



Jaime H. McCoy
Vice President Engineering

May 19, 2016

ET 16-0016

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

- Reference: 1) Letter ET 16-0001, dated January 27, 2016, from J. H. McCoy, WCNOC, to USNRC
- 2) Letter 16-00418, dated April 25, 2016, from C. F. Lyon, USNRC, to A. C. Heflin, WCNOC, "Wolf Creek Generating Station – Request for Additional Information Re: License Amendment Request to Allow Use of Optimized ZIRLO™ (CAC NO. MF7285)"

Subject: Docket No. 50-482: Response to Request for Additional Information Regarding License Amendment Request to Allow Use of Optimized ZIRLO™

Gentlemen:

Reference 1 provided the Wolf Creek Nuclear Operating Corporation (WCNOC) application to revise the Wolf Creek Generating Station (WCGS) Technical Specifications (TS). The proposed amendment would modify the WCGS TS requirements to allow the use of Optimized ZIRLO™ as an approved fuel rod cladding. Reference 2 provided a request for additional information (RAI) related to the application. The Attachment to this letter provides WCNOC's response to the RAI.

Enclosures I-IV contain documents that were referenced in the application. These Enclosures are contained on CD-ROM. In accordance with the provisions of 10 CFR 2.390, it is respectfully requested that the documents contained in Enclosures I-IV to this letter be regarded as proprietary information and be withheld from public disclosure on the grounds that they contain trade secrets and confidential commercial information. The original submittal letters for these documents are included on the CD-ROM as Enclosures V-VII. These were the submittal letters to the Nuclear Regulatory Commission (NRC) for the documents in Enclosures I-IV. These submittal letters contain the affidavits which set forth the basis by which the information in Enclosures I-IV should be withheld from public disclosure by the NRC and addressees.

The additional information does not expand the scope of the application and does not impact the no significant hazards consideration determination presented in Reference 1.

A001
NRR

In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," a copy of this submittal, with the Attachment, without the Enclosures, is being provided to the designated Kansas State official.

This letter contains no commitments. If you have any questions concerning this matter, please contact me at (620) 364-4156, or Cynthia R. Hafenstine (620) 364-4204.

Sincerely,



Jaime H. McCoy

JHM/rit

Attachment: Response to Request for Additional Information

Enclosures (on CD-ROM):

- I – WCNOC Topical Report TR 90-0025 W01, "Core Thermal Hydraulic Analysis Methodology for the Wolf Creek Generating Station" (Proprietary)
- II – WCNOC Topical Report NSAG-006, "Transient Analysis Methodology for the Wolf Creek Generating Station" Volume 1 (Proprietary)
- III – WCNOC Topical Report NSAG-006, "Transient Analysis Methodology for the Wolf Creek Generating Station" Volume 2 (Proprietary)
- IV – WCNOC Topical Report NSAG-007, "Reload Safety Evaluation Methodology for the Wolf Creek Generating Station" (Proprietary)
- V – Letter ET 90-0140, dated August 21, 1990, from F. T. Rhodes, WCNOC, to USNRC, "Core Thermal Hydraulic Analysis Methodology for the Wolf Creek Generating Station"
- VI – Letter ET 91-0026, dated February 1, 1991, from F. T. Rhodes, WCNOC, to USNRC, "WCNOC Transient Analysis Methodology Topical"
- VII – Letter ET 92-0032, dated March 11, 1992, from F. T. Rhodes, WCNOC, to USNRC, "Reload Safety Evaluation Methodology Topical Report"

cc: M. L. Dapas (NRC), w/a, w/e
C. F. Lyon (NRC), w/a, w/e
K. S. Steves (KDHE), w/a, w/oe
N. H. Taylor (NRC), w/a, w/e
Senior Resident Inspector (NRC), w/a, w/e

STATE OF KANSAS)
) SS
COUNTY OF COFFEY)

Jaime H. McCoy, of lawful age, being first duly sworn upon oath says that he is Vice President Engineering of Wolf Creek Nuclear Operating Corporation; that he has read the foregoing document and knows the contents thereof; that he has executed the same for and on behalf of said Corporation with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By *Jaime H. McCoy*
Jaime H. McCoy
Vice President Engineering

SUBSCRIBED and sworn to before me this 19th day of May, 2016.



Gayle Shepherd
Notary Public

Expiration Date 7/24/2019

Response to Request for Additional Information

Reference 1 provided the Wolf Creek Nuclear Operating Corporation (WCNOC) application to revise the Wolf Creek Generating Station (WCGS) Technical Specifications (TS). The proposed amendment would modify the WCGS TS requirements to allow the use of Optimized ZIRLO™ as an approved fuel rod cladding. Reference 2 provided a request for additional information (RAI) related to the application. The specific Nuclear Regulatory Commission (NRC) requests are provided in italics.

Request:

Please demonstrate that that same thermal-hydraulic analysis and transient and accident analysis used (non-loss-of-coolant accident (LOCA); non-LOCA) for WCGS as described in References 1, 2, and 3 will not be impacted by the transition to Optimized ZIRLO™. This should include (1) demonstrating that the process is valid for all resident fuel designs licensed for WCGS, (2) demonstrating that the transition has no impact on both non-LOCA and LOCA analyses methodologies at WCGS, and (3) addressing the change to the cladding or structural materials for the fuel assembly skeleton and its impact on the thermal-hydraulic analysis. Additionally, please provide the three references.

References:

1. WCNOC Topical Report TR 90-0025 W01, "Core Thermal Hydraulic Analysis Methodology for the Wolf Creek Generating Station."
2. WCNOC Topical Report NSAG-006, "Transient Analysis Methodology for the Wolf Creek Generating Station."
3. WCNOC Topical Report NSAG-007, "Reload Safety Evaluation Methodology for the Wolf Creek Generating Station."

Response:

The three references requested have been electronically provided via CD-ROM. In accordance with the provisions of 10 CFR 2.390, it is respectfully requested that these documents contained therein be regarded as proprietary information and be withheld from public disclosure on the grounds that they contain trade secrets and confidential commercial information. The original submittal letters are also included, as the documents that were requested in this RAI had been previously submitted to the NRC, and these letters contain the affidavits which set forth the basis by which this information should be withheld from public disclosure by the NRC and addressees. The associated NRC Safety Evaluations (SEs) are documented in References 3, 4, and 5, respectively.

The thermal-hydraulic analysis and transient and accident analysis methodology used for WCGS will not be impacted by the transition to Optimized ZIRLO™, as discussed below:

1. *Demonstrate that the process is valid for all resident fuel designs licensed for WCGS*

As documented in Section 4.2.1 of Reference 6, WCGS is licensed to use Zircaloy or ZIRLO clad fuel rods.

Regarding the use of Zircaloy, the WCGS core thermal-hydraulic analysis methodology (Reference 7) and transient analysis methodology (Reference 8) were based upon Zircaloy-4 cladding models. The associated SEs are documented in References 3 and 4, respectively.

Reference 9 contains the SE that approved adding ZIRLO as a fuel material to the Technical Specifications. The associated amendment request (Reference 10) documents that the use of ZIRLO is consistent with WCGS methods.

2. *Demonstrate that the transition has no impact on both non-LOCA and LOCA analyses methodologies at WCGS*

The WCGS non-LOCA analysis modeling is consistent with the Westinghouse modeling discussed in Section 4.5 of Reference 11. Specifically, Section 5.1 of Reference 122 concluded that the only difference of any consequence between Zircaloy-4 and ZIRLO was the change in specific heat and that the change had negligible effect on impacted transients (Locked Rotor/Sheared Shaft and Rod Ejection). Thus, since the specific heats of ZIRLO and Optimized ZIRLO™ are approximately equal (Section B.2 of Reference 11), the change from ZIRLO to Optimized ZIRLO™ will also have either no effect or a negligible effect on non-LOCA transient results.

Consistent with Item 10 of Section 5.0 of Reference 11, due to the absence of high temperature oxidation data for Optimized ZIRLO™, a reduced peak cladding temperature (PCT) limit was considered for the locked rotor event. Table 15.3-2 of the WCGS Updated Safety Analysis Report (USAR) documents that the PCT observed during the locked rotor event remains below the limit specified in Item 10 of Section 5.0 of Reference 11. Therefore, the current locked rotor event supports the transition to Optimized ZIRLO™.

Regarding the LOCA analyses methodologies, these analyses are held and performed by Westinghouse. Thus, these analyses are based upon Westinghouse methods and the associated basis that Optimized ZIRLO™ has no impact on them is documented in Section 4.6 of Reference 11.

3. *Address the change to the cladding or structural materials for the fuel assembly skeleton and its impact on the thermal-hydraulic analysis*

The WCGS thermal-hydraulic modeling is consistent with the Westinghouse modeling discussed in Section 4.4 of Reference 11. Specifically, the use of Optimized ZIRLO™ cladding or structural materials for the fuel assembly skeleton has no impact on the thermal-hydraulic analysis since the material properties are not modeled within the analysis. Thus, transitioning to Optimized ZIRLO™ will have no effect on the WCGS thermal-hydraulic analysis.

References:

1. WCNOC letter ET 16-0001, "Revision to Technical Specifications and 10 CFR 50.12 Exemption Request to Allow Use of Optimized ZIRLO," January 27, 2016. ADAMS Accession No. ML16033A470.
2. Letter from C. F. Lyon, USNRC, to A. C. Heflin, WCNOC, "Wolf Creek Generating Station – Request for Additional Information Re: License Amendment Request to Allow Use of Optimized ZIRLO™ (CAC NO. MF7285)," April 25, 2016. ADAMS Accession No. ML16110A372.

3. Letter from W. D. Reckley, USNRC, to B. D. Withers, WCNOC, "Wolf Creek Nuclear Operating Corporation – Core Thermal-Hydraulic Analysis Methodology (TAC NO. M77608)," October 29, 1992.
4. Letter from W. D. Reckley, USNRC, to N. S. Carns, WCNOC, "Wolf Creek Nuclear Operating Corporation – Transient Analysis Methodology for Wolf Creek Generating Station (TAC NO. M79740)," September 30, 1993.
5. Letter from W. D. Reckley, USNRC, to B. D. Withers, WCNOC, "Wolf Creek Nuclear Operating Corporation – Reload Safety Evaluation Methodology for Wolf Creek Generating Station (TAC NO. M82970)," March 10, 1993.
6. Technical Specifications, Wolf Creek Generating Station, Unit No. 1, Docket No. STN 50-482, Amendment 213.
7. WCNOC Topical Report TR 90-0025 W01, "Core Thermal Hydraulic Analysis Methodology for the Wolf Creek Generating Station," July, 1990.
8. WCNOC Topical Report NSAG-006, "Transient Analysis Methodology for the Wolf Creek Generating Station," January, 1991.
9. Letter from J. C. Stone, USNRC, to O.L. Maynard, WCNOC, "Wolf Creek Generating Station – Amendment No. 110 to Facility Operating License No. NPF-42 (TAC NO. M98204)," September 22, 1997. ADAMS Accession No. ML022040452.
10. Letter from R. A. Muench, WCNOC, to USNRC, Wolf Creek Letter ET 97-0067, "Docket No. 50-482: Proposed Revision to Technical Specification Section 5.3.1, Fuel Assemblies," July 3, 1997.
11. WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™," July 2006.
12. WCAP-12610-P-A, "Vantage+ Fuel Assembly Reference Core Report," April 1995.