NRR-DMPSPEm Resource

From: Galvin, Dennis
Sent: Wednesday, April 18, 2018 3:24 PM
To: Arthur.Zaremba@duke-energy.com
Cc: Joshua.Duc@duke-energy.com; Forsaty, Fred; Anzalone, Reed
Subject: Harris/Robinson Draft RAIs – Change Technical Specifications to Support Performance of Core Reload Design and Safety Analyses (L-2017-LLA-0356)
Attachments: Harris Robinson - Fuel Reload TS - Draft RAIs - L-2017-LLA-0356 2018-04-18.pdf

Mr. Zaremba,

By letter dated October 19, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17292A040), Duke Energy Progress, LLC (Duke Energy or the licensee) submitted a license amendment request (LAR) for Shearon Harris Nuclear Power Plant, Unit 1 (Harris) and H. B. Robinson Steam Electric Plant, Unit No. 2 (Robinson). The proposed amendment consists of five changes that would revise the Technical Specifications (TSs) to support the allowance of Duke Energy to self-perform core reload design and safety analyses. These changes would (1) add the NRC-approved COPERNIC Topical Report (TR) to the list of TRs for Harris and Robinson; (2) relocate several TS parameters to the Core Operating Limits Reports for Harris and Robinson, (3) revise the Robinson TS Moderator Temperature Coefficient maximum upper limit, (4) revise the Harris TS definition of Shutdown Margin consistent with Technical Specification Task Force (TSTF)-248, Revision 0 (ADAMS Accession No. ML040611010), “Revise Shutdown Margin Definition for Stuck Rod Exception,” and (5) revise the Harris and Robinson Power Distribution Limits limiting condition of operation actions and surveillance requirements to allow operation of a reactor core designed using the DPC-NE-2011-P [proprietary], “Nuclear Design Methodology Report for Core Operating Limits of Westinghouse Reactors,” methodology. (A redacted version, designated as DPC-NE-2011, is publicly-available under ADAMS Accession No. ML16125A420.)

To complete its review, the U.S. Nuclear Regulatory Commission (NRC) staff has prepared requests for additional information (RAIs). Please see the attached RAIs in DRAFT form. Please submit your response to these RAIs within 30 days of this email. If you need a clarification call for the attached draft RAIs, or you need to change the RAI response due date, please contact me at (301) 415-6256.

Respectfully,

Dennis Galvin
Project Manager
U.S Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Division of Operating Reactor Licensing
Licensing Project Branch 2-2
301-415-6256

Docket Nos. 50-261

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REQUEST FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST TO CHANGE TECHNICAL SPECIFICATIONS TO SUPPORT PERFORMANCE OF CORE RELOAD DESIGN AND SAFETY ANALYSES

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

Introduction and Regulatory Basis

By letter dated October 19, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17292A040), Duke Energy Progress, LLC (Duke Energy or the licensee) submitted a license amendment request (LAR) for the H. B. Robinson Steam Electric Plant, Unit No. 2 (Robinson) and the Shearon Harris Nuclear Power Plant, Unit 1 (Harris). The proposed amendment requested in part to revise the Robinson Technical Specification (TS) 3.2 and Harris TS 3/4.2 Power Distribution Limits limiting condition of operation (LCO) actions and surveillance requirements (SRs) to allow operation of reactor cores designed using the Duke Energy methodology described in DPC-NE-2011-P [proprietary], "Nuclear Design Methodology Report for Core Operating Limits of Westinghouse Reactors." (A redacted version, designated as DPC-NE-2011, is publicly-available under ADAMS Accession No. ML16125A420.) The U.S. Nuclear Regulatory Commission (NRC) staff approved the adoption of DPC-NE-2011 into the Administrative Controls sections of the Robinson and Harris TS by safety evaluation dated May 18, 2017 (ADAMS Accession Nos. ML17102A923 (non-proprietary) and ML17102A911 (proprietary)).

The LAR Enclosure Attachments 1 and 2 describe and provide a technical justification for the changes associated with the implementation of the methodology describe in DPC-NE-2011 for Robinson and Harris, respectively. The LAR Enclosure Attachments 3 and 4 provide markups of the TS showing each change for Robinson and Harris, respectively.

Section 50.90 of Title 10 of the *Code of Federal Regulations* (10 CFR) requires that the application be submitted as specified in 10 CFR 50.4 and that it must fully describe the changes desired, and following as far as applicable, the form prescribed for original applications. Section 50.36(a)(1) of 10 CFR requires each applicant for a license authorizing operation of a production or utilization facility shall include in his application proposed technical specifications in accordance with the requirements of this section. A summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become part of the technical specifications. The following requests for additional information (RAIs) identify missing bases for proposed revised TS. The RAIs also identify instances where the proposed TS are inconsistent with DPC-NE-2011 or would introduce inconsistencies into the TS.

SRXB-RAI-1:

10 CFR 50, Appendix A, General Design Criterion (GDC) 10, "Reactor Design," requires that the reactor core and associated coolant, control, and protection systems be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences.

Robinson was not licensed to the current 10 CFR 50, Appendix A, GDC. Per the Robinson UFSAR, it was evaluated against the proposed Appendix A to 10 CFR 50, General Design Criteria for Nuclear Power Plants, published in the Federal Register on July 11, 1967. Criterion 6, "Reactor Core Design," of the July 11, 1967 proposed Appendix A requires that:

> "The reactor core shall be designed to function throughout its design lifetime, without exceeding acceptable fuel damage limits which have been stipulated and justified. The core design, together with reliable process and decay heat removal systems, shall provide for this capability under all expected conditions of normal operation with appropriate margins for uncertainties and for transient situations which can be anticipated, including the effects of the loss of power to recirculation pumps, tripping out of a turbine generator set, isolation of the reactor from its primary heat sink, and loss of all offsite power."

LAR Enclosure Attachments 1 and 2 describe the changes to the Robinson and Harris TSs, respectively, for the heat flux hot channel factor F_Q. The proposed TSs will use the designation $F^M_Q(X,Y,Z)$ for the measured F_Q and the designation $F^L_Q(X,Y,Z)$ for the limit F_Q. LAR Enclosure Attachments 1 and 2 also introduce the use of a variable "KSLOPE" to ensure positive margin exists to the centerline fuel melt (CFM) limit during transient conditions when core peaking may be greater than the design value. The variable KSLOPE is not currently defined or used in DPC-NE-2011, the Harris or Robinson TS, or the Harris or Robinson core operating limits report (COLR). DPC-NE-2011, Section 6.4.3, describes an adjustment for the CFM limits in one sentence but does not designate this adjustment using the variable KSLOPE:

> If $F^M_Q(X,Y,Z)$ exceeds $F^L_Q(X,Y,Z)^{RPS}$ (CFM limits), then a reduction is made to the OT [over temperature] ΔT trip setpoints, or the $f_1(\Delta I)$ or $f_2(\Delta I)$ breakpoints are adjusted.

LAR Enclosure Attachment 1 (Page 2 of 14) states that:

> "If the RPS margin calculation indicates negative margin, then the overpower ΔT $f_2(\Delta I)$ breakpoints from the COLR are reduced by KLSOPE for each 1% that the measured F_Q exceeds its limit. The variable KSLOPE is determined in the maneuvering analysis and is specified in the COLR."

A similar statement is also in LAR Enclosure Attachment 2.

Also, DPC-NE-2011, Section 6.1, defines the factor K(Z) as the "normalized F_Q as a function of core height" and the factor K(BU) as representing "the normalized burnup dependency" of the F_Q limit at rated thermal power. However, DPC-NE-2011 does not specify how these factors are determined or how whether they are sensitive to fuel types applicable to Harris and Robinson .

The NRC staff has identified the following questions to ensure the appropriate considerations are made in the determination of KSLOPE and the CFM limits are protected.

a. Identify the steps taken and the parameters considered in determining KSLOPE.
b. Explain how the normalized $F_Q(X,Y,Z)$ as a function of core height (K(Z)) is calculated. Provide reason(s) for any assumptions in calculating this factor.
c. Explain how the normalized $F_Q(X,Y,Z)$ as a function of burnup (K(BU)) is calculated. Provide reason (s) for any assumptions in calculating this factor.
d. Address fuel type dependencies as applicable to Harris and Robinson in your response to the above questions.

SRXB-RAI-2:

LAR Enclosure Attachments 1 and 3 describe the proposed revision to Robinson TS 3.2.1, Heat Flux Hot Channel Factor (F_Q). The LAR proposes a new LCO Action statement, LCO 3.2.1 Action C, that compares the measured $F^M_Q(X,Y,Z)$ against the centerline fuel melt limit ($F^L_Q(X,Y,Z)^{RPS}$). If $F^M_Q(X,Y,Z)$ exceeds $F^L_Q(X,Y,Z)^{RPS}$, the LAR proposes the following.

C.1 Reduce the OPΔT $f_2(\Delta I)$ breakpoints from the COLR limit by KSLOPE for each 1% $F^M_Q(X,Y,Z)$ exceeds limit.

The proposed LCO 3.2.1 Action C has a proposed completion time of 72 hours.

However, the technical justification in LAR Enclosure Attachment 1 for LCO 3.2.1 Action C is insufficient. Please provide a technical justification for LCO 3.2.1 Action C, including addressing the following.

a. The LAR does not address the completion time for LCO 3.2.1 Action C. Please provide a basis for the LCO 3.2.1 Action C completion time.

b. Robinson TS Table 3.3.1-1, "Reactor Protection System Instrumentation," Note 2, "Overpower ΔT," includes the Overpower ΔT (OPΔT) function. The Robinson OPΔT function includes an axial imbalance function that is designated as f(ΔI). However, in the proposed Robinson LCO 3.2.1 Action C.1, the axial imbalance function is designated as $f_2(\Delta I)$, not f(ΔI). Please revise the proposed Robinson LCO 3.2.1 Action C.1 to be consistent with TS Table 3.3.1-1, Note 2, including providing the appropriate TS page markup, or justify the discrepancy.

SRXB-RAI-3:

The LAR proposes to replace the Robinson SR 3.2.1.1, and add two new SRs, SR 3.2.1.2, and SR 3.2.1.3. The LAR does not technically justify the surveillance frequencies for the replaced SR 3.2.1.1 or for the new SRs, SR 3.2.1.2, and SR 3.2.1.3. Please discuss and provide a technical justification for the surveillance frequencies of the revised and new SRs.

SRXB-RAI-3:

For Robinson TS 3.2.3, "Axial Flux Difference (AFD)," SR 3.2.3.1, SR 3.2.3.2, and SR 3.2.3.3 are proposed to be replaced with SR 3.2.3.1.

a. While the surveillance portion of SR 3.2.3.1 was retained, the frequency portion of SR 3.2.3.1 was revised. However, the LAR does not address this change.

b. The existing SR 3.2.3.2 includes the following note in the frequency portion of the SR

   Only required to be performed if AFD monitor is inoperable

   The existing SR 3.2.3.2 was partially included in the frequency column of SR 3.2.3.1, however, the following was not included: (1) the need to log the AFD for each operable channel, (2) the note in the surveillance portion of the SR, and (3) the condition to perform the SR on 15 minutes intervals. The LAR does not address this change. The staff notes that the LAR proposed to retain the logging provision and the equivalent of the note in the surveillance portion of the Harris AFD TS but the LAR does not describe the reason the provisions are deleted for Robinson but retained for Harris.

   Please provide a discussion of and a technical justification for the proposed revision to the Robinson SR 3.2.3.1 and the elimination of SR 3.2.3.2.

SRXB-RAI-4:

Robinson TS 5.6.5.a lists TSs with parameters to be documented in the core operating limits report (COLR). The LAR proposes to revise the names of TS of 3.2.1 and 3.2.2 but does not propose corresponding changes in TS 5.6.5.a.5 and TS 5.6.5.a.6. The effect is that the COLR will have parameters not applicable to the TS. Please clarify TS 5.6.5.a to be consistent with the proposed changes to TS of 3.2.1 and 3.2.2 and provide corresponding TS markups as applicable.

SRXB-RAI-5:

In LAR Enclosure Attachments 2 and 4, the LAR describes the proposed revision to Harris TS 3/4.2.2, "Heat Flux Hot Channel Factor - $F_Q(Z)$." The LAR proposes a new TS 3/4.2.2 LCO Action a.1 (from Insert #2b) that states:

1. Reduce Overpower ΔT $f_2(\Delta I)$ breakpoints from the COLR limit by KSLOPE for each 1% $F^M_Q(X,Y,Z)$ exceeds the limit within 72 hours.

However, Harris TS 3/4.2.2 LCO Action a.1 (from insert 2b) is not fully discussed in the corresponding technical justification section. Please provide a technical justification for Harris TS 3/4.2.2 LCO Action a.1, including addressing the following.

a. The LAR proposes 72 hours to complete the action for LCO 3.2.2 Action a.1 (from insert 2b). The LAR does not discuss the time period. Please provide a justification for the time period.

b. DPC-NE-2011, in the section designated as "Technical Justification of Changes for Revision 2 (Redacted)," for Change 6-10, "Heat Flux Hot Channel Factor - $F_Q(x,y,z)$ (Section 6.4.3, third paragraph, page 6-10)," states

   The option to adjust the breakpoints of the OTΔT $f_1(\Delta I)$ trip reset penalty function is added because the OPΔT $f_2(\Delta I)$ trip reset penalty function at Harris is not active. As a

result, the OTΔT $f_1(\Delta I)$ trip reset function breakpoints must be adjusted to compensate for the condition where $F^M_Q(X,Y,Z)$ exceeds $F^L_Q(X,Y,Z)^{RPS}$ limit.

The OPΔT $f_2(\Delta I)$ trip reset penalty function at Harris being not active means $f_2(\Delta I)$ is defined as 0.0 for all ΔI and thus $f_2(\Delta I)$ has no breakpoints or slopes defined. Prior to $f_2(\Delta I)$ being moved to the COLR by Harris Amendment 161 (ADAMS Accession No. ML17250A202) $f_2(\Delta I)$ was defined as 0.0 for all ΔI for Harris. In the Harris Cycle 21 Core Operating Limits Report, Revision 1, submitted February 14, 2018 (ADAMS Accession No. ML18045A648), $f_2(\Delta I)$ was also defined as 0.0 for all ΔI.

Please describe how the proposed action statement addresses the condition of the measured $F^M_Q(X,Y,Z)$ exceeds $F^L_Q(X,Y,Z)^{RPS}$ if the OPΔT $f_2(\Delta I)$ trip reset penalty function at Harris is not active. In particular, please describe what it means to adjust the breakpoints for OPΔT $f_2(\Delta I)$ when no breakpoints and slopes are defined.

c. Two actions a. are being proposed for TS 3/4.2.2 LCO Action a., one each in inserts 2a and 2b. Please clarify the designation of the actions for Harris TS 3/4.2.2 LCO Actions.

SRXB-RAI-6:

Harris TS 6.9.1.6.1 lists the core operating limits that shall be established and documented in the COLR. Harris TS 6.9.1.6.2 lists the analytical methods to be used to determine the core operating limits and the TS each analytical method is being used to determine. The LAR proposes to add to Harris TS 6.9.1.6.1 core operating limits in TSs 3/4.1.1.1, 3/4.1.2.5, 3/4.1.2.6, 3/4.1.5.1, and 3/4.1.5.4; however, no corresponding changes were proposed to TS 6.9.1.6.2 to identify the analytical methods applicable to the proposed added TS. LAR Enclosure Section 3.0 states that or each proposed TS relocation described in LAR Enclosure Sections 2.2 and 2.4, DPC-NF-2010 is the NRC-approved methodology used to calculate the appropriate acceptance criteria to ensure applicable plant safety analysis limits are met. Please provide a markup of TS 6.9.1.6.2 to reflect the additional TS DPC-NF-2010 is being used to determine.