



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

August 8, 2016

Mr. John Eltnisky
Senior Vice President
Governance, Projects and Engineering
Duke Energy Carolinas, LLC
P.O. Box 1006
Mail Code EC07H
Charlotte, NC 28201-1006

SUBJECT: MCGUIRE NUCLEAR STATION, UNITS 1 AND 2, AND CATAWBA NUCLEAR STATION, UNITS 1 AND 2 – CORRECTION TO ISSUANCE OF AMENDMENTS REGARDING USE OF OPTIMIZED ZIRLO™ (CAC NOS. MF6631, MF6632, MF6633, AND MF6634)

Dear Mr. Eltnisky:

By letter dated June 21, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16105A326), the U.S. Nuclear Regulatory Commission (NRC) issued License Amendment Nos. 288 and 267 for the McGuire Nuclear Station (MNS), Units 1 and 2, respectively, and License Amendment Nos. 284 and 280 for the Catawba Nuclear Station (CNS), Units 1 and 2, respectively. The amendments consisted of changes to the technical specifications (TSs) and facility operating licenses in response to your application dated August 20, 2015.

The amendments revised TS 4.2.1, "Fuel Assemblies," and TS 5.6.5.b, "Core Operating Limits Report (COLR)," to allow the use of Optimized ZIRLO™ fuel cladding material in both CNS, Units 1 and 2, and MNS, Units 1 and 2. Additionally, the amendments modified TS 5.6.5.b to add associated methodologies for determining the limits in the COLR. These amendments were also supported by an exemption from certain requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," and 10 CFR 50, Appendix K, "ECCS Evaluation Models," for both CNS, Units 1 and 2, and MNS, Units 1 and 2. The approval was in response to Duke Energy Carolinas, LLC (Duke Energy, the licensee), LAR dated August 20, 2015 (ADAMS Accession No. ML15295A016).

Subsequent to issuing the amendments, an error was identified on page 9 of the safety evaluation (SE). Specifically, the NRC staff review in SE Section 3.1.3, "Thermal-Hydraulic Design, Transients, and Accidents Methodology," contained an error that cites incorrect information. Duke Energy did not use WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," but instead used DPC-NE-3000-PA, "Thermal-Hydraulic Transient Analysis Methodology"; DPC-NE-3001-PA, "Multidimensional Reactor Transients and Safety Analysis Physics Parameter Methodology"; and DPC-NE-3002-A, "UFSAR Chapter 15 System Transient Analysis Methodology." We have enclosed corrected pages 9, 10, and 13 of the SE dated June 21, 2016, to address this error. Please note that page 10 changed due to added text on page 9, and page 13 changed due to updated references. The areas of change are marked with revision bars in the margin on the corrected pages.

J. Eltnisky

-2-

This administrative error on the part of the NRC does not affect the NRC staff's overall conclusions associated with the approval of the MNS, Units 1 and 2, License Amendment Nos. 288 and 267, respectively, and CNS, Units 1 and 2, License Amendment Nos. 284 and 280, respectively. This change is within the scope of the application as originally noticed in the *Federal Register* on November 24, 2015 (80 FR 73236).

If you have any questions, please contact me at 301-415-2481 or Ed.Miller@nrc.gov.

Sincerely,

Handwritten signature of G. Edward Miller, written in black ink. The signature is cursive and includes the word "for" at the end.

G. Edward Miller, Project Manager
Plant Licensing II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-369, 50-370, 50-413,
and 50-414

Enclosure:
Corrected Pages to Safety Evaluation
dated June 21, 2016

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ENCLOSURES

**Corrected Pages to Safety Evaluation
dated June 21, 2016**

Optimized ZIRLO™ strengths will saturate at the same properties as standard ZIRLO® at 12×10^{21} n/cm².

- a. For the CE fuel design analyses, the measured, unirradiated Optimized ZIRLO™ strengths shall be used for all fluence levels (consistent with previously approved methods).

Duke Energy stated that future analysis of Optimized ZIRLO™ will use the yield strength and ultimate tensile strength as modified per Conditions 8.a.i, 8.a.ii, and 8.a.iii, until such time as the irradiated data for Optimized ZIRLO™ cladding strengths have been collected and accepted by the NRC and that this is confirmed as part of the normal reload design process as required by the methodologies listed in TS 5.6.5.b. Therefore, the NRC staff concludes that this condition and limitation is satisfied.

CNS and MNS use a Westinghouse fuel design and, therefore, Condition and Limitation 8.b does not apply.

3.1.2.9 Condition and Limitation 9 – LOCBART or STRIKIN-II Early Peak Cladding Temperature (PCT)

Condition and Limitation 9 states that as discussed in response to RAI #21 (Reference 3), for plants introducing Optimized ZIRLO™ that are licensed with LOCBART or STRIKIN-II and have a limiting PCT that occurs during blowdown or early reflood, the limiting LOCBART or STRIKIN-II calculation will be rerun using the specified Optimized ZIRLO™ material properties. Although not a condition of approval, the NRC staff strongly recommends that, for future evaluations, Westinghouse update all computer models with Optimized ZIRLO™ specific material properties. CNS and MNS are not licensed with LOCBART or STRIKIN-II. Therefore, the NRC staff concludes that this condition and limitation does not apply.

3.1.2.10 Condition and Limitation 10 – Locked Rotor PCT

Condition and Limitation 10 states that due to the absence of high temperature oxidation data for Optimized ZIRLO™, the Westinghouse coolability limit on PCT during the locked rotor event shall be maintained within the proprietary limits included in the topical report and proprietary version of the SE.

Duke Energy does not use a PCT limit for the locked rotor event, but instead uses a core cooling capability analyses, which determines to what extent fuel cladding integrity is comprised by calculating the number of fuel rods that exceed the 95/95 departure from nucleate boiling ratio limit. Therefore, the NRC staff concludes that this condition and limitation does not apply.

3.1.3 Thermal-Hydraulic Design, Transients, and Accidents Methodology

Duke Energy will transition to Optimized ZIRLO™ using the same thermal-hydraulic analysis and transients and accident (non-LOCA) analyses described in DPC-NE-3000, 3001, and 3002 (References 20, 21, and 22), which are currently approved for use at CNS and MNS, as listed in TS 5.6.5, "Core Operating Limits Report." The current methods remain valid for Optimized ZIRLO™ transition cores, as they are consistent with the methods described in WCAP-12610-P-A. This process is valid for all resident fuel designs licensed for CNS and

MNS, and the transition has no impact on both non-LOCA and LOCA analyses methodologies at CNS and MNS. Therefore, the NRC staff concludes that these methods are acceptable. |

3.1.4 Technical Conclusion

Based upon the NRC staff's prior approval of Optimized ZIRLO™, the licensee's compliance with the SE conditions and limitations through inclusion of the topical reports into the TSs, and the licensees use of NRC-approved methodologies in TS 5.6.5.b for thermal-hydraulic transients and accidents analyses to ensure that the operating limits will be appropriate, the NRC staff finds the proposed changes to TS 4.2.1 and TS 5.6.5 to allow the use of Optimized ZIRLO™ acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the North Carolina and South Carolina State officials were notified of the proposed issuance of the amendments. The State officials had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts and no significant change in the types of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding 80 FR 73236. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

7.0 REFERENCES

1. Duke Energy, R. T. Repko letter to U.S. NRC, "License Amendment Request and 10 CFR 50.12 Exemption Request for the Use of Optimized ZIRLO™ Fuel Rod Cladding," RA-15-0020, August 20, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15295A016).

19. Westinghouse, letter from J. A. Gresham to U.S. NRC, "SER Compliance of WCAP-12610-P-A & CENPD-404-P-A Addendum 1-A 'Optimized ZIRLO™'," LTR-NRC-08-60, December 30, 2008 (ADAMS Accession No. ML090080380).
20. DPC-NE-3000-PA, Revision 3, "Thermal-Hydraulic Transient Analysis Methodology," (September 2004) (ADAMS Package Accession No. ML050680273 (non-public) (proprietary)).
21. DPC-NE-3001-PA, "Multidimensional Reactor Transients and Safety Analysis Physics Parameter Methodology," October 2013 (ADAMS Accession No. ML13325B143 (non-public) (proprietary)).
22. DPC-NE-3002-A, Revision 4b, "UFSAR Chapter 15 System Transient Analysis Methodology," September 2010 (ADAMS Accession No. ML16102A159).

Principal Contributor: Joshua Kaizer

Date: June 21, 2016

J. Eltnisky

- 2 -

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Sincerely,

/RA MOrnak for/

G. Edward Miller, Project Manager
Plant Licensing II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-369, 50-370, 50-413,
and 50-414

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