May 31, 2005

Mr. Rick A. Muench
President and Chief Executive Officer
Wolf Creek Nuclear Operating Corporation
Post Office Box 411
Burlington, KS 66839

SUBJECT: WOLF CREEK GENERATING STATION - REQUEST FOR RELIEF REGARDING CLASSIFICATION OF PRESSURIZER UPPER LEVEL INSTRUMENT AND OTHER LINES AND ASSOCIATED COMPONENTS FOR WOLF CREEK GENERATING STATION, UNIT 1 (TAC NO. MC5058)

Dear Mr. Muench:

By letter dated November 2, 2004 (WM 04-0032) (ADAMS Accession No. ML043140268), you requested relief from Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.55a(c) requirements pertaining to the pressurizer upper level instrument and other lines and associated components connected to the pressurizer above the normal water level in the pressurizer for Wolf Creek Generating Station, Unit 1. Section 50.55a(c) of 10 CFR requires that reactor coolant pressure boundary components meet American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III for Class 1 components. The licensee proposed to retain the design of certain reactor coolant pressure boundary components which were originally designed as Class 2 components. The attached safety evaluation provides the results of the review.

The staff finds that the licensee's alternative to the ASME Code classification requirements is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the Code requirements at this time would result in hardship without a compensating increase in the level of quality and safety. The licensee's proposed alternative provides reasonable assurance that the instrument and other lines and components will perform their intended safety function.

Sincerely,

/RA/
Robert A. Gramm, Chief, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-482

Enclosure: Safety Evaluation

cc w/encl: See next page

Mr. Rick A. Muench
President and Chief Executive Officer
Wolf Creek Nuclear Operating Corporation
Post Office Box 411
Burlington, KS 66839

May 25, 2005

SUBJECT: WOLF CREEK GENERATING STATION - REQUEST FOR RELIEF REGARDING CLASSIFICATION OF PRESSURIZER UPPER LEVEL INSTRUMENT AND OTHER LINES AND ASSOCIATED COMPONENTS FOR WOLF CREEK GENERATING STATION, UNIT 1 (TAC NO. MC5058)

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The staff finds that the licensee's alternative to the ASME Code classification requirements is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the Code requirements at this time would result in hardship without a compensating increase in the level of quality and safety. The licensee's proposed alternative provides reasonable assurance that the instrument and other lines and components will perform their intended safety function.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUEST

FOR PRESSURIZER UPPER LEVEL INSTRUMENTATION

AND OTHER LINES AND ASSOCIATED COMPONENTS

WOLF CREEK NUCLEAR OPERATING CORPORATION

WOLF CREEK GENERATING STATION

DOCKET NO. 50-482

1.0 INTRODUCTION

By letter dated November 2, 2004, Wolf Creek Nuclear Operating Corporation, the licensee for Wolf Creek Generating Station (WCGS), submitted to the U.S. Nuclear Regulatory Commission (the NRC or Commission), a proposed alternative to the design requirements for Class 1 components as specified in Section III of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) pertaining to the pressurizer upper level instrument and other lines and associated components. These lines were designed and constructed to meet the Code requirements for Class 2 components. The regulations in Section 50.55a(c) of Title 10 of the *Code of Federal Regulations* (10 CFR) require that reactor coolant pressure boundary components meet the ASME Code, Section III, requirements for Class 1 components. Specifically, the licensee's alternative applies to the ASME Code, Section III, Class 2 portions of the reactor coolant system and the nuclear sampling system including piping and instrument lines, valves and supports, connected to the pressurizer above the normal water level in the pressurizer. The proposed alternative would allow these lines, piping, and valves to remain as designed and constructed.

2.0 REGULATORY EVALUATION

The regulations in 10 CFR 50.55a require that components which are part of the reactor coolant pressure boundary meet the requirements for Class 1 components in Section III of the ASME Code, except where alternatives have been authorized by the Commission pursuant to paragraphs (a)(3)(i) or (a)(3)(ii) of 10 CFR 50.55a. In proposing alternatives, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety, or (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Section 50.55a allows the Commission to authorize alternatives upon making the necessary findings.

In addition, 10 CFR 50.55a(c) states, in part:

> (1) Components which are part of the reactor coolant pressure boundary must meet the requirements for Class 1 components in Section III of the ASME Boiler and Pressure Vessel Code, except as provided in paragraphs (c)(2), (c)(3), and (c)(4) of this section.
>
> (2) Components which are connected to the reactor coolant system and are part of the reactor coolant pressure boundary as defined in § 50.2 need not meet the requirements of paragraph (c)(1) of this section, provided:
>
> (i) In the event of postulated failure of the component during normal reactor operation, the reactor can be shut down and cooled down in an orderly manner, assuming makeup is provided by the reactor coolant makeup system . . .

In a letter dated April 3, 2000, Westinghouse Electric Company issued its Nuclear Safety Advisory Letter, "NSAL-00-006: Pressurizer Upper Level Instrument Safety Classification." This letter identified an issue where a break in the instrument lines for the upper (steam side) pressurizer level instruments may result in a rapid depressurization of the reactor coolant system (RCS) sufficient to cause an emergency core cooling system actuation. Westinghouse indicated in its letter that these instrument lines should be ASME Code Class 1. Because such a break would not result in a shutdown and cooldown "in an orderly manner," the licensee determined that the existing affected ASME Code Class 2 instrument and other lines and associated components connected to the pressurizer steam space should be classified as ASME Code Class 1, in accordance with 10 CFR 50.55a(c). The licensee has determined that these existing affected Class 2 lines are not in compliance with 10 CFR 50.55a(c). Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee proposes to allow these lines and valves to remain as designed and constructed.

3.0 EVALUATION OF RELIEF REQUEST

3.1 Items for Which Relief is Requested

The affected lines include: (1) approximately 540 feet of small bore piping and instrument tubing, (2) approximately 120 piping and tubing supports, and (3) 27 valves. The instruments connected beyond the instrument manifold valves are not within the scope of the ASME Code, Section III, rules as specified in Section III, paragraph NA-1130(c) and, therefore, are not included in the scope of the requested relief.

The piping and instrument lines affected are described below:

> Piping from the three pressurizer upper instrumentation taps to the root valves, boundary valves and tubing downstream to the instrument manifold valves.
>
> The pressurizer safety valve loop seal drain lines up to each boundary valve.
>
> The piping from the tap on the pressurizer relief line BB-082-BCA-6", to the boundary valve in the pressurizer high point vent line, and line BB-083-BCB-3/4" to pressurizer fill

> and vent valve BBV0085. It also includes the branch line from BB-083-BCB-3/4" to the Nuclear Sampling System . . . This branch line extends to and includes the containment isolation valves for the pressurizer steam space sample line.

These lines and associated components are shown on the licensee's Piping and Instrumentation Drawing (P&ID) M-12BB02 (Updated Safety Analysis Report (USAR) Figure 5.1-1) for the RCS, and on P&ID M-12SJ01 (USAR Figure 9.3-2) for the nuclear sampling system.

3.2 Code Requirement

The regulations in 10 CFR 50.55a(c) require 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.

3.3 Proposed Alternative

The licensee states that the piping, tubing, and valves identified in the request were constructed using the ASME Code, Section III, Subsection NC (Class 2) requirements. The supports for the subject piping and tubing lines were constructed as Class 2 in accordance with the rules of ASME Section III, Subsection NF. Construction as used in Section III, Division 1, included requirements for materials, design, fabrication, examination, testing, inspection, and certification required in the manufacture and installation of items.

The proposed alternative would allow the piping and instrument lines, valves and supports to remain as designed and constructed (ASME Code Class 2) in lieu of upgrading the current design configuration and replacing these items with items constructed to ASME Section III, Subsection NB (ASME Code Class 1).

3.4 Basis for Relief

The licensee states that upgrading the affected components to ASME Code, Section III, Subsection NB (Class 1), would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety because the scope of the change would require substantial time and resources to upgrade the plant design configuration and perform plant modification work to replace the affected items. Additionally, a modification of this type would be costly in time, materials, personnel radiation exposure, and radioactive waste, and would not result in a compensating increase in the level of quality or safety. The estimated time for the potential removal and re-installation of approximately 540 feet of small bore piping and instrument tubing, 27 valves, and approximately 120 piping and tubing supports would be approximately 11,000 man-hours. The estimated additional engineering man-hours for upgrading the design configuration and issuing design change packages would be approximately 1,500 man-hours.

Although the components identified in the alternative meet most of the Section III requirements for Class 1 items, they do not meet all Section III requirements for Class 1 items. For example, the valves do not meet the component certification requirements of Section III, which require that a valve be stamped by an appropriate ASME Certificate Holder with the Class 1

identification mark and be certified by an appropriate ASME Certificate Holder on the Section III Code Data Report (Form NPV-1) for being in full compliance with Class 1 requirements.

To justify the proposed alternative, the licensee compared the ASME Code, Section III requirements in Subsection NB for Class 1 components to the design rules in Subsection NC for Class 2 components using the applicable editions and addenda of the ASME Code. The comparison considered each Article of Subsections NB and NC (covering the areas of materials, design, fabrication and installation, examination, testing, protecting against overpressure, nameplates, stamping and reports) and determined whether the differences were technical, quality, or administrative requirements. Differences in Section III administrative requirements such as certification and stamping, furnishing of a stress report, marking of items, etc., although affecting literal compliance, were determined to not reduce the quality or safety of the items. There were few differences in quality requirements between Class 1 and Class 2 because most quality requirements are contained in the General Requirements Subsection NA and are equally applicable to both Class 1 and Class 2. No differences in quality requirements were identified that would reduce the quality or safety of the items.

There were some differences in technical requirements between Class 1 and Class 2 in the areas of piping and tubing material examination (NB/NC-2510), valve design (NB/NC-3500), piping design (NB/NC-3600), examination of circumferential piping butt welds (NB/NC-5220), and examination of springs in Class 1 component standard supports (NF-5410). However, replacing the affected items would provide minimal increase in quality and safety, as demonstrated in the following paragraphs discussing the technical requirement differences.

For piping and tubing material examination, the later provisions of NB-2501(a) in the summer 1983 Addenda exempted 1 inch and less seamless pipe, tubes and fittings from the examination requirements of NB-2500, thus making the Class 1 rules the same as Class 2 and eliminating the technical difference between Class 1 and Class 2. For piping design, there are considerable differences between Class 1 and Class 2 requirements but these differences were eliminated by the summer 1975 Addenda change to NB-3630(d). This change allowed 1 inch and smaller Class 1 piping to be designed to NC-3600, thus making the Class 1 design rules the same as Class 2. If the design and construction had used the later NRC excepted addenda, the Class 2 installed configuration would meet Class 1 material examination and piping design requirements. No increase in quality or safety would be realized by updating these Design Specifications or in upgrading the design configuration by replacing piping and tubing.

In the area of valve design, the requirements in NB-3500 are considerably different than the requirements in NC-3500. However, the small valves that are affected have been evaluated to the applicable requirements in NB-3500 and all the valves were found to meet the technical requirements of NB-3500 applicable to small valves. Therefore, there are no technical differences between the installed Class 2 valves and the requirements for Class 1 valves that would reduce the assurance that the valves will perform their intended safety function. No increases in quality and safety would be realized by replacing the valves with valves constructed to Class 1 requirements.

In the area of examination of circumferential piping butt welds, NB-5220 requires radiograph and surface examination of circumferential piping butt welds. NC-5222 requires radiograph only of these welds. The radiographs and surface exams in Class 1 assure volumetric quality

of the welds and surface quality of the welds. Surface quality of the welds in Class 1 is to be verified because of Class 1 fatigue considerations and the design by analysis approach in Class 1 that reduces the design factor from 4 to 3. Class 2 does not require the additional surface examinations of these welds because of its design by rule approach, which does not have specific fatigue requirements. Because NB-3630(d) allows 1 inch and less Class 1 piping and tubing to be designed to Class 2 rules, the reduced design factor of 3 is not used, fatigue evaluation is not required, and special concern with surface quality in addition to volumetric quality is essentially eliminated. Therefore, the Class 1 requirement for surface examination of these welds will provide minimal increase in quality and safety. The use of Class 2 piping examination rules provides adequate assurance that these welds will perform their intended safety function of passive pressure boundary integrity.

In the area of examination of springs in component standard supports, NF-5410 states that springs in Class 1 component standard supports shall be examined by a surface examination. No such examination requirement exists for Class 2 springs in component standard supports. For branch line BB-098-BCB-3/4 inch to the nuclear sampling system tubing before valve BB-V0086, there is a Subsection NF Class 2 constant support (BB13-H510) containing a spring. As a Class 2 support, this spring did not receive a surface examination. This is a technical difference between the installed Class 2 support and the Class 1 requirements. However, the constant support was load rated by the manufacturer at 130 pounds in accordance with Subsection NF requirements, while the maximum load on this constant support during any loading condition is only 42 pounds, thus providing a considerable margin in the function of the support. Not having received a surface examination may result in a minimal reduction in the quality and safety of the constant support; however, the support can be expected to perform its intended safety function based on the available loading margin.

From the preceding discussions, it is concluded that for the piping, tubing, and valves identified in this request, including the supports, the technical, quality, and administrative differences between Section III requirements for Class 1 and Class 2 construction would have minimal impact on the ability of these items to perform their intended safety function.

3.5 Evaluation

A piping and tubing stress analysis was performed by the site architect/engineer primarily using the 1974 Edition of the ASME Code, Section III with the winter 1974 Addenda. The piping, tubing, valves, and supports identified in the relief request were designed, constructed and installed to a variety of Editions and Addenda of the ASME Code, Section III depending on the applicable governing Design Specification and include the 1974 Edition with the winter 1974 Addenda. Unlike later versions of the Code, this edition and addenda does not have a specific provision allowing Class 2 rules to be used for Class 1 design for piping less than or equal to 1 inch in size. This provision was added in the summer 1975 Addendum to the 1974 Edition in subparagraph NB-3630(d). This provision would not be directly applicable to components designed and constructed to requirements through the winter 1974 Addenda. However, the fact that the provision was incorporated into the later addendum indicates that the Class 2 installation would meet Class 1 requirements, if the design and construction had simply taken place at a later point in time and the later addendum referenced. In addition, the NRC incorporated by reference the summer 1975 Addenda (43 FR 17337) in 10 CFR 50.55a(b) without any modifications or limitation in the use of this particular provision. Therefore, the NRC

staff finds that the design rules used for the affected Class 2 piping provide an equivalent level of safety to Class 1 design requirements in later ASME Code editions and addenda.

The bounding effect that the above differences in fabrication, installation, examination, and material quality would be a potential for a slight decrease in the quality of these lines and associated components, compared to those constructed to meet ASME Code Class 1 requirements. From the preceding discussions, the NRC staff concludes that for the piping, tubing, and valves identified in this request, including the supports, the differences between Section III requirements for Class 1 and Class 2 construction would have minimal impact on the ability of these items to perform their intended safety function. Therefore, authorizing this alternative to allow continued operation with the current design configuration would not adversely impact the health and safety of the public. Further, the licensee has demonstrated that upgrading the affected piping and valves to ASME Code, Section III, Class 1 requirements would result in a hardship or unusual difficulty because the scope of the change would require substantial time and resources to upgrade the current design configuration without a compensating increase in the level of quality and safety.

Therefore, the NRC staff finds that compliance with ASME Code, Section III, Class 1 requirements for the lines and associated components described in the alternative would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

4.0 CONCLUSION

The NRC staff concludes that the proposed alternative to the requirements of 10 CFR 50.55a(c) is authorized for WCGS, Unit 1 on the basis that compliance with the ASME Code, Section III design requirements for Class 1 components would result in hardship without a compensating increase in the level of quality and safety pursuant to 10 CFR 50.55a(a)(3)(ii). The licensee's proposed alternative provides reasonable assurance that the pressurizer upper level instrument and other lines and associated components, as designed and constructed, will perform their intended safety function. The alternative is authorized for the remaining life of the plant.

Principal Contributor: W. Poertner

Date: May 31, 2005

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