

RS-11-051

10 CFR 50.55a

March 31, 2011

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

Byron Station Unit 1
Facility Operating License No. NPF-37
NRC Docket No. STN 50-454

Subject: Additional Information Related to Byron Station Unit 1, Inservice Inspection Relief Request I3R-19: Alternative Requirements for the Repair of Reactor Vessel Head Penetrations

- References:**
- (1) Letter from J. Hansen (Exelon) to U. S. NRC, "Byron Station Unit 1 Inservice Inspection Relief Request I3R-19: Alternative Requirements for the Repair of Reactor Vessel Head Penetrations," dated March 24, 2011
 - (2) Email from N. DiFrancesco (U. S. NRC) to R. McIntosh (Exelon), "Byron Station, Unit No. 1 – Request for Additional Information re: Relief Request I3R-19 (TAC No. ME5877)," dated March 25, 2011
 - (3) Letter from D. M. Benyak (Exelon) to U. S. NRC, "Additional Information Related to Byron Station Unit 1, Inservice Inspection Relief Request I3R-19: Alternative Requirements for the Repair of Reactor Vessel Head Penetrations," dated March 25, 2011
 - (4) Memorandum from N. DiFrancesco (U. S. NRC) to R. Carlson (U. S. NRC), "Verbal Authorization of Relief Request I3R-19 – Alternative Requirements for Repair of Reactor Vessel Head Penetrations 64 and 76 (TAC No. ME5877)," dated March 29, 2011

In Reference 1, in accordance with 10 CFR 50.55a, "Codes and standards," paragraph (a)(3)(i), Exelon Generation Company, LLC (EGC), submitted the Relief Request I3R-19 from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," on the basis that the proposed alternatives would provide an acceptable level of quality and safety. Specifically, Reference 1 proposed to perform an alternative repair technique using an embedding weld overlay methodology on the reactor Vessel Head Penetration (VHP) housings and J-groove welds of Byron Station, Unit 1.

During the current Byron Station, Unit 1 Spring 2011 Refueling Outage B1R17, EGC performed volumetric examinations of the VHPs in accordance with 10 CFR 50.55a(g)(6)(ii)(D), which specifies the use of Code Case N-729-1, with conditions. By Reference 3, letter dated March 25, 2011, EGC issued a response to an NRC Request for Additional Information (RAI) on VHP nozzles 64 and 76, (i.e., Reference 2). Reference 4 describes that during a teleconference held between EGC and the NRC on March 28, 2011, the NRC provided verbal authorization to use the Relief Request I3R-19 in accordance with 10 CFR 50.55a(a)(3)(i) for the nozzles 64 and 76.

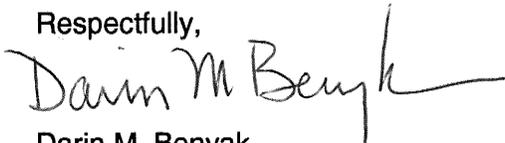
The B1R17 examinations of the VHPs have since completed and an additional two VHP nozzles, 31 and 43, also require repair. This letter provides a supplemental RAI response to Reference 2 for VHP nozzles 31 and 43.

EGC requests an expedited approval for the use of Relief Request I3R-19 with the additional VHP nozzles 31 and 43, by April 11, 2011. Attachment 1 contains the information requested by the NRC.

There are no new regulatory commitments in this submittal. More specifically, the regulatory commitment from EGC's most recent response to an RAI (i.e., Reference 3) will remain applicable to Relief Request I3R-19.

If you have any questions about this letter, please contact Mr. Richard W. McIntosh at (630) 657-2816.

Respectfully,



Darin M. Benyak
Director, Licensing and Regulatory Affairs

Attachment: 1. Response to Request for Additional Information on Alternative Requirements for the Repair of Reactor Vessel Head Penetrations

**ATTACHMENT 1
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION ON
ALTERNATIVE REQUIREMENTS FOR THE REPAIR OF REACTOR VESSEL HEAD
PENETRATIONS**

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NRC QUESTION RAI-1:

NRC staff notes that the licensee requests expedited verbal relief by 1 PM Central Standard Time on March 28, 2011. Staff notes that expedited review and verbal authorization would be difficult for the generic application of the licenses' submittal within that time frame. Therefore, staff requests licensee reconsider the scope of this relief request under Section 1.0 "ASME Code Component(s) Affected" to the items needed for repair this outage, in order to meet the licensee's requested date of verbal authorization.

RESPONSE TO RAI-1:

The Exelon Generation Company, LLC (EGC) request for an expedited verbal authorization from the NRC by March 28, 2011, was to support repair activities on reactor Vessel Head Penetrations 64 and 76. This request is further revised to support repair activities specific to reactor Vessel Head Penetration (VHP) nozzles 31 and 43. EGC understands that NRC review of the generic application of the relief request will continue, but not on the expedited schedule. EGC requests the expedited approval for use of the I3R-19 for nozzles 31 and 43 by April 11, 2011.

NRC QUESTION RAI-2:

In Reference 2 of the submittal, the NRC requested the following, "The NRC must be notified of changes in flaw(s) or finding new flaw(s) in the j-groove weld beneath a seal weld repair or in the seal weld repair." In order to add clarity to this request the NRC staff requests that the licensee commit to the following statement;

The licensee will notify NRC staff of the Division of Component Integrity or its successor of changes in indication(s) or findings of new indication(s) in the penetration nozzle or J-groove weld beneath a seal weld repair, or new linear indications in the seal weld repair, prior to commencing repair activities.

NRC staff requests this commitment as a finding of these types of indications may invalidate the embedded flaw repair technique as an effective repair for the penetration nozzle in question. Timely notification of NRC staff of ISI indications will allow clear communications to assist NRC staff in determination of the effectiveness of the repair due to the indication in question.

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RESPONSE TO RAI-2:

Exelon Generation Company, LLC (EGC) will notify NRC staff of the Division of Component Integrity or its successor of changes in indication(s) or findings of new indication(s) in the penetration nozzle or J-groove weld beneath a seal weld repair, or new linear indications in the seal weld repair, prior to commencing repair activities. This Regulatory Commitment will remain applicable with use of Relief Request I3R-19, as stated on Attachment 2 in Reference 3, committed for Byron Unit 1 refueling outages, beginning with B1R18.

NRC QUESTION RAI-3:

In Section 5.0 of the submittal, Step 1 states that an unacceptable axial or circumferential flaw in a tube below a J-groove attachment weld will be sealed off with an Alloy 52 or 52M weldment, with no additional detail as to the scope of the weldment. WCAP - 15987-P Rev. 2, Reference 1 of the submittal, states in Section 2.2.3, for axial cracks on the penetration tube OD below the j-weld, that the overlay begins %" beyond the Alloy 600/stainless steel interface at the outer periphery of the J-weld and extends down the outer surface of the penetration tube to a point %" beyond the flaw indication. Section 2.2.4, for circumferential cracks in the penetration tube, the scope of the weldment is not specific other than isolation of the flaw. In order to clarify the licensee's implementation of requirements, provide the following;

- a) State the generic scope of the weldment that will be used to repair an OD flaw in the nozzle below the J-groove weld.***
- b) State the scope of the weldment being used to repair reactor pressure vessel upper head penetration numbers 64 and 76.***
- c) In regards to the Table of Item 3 of Section 5.0, "Conditions and Limitations" of Reference 2 of the submittal, answer the following;***
 - 1. How will each of the four(4) indications be characterized for,***
 - i. "Repair Location,"***
 - ii. "Flaw Orientation," and***
 - iii. "Repair NDE"***
 - 2. Will Note 3 be implemented for "ISI NDE of the repair" for penetration numbers 64 and 76?***

RESPONSE TO RAI-3:

- a) The generic scope of the weldment that will be used to repair an OD flaw in the nozzles and the J-groove weld will conform to the following description.**

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The stainless steel head cladding will have three beads of 309L stainless steel buffer installed 360° (degrees) around the interface of the clad and the J-groove weld metal at each effected penetration. The J-groove weld will have three layers of Alloy 52/52M deposited 360° around the nozzle over and out to the stainless steel buffer.

The nozzle tube will have two layers of Alloy 52/52M deposited 360° around the nozzle and tied into the J-groove overlay. The nozzle tube will be overlayed to at least the minimum required point 0.50 inches beyond the flaw, as required by Reference 5, or to the bottom of the nozzle.

- b) In this submittal, EGC is supplementing the previous RAI response with information for VHP nozzles 31 and 43.

The stainless steel head cladding will have three beads of 309L stainless steel buffer installed 360° (degrees) around the interface of the clad and the J-groove weld metal at Penetrations 31 and 43. The J-groove weld will have three layers of Alloy 52/52M deposited 360° around the nozzle over and out to the stainless steel buffer.

The nozzle tube will have two layers of Alloy 52/52M deposited 360° around the nozzle and tied into the J-groove overlay. The nozzle tube will be overlayed to the bottom of the nozzle. Both VHPs do not have funnels installed that may obstruct the welding process.

- c.1(i) Repair Location

In this submittal, EGC is supplementing the previous RAI response with information for VHP nozzles 31 and 43.

VHP Nozzle 31

Volumetric: one recordable indication approximately at the 0 degree mark, 0.600 inches in length with a through-wall depth of 0.169 inches.

Surface: one rounded indication of 0.10 inches in size approximately 0.3 inches from the 0 degree mark, 0.20 inches into the J-groove weld.

VHP Nozzle 43

Volumetric: one recordable indication approximately 0.48 inches from the 0 degree mark, 0.840 inches in length with a through-wall depth of 0.294 inches.

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- Surface:
- 1) one rounded indication of 0.15 inches in size approximately 0.5 inches from the 0 degree mark, at the junction of the J-groove weld to penetration tube.
 - 2) one linear indication of 0.10 inches in size approximately 0.5 inches from the 0 degree mark, 0.10 inches into the J-groove weld.
 - 3) one linear indication of 0.20 inches in size approximately 0.5 inches from the 0 degree mark, 0.25 inches into the J-groove weld.

Both volumetric indications are located in the outer VHP tube material and extend into the tube region covered by the J-groove weld. The recordable indication in VHP nozzle 31 extends 0.240 inches above the toe of the weld and for VHP nozzle 43, the recordable indication extends 0.040 inches above the toe the toe of the weld.

All of the surface indications are in the J-groove weld.

NOTE: 0 degrees is located at the downhill side of the penetration where the nozzle extension is shortest.

c.1(ii) Flaw Orientation:

In this submittal, EGC is supplementing the previous RAI response with information for VHP nozzles 31 and 43.

The volumetric recordable indication in Penetration 31 is axial in orientation.

The volumetric recordable indication in Penetration 43 is axial in orientation.

c.1(iii) Repair Non-Destructive Examination (NDE) will be an Ultrasonic Testing (UT) of the nozzle from the Inside Diameter (ID) and a Liquid Penetrant (PT) Examination of the overlaid surface. In addition, response to Item c.2 below is applicable.

c.2 In this submittal, EGC is supplementing the previous RAI response with information for VHP nozzles 31 and 43.

For penetrations 31 and 43 and in accordance with Note 3 of the NRC acceptance for WCAP-15987-P-Revision 2, (See Reference 5, TAC No. MB8997) the "Repair NDE" (final NDE) and "ISI NDE of the repair" (subsequent NDE's in future outages) performed on Penetrations 31 and 43 will include Performance Demonstration Initiative (PDI) UT of the nozzle and PT of the overlaid area. This will constitute 100% coverage for the required examinations of the final NDE on the repair during B1R17 and subsequent NDEs.

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- (2) Email from N. DiFrancesco (U. S. NRC) to R. McIntosh (Exelon), "Byron Station, Unit No. 1 - Request for Additional Information re: Relief Request 13R-19 (TAC No. ME5877)," dated March 25, 2011
- (3) Letter from D. M. Benyak (Exelon) to U. S. NRC, "Additional Information Related to Byron Station Unit 1, Inservice Inspection Relief Request I3R-19: Alternative Requirements for the Repair of Reactor Vessel Head Penetrations," dated March 25, 2011.
- (4) Memorandum from N. DiFrancesco (U. S. NRC) to R. Carlson (U. S. NRC), "Verbal Authorization of Relief Request I3R-19 – Alternative Requirements for Repair of Reactor Vessel Head Penetrations 64 and 76 (TAC No. ME5877)," dated March 29, 2011
- (5) Westinghouse WCAP-15987, Revision 2-A, "Technical Basis for the Embedded Flaw Process for Repair of Reactor Vessel Head Penetrations," December 2003
- (6) Letter from H. N. Berkow (U. S. NRC) to H. A. Sepp (Westinghouse Electric Company), "Acceptance for Referencing - Topical Report WCAP-15987-P, Revision 2, 'Technical Basis for the Embedded Flaw Process for Repair of Reactor Vessel Head Penetration,' (TAC NO. MB8997)," dated July 3, 2003
- (7) Westinghouse WCAP-16401-P, Revision 0, "Technical Basis for Repair Options for Reactor Vessel Head Penetration Nozzles and Attachment Welds: Byron and Braidwood Units 1 and 2"
- (8) American Society of Mechanical Engineers Boiler and Pressure Vessel Code Case N-729-1, "Alternative Examination Requirements for PWR Reactor Vessel Upper Heads With Nozzles Having Pressure-Retaining Partial-Penetration Welds Section XI, Division 1"