



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

May 15, 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
NOS. 4PR-01, 4PR-02, AND 4VR-02 FOR THE FOURTH 10-YEAR INSERVICE
TESTING PROGRAM INTERVAL (TAC NO. MF4992, MF4993, AND MF4994)

Dear Mr. Heflin:

By letter dated October 8, 2014, Wolf Creek Nuclear Operating Corporation (WCNOC, the licensee) proposed alternatives 4GR-01, 4PR-01, 4PR-02, 4VR-01, and 4VR-02 to the inservice testing (IST) interval requirements of the American Society of Mechanical Engineers (ASME) *Code for Operations and Maintenance of Nuclear Power Plants* (OM Code), Section IST, for the Wolf Creek Generating Station (WCGS) for the fourth 10-year interval of the IST Program. By letter dated December 16, 2014, WCNOC withdrew proposed alternative 4VR-02. This letter addresses proposed alternatives 4PR-01 and 4PR-02. The remaining proposed alternatives will be addressed by separate correspondence.

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) paragraph 50.55a(a)(3)(i), in 4PR-01, the licensee requested an alternative to pump testing following the guidance of ASME OM Code Case OMN-21, Revision 0, "Alternative Requirements for Adjusting Hydraulic Parameters to Specified Reference Points." In 4PR-02, the licensee requested an alternative to the requirements of ASME OM Code ISTB-3510(b)(1) as they pertain to the Centrifugal Charging Pump suction pressure gauge requirements. The licensee requested to use the proposed alternatives on the basis that they provide an acceptable level of quality and safety.

The paragraph headings in 10 CFR 50.55a were changed by *Federal Register* notice dated November 5, 2014 (79 FR 65776), which became effective on December 5, 2014 (e.g., 10 CFR 50.55a(a)(3)(i) is now 50.55a(z)(1), and 50.55a(a)(3)(ii) is now 50.55a(z)(2)). See the cross-reference tables, which are cited in the notice, in the Agencywide Documents Access and Management System (ADAMS) at Accession No. ML14015A191 and ADAMS package Accession No. ML14211A050.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the subject requests and concludes, as set forth in the enclosed safety evaluation, that the proposed alternatives provide 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) for requests 4PR-01 and 4PR-02. Therefore, the NRC staff authorizes the alternatives proposed in 4PR-01 and 4PR-02 for WCGS for the fourth 10-year IST program interval, which begins on September 4, 2015, and is scheduled to end on September 3, 2025.

A. Heflin

- 2 -

All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject requests remain applicable.

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". The signature is written in a cursive style with a large, sweeping initial "M".

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

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FOURTH 10-YEAR INSERVICE TESTING PROGRAM INTERVAL

REQUEST FOR RELIEF NOS. 4PR-01 AND 4PR-02

WOLF CREEK NUCLEAR OPERATING CORPORATION

WOLF CREEK GENERATING STATION

DOCKET NO. 50-482

1.0 INTRODUCTION

By letter dated October 8, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14288A316), Wolf Creek Nuclear Operating Corporation (WCNOC, the licensee), submitted alternative requests 4PR-01 and 4PR-02 to the U.S. Nuclear Regulatory Commission (NRC). The licensee proposed alternatives to certain inservice testing (IST) requirements of the American Society of Mechanical Engineers *Code for Operation and Maintenance of Nuclear Power Plants* (ASME OM Code), for the IST program at Wolf Creek Generating Station (WCGS) for the fourth 10-year IST program interval, which begins on September 4, 2015, and is scheduled to end on September 3, 2025.

The paragraph headings in 10 CFR 50.55a were changed by *Federal Register* notice dated November 5, 2014 (79 FR 65776), which became effective on December 5, 2014 (e.g., 10 CFR 50.55a(a)(3)(i) is now 50.55a(z)(1), and 50.55a(a)(3)(ii) is now 50.55a(z)(2)). See the cross-reference tables, which are cited in the notice, in ADAMS at Accession No. ML14015A191 and ADAMS package Accession No. ML14211A050.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i), the licensee requested to use the proposed alternatives in 4PR-01 and 4PR-02 on the basis that the alternatives provide an acceptable level of quality and safety.

2.0 REGULATORY EVALUATION

By *Federal Register* notice dated November 5, 2014 (79 FR 65776), which became effective on December 5, 2014, the paragraphs headings in 10 CFR 50.55a were revised. Accordingly, relief requests that had been previously covered by 10 CFR 50.55a(a)(3)(i) are now covered under the equivalent 10 CFR 50.55a(z)(1) and relief requests that had been previously covered by 10 CFR 50.55a(a)(3)(ii) are now covered under the equivalent 10 CFR 50.55a(z)(2). The regulations in 10 CFR 50.55a(z), "Alternatives to codes and standards requirements," state that alternatives to the requirements of paragraphs (b) through (h) of this section or portions thereof

Enclosure

may be used when authorized by the Director, Office of Nuclear Reactor Regulation, or Director, Office of New Reactors, as appropriate. A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate that:

- (1) Acceptable level of quality and safety. The proposed alternative would provide an acceptable level of quality and safety; or
- (2) Hardship without a compensating increase in quality and safety. Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in quality and safety.

The WCGS fourth 10-year IST interval begins on September 4, 2015, and is scheduled to end on September 3, 2025. The fourth interval IST program Code of record is the ASME OM Code, 2004 Edition with Addenda through OMB-2006 Addenda.

Based on the above, and subject to the NRC's findings with respect to authorizing the proposed alternatives to the ASME OM Code given below, the NRC staff finds that regulatory authority exists for the licensee to request and the Commission to authorize the alternatives requested by the licensee.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Alternative Request 4PR-01

Applicable Code Requirements

ISTB-5121, "Group A Test Procedure," (b) states, in part, that "The resistance of the system shall be varied until the flow rate equals the reference point."

ISTB-5122, "Group B Test Procedure," (c) states, in part, that "System resistance may be varied as necessary to achieve the reference point."

ISTB-5123, "Comprehensive Test Procedure," (b) states, in part, that "For centrifugal and vertical line shaft pumps, the resistance of the system shall be varied until the flow rate equals the reference point."

ISTB-5221, "Group A Test Procedure," (b) states, in part, that "The resistance of the system shall be varied until the flow rate equals the reference point."

ISTB-5222, "Group B Test Procedure," (c) states, that "System resistance may be varied as necessary to achieve the reference point."

ISTB-5223, "Comprehensive Test Procedure," (b) states, in part, that "The resistance of the system shall be varied until the flow rate equals the reference point."

The licensee has requested an alternative to the pump testing reference value requirements of ISTB-5121, ISTB-5122, ISTB-5123, ISTB-5221, ISTB-5222, and ISTB-5223. The components affected by this alternative request are the pumps listed in the table below. By NRC letter dated

July 15, 2014 (ADAMS No. ML14178A769), a similar alternative request was authorized for Callaway Plant, Unit 1.

Table for Pumps Affected by Alternative Request 4PR-01

Pump Number	Description	Pump Type	ASME Code Class	ASME OM Code Category
PBG02A/B	Boric Acid Pumps	Centrifugal	3	Group A
PEG01A/B/C/D	Component Cooling Water Pumps	Centrifugal	3	Group A
PEJ01A/B	Residual Heat Removal Pumps	Centrifugal	2	Group A
PECO1A/B	Fuel Pool Cooling Pumps	Centrifugal	3	Group A
PAL01A/B	Motor Driven Auxiliary Feedwater Pumps	Centrifugal	3	Group A
PAL02	Turbine Driven Auxiliary Feedwater Pump	Centrifugal	3	Group B
PBG05A/B	Centrifugal Charging Pumps	Centrifugal	2	Group B
PEF01A/B	Essential Service Water Pumps	Vertical Line Shaft	3	Group A
PEM01A/B	Safety Injection Pumps	Centrifugal	2	Group B
PEN01A/B	Containment Spray Pumps	Centrifugal	2	Group B

Licensee's Reason for Request

The licensee stated that for pump testing, there is difficulty adjusting system throttle valves with sufficient precision to achieve exact flow reference values during subsequent IST exams, and that Section ISTB of the ASME OM Code does not allow for variance from a fixed reference value for pump testing. The licensee also noted that Section 5.3 of NUREG-1482, Revision 2, "Guidelines for Inservice Testing at Nuclear Power Plants: Inservice Testing of Pumps and Valves and Inservice Examination and Testing of Dynamic Restraints (Snubbers) at Nuclear Power Plants," October 2013 (ADAMS Accession No. ML13295A020), acknowledges that certain pump system designs do not allow for the licensee to set the flow at an exact value because of limitations in the instruments and controls for maintaining steady flow.

The licensee further stated that ASME OM Code Case OMN-21, "Alternative Requirements for Adjusting Hydraulic Parameters to Specified Reference Points," provides guidance for adjusting reference flow/ ΔP to within a specified tolerance during inservice testing. The Code Case states that:

It is the opinion of the Committee that when it is impractical to operate a pump at a specified reference point and adjust the resistance of the system to a specified reference point for either flow rate, differential pressure or discharge pressure, the pump may be operated as close as practical to the specified reference point with the following requirements. The Owner shall adjust the system resistance to as close as practical to the specified reference point where the variance from the reference point does not exceed + 2% or - 1% of the reference point when the

reference point is flow rate, or + 1% or – 2% of the reference point when the reference point is differential pressure or discharge pressure.

Currently, differential pressure and discharge pressure are not used as a fixed parameter during IST of pumps at WCGS.

Licensee's Proposed Alternative

The licensee proposes to perform future inservice pump testing in a manner consistent with the requirements as stated in ASME OM Code Case OMN-21. Specifically, testing of pumps will be performed such that flow rate is adjusted as close as practical to the reference value and within limits of +2 percent/-1 percent of the reference value.

WCGS plant operators will still strive to achieve the exact test flow reference values during testing. Typical test guidance will be to adjust flow to the specific reference value with additional guidance that if the reference value cannot be achieved with reasonable effort, the test will be considered valid if the steady state flow rate is within the limits of +2 percent/-1 percent of the reference value.

Code Case OMN-21 was approved by the ASME Operations and Maintenance Standards Committee on April 20, 2012, with an NRC representative voting in the affirmative. The applicability of Code Case OMN- 21 is the ASME OM Code 1995 Edition through 2011 Addenda. The language from Code Case OMN-21 has been included in the ASME OM Code 2012 Edition.

Using the provisions of this request as an alternative to the specific requirements of ISTB-5121, ISTB-5122, ISTB-5123, ISTB-5221, ISTB-5222, and ISTB-5223 as described above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety.

NRC Staff Evaluation

An inquiry was submitted to the ASME OM Code Committee to determine what alternatives may be used when it is impractical to operate a pump at a specified reference point for flow rate, differential pressure, or discharge pressure. In response to the inquiry, ASME Code Case OMN-21 was developed to provide guidance on alternatives. The guidance in Code Case OMN-21 states that when it is impractical to operate a pump at a specified reference point for flow rate, differential pressure or discharge pressure, the pump may be operated as close as practical to the specified reference point with the following requirements. Code Case OMN-21 specifies that the variance from the reference point shall not exceed +2 percent or -1 percent of the reference point when the reference point is flow rate, or +1 percent or -2 percent of the reference point when the reference point is differential pressure or discharge pressure.

Code Case OMN-21 was approved by the ASME Operation and Maintenance Standards Committee on April 20, 2012, with the NRC representative voting in the affirmative. The licensee proposes to adopt Code Case OMN-21. The applicability of Code Case OM-21 is the ASME OM Code 1995 Edition through the 2011 Addenda. The language from Code Case OMN-21 has been included in the ASME OM Code, 2012 Edition.

The NRC staff notes that in certain situations, it is not possible to operate a pump at a precise reference point. The NRC staff has reviewed the alternatives proposed in ASME OM Code Case OMN-21 and found that the proposed alternatives are reasonable and appropriate when a pump cannot be operated at a specified reference point. Operation within the tolerance bands specified in ASME OM Code Case OMN-21 provides reasonable assurance that licensees will be able to utilize the data collected to detect degradation of the pumps. Based on the NRC staff's review of ASME OM Code Case OMN-21 and the licensee's commitment to use the bands specified in ASME OM Code Case OMN-21 for flow rate, the NRC staff concludes that implementation of the alternatives contained in ASME OM Code Case OMN-21 is acceptable for the pumps listed in the table above. Therefore, the NRC staff concludes that the licensee's proposed alternative provides an acceptable level of quality and safety.

3.2 Licensee's Alternative Relief Request 4PR-02

Applicable Code Requirements

ISTB-3510, "Data Collection General," (b), "Range," (1) states that "The full-scale range of each analog instrument shall be not greater than three times the reference value."

The licensee requested to use alternative instrument range requirements for centrifugal charging pumps PBG05A and PBG05B. The pumps are classified as ASME Class 2 and ASME OM Code Group B. By NRC letter dated July 15, 2014 (ADAMS Accession No. ML14178A769), a similar alternative request was authorized for Callaway Plant, Unit 1.

Licensee's Reason for Request

The licensee stated that the installed suction pressure gauges for the centrifugal charging pumps is 0–150 pounds per square inch gauge (psig). The reference values for suction pressure during IST are between 30 psig and 40 psig. As a result, the instrument range exceeds the requirement of ISTB-3510(b)(1).

The licensee further stated that pump suction pressure indication is used along with pump discharge pressure indication to determine pump differential pressure. Reference values for the centrifugal charging pumps during IST are between 30 psig and 40 psig. Based on ISTB-3510(b)(1), this would require as a maximum, a gauge with a range of 0 to 90 psig (3 X 30 psig) to bound the lowest reference value for pressure. Applying the accuracy requirement of ± 2 percent for the quarterly Group B pump test, the resulting inaccuracies due to suction pressure effects would be ± 1.8 psig (0.02×90 psig).

Licensee's Proposed Alternative

For the Group B quarterly test, the licensee will use the installed suction pressure gauge 0 to 150 psig calibrated to less than or equal to ± 1.2 percent such that the inaccuracies due to pressure will be less than that required by the Code (± 1.8 psig). The error associated with the suction gauge would then be no worse than ± 1.8 pounds per square inch (psi) (150×0.012). Use of the installed pressure gauge calibrated to less than ± 1.2 percent is equivalent in terms of measuring differential pressure using a pressure gauge of 90 psig calibrated to ± 2 percent.

NRC Staff Evaluation

The licensee requests an alternative to the ASME OM Code instrumentation requirements of paragraph ISTB-3510(b)(1) for the pressure gauges that are used to measure the suction pressure of centrifugal charging pumps PBG05A and PBG05B. ASME OM Code paragraph ISTB-3510(b)(1) requires that the full-scale range of each instrument be no greater than three times the reference value. The licensee proposes to use the installed suction pressure gauges that do not meet this requirement.

The installed suction pressure gauges for the centrifugal charging pumps have a range of 0-150 psig. The typical suction pressure reference values for the centrifugal charging pumps during testing are 30-40 psig. Use of the low-end reference value of 30 psig to calculate a reading error is conservative and appropriate for these pumps. Based on the Code-required full range of 90 psig (30 X 3) and the accuracy requirement of ± 2 percent for the quarterly Group B pump test, the resulting inaccuracies due to suction pressure effects would be ± 1.8 psig (0.02 X 90 psig). Therefore, the effective gauge accuracy of the installed pressure gauge when calibrated to less than or equal to ± 1.2 percent is also ± 1.8 psi (0.012 X 150 psig), which is equivalent to the resulting measurement accuracy for Group B tests if ASME OM Code requirements were met.

The use of the existing gauges is also supported by NUREG-1482, Revision 2, Paragraph 5.5.1, when the combination of range and accuracy yields a reading at least equivalent to the reading achieved from instruments that meet the ASME OM Code requirements. The centrifugal charging pumps' suction pressure gauges yield readings at least equivalent to the readings achieved from instruments that meet ASME OM Code requirements for Group B tests as required in ISTB-3510(b)(1). Therefore, the NRC staff concludes that the licensee's proposed alternative provides an acceptable level of quality and safety on the basis that the installed instrumentation provides a measurement accuracy that equals the resulting measurement accuracy for Group B tests if ASME OM Code requirements were met.

4.0 CONCLUSION

Based on the above, the NRC staff determines that the proposed alternatives 4PR-01 and 4PR-02 provide 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) for proposed alternatives 4PR-01 and 4PR-02 for WCGS. Therefore, the NRC staff authorizes the proposed alternatives for WCGS for the fourth 10-year IST program interval, which begins on September 4, 2015, and is scheduled to end on September 3, 2025.

All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject requests remain applicable.

Principal Contributor: J. Huang, NRR/DE/EPNB

Date: May 15, 2015

A. Heflin

- 2 -

All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject requests remain applicable.

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

Enclosure
Safety Evaluation

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