes requested in DPC-NE-2011, Revision 2, is a change in the way abnormal xenon distributions are generated in order to define abnormal power shapes and set the AFD operational space provided in the plants' TSs. The proposed language clarifies that control rods are only to be inserted at most to the control rod insertion limit. Though this modification appears to make DPC-NE-2011 more consistent to existing approved industry methodologies, the justification provided for the proposed Change 2-3 in the LAR raised several questions about the modifications to the process and whether the AFD limits would be appropriately defined.

- a. Please clarify how Duke Energy will ensure that the full AFD operational space is covered by abnormal xenon transients (and thus, abnormal power distributions) over the full range of powers and the length of the cycle. Explain how appropriate coverage of the operating space allowed by the TSs is assured. Describe if there are a variety of xenon transients initiated from a variety of initial conditions.
- b. Part of Duke Energy's justification for the proposed change in the generation of abnormal xenon distributions is that [[

]].³

This is illustrated in Figure 1 of the justification of Change 2-3 in the LAR. However, Figure 2 seems to contradict this justification. [[

]] Please

explain how a change to the method that is intended to [[

]] only [[

]].

- c. To justify the operational AFD limits, the analyzed operational space should be slightly wider than the final limits. Please describe how far beyond the limits is the analyzed operational space. Describe if the abnormal xenon distributions include an allowance for the time allowed to be outside of the rod insertion and AFD limits by the TSs.

³ The text between boldface brackets [[]] contains proprietary information.

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If you have any questions, please contact me at (301) 415-2760 or Martha.Barillas@nrc.gov.

Sincerely,

/RA/

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

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cc w/Enclosure 2: Distribution via Listserv

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ADAMS Accession Nos.: Pkg. ML16288A027; Encl 1 (proprietary): ML16288A077;

Encl 2 (non-proprietary): ML16288A078

*email dated

OFFICE	DORL/LPL2-2/PM	DORL/LPL2-2/LA	DSS/SNPB/BC*	DORL/LPL2-2/BC(A)	DORL/LPL2-2/PM
NAME	MBarillas	BClayton (JBurkhardt for)	JDean	JDion	MBarillas
DATE	10/26/2016	10/25/2016	9/28/2016	10/26/2016	10/26/2016

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