



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

August 21, 2015

Mr. Adam C. Heflin
President, Chief Executive Officer,
and Chief Nuclear Officer
Wolf Creek Nuclear Operating Corporation
Post Office Box 411
Burlington, KS 66839

SUBJECT: WOLF CREEK GENERATING STATION – REQUEST FOR RELIEF FOR
ALTERNATIVE TO ASME CODE CASE N-579, "USE OF NONSTANDARD
NUTS, CLASS 1, 2, AND 3, MC, CS COMPONENTS AND SUPPORTS
CONSTRUCTION SECTION III, DIVISION 1" (TAC NO. MF5426)

Dear Mr. Heflin:

By letter dated December 17, 2014, Wolf Creek Nuclear Operating Corporation (WCNOC, the licensee) proposed an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, Code Case N-579, "Use of Nonstandard Nuts, Class 1, 2, and 3, MC, CS Components and Supports Construction Section III, Division 1," for the remaining life of the excess letdown heat exchanger, EBG02, in accordance with paragraph 50.55a(b)(4) of Title 10 of the *Code of Federal Regulations* (10 CFR).

Pursuant to 10 CFR 50.55a(z)(1), the licensee requested to use the proposed alternative on the basis that the alternative provides an acceptable level of quality and safety. WCNOC was previously granted approval of a similar request; however, that request was only granted until September 2, 2015.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the subject request and concludes, as set forth in the enclosed safety evaluation, that the proposed alternative to Code Case N-579 stated in licensee's request for relief provides an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1). Therefore, the NRC staff authorizes the proposed alternative to ASME Code Case N-597 at WCGS for the remaining life of the excess letdown heat exchanger, EBG02, channel head joint flange-bolting and associated nuts.

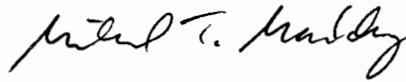
All other requirements of the ASME Code for which relief has not been specifically requested and approved remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

A. Heflin

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The detailed results of the NRC staff review are provided in the enclosed safety evaluation. If you have any questions concerning this matter, please call Mr. F. Lyon of my staff at (301) 415-2296 or by electronic mail at fred.lyon@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael T. Markley".

Michael T. Markley, Chief
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-482

Enclosure
Safety Evaluation

cc w/encl: Distribution via Listserv



UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF

ALTERNATIVE TO ASME CODE CASE N-579 FOR EXCESS LETDOWN HEAT EXCHANGER

WOLF CREEK NUCLEAR OPERATING CORPORATION

WOLF CREEK GENERATING STATION

DOCKET NO. 50-482

1.0 INTRODUCTION

By letter dated December 17, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14357A122), the Wolf Creek Nuclear Operating Corporation (the licensee, WCNOC) submitted a relief request which proposes an alternative to the requirements of the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (Code) Section III, Code Case N-579, "Use of Nonstandard Nuts' Class 1, 2, and 3, MC, CS Components and Supports Construction Section III, Division 1," for the Wolf Creek Generating Station, Unit 1 (WCGS) for the remaining life of the excess letdown heat exchanger, EBG02.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1), the licensee requested to use the proposed alternative on the basis that the alternative provides an acceptable level of quality and safety.

2.0 REGULATORY EVALUATION

The regulations in 10 CFR 50.55a(c)(1) state that components which are part of the reactor coolant pressure boundary must meet the requirements for Class 1 components in Section III of the ASME Code, except as provided in paragraphs 10 CFR 50.55a(c)(2), (c)(3), and (c)(4). Paragraph 10 CFR 50.55a(c)(3)(iv) states that optional Code Cases applied to components must be those listed in U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide 1.84.

Pursuant to 10 CFR 50.55a(z)(1), the licensee is requesting to use an alternative to the requirements of ASME Section III, Code Case N-579, which is listed in Table 1, "Acceptable Section III Code Cases," of Regulatory Guide 1.84, Revision 36, "Design, Fabrication, and Materials Code Case Acceptability, ASME Section III," October 2014 (ADAMS Accession No. ML13339A515).

Paragraph 55a(z) of 10 CFR 50 states, in part, that alternatives to the requirements of 10 CFR 50.55a(b)-(h) may be used, when authorized by the NRC, if (1) the proposed

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alternatives would provide an acceptable level of quality and safety, or (2) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Based on the above, and subject to the following technical evaluation, the NRC staff finds that regulatory authority exists for the licensee to request and the Commission to authorize the alternative requested by the licensee.

3.0 TECHNICAL EVALUATION

3.1 Requested Relief

ASME Code of Reference

The applicable Construction Code for the excess letdown heat exchanger is ASME Code, Section III, 1974 Edition including the summer 1974 Addenda.

ASME Code, Section III, Code Case N-579, "Use of Nonstandard Nuts, Class 1, 2, and 3, MC, CS Components and Supports Construction Section III, Division 1," is listed in Table 1, "Acceptable Section III Code Cases," of NRC Regulatory Guide 1.84.

Affected Component

The excess letdown heat exchanger (EBG02) channel head joint flange-bolting (ASME Code Class 2).

Applicable Code Requirement

ASME Code Case N-579 requires that material for nuts shall conform to the requirements of ASME Code, Section II, Part A, "Ferrous Material Specifications," Section SA-194, "Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both" (except paragraph 9.1 as stated in SA-194 in ASME Code, Section II, 1995 Edition through 1997 Addenda), and that screw threads of nonstandard nuts shall be manufactured to meet the requirements for threads in ASME B1.1, "Unified Inch Screw Threads (UN and UNR Thread Form)."

Proposed Alternative and Basis for Use (As Stated)

The licensee is proposing to continue to use hydraulic nuts constructed from SA-540 Grade B23 steel. Hydraulic nuts meeting fabricated from SA-540 Grade B23 are currently installed on the excess letdown heat exchanger flange instead of the SA-194 material specified in ASME Code Case N-579.

ASME Code Case N-579 specifies that the nonstandard nut meet the proof load requirements of SA-194. Nuts meeting SA-194 Grade 2H and SA-194 Grade 7 have the highest proof load requirements in SA-194 with a proof load based on a proof stress of 175,000 pounds per square inch (psi) (reference Table 3 of SA-194). The SA-540 Grade B23 hydraulic nuts, have been subjected to a proof load of 311,500 pounds-force (lbf) based on a proof stress of 175,000 psi

for 1-5/8-inch diameter nuts. The SA-540 Grade B23 material, which is listed in Table 1-7.3 of Section II for Class 2 bolting, has been used in lieu of SA-194 for manufacture of the hydraulic nuts currently installed on the excess letdown heat exchanger EBG02 and is shown to have sufficient strength.

The hydraulic nuts also use a proprietary design, including threads on the outer diameter of the nuts. Code Case N-579 requires the screw threads of nonstandard nuts to be manufactured to meet the requirements for threads in ASME B1.1. While the inside threads of the hydraulic nuts conform to ASME B1.1, the outside threads currently installed on EBG02 have a proprietary thread design which minimizes thread deflection between the nut and lock ring to reduce the loss of preload.

The licensee is required to perform a VT-2 examination each refueling outage and document any signs of leakage or corrosion products. No leakage has been identified in this joint since the original installation of the nonstandard nuts in Refueling Outage 18 (spring 2011).

Finally, the hydraulic tensioning process also reduces overall radiation exposure to maintenance personnel by reducing maintenance time in the area.

Precedent

The NRC safety evaluation for WCGS dated March 21, 2011 (ADAMS Accession No. ML110750069), found the use of SA-540 Grade B23 material acceptable as SA-540 Grade B23 is listed as an acceptable material for Class 2 bolting in Section III of the ASME Code. The safety evaluation also found the use of the proprietary outside thread design acceptable because the design minimizes thread deflection between the nut and lock ring and thus the loss of preload is minimized.

3.2 NRC Staff Evaluation

The licensee is proposing to continue to use SA-540 Grade B23 material to fabricate the hydraulic nuts currently installed on the excess letdown heat exchanger flange instead of the SA-194 material specified in ASME Code Case N-579 pursuant to 10 CFR 50.55a(z)(1) on the basis that use the proposed alternative provides an acceptable level of quality and safety.

The safety evaluation dated March 21, 2011, stated, in part, that:

The NRC staff has reviewed the information related to the request for relief from Code Case N-579 for replacement of bolting in the channel head joint flange of the Excess Letdown Heat Exchanger. The component is located in a high-radiation area in the vicinity of reactor coolant loop 4 inside the secondary shield wall of the reactor building. The Excess Letdown Heat Exchanger flange has had chronic boric acid leakage at various times. Prior efforts to stop the leakage by replacement of the gasket along with adjustment of bolt torque have not been successful and have exposed maintenance personnel to increased occupational radiation exposure. Typical joint design incorporates a tapered geometry and a series of spacer washers that are difficult to maintain. The joint is being redesigned to eliminate the tapered geometry and spacer washer

configuration with the use of hydraulic tensioning nuts (HydraNuts) to assure consistent loading around the joint. The new design would provide a safety benefit in reducing occupational radiation exposure by limiting maintenance stay times in the area.

As an alternative to Code Case N-579, SA-540 Grade B23 material was used instead of SA-194 for the manufacture of the hydraulic nuts. The licensee has determined that SA-540 Grade B23 material has sufficient strength for this application. The NRC staff concludes that SA-540 Grade B23 is acceptable for this application because this material is listed as an acceptable material for Class 2 bolting in ASME Code, Section III.

Code Case N-579 requires that the screw threads of nonstandard nuts be manufactured to meet the requirements for threads in ASME B1.1. The hydraulic nuts used by the licensee have a proprietary outside thread design developed by the nut manufacturer which minimizes thread deflection between the nut and the lock ring and thereby minimizes loss of preload. The inside threads of the hydraulic nuts conform to ASME B1.1. The NRC staff concludes the use of the proprietary outside thread design is acceptable because the design would result in minimizing thread deflection between the nut and the lock ring, which would result in reducing the loss of preload.

The NRC staff's position on the adequacy of the use of the alternate nut material and design, and a review of operating experience does not show any issues with the material or design. The NRC staff continues to conclude that the use of the non-standard nut design and materials are acceptable.

The conclusion to the March 21, 2011, safety evaluation stated:

Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third 10-year ISI interval of WCGS.

Typically, when an alternative to ASME Code, Section XI is authorized, the restriction to a given 10-year interval means that the authorized relief ceases to be in effect when the interval ends, as, among other reasons the licensee will update to a new Edition and Addenda of Section XI and inspection requirements for the component may change.

For alternatives related to ASME Code, Section III, which are typically related to repair and replacement activities, the relief requests do not necessarily expire for the component at the end of the 10-year inspection interval, but that the repair and replacement activities must be completed by the end of the 10-year inspection interval. As the intent was not clearly stated in the safety evaluation, it can be interpreted as saying that the use of the non-standard nuts expire at the end of the 10-year interval.

The NRC staff concludes that the use of the SA-540 Grade B23 nuts with the proprietary outside thread design provides an acceptable level of quality and safety for the remaining life of the component.

4.0 CONCLUSION

As set forth above, the NRC staff concludes that the proposed alternative to Code Case N-579 stated in licensee's request for relief provides an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1). Therefore, the NRC staff authorizes the proposed alternative to ASME Code Case N-597 at WCGS for the remaining life of the excess letdown heat exchanger, EBG02, channel head joint flange-bolting and associated nuts.

All other requirements of the ASME Code for which relief has not been specifically requested remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: S. Cumblidge, NRR/DE/EPNB

Date: August 21, 2015

A. Heflin

- 2 -

The detailed results of the NRC staff review are provided in the enclosed safety evaluation. If you have any questions concerning this matter, please call Mr. F. Lyon of my staff at (301) 415-2296 or by electronic mail at fred.lyon@nrc.gov.

Sincerely,

/RA/

Michael T. Markley, Chief
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-482

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