

WOLF CREEK

NUCLEAR OPERATING CORPORATION

O. L. Maynard
President and Chief Executive Officer

May 6, 1997

WM 97-0048

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-137
Washington, D. C. 20555

Reference: 1) Letter WM 95-0129, dated August 30, 1995, from
N. S. Carns, WCNO, to USNRC
2) Letter dated October 10, 1996, from USNRC,
to N. S. Carns, WCNO
3) Letter WM 96-0135, dated December 9, 1996, from
N. S. Carns, WCNO, to USNRC
4) Letter dated March 4, 1997, from J. C. Stone, USNRC,
to O. L. Maynard, WCNO
Subject: Docket No. 50-482: Response to Request for Additional
Information, Second 10-Year Interval Inservice
Inspection Program Plan and Associated Requests for
Relief

Gentlemen:

Reference 1 transmitted the Wolf Creek Generating Station, Second 10-Year Interval Inservice Inspection Program Plan. Reference 2 requested additional information to support review of Reference 1. Reference 3 transmitted the Wolf Creek Nuclear Operating Corporation's (WCNO) response to Reference 2. Reference 4 requested additional information to support review of Reference 3. This letter transmits the WCNO's response to Reference 4. The Attachment contains the details of WCNO's response. Approval is requested by September 1, 1997, to support Refuel IX, which is scheduled to begin September 20, 1997.

If you should have any questions regarding this request, please contact me at (316) 364-8831, extension 4100, or Mr. Richard D. Flannigan at extension 4500.

Very truly yours,

O. L. Maynard
Otto L. Maynard

OLM/jad

Attachment

120057

cc: M. T. Anderson (INEL Research Center), w/a
E. W. Merschoff (NRC), w/a
W. D. Johnson (NRC), w/a
J. F. Ringwald (NRC), w/a
J. C. Stone (NRC), w/a

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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

The following information is provided in response to the Request for Additional Information for the Second Interval Inservice Inspection Program Plan and associated response to a Request for Additional Information dated March 4, 1997. Revisions to the subject Relief Requests are included to incorporate the responses within this submittal and any applicable changes resulting from responses to previous requests for additional information.

Request Item 1.

Under Item A, the licensee provided the following additional paragraph:

"When pressure testing piping systems that contain boron for the purpose of controlling reactivity, the insulation will be removed, on the same frequency as that required for performance of the pressure test, and VT-2 visually examined, without the system at normal operating pressure. Any evidence of leakage will be evaluated in accordance with IWA-5250."

The current position that the NRC has adopted on insulation removal is consistent with Code Case N-533, *Alternative Requirements for VT-2 Visual Examination of Class 1 Insulated Pressure Retaining Bolted Connections*. Paragraph (2) of this Code case states: "Each refueling outage the insulation shall be removed from the bolted connection, and a VT-2 visual examination shall be performed. The connection is not required to be pressurized. Any evidence of leakage shall be evaluated in accordance with IWA-5250."

Provide the basis for the current position to remove the insulation on a per period basis only.

Response to Item 1.

Item A of the referenced submittal relates to Relief Request I2R-01. I2R-01 was submitted as a proposed alternative for ASME Code Class 1 and 2 piping systems, Code Categories B-P and C-H, respectively. In response to Request Item 1, Wolf Creek Nuclear Operating Corporation (WCNOC) has revised the relief request to only be applicable to Class 1 items. Insulation will be removed from Class 1 pressure retaining bolted connections each refueling outage, as proposed in the relief request. Removal of insulation on Class 2 items, and examination during pressure testing, will be performed in accordance with ASME Section XI and are no longer covered by this relief request. A more detailed explanation is provided below.

The condition that was requested to be incorporated into I2R-01 specified "The licensee shall remove all insulation at bolted connections in borated systems during each refueling outage and perform..." Because pressure testing of Class 2 systems is not required to be performed during each refueling outage, the response clarified performance of the alternative examination on the periodicity required by the Code. This item was discussed with the NRC and associated reviewers on March 18, 1997 during a telephone conference call. The discussions clarified the NRC position, regarding the relief request, that removal of insulation from Class 2 pressure retaining bolted connections must be performed every refueling outage, but the system need not be pressurized during examination, consistent with the NRC adopted position for Class 1 pressure retaining bolted connections.

Removal of insulation from Class 2 pressure retaining bolted connections every refueling may, in a majority of insulated Class 2 systems, represent a significant increase in radiation exposure than would occur under the current requirements for pressure testing of Class 2 systems. Therefore, Relief Request I2R-01 is being revised, and included with this submittal, to apply only to Class 1 systems which is consistent with ASME Code Case N-533.

WOLF CREEK GENERATING STATION SECOND INTERVAL ISI PROGRAM PLAN

RELIEF REQUEST I2R-01

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COMPONENT IDENTIFICATION

Code Class: 1
References: IWA-5242(a)
Examination Category: B-P
Item Number: All Item Numbers per Category B-P
Description: Alternative Rules for Insulation Removal at Bolted Connections in Systems Borated for the Purpose of Controlling Reactivity

CODE REQUIREMENT

IWA-5242(a), states "for systems borated for the purpose of controlling reactivity, insulation shall be removed from pressure retaining bolted connections for visual examination VT-2."

BASIS FOR RELIEF

Pursuant to 10 CFR 50.55a(a)(3) i), relief is requested on the basis that the proposed alternative would provide an acceptable level of quality and safety. Specifically, relief is requested from the requirement to remove insulation at bolted connections for visual, VT-2 examination during system pressure testing for the following reasons:

1. Code Class 1 systems borated for the purpose of controlling reactivity are extensive and large systems extend into multiple areas and elevations. Scaffolding will be required to access many of the bolted connections. In addition, many of the bolted connections are located in difficult to access areas and in medium to high radiation areas. Insulation removal combined with scaffolding requirements will increase the financial cost, personnel exposure, and generation of radwaste associated with performance of visual VT-2 examinations.
2. The visual VT-2 examination of Class 1 systems, primarily the Reactor Coolant System (RCS) piping and components, is performed between plant mode 3 and 2 ascending. As required by IWB-5221, the RCS is at a normal operating pressure of 2235 psig. Between modes 3 and 2 ascending, the temperature is approximately 557° F. Performance of a visual VT-2 examination, installation of insulation, and disassembly of scaffolding at bolted connections under these operating conditions is a personnel safety hazard. The visual VT-2 examination is a critical path activity and normally has a duration of six to eight hours. Since the majority of Class 1 piping is inside the containment building bio-shield wall, insulation installation and disassembly of scaffolding will add to the outage duration. Critical path cost is currently estimated at \$216,000 per day.

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RELIEF REQUEST I2R-01

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The following WCNOG bolting examination commitments and material control programs, in conjunction with the proposed alternate provisions, provide an acceptable level of safety and quality for bolted connections in systems borated for the purpose of controlling reactivity.

- A. In response to NRC Generic Letter 88-05, "Boric Acid Corrosion Of Carbon Steel Reactor Pressure Boundary Components In PWR Plants," Wolf Creek Generating Station (WCGS) has established a program to inspect all boric acid leaks discovered in the containment building and to evaluate the impact of those leaks on carbon steel or low alloy steel components. All evidence of leaks, including boric acid crystals or residue, is inspected and evaluated regardless of whether the leak was discovered at power or during an outage. Based on the evaluation, appropriate corrective actions are initiated to prevent reoccurrence of the leak and to repair, if necessary, any degraded materials or components.
- B. In addition to the nondestructive examinations required by ASME Section XI, WCGS has committed to the bolting examination requirements of NRC Bulletin 82-02, "Degradation Of Threaded Fasteners In The Reactor Coolant Pressure Boundary Of PWR Plants". In accordance with this bulletin, at least two nondestructive examination techniques (e.g., ultrasonic, liquid penetrant, magnetic particle, or visual VT-1) are performed on bolted connections of the following components: Steam Generator primary manways, Pressurizer primary manway, Pressurizer safety valves, and a total of 22 Reactor Coolant System isolation valves that are greater than 6" NPS. As a minimum, two nondestructive examination techniques are used whenever the bolted connection of one of the subject components is disassembled for maintenance or other inspection. These additional examinations ensure that degradation mechanisms such as Stress Corrosion Cracking or corrosion do not go undetected in bolted connections critical to reactor safety.
- C. The only carbon steel and low alloy pressure boundary components at WCGS that are in systems borated for the purpose of controlling reactivity are clad with stainless steel. Specifically, these clad components are the Reactor Vessel, Steam Generators (primary side), and Pressurizer. All other pressure boundary piping and components in borated systems that are within inservice inspection boundaries are constructed of stainless steel. There is substantial information, such as EPRI NP-5679, attesting to the resistance of stainless steels to boric acid corrosion. To ensure that degradation mechanisms in stainless steels are mitigated, WCNOG maintains a program for controlling materials (insulation, thread lubricant, boron, etc.) that may come in contact with safety related components, including bolting. This program ensures that impurities are not present in concentrations that would promote development of Stress Corrosion Cracking in stainless steel bolted connections.

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RELIEF REQUEST I2R-01 (Page 3 of 3)

PROPOSED ALTERNATE PROVISIONS

Pressure retaining bolted connections in Class 1 components subject to the pressure test at the completion of each refueling outage, will be VT-2 visually examined with the insulation removed. However, it is not required to have the system pressurized. Any evidence of leakage will be evaluated in accordance with IWA-5250.

A VT-2 visual examination of pressure retaining bolted connections in Class 1 components will be performed during the system pressure test at the completion of each refueling outage, without removing the insulation, after satisfying the requirements of IWA-5213, *Test Condition Holding Time*.

PERIOD FOR WHICH RELIEF IS REQUESTED

Relief is requested for the second inspection interval, September 3, 1995, through September 2, 2005.

Request Item 2.

Under Item B, the licensee noted an addition to the corrective measures as follows:

"In addition, if the leakage is identified at a bolted connection that is in service and the evaluation supports continued service, the bolt removal and subsequent VT-3 may be deferred to the next component/system outage of sufficient duration."

Later editions of the Code have provided an alternative to the removal of all bolting at a leaking connection. The licensee's approach to perform an evaluation of the bolted joint to determine the need to remove one bolt is considered too generic to be considered acceptable. An evaluation to determine whether deferral is acceptable is not supported by ISI philosophy. Therefore the licensee should consider the withdrawal of this paragraph.

Response to Item 2.

Item B of the above referenced submittal relates to Relief Request I2R-02.

ASME Section XI is written to primarily address examinations and testing during periods of plant or system shutdown which explains why no guidance is given to address components that are examined or tested while the plant or system is in service. However, many Code Class 3 and a few Code Class 2 systems are pressure tested, including VT-2 visually examined, utilizing the "inservice test" requirements of IWA-5000.

Performance of the test while the system is inservice may identify leakage at a bolted connection which, upon evaluation, may conclude that the joint's structural integrity and pressure retaining ability is not challenged. It would not be prudent to negatively impact a safety system's availability by removing the system from service to address a leak that does not challenge the system's ability to perform its safety function.

This item was also discussed with the NRC and associated reviewers on March 18, 1997. It was understood that the concern focuses on possible deferral of the corrective actions on bolted connections that are questionable in maintaining integrity until the next component/system outage of sufficient duration. It was understood, in the discussion, that evaluation of the need to remove a bolt is acceptable, but if the evaluation concludes that bolt removal is required, it cannot be deferred.

The statement included in reference 3 was intended to make clear that deferral would only apply if the evaluation of the connection supports continued operation. Relief Request I2R-02 is revised, and included in this submittal, to more clearly define the corrective actions when pressure boundary leakage is identified at a pressure retaining bolted connection.

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RELIEF REQUEST I2R-02

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COMPONENT IDENTIFICATION

Code Class:	1, 2 and 3
References:	IWA-5250(a)(2)
Examination Category:	N/A
Item Number:	N/A
Description:	Alternative Rules for Corrective Measures if Leakage Occurs at a Bolted Connection

CODE REQUIREMENT

ASME Section XI, 1989 Edition, IWA-5250(a)(2) states "if leakage occurs at a bolted connection, the bolting shall be removed, VT-3 visually examined for corrosion, and evaluated in accordance with IWA-3100."

BASIS FOR RELIEF

Pursuant to 10 CFR 50.55a(a)(3)(i), relief is requested on the basis that the proposed alternative would provide an acceptable level of quality and safety.

Removal of pressure retaining bolting at mechanical connections for visual, VT-3 examination and subsequent evaluation in locations where leakage has been identified is not always the most prudent course of action to determine the acceptability of the bolting. The Code requirement to remove, examine, and evaluate bolting in this situation does not allow the Owner to consider other factors which may indicate the acceptability of mechanical joint bolting. WCNOG considers this requirement to be unnecessarily prescriptive and restrictive.

Other factors which should be considered when evaluating bolting acceptability when leakage has been identified at a mechanical joint include, but should not be limited to: joint bolting materials, service age of joint bolting materials, location of the leakage, history of leakage at the joint, evidence of corrosion with the joint assembled and corrosiveness of process fluid.

ASME Section XI is written to primarily address examinations and testing during periods of plant or system shutdown. No guidance is given to address components that are examined or tested while the plant or system is in service. However, many Code Class 3 and a few Code Class 2 systems are pressure tested, including VT-2 visually examined, utilizing the "inservice test" requirements of IWA-5000.

Performance of the test while the system is inservice may identify leakage at a bolted connection that, upon evaluation, may conclude that the joint's structural integrity and pressure retaining ability is not challenged. It would not be prudent to negatively impact a safety system's availability by removing the system from service to address a leak that does not challenge the system's ability to perform its safety function.

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RELIEF REQUEST I2R-02
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In addition, a situation frequently encountered at commercial nuclear plants such as WCGS is the complete replacement of bolting materials (studs, bolts, nuts, washers, etc.) at mechanical joints during plant outages. When the associated system process piping is pressurized during plant start-up, leakage may be identified at these joints. The root cause of this leakage is most often due to thermal expansion of the piping and bolting materials at the joint and subsequent process fluid seepage at the joint gasket. Proper retorquing of the joint bolting, in most cases, stops the leakage. Removal of any of the joint bolting to evaluate for corrosion would be unwarranted in this situation due to new condition of the bolting materials. ASME Section XI Interpretation XI-1-92-01 has recognized this situation as one to which the requirements of IWA-5250(a)(2) do not apply.

WCNOC proposes the following alternative methodology to the requirements of IWA-5250(a)(2) which will provide an acceptable level of quality and safety when evaluating leakage and bolting material acceptability at Class 1, 2, and 3 bolted connections.

PROPOSED ALTERNATE EXAMINATIONS

When leakage is identified at bolted connections by visual, VT-2 examination during system pressure testing, an evaluation will be performed to determine the susceptibility of the bolting to corrosion and assess the potential for failure. The following factors, may be considered, as applicable, but not limited to, when evaluating the acceptability of the bolting:

- 1) Bolting materials
- 2) Corrosiveness of process fluid leaking
- 3) Leakage location
- 4) Leakage history at connection or other system components
- 5) Visual evidence of corrosion at connection (connection assembled)
- 6) Service age of bolting materials

When the pressure test is performed with the system in service or required by the Technical Specifications to be operable, and the bolting is susceptible to corrosion, the evaluation shall address the connection's structural integrity until the next component/system outage of sufficient duration. If the evaluation concludes that the system can perform its safety related function, removal of the bolt closest to the leakage and VT-3 visual examination of the bolt will be performed when the system or component is taken out of service for a sufficient duration for accomplishment of other system maintenance activities.

For bolting that is susceptible to corrosion, and when the initial evaluation indicates that the connection cannot conclusively perform its safety function until the next component/system outage of sufficient duration, the bolt closest to the source of leakage will be removed, receive a VT-3 visual examination, and be evaluated in accordance with IWA-3100(a).

PERIOD FOR WHICH RELIEF IS REQUESTED

Relief is requested for the second inspection interval, September 3, 1995, through September 2, 2005.

Request Item 3.

For Item C, Request for Relief I2R-12 addresses both Categories C-F-1 and C-F-2. However, the licensee noted that the relief does not apply to ferritic piping (C-F-2) as inspection will continue to be performed on the longitudinal welds in ferritic piping in accordance with the Code. It is unclear why the licensee has taken exception to ferritic pipe longitudinal welds. Is this request for austenitic piping only? Provide the basis for the current position.

Response to Item 3.

In response to Request Item 3, I2R-12 has been revised to only apply to austenitic stainless steel piping, Category C-F-1. Examination of ferritic piping will be performed in accordance with ASME Section XI and is no longer covered by this relief request.

Excluding ferritic welds from I2R-12 is supported by the fact that there are very few longitudinal welds in ferritic piping in the WCGS ISI Program. Because the few that are present are on large pipe, performance of a scan for reflectors transverse to the circumferential weld presents greater examination time versus performance of an individual longitudinal weld examination as currently required by Code.

Included in this submittal is a revision to I2R-12 to reflect application to Class 2, Category C-F-1 welds only.

WOLF CREEK GENERATING STATION SECOND INTERVAL ISI PROGRAM PLAN

RELIEF REQUEST I2R-12

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COMPONENT IDENTIFICATION

Code Classes:	2
References:	Table IWC-2500-1
Examination Categories:	C-F-1
Item Numbers:	C5.12, C5.22, and C5.42
Description:	Alternate Examination Requirements for Longitudinal Welds in Class 2 Piping
Component Numbers:	All Class 2, Category C-F-1 Longitudinal Piping Welds Subject to Surface or Volumetric Examination

CODE REQUIREMENTS

Table IWC-2500-1 requires the performance of surface and volumetric examination on Item Nos. C5.12 and C5.22 and a surface examination on Item No. C5.42. The examination includes a length of 2.5t at the intersecting circumferential welds required to be examined by Examination Category C-F-1.

BASIS FOR RELIEF

Pursuant to 10 CFR 50.55a(a)(3)(i), relief is requested on the basis that the proposed alternative would provide an acceptable level of quality and safety.

Based on the following discussion, the performance of surface and volumetric examination on longitudinal piping welds has a negligible compensating effect on the quality or safety of Class 2 piping. In addition, there is little, if any, technical benefit associated with the performance of these examinations, and may result in a substantial man-rem exposure and cost.

- 1) Throughout the nuclear industry, there has been no evidence of rejectable service induced flaws being attributed to longitudinal piping welds.
- 2) During the first inservice inspection interval at the WCGS, no inservice flaws were detected in longitudinal piping welds.
- 3) There are distinct differences between the processes used in the manufacturing of longitudinal and circumferential welds which enhance the integrity of longitudinal welds. First, longitudinal welds are typically manufactured under controlled shop conditions whereas circumferential welds are produced in the field under less ideal conditions. Secondly, longitudinal welds usually undergo heat treatment in the shop which improves their material properties and relieves the residual stresses created by welding. Finally, shop manufacturing inspections can be performed under more favorable conditions which further increase the confidence level of the longitudinal weld quality.

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RELIEF REQUEST I2R-12

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- 4) During field installation of piping, the ends of the longitudinal welds may be affected during welding of the intersecting circumferential field welds. This small area falls within the circumferential weld inspection boundaries. Therefore, the ends of the longitudinal welds will still be subject to examination.
- 5) From an industry-wide standpoint, there has been no evidence of longitudinal weld defects compromising safety at nuclear generating facilities.
- 6) No significant loading conditions or known material degradation mechanisms have become evident to date which specifically relate to longitudinal seam welds in nuclear plant piping.
- 7) There is a significant accumulation of man-rem exposure and cost associated with the inspection of Class 2 longitudinal piping welds.
- 8) The proposed alternative examinations provide an acceptable level of quality and safety without causing undue hardship or difficulties.

PROPOSED ALTERNATE EXAMINATION

Surface and volumetric examinations shall be performed, as applicable, on the length of the longitudinal weld that is normally examined during examination of the intersecting circumferential weld(s). The volumetric examination at the intersection of circumferential and longitudinal welds will include both transverse and parallel scans within the length of the longitudinal weld that falls within the circumferential weld examination boundary.

PERIOD FOR WHICH RELIEF IS REQUESTED

Relief is requested for the second inspection interval, September 3, 1995, through September 2, 2005.