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Serial: RA-17-0055
December 19, 2017

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: RESPONSE TO SECOND REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING APPLICATION TO REVISE TECHNICAL SPECIFICATIONS FOR METHODOLOGY REPORT DPC-NE-3009, REVISION 0**

**REFERENCES:**

1. Duke Energy letter, *Supplemental Information for License Amendment Request Regarding Methodology Report DPC-NE-3008-P,* dated October 3, 2016 (ADAMS Accession No. ML16278A080)
2. NRC letter, *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-NE-3008-P, Revision 0, "Thermal-Hydraulic Models for Transient Analysis," and DPC-NE -3009-P, Revision 0, "FSAR / UFSAR Chapter 15 Transient Analysis Methodology" (CAC Nos. MF8439 and MF8440)*, dated September 8, 2017 (ADAMS Accession No. ML17226A264)
3. Duke Energy letter, *Response to Request For Additional Information (RAI) Regarding Application to Revise Technical Specifications for Methodology Report DPC-NE-3009, Revision 0*, dated October 9, 2017 (ADAMS Accession No. ML17282A023)
4. Duke Energy letter, *Response to Request For Additional Information (RAI) Regarding Application to Revise Technical Specifications for Methodology Report DPC-NE-3009, Revision 0 (Part 2)*, dated October 30, 2017 (ADAMS Accession No. ML17303B205)
5. NRC email, *Duke Energy Progress, LLC, For Shearon Harris Nuclear Power Plant, Unit 1, and H. B. Robinson Steam Electric Plant, Unit No. 2 – Supplemental Request for Additional Information Regarding Application to Adopt DPC-NE-3008-P, Revision 0, "Thermal-Hydraulic Models For Transient Analysis," And DPC-NE-3009-P, Revision 0, "FSAR /UFSAR Chapter 15 Transient Analysis Methodology." (CAC Nos. MF8439 and MF8440; EPID L-2016-LLA-0012)*, dated December 11, 2017

Ladies and Gentlemen:

In Reference 1, Duke Energy Progress, LLC (formerly referred to as Duke Energy Progress, Inc.), referred to henceforth as "Duke Energy," submitted a supplemental request for an

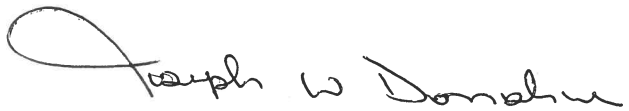
amendment to the Technical Specifications (TS) for Shearon Harris Nuclear Power Plant, Unit 1 (HNP) and H. B. Robinson Steam Electric Plant, Unit No. 2 (RNP). In part, Duke Energy requested NRC review and approval of DPC-NE-3009-P, Revision 0, "FSAR / UFSAR Chapter 15 Transient Analysis Methodology," and adoption of the methodology into the TS for HNP and RNP. In Reference 2, the NRC requested additional information (RAI) regarding DPC-NE-3009. Duke Energy provided responses to the Reference 2 RAI in References 3 and 4. In Reference 5, the NRC submitted a second RAI to Duke Energy regarding DPC-NE-3009. Attachment 1 provides Duke Energy's response to Reference 5.

This submittal contains no new regulatory commitments. Duke Energy is notifying the states of North Carolina and South Carolina by transmitting a copy of this letter to the designated state officials. Should you have any questions concerning this letter, or require additional information, please contact Art Zaremba, Manager – Nuclear Fleet Licensing, at 980-373-2062.

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

Executed on December 19, 2017.

Sincerely,



Joseph Donahue
Vice President – Nuclear Engineering

JBD

Attachments:
1. Response to NRC Request for Additional Information

cc: (all with Attachments unless otherwise noted)

C. Haney, Regional Administrator USNRC Region II
J. Zeiler, USNRC Senior Resident Inspector – HNP
J. Rotton, USNRC Senior Resident Inspector – RNP
M. C. Barillas, NRR Project Manager – HNP
D. J. Galvin, NRR Project Manager – RNP
W. L. Cox, III, Section Chief, NC DHSR
S. E. Jenkins, Manager, Radioactive and Infectious Waste Management Section (SC)
A. Wilson, Attorney General (SC)
A. Gantt, Chief, Bureau of Radiological Health (SC)

**Attachment 1**

**Response to NRC Request for Additional Information**

**NRC RAI 30.1**

Section 15.2.8 of the Robinson UFSAR states that the feedwater system pipe break event is bounded by the steam system piping failure event. At Robinson, the steam generator (SG) design is such that the main feedwater line break is not expected to result in loss of significant liquid inventory from the SGs, and thus is expected to be a cooldown event that is bounded by the main steam line break.

The response to NRC-RAI-30 states that the existing steam system piping failure analysis credits an operator manual action to isolate auxiliary feedwater (AFW) flow to a faulted SG within 10 minutes. The response states that this action will be credited in any new feedwater system pipe break analysis, should a new analysis be required.

The NRC staff reviewed the credited human actions against the criteria in NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light Water Reactor] Edition" (SRP) Section 18, "Human Factors Engineering," (Reference 6) and NUREG-1764, "Guidance for the Review of Changes to Human Actions," (Reference 7).

Please provide the following:

1. DPC-NE-3009, Section 5.2.5, states that the credited operator actions for the feedwater system pipe break event are to terminate pumped safety injection and cycle AFW flow. By contrast, the response to NRC-RAI-30 implies that for Robinson the implicitly credited action is to terminate AFW flow to a faulted SG within 10 minutes (operator actions to terminate pumped safety injection for Robinson are judged unnecessary in the RAI response because the analyzed shutoff pressure of the high-head pumped safety injection is below the reactor coolant system pressure). Please clarify which operator action will be assumed in future Robinson plant analyses, and confirm that cycling AFW flow would be considered a new operator action for Robinson (to be evaluated in accordance with the requirements of 10 CFR 50.59 as stated in the RAI response).

2. The RAI response states that the Robinson feedwater system pipe break event is bounded by the steam system piping failure event as a primary system cooldown transient, and thus the credited operator action for the steam system piping failure event is implicitly credited for the feedwater system pipe break event. Clarify whether the future analysis scope, which credits operator manual action to isolate AFW flow to a faulted SG within 10 minutes, includes events other than cooldown events such as, but not limited to, overheating or overpressurization events. If so, please provide details of these events.

3. The RAI response states that the operator action and the timing of the action are validated by procedure for the steam system piping failure event. Please provide the rationale (e.g. event timeline operator action validation, event timeline comparisons, etc.…) that supports crediting the operator manual action to isolate AFW flow to a faulted SG within 10 minutes (currently credited in the steam system piping failure event) in future feedwater system pipe break event analyses. Please include any areas where feedwater break and main steam break analyses may differ. The rationale should address any "other events" identified in item 2 above, unless the operator action would be treated as a new operator action for Robinson (to be evaluated in accordance with the requirements of 10 CFR 50.59 as stated in the RAI response).

**NRC RAI 30.1 References**

6. U.S. Nuclear Regulatory Commission, NUREG-0800, "Standard Review Plan," Section 18, "Human Factors Engineering," Revision 3, December 2016 (ADAMS Accession No. ML16125A114).

7. U.S. Nuclear Regulatory Commission, NUREG-1764, "Guidance for the Review of Changes to Human Actions," Revision 1, September 2007 (ADAMS Accession No. ML072640413).

**Duke Energy RAI 30.1 Response**

1. Section 5.2.5 of DPC-NE-3009 states that the assumed operator actions for the feedwater system line break (FWLB) event are to terminate pumped safety injection and cycle AFW flow. Cycling AFW will not be an assumed operator action for Robinson plant analyses of the FWLB event and would be considered a new operator action to be evaluated in accordance with the requirements of 10 CFR 50.59. An operator action to terminate pumped safety injection for Robinson is judged unnecessary in the response to NRC-RAI-30 because the analyzed shutoff pressure of the high-head pumped safety injection is below the reactor coolant system pressure. An operator action to terminate AFW flow to a faulted steam generator within 10 minutes will be assumed in future Robinson plant analyses of the FWLB event.

2. The operator action terminating AFW to a faulted steam generator within 10 minutes is assumed in the analysis of the steam system piping failure event and will be assumed in future analyses of the FWLB event. It is not planned to credit this operator action for any other event such as, but not limited to, overheating or overpressurization events.

3. The response to NRC-RAI-30 states that the "operator action to isolate AFW to a faulted steam generator at 10 minutes is credited in the MSLB analysis and implicitly credited in the evaluation of the FWLB. This operator action will be credited if analyses are performed for the FWLB in the Robinson plant." The operator action to terminate AFW flow to a faulted steam generator is invoked by procedure if:

    a. At least one steam generator pressure is lowering in an uncontrolled manner or has completely depressurized and
    b. At least one steam generator is not faulted.

    It is reasonable to conclude that the operator action to terminate AFW to the faulted steam generator at 10 minutes is applicable to analyses performed for FWLB in the Robinson plant. This conclusion is based on the similarity of the short-term response of the MSLB and FWLB events and the ability of the operators to terminate AFW to the faulted steam generator within 5 minutes for a MSLB based on simulator validation of this time critical action.

    The FWLB event is defined to result from a break in the main feedwater line to one of the steam generators between the final feedwater line check valve and the inlet nozzle to the steam generator. Some liquid may initially blow down during a FWLB, but the overall short-

term response of the FWLB event is very similar to the MSLB event based on Robinson plant simulator performance tests. The operators would identify the faulted steam generator about two minutes later than in a MSLB event, but terminate AFW to the faulted steam generator well within the 10 minute time critical action requirement for MSLB.

The 10 minute operator action time to terminate AFW to the faulted steam generator during a FWLB is consistent with operator action times for FWLB for similar plants (e.g., page 296 of Enclosure 3 to Reference RAI-30.1-1). Any deviations in the planned analysis assumptions will be evaluated in accordance with the requirements of 10 CFR 50.59.

**Duke Energy RAI 30.1 Response Reference**

RAI-30.1-1. Letter from J. C. Paige (NRC) to M. Nazar (Florida Power and Light Company), *Turkey Point Units 3 and 4 – Issuance of Amendments Regarding Extended Power Uprate (TAC Nos. ME4907 and ME4908)*, June 2012 (ADAMS Accession No. ML11293A365).