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October 22, 1998

LTR: BYRON-98-0284
FILE: 2.01.0700

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Second 10 Year Inservice Inspection Program
Byron Station Relief Requests I2R-24, Revision 0 "Deferral of Volumetric
Examinations on the Shell-to-Flange Weld of the Reactor Vessel", and
I2R-34, Revision 0 "Alternative Rules for Insulation Removal at Bolted
Connections in Systems Borated for the Purpose of Controlling
Reactivity."

Byron Station, Units 1 and 2
Facility Operating Licenses Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

Reference: NRC Letter, "Evaluation of the Second 10 Year Interval Inservice
Inspection Program Request for Relief I2R-30 for Braidwood Station,"
dated October 2, 1998.

Attached are two requests for relief from the requirements of the American Society of Mechanical
Engineers Boiler and Pressure Vessel Code (ASME Code).

10CFR50.55a(a)(3)(ii) allows for ASME Code relief if compliance with the specified requirements
of the Code would result in hardship or unusual difficulty without a compensating increase in the
level of quality and safety.

Relief Request I2R-24, Revision 0, requests exemption from the requirements of ASME Code
Section XI, Subsection IWB-2420(a). This subsection states "*the sequence of component
examinations established during the first inspection interval shall be repeated during each
successive interval, to the extent practical.*"

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The intent of Relief Request I2R-24 is to provide acceptable alternative for the sequence of the second interval examinations of the shell-to-flange weld of the Reactor Vessel.

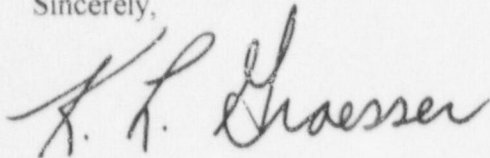
10CFR50.55a(a)(3)(i) allows for ASME Code relief on the basis that the proposed alternative provides an acceptable level of quality and safety. Relief Request I2R-34, Revision 0, requests exemption from the requirements of ASME Code Section XI, Subsection IWA-5242. This subsection states the following, "*For systems borated for the purpose of controlling reactivity, insulation shall be removed from pressure retaining bolted connections for visual examination VT-2.*"

The intent of Relief Request I2R-34 is to provide acceptable alternatives to inspection of bolted connections under IWA-5242(a) of ASME Code Section XI, 1989 Edition. The relief request is applicable to ASME Class 1 piping systems that are borated for the purpose of controlling reactivity. Please note, the proposed alternatives and bases are similar to a Braidwood Station Relief Request I2R-30 recently approved in the referenced letter.

Upon approval of these Relief Requests, Byron Station commits to implementing the requirements delineated in the proposed alternative provisions section of the requests. Any other actions described in these relief requests represent intended or planned actions by Byron Station. They are described for the NRC's information and are not regulatory commitments.

Byron Station respectfully requests NRC review by March 1, 1999 to take advantage of the relief requests in the next Byron Unit 1 refuel outage, B1R09. Please address any comments or questions regarding this matter to B. J. Adams at (815) 234-5441, extension 2280.

Sincerely,



K. L. Graesser
Site Vice President
Byron Nuclear Power Station

KLK/JL/cb

Attachments

cc: NRC Regional Administrator, RIII
Senior Resident Inspector, Byron
Byron Project Manager, NRR

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COMPONENT IDENTIFICATION

Code Class: 1
References: IWB-2420 (a), IWB-2500, Table IWB-2500-1
Examination Categories: B-A
Item Numbers: B1.30
Description: Deferral of Volumetric Examinations on the Shell-to-Flange
Weld of the Reactor Vessel
Component Numbers: Unit 1: 1RC-01-R, WR-7
Unit 2: 2RC-01-R, WR-7

CODE REQUIREMENT

ASME Section XI, 1989 Edition, IWB-2420 (a) states that the sequence of component examinations established during the first inspection interval shall be repeated during the each successive inspection interval, to the extent practical.

Table IWB-2500-1, Examination Category B-A, Item B1.30, requires a volumetric examination of essentially 100% of the reactor vessel shell-to-flange weld once each ten-year inspection interval. The requirements are modified by the following conditions.

- a) Table IWB-2500-1 allows partial deferral to the end of the interval allowed (Note 3 referenced).
- b) Note (3): "If partial examinations are conducted from flange face, the remaining volumetric examinations required to be conducted from vessel wall may be performed at or near the end of each inspection interval."
- c) Note (4): "The examination of shell-to-flange welds may be performed during the first and third inspection periods in conjunction with the nozzle examinations of Examination Category B-D (Program B). At least 50% of the shell-to-flange welds shall be examined by the end of the first inspection period, and the remainder by the end of the third inspection period."

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CODE REQUIREMENTS FROM WHICH RELIEF IS REQUESTED

Relief is Requested from the requirements of IWB-2420(a) to repeat the sequence of examinations as established in the First Inspection Interval and from Table IWB-2500-1, Examination Category B-A, Note (4) to require a volumetric examination from the flange face.

BASIS FOR RELIEF

Pursuant to 10 CFR 50.55a(a)(3)(ii), relief is requested on the basis that the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level quality and safety.

Relief is requested to defer the entire reactor vessel shell-to-flange vessel weld examination to the end of Byron Station's second ten-year inspection interval to coincide with the examinations of other reactor vessel shell and nozzle-to-vessel welds. The automated equipment necessary for the vessel shell and nozzle-to-vessel weld examinations can also be used to satisfy the examination of the shell-to-flange weld. Mobilizing this automated equipment to perform a partial examination in the first period would constitute an economic and schedule hardship. In the First Inspection Interval, this weld was examined twice (in the First Period and again in the Third Period). The first time was a partial examination from the flange face performed manually. The second time was a complete examination from the vessel interior performed with automated equipment. This relief requests that the examination only be performed at the end of the interval.

Byron Station believes that performing a partial examination of the reactor vessel shell-to-flange weld in the first period of the second inspection interval would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety for the following reasons:

- a) Personnel Safety: Volumetric examination of these welds from the flange would typically be performed manually, requiring inspection personnel to position themselves under a suspended reactor vessel head. The reactor head is used as shielding for dose reduction. This situation is a potential safety hazard, which can be avoided by deferring the examination of 100% of this weld to the end of the interval. The examination of this weld at the end of the interval would be

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- b) Radiation Exposure: As mentioned above, this inspection is performed in a radiation area and significant shielding (the reactor head) is necessary for dose reduction. During refueling outage B2R07, dose rates at the center of the flange were measured at 1.5 to 2.0 REM per hour. Even with the reactor head as shielding, the dose rates ranged from approximately 0.5 to 1.0 REM per hour.
- c) The cost of scheduling automated equipment to perform an examination that would not meet the requirements of ASME Section XI would be an unnecessary burden on station resources.

From an industry perspective, the deferral of Byron Station's shell-to-flange volumetric examinations to the end of the second inspection interval will not decrease the level of quality and safety because Pressurized Water Reactor (PWR) vessels similar to Byron Station's have been operating for over 20 years with no recorded inservice induced flaws or potential degradation mechanisms. Since each PWR vessel in operation is representative of the operating conditions throughout the industry, continued inspection of these vessels ensures that any potential degradation mechanism will be detected.

Performing all the automated reactor vessel examinations during a single refueling outage improves consistency of the examinations by utilizing the same equipment, personnel, and procedures. Moreover, this improves the reliability and reproducibility of the examinations. Based on lack of any previous indications in the flange-to-shell weld, requiring the inspection of only the flange-to-shell weld during the first period would constitute a safety, exposure, economic and schedule hardship without a compensating increase in quality or safety.

In addition, Byron Station believes that deferral of the examination of the reactor vessel shell-to-flange weld to the end of the second inspection interval will provide an acceptable level of safety and quality for the following reasons:

- a) The purpose of Table IWB-2500-1, Examination Category B-A, Note (4) is to permit the licensee to combine the examinations of the flange-to-shell from the flange surface and the vessel-to-nozzle welds, since both examinations could use automated scanning equipment.

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- b) Both of Byron Station's reactor vessel shell-to-flange welds were 100% volumetrically examined during the Third Period of the First Inspection Interval. The 100% coverage obtained by this examination was independent of the First Period volumetric examination from the flange face. No indications or relevant conditions were discovered that required successive inspections in accordance with Paragraph IWB-2420 (b). No inservice repairs or replacements by welding have ever been performed on any of the reactor vessel welds at Byron Station.

- c) The performance of these examinations in the First Inspection Interval is such that no more than ten years will transpire until the Second Inspection Interval examinations except as allowed by IWA-2430. This provides a reasonable assurance of operational readiness.

PROPOSED ALTERNATE EXAMINATION

Byron Station will perform the required shell-to-flange weld volumetric examination concurrent with the reactor vessel ten-year examinations at or near the end of the Second Inservice Inspection Interval. Scheduling will be such that no more than 10 years expires between successive examinations, except where the length of an interval is adjusted in accordance with IWA-2430.

PERIOD FOR WHICH RELIEF IS REQUESTED

Relief is requested for the Second Inservice Inspection Interval.

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COMPONENT IDENTIFICATION

Code Class: 1
 References: IWA-5242(a)
 Examination Category: B-P
 Examination Item Numbers: B15.70 and B15.71
 Description: Alternative Requirements for Insulation Removal at Bolted Connections in Systems Borated for the Purpose of Controlling Reactivity

Component Number: Valve Numbers (22 Total Each Unit)

1(2)SI8948A-D	1(2)RC8002A-D
1(2)SI8949A-D	1(2)RC8003A-D
1(2)RC8001A-D	1(2)RH8701A-B

Reference: 1) "Materials Handbook for Nuclear Plant Pressure Boundary Applications," EPRI TR-109668-SI, WO4382-01, Final Report, Revision 0, December 1997 (EPRI Proprietary)

ASME 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".

ASME CODE REQUIREMENTS FROM WHICH RELIEF IS REQUESTED

Relief is requested for the IWA-5242(a) requirement to remove insulation on all bolted connections in systems borated for the purpose of controlling reactivity.

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 for the Class 1 components listed above for VT-2 on the frequency specified in Tables IWB-2500, Category B-P, (each refueling outage). The following supports a reduced inspection frequency:

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1. ASME Code Section XI paragraph IWA-5242(a) requires the removal of insulation from pressure retaining bolted connections for VT-2 visual examinations when the system is borated for the purpose of controlling reactivity. Paragraph IWA-5242(a) requires this for all bolting, regardless of material type, when the system is borated for the purpose of controlling reactivity. For all materials of construction, when the system is not borated for the purpose of controlling reactivity, insulation removal is not required by paragraph IWA-5242(a) for VT-2 visual examinations.

ComEd believes that by the ASME Code only requiring insulation removal for borated systems, the intent of this requirement is to address early detection of boric acid wastage of the bolting materials. In either borated or non-borated systems, if leakage results in wetting of the bolting material, the required VT-2 visual examinations would not be effective at detection of incipient stress corrosion cracking if it occurs; only the volumetric examinations of IWB-2500 Categories B-G-1 would be effective. For this reason, if the bolting material of construction is resistant to boric acid wastage, there is no reduction in margin of safety if the required VT-2 visual examinations are performed without insulation removal each refueling the same way as is performed for other Class 1 non-borated systems. The proposed alternative provision of inspecting these components on a once per year 10-year interval basis will provide sufficient assurance that these highly corrosion resistant components have not degraded.

2. For the valves listed above both the stud / bolt material and closure nut material utilize SA-453 Grade 660 Class B. Also known as alloy A-286, the nominal composition of this ferrous alloy is 25Ni-15Cr-2Ti-Al. According to Reference 1, the "high chromium content of alloy A-286 gives it similar resistance to general corrosion in boric acid as possessed by stainless steel, which is essentially immune to the wastage or erosion-corrosion problems." Reference 1 determines that for A-286 material, stress corrosion cracking is only a concern if bolting material is loaded to 100 ksi or higher. For the valves listed above, review of the installation procedures shows that none of the bolting is loaded to more than 65 ksi. Therefore, stress corrosion cracking is not a concern. Also, Reference 1 states that a review of available NRC Public Documentation revealed no reports of failures of alloy A-286 used for external reactor vessel bolting service in B&W units over a service period of greater than 20 years.
3. The valves listed above are among the highest radiation level components in the Borated Bolting Inspection Program. Insulation removal combined with scaffolding erection and inspection time are expected to contribute significantly (approximately 1.5 person-rem) to the overall dose received. As discussed above, there is no significant increase in plant safety to be gained by performing VT-2 inspection of these materials on an every refueling outage frequency.

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The following Byron Station bolting examination commitments and material control programs in conjunction with the Proposed Alternative Provisions provide an acceptable level of safety and quality for bolted connections in systems borated for the purpose of controlling reactivity.

In response to NRC Generic Letter 88-05, Byron Station has established a program for Engineering 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. Any evidence of leakage, including dry boric acid crystals or residue, is inspected and evaluated regardless of whether the leak was discovered at power or during an outage. Issues such as the following are considered in the inspection and evaluation:

- 1) Evidence of corrosion or metal degradation
- 2) Effect the leak may have on the pressure boundary
- 3) Possibility of boric acid traveling along the inside of insulation on piping, and
- 4) Possibility of dripping or spraying on other components.

Based on this evaluation, Byron Engineering initiates appropriate corrective actions to prevent reoccurrence of the leak and to repair, if necessary, any degraded materials or components.

In summary, for systems borated for the purpose of controlling reactivity, when the bolting material is SA-453 Grade 660 and therefore immune to boric acid corrosion, ComEd requests relief from the requirement of ASME Code Section XI paragraph IWA-5242(a) that insulation shall be removed from pressure retaining bolted connections for VT-2 visual examination. Volumetric examinations as applicable to IWB-2500 Categories B-G-1 will continue to be performed.

PROPOSED ALTERNATE PROVISIONS

For ASME Code Class 1 systems borated for the purpose of controlling reactivity, a system inservice leakage test shall be performed in accordance with the frequency required in table IWB-2500 (each refueling outage), without the removal of insulation from the bolted connections. The requirements for inservice leak tests shall be augmented with a minimum 4-hour hold time at system normal operating pressure prior to the VT-2 visual examination to allow for leakage propagation from the insulation. If evidence of leakage is detected on the above listed valves, the insulation shall be removed and the evaluations for corrective measures performed in accordance with IWA-5250 (as modified for Byron by Relief Request I2R-12).

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For the valves listed above, the insulation shall be removed from the bolted connections and a VT-2 examination shall be conducted, with the system depressurized on a once per 10-year interval frequency. These examinations shall be distributed throughout the inspection interval. If evidence of leakage is detected evaluations for corrective measures performed will be performed in accordance with IWA-5250 (as modified for Byron by Relief Request I2R-12). These inspections shall be implemented through application of the Byron Station predefined surveillance program to assure they are performed within the prescribed time periods.

The referenced, Class 1 valves, are included in the scope of Byron ASME Code Relief Request I2R-11, Revision 2, currently in review with the NRC, which stipulates an inspection frequency of every refuel cycle with the system depressurized for Class 1 valves. The 10-year frequency of this relief request (I2R-34) supercedes I2R-11 for these valves only.

Regardless of whether a component is scheduled for examination or not, any evidence of leakage will result in evaluations for corrective measures in accordance with IWA-5250 (as modified for Byron Station by Relief Request I2R-12).

PERIOD FOR WHICH RELIEF IS REQUESTED

Relief is requested for the second ten-year inspection interval of the Inservice Inspection Program for Byron Unit 1 and Unit 2.