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10 CFR 50.90

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

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

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261 / RENEWED LICENSE NO. DPR-23

SUBJECT: SUPPLEMENT FOR LICENSE AMENDMENT REQUEST TO SELF-PERFORM CORE RELOAD DESIGN AND SAFETY ANALYSES

REFERENCES:

1. BAW-10231P-A, COPERNIC Fuel Rod Design Computer Code, Revision 1, FRAMATOME ANP, dated January 2004 (ADAMS Accession No. ML042930236)
2. Duke Energy letter, *Technical Specification Changes to Support Self-Performance of Core Reload Design and Safety Analyses*, dated October 19, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17292A040)
3. Duke Energy letter, *Response to Request for Additional Information (RAI) Regarding Technical Specification Changes to Support Self-Performance of Core Reload Design and Safety Analyses*, dated June 5, 2018 (ADAMS Accession No. ML18156A209)
4. Duke Energy letter, *Corrected Technical Specification Page Regarding License Amendment Request to Self Perform Core Reload Design and Safety Analyses*, dated October 15, 2018 (ADAMS Accession No. ML18288A276)

Ladies and Gentlemen:

In Reference 2, as supplemented by References 3 and 4, Duke Energy Progress, LLC (Duke Energy) submitted a request for an amendment to the Technical Specifications (TS) for Shearon Harris Nuclear Power Plant, Unit 1 (HNP) and H. B. Robinson Steam Electric Plant, Unit No. 2 (RNP) to support the allowance of Duke Energy to self-perform core reload design and safety analyses. The proposed amendment would, in part, add the Nuclear Regulatory Commission (NRC) approved COPERNIC topical report (Reference 1) to the list of topical reports in RNP TS 5.6.5.b and HNP TS 6.9.1.6.2. To support the adoption of COPERNIC into the TS, this letter provides an additional change to RNP TS 2.1.1.2 and HNP TS 2.1.1.b. A revised No Significant Hazards Consideration Analysis (NSHCA) is provided in Attachment 1. Attachments 2 and 3 provide markup pages of the existing TS, showing the proposed changes. The NSHCA has also been revised to include the change to RNP TS Table 3.3.1-1 described in Reference 3.

The peak fuel centerline temperature is given by the relationships defined by TS 2.1.1.2 (RNP) and TS 2.1.1.b (HNP) and is dependent upon which computer code is used in the analysis. The equation currently given in the TS is applicable to the RODEX2 fuel performance code. To support the adoption of the COPERNIC topical report into the RNP and HNP TS, Duke Energy proposes to revise the peak fuel centerline temperature equation to be the equation utilized in the COPERNIC fuel performance code.

The intent of the peak fuel centerline temperature limit is to prevent centerline temperature from reaching the melting point, which conservatively assures that there will be no breach in cladding integrity. The centerline melt limit, as presented in COPERNIC, decreases linearly with fuel burnup. The limiting fuel melt temperature of new fuel is 4901°F based on the COPERNIC code. The limiting fuel melt temperature is adjusted downward from this temperature depending on the amount of burnup. The downward adjustment is 1.37×10^{-3} °F per MWD/MTU of burnup. This proposed change is shown in detail in Attachments 2 and 3. The Reference 2 NSHCA has been revised and provided in Attachment 1, with revision bars in the margin denoting the location of the changes.

No new commitments have been made in this submittal. If you have additional questions, please contact Mr. Art Zaremba, Manager – Regulatory Affairs, at 980-373-2062.

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

Executed on November 6, 2018.

Sincerely,

Joseph Donahue
Vice President – Nuclear Engineering

JD/jbd

Attachments:
1. Revision of No Significant Hazards Consideration Analysis
2. Robinson Proposed Technical Specification Changes (Markup)
3. Harris Proposed Technical Specification Changes (Markup)

cc:
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A. Gantt, Chief, Bureau of Radiological Health (SC)

Attachment 1
Revision of No Significant Hazards Consideration Analysis

4.3 No Significant Hazards Consideration Analysis

Pursuant to 10 CFR 50.90, Duke Energy Progress, LLC (Duke Energy) is submitting a request to the Nuclear Regulatory Commission (NRC) for an amendment to the Technical Specifications (TS) for Shearon Harris Nuclear Power Plant, Unit 1 (HNP) and H. B. Robinson Steam Electric Plant, Unit No. 2 (RNP) to support the allowance of Duke Energy to self-perform core reload design and safety analyses. The proposed amendment consists of five changes:

1. Add the NRC-approved COPERNIC topical report (Reference 1) to the list of topical reports in RNP TS 5.6.5.b and HNP TS 6.9.1.6.2 and revise the peak fuel centerline temperature equation in RNP TS 2.1.1.2 and HNP TS 2.1.1.b to be the equation used by COPERNIC.
2. Relocate the following TS parameters to the Core Operating Limits Report (COLR):
   a. (RNP TS 3.5.1) Accumulator boron concentration limits.
   b. (RNP TS 3.5.4) Refueling Water Storage Tank (RWST) boron concentration limits.
   c. (HNP TS 3/4.1.1.1) Shutdown Margin.
   d. (HNP TS 3/4.1.2.5) Boric Acid Tank (BAT) and RWST boron concentration limits.
   e. (HNP TS 3/4.1.2.6) BAT and RWST boron concentration limits.
   f. (HNP TS 3/4.5.1) Accumulator boron concentration limits.
   g. (HNP TS 3/4.5.4) RWST boron concentration limits.
3. Revise the RNP TS 3.1.3 Moderator Temperature Coefficient (MTC) maximum upper limit.
4. Revise HNP TS Chapter 1 definition of Shutdown Margin, consistent with Technical Specification Task Force (TSTF) TSTF-248, Revision 0, “Revise Shutdown Margin Definition for Stuck Rod Exception.”
5. Revise the RNP TS 3.2 and HNP TS 3/4.2 Power Distribution Limits LCO Actions and Surveillance Requirements as well as RNP Reactor Protection System Instrumentation Table 3.3.1-1 to allow operation of a reactor core designed using the DPC-NE-2011-P methodology.

Duke Energy has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) 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.

   COPERNIC

   The proposed change adds a topical report for an NRC-reviewed and approved fuel performance code to the list of topical reports in RNP and HNP Technical Specifications (TS), which is administrative in nature and has no impact on a plant configuration or system performance relied upon to mitigate the consequences of an accident. The list of topical reports in the TS used to develop the core operating limits does not impact either the initiation of an accident or the mitigation of its consequences.

   The proposed change also revises a limit on peak fuel centerline temperature in the RNP and HNP TS that is based on a NRC reviewed and approved fuel performance code, and

does not require a physical change to plant systems, structures, or components. Plant operations and analysis will continue to be in accordance with the licensing basis. The peak fuel centerline temperature limit provides protection to the fuel and is consistent with the safety analysis.

Relocate TS Parameters to the COLR

The proposed change relocates certain cycle-specific core operating limits from the RNP and HNP TS to the Core Operating Limits Report (COLR). The cycle-specific values must be calculated using the NRC approved methodologies listed in the COLR section of the TS. Because the parameter limits are determined using the NRC methodologies, they will continue to be within the limit assumed in the accident analysis. As a result, neither the probability nor the consequences of any accident previously evaluated will be affected.

RNP MTC TS Change

The proposed change revises the RNP Technical Specification maximum upper Moderator Temperature Coefficient (MTC) limit. Revision of the MTC limit does not affect the performance of any equipment used to mitigate the consequences of an analyzed accident. There is no impact on the source term or pathways assumed in accidents previously assumed. No analysis assumptions are violated and there are no adverse effects on the factors that contribute to offsite or onsite dose as the result of an accident.

HNP TSTF-248

The proposed change revises the HNP Technical Specification definition of Shutdown Margin (SDM) consistent with existing NRC-approved definition. The proposed revision to the SDM definition will result in analytical flexibility for determining SDM. Revision of the SDM definition does not affect the performance of any equipment used to mitigate the consequences of an analyzed accident. There is no impact on the source term or pathways assumed in accidents previously assumed. No analysis assumptions are violated and there are no adverse effects on the factors that contribute to offsite or onsite dose as the result of an accident.

DPC-NE-2011-P TS Changes

The proposed change revises the RNP and HNP TS to allow operation of a reactor core designed using the DPC-NE-2011-P methodology. The DPC-NE-2011-P methodology has already been approved by the NRC for use at RNP and HNP. Revision of the TS to align with the NRC-approved methodology does not affect the performance of any equipment used to mitigate the consequences of an analyzed accident. There is no impact on the source term or pathways assumed in accidents previously assumed. No analysis assumptions are violated and there are no adverse effects on the factors that contribute to offsite or onsite dose as the result of an accident.

Therefore, the proposed changes do 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.

COPERNIC

The proposed change adds a topical report for an NRC-reviewed and approved fuel performance code to the list of topical reports in HNP and RNP TS, which is administrative in nature and has no impact on a plant configuration or on system performance. The proposed change updates the list of NRC-approved topical reports used to develop the core operating limits. There is no change to the parameters within which the plant is normally operated. The possibility of a new or different kind of accident is not created.

The proposed change also revises a limit on peak fuel centerline temperature in the RNP and HNP TS that is based on a NRC reviewed and approved fuel performance code, and does not require physical changes to plant systems, structures, or components. Specifying peak fuel centerline temperature ensures that the fuel design limits are met. Operations and analysis will continue to be in compliance with NRC regulations. Revising the peak fuel centerline temperature limit does not affect any accident initiators that would create a new accident.

Relocate TS Parameters to the COLR

The proposed change relocates certain cycle-specific core operating limits from the RNP and HNP TS to the COLR. No new or different accidents result from utilizing the proposed change. The changes do not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. In addition, the changes do not impose any new or different requirements or eliminate any existing requirements. The changes do not alter assumptions made in the safety analyses. The proposed changes are consistent with the safety analyses assumptions and current plant operating practice.

RNP MTC TS Change

The proposed change revises the RNP Technical Specification maximum upper MTC limit. The proposed change does not physically alter the plant; that is, no new or different type of equipment will be installed. Therefore the proposed change could also not initiate an equipment malfunction that would result in a new or different type of accident from any previously evaluated. This change does not create new failure modes or mechanisms which are not identifiable during testing, and no new accident precursors are generated.

HNP TSTF-248

Revising the HNP Technical Specification definition of SDM would not require revision to any SDM boron calculations. Rather, it would afford the analytical flexibility for determining SDM for a particular circumstance. The proposed change does not physically alter the plant; that is, no new or different type of equipment will be installed. Therefore the proposed change could also not initiate an equipment malfunction that would result in a new or different type of accident from any previously evaluated. This change does not create new failure modes or mechanisms which are not identifiable during testing, and no new accident precursors are generated.

DPC-NE-2011-P TS Changes

The proposed change revises the RNP and HNP TS to allow operation of a reactor core designed using the DPC-NE-2011-P methodology. The DPC-NE-2011-P methodology has

already been approved by the NRC for use at RNP and HNP. The proposed change does not physically alter the plant, that is, no new or different type of equipment will be installed. Therefore the proposed change could also not initiate an equipment malfunction that would result in a new or different type of accident from any previously evaluated. Operating the reactor in accordance with the NRC-approved methodology will ensure that the core will operate within safe limits. This change does not create new failure modes or mechanisms which are not identifiable during testing, and no new accident precursors are generated.

Therefore, the proposed changes do 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.

Margin of safety is related to the confidence in the ability of the fission product barriers to perform their design functions during and following an accident. These barriers include the fuel cladding, the reactor coolant system, and the containment system.

COPERNIC

The proposed change adds a topical report for an NRC-reviewed and approved fuel performance code to the list of topical reports in HNP and RNP TS, which is administrative in nature and does not amend the cycle specific parameters presently required by the TS. The individual TS continue to require operation of the plant within the bounds of the limits specified in the COLR. The proposed change to the list of analytical methods referenced in the COLR does not impact the margin of safety.

The proposed change also revises a limit on peak fuel centerline temperature in the RNP and HNP TS that is based on a NRC reviewed and approved fuel performance code, and does not require physical changes to plant systems, structures, or components. Plant operations and analysis will continue to be in accordance with the licensing basis. Revising the peak fuel centerline temperature limit defined by the NRC reviewed and approved fuel performance code will continue to ensure that applicable design and safety limits are satisfied such that the fission product barriers will continue to perform their design functions and thereby margin of safety is not reduced.

Relocate TS Parameters to the COLR

The proposed change relocates certain cycle-specific core operating limits from the RNP and HNP TS to the COLR. This change will have no effect on the margin of safety. The relocated cycle-specific parameters will continue to be calculated using NRC-approved methodologies and will provide the same margin of safety as the values currently located in the TS.

RNP MTC TS Change

The proposed change revises the RNP Technical Specification maximum upper MTC limit. The MTC limit change does not impact the reliability of the fission product barriers to function. Radiological dose to plant operators or to the public will not be impacted as a result of the proposed change. The current Updated Final Safety Analysis Report (UFSAR)

Chapter 15 analyses of record remain bounding with the proposed change to the maximum upper MTC limit. Therefore, all of the applicable acceptance criteria continue to be met for each of the analyses with the revised maximum upper MTC limit.

HNP TSTF-248

The proposed revision to the HNP Technical Specification definition of SDM does not impact the reliability of the fission product barriers to function. Radiological dose to plant operators or to the public will not be impacted as a result of the proposed change. Adequate SDM will continue to be ensured for all operational conditions.

DPC-NE-2011-P TS Changes

The proposed change revises the RNP and HNP TS to allow operation of a reactor core designed using the DPC-NE-2011-P methodology. As a portion of the overall Duke Energy methodology for cycle reload safety analyses, DPC-NE-2011-P has already been approved by the NRC for use at RNP and HNP. The proposed change will continue to ensure that applicable design and safety limits are satisfied such that the fission product barriers will continue to perform their design functions. Operation of the reactor in accordance with the DPC-NE-2011-P methodology will ensure the margin of safety is not reduced.

Therefore, the proposed changes do 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.

Attachment 2
Robinson Proposed Technical Specification Changes (Markup)

2.0 SAFETY LIMITS (SLs)

2.1 SLs

2.1.1 Reactor Core SLs

In MODES 1 and 2, the combination of THERMAL POWER, Reactor Coolant System (RCS) highest cold leg temperature, and pressurizer pressure shall not exceed the limits specified in the COLR; and the following SLs shall not be exceeded:

2.1.1.1 The departure from nucleate boiling ratio (DNBR) shall be maintained ≥ 1.141 for the HTP correlation and ≥ 1.17 for the XNB correlation.

2.1.1.2 The peak fuel centerline temperature shall be maintained < [~~(2790 – 17.9 x P – 3.2 x B) x 1.8 + 32] °F where P is the maximum weight percent of Gadolinia (%) and B is the maximum pin burnup (GWD/MTU)~~].

2.1.2 RCS Pressure SL

[4901 - (1.37 x 10^{-3} x (Burnup, MWD/MTU))] °F

In MODES 1, 2, 3, 4, and 5, the RCS pressure shall be maintained ≤ 2735 psig.

2.2 SL Violations

2.2.1 If SL 2.1.1 is violated, restore compliance and be in MODE 3 within 1 hour.

2.2.2 If SL 2.1.2 is violated:

2.2.2.1 In MODE 1 or 2, restore compliance and be in MODE 3 within 1 hour.

2.2.2.2 In MODE 3, 4, or 5, restore compliance within 5 minutes.

Attachment 3
Harris Proposed Technical Specification Changes (Markup)

2.0 SAFETY LIMITS AND LIMITING SAFETY SYSTEM SETTINGS

2.1 SAFETY LIMITS

REACTOR CORE

2.1.1 The combination of THERMAL POWER, pressurizer pressure, and the highest operating loop coolant temperature (T_{avg}) shall not exceed the limits specified in the COLR; and the following SLs shall not be exceeded:

a. The departure from nucleate boiling ratio (DNBR) shall be maintained ≥ 1.141 for the HTP DNB correlation.

b. The peak centerline temperature shall be maintained < [~~(2790 – 17.9 x P – 3.2 x B) x 1.8 + 32] °F where P is the maximum weight percent of Gadolinia (%) and B is the maximum pin burnup (GWD/MTU)~~.

[4901 - (1.37 x 10^{-3} x (Burnup, MWD/MTU))] °F

APPLICABILITY: MODES 1 and 2.

ACTION:

If Safety Limit 2.1.1 is violated, restore compliance and be in HOT STANDBY within 1 hour.

REACTOR COOLANT SYSTEM PRESSURE

2.1.2 The Reactor Coolant System pressure shall not exceed 2735 psig except during hydrostatic testing.

APPLICABILITY: MODES 1, 2, 3, 4, and 5.

ACTION:

MODES 1 and 2:

Whenever the Reactor Coolant System pressure has exceeded 2735 psig, be in HOT STANDBY with the Reactor Coolant System pressure within its limit within 1 hour.

MODES 3, 4, and 5:

Whenever the Reactor Coolant System pressure has exceeded 2735 psig, reduce the Reactor Coolant System pressure to within its limit within 5 minutes.

2.2 LIMITING SAFETY SYSTEM SETTINGS

REACTOR TRIP SYSTEM INSTRUMENTATION SETPOINTS

2.2.1 The Reactor Trip System Instrumentation and Interlock Setpoints shall be set consistent with the Trip Setpoint values shown in Table 2.2-1.

APPLICABILITY: As shown for each channel in Table 3.3-1.