

RS-11-048

10 CFR 50.55a

March 25, 2011

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

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. Examination of the VHPs is on going, however, results for the examination of VHP nozzles 64 and 76 did not meet the applicable acceptance criteria; and therefore, EGC is making preparations for a repair. A teleconference was held between EGC and the NRC on March 25, 2011, to discuss a Request for Additional Information (RAI) from the NRC to complete its review of the proposal.

The EGC request for an expedited verbal authorization from the NRC by March 28, 2011, is revised by this letter to support repair activities specific to the VHP nozzles 64 and 76. Attachment 1 contains the information requested by the NRC.

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Attachment 2 contains one new regulatory commitment in this submittal. 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

- Attachments:
1. Response to Request for Additional Information on Alternative Requirements for the Repair of Reactor Vessel Head Penetrations
 2. Summary of Regulatory Commitments

**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, is revised by this letter to support repair activities specific to reactor Vessel Head Penetration (VHP) nozzles 64 and 76 only. EGC understands that NRC review of the generic application of the relief request will continue, but not on the expedited schedule.

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.

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 is on Attachment 2, committed for Byron Unit 1 refueling outages, beginning with B1R18.

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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 ½" 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 ½" 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) EGC will provide a supplemental response to this letter to discuss generic scope of the proposed weldment.
- b) 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 64 and 76. 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. On Penetration 76, the nozzle tube will have the overlay extend down to the lowest possible location that will allow reinstallation of the funnel. On Penetration 64, the nozzle tube will be overlaid to the bottom of the nozzle (i.e., no funnel is installed).

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c.1(i) Repair Location

The following recordable indications were discovered in the reactor head penetration nozzles 64 and 76;

64-1	approximately 1.3 inches counterclockwise from the 180 degree mark
64-2	approximately 0.9 inches counterclockwise from the 180 degree mark
76-1	approximately 1.0 inches clockwise from the 180 degree mark
76-2	between 0 inches and 1.2 inches counterclockwise from the 180 degree mark

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

c.1(ii) Flaw Orientation:

The two indications in Penetration 64 are axial flaws on the uphill side. Indication 1 in Penetration 76 is an axial flaw and indication 2 is a circumferential flaw. Both flaws in Penetration 76 are on the uphill side.

The recorded distances of the flaws to the toe of the weld are:

Flaw:	Ultrasonic Testing (UT) measured distance from Toe of Weld: (inches)	Liquid Penetrant (PT) measured distance from Toe of Weld: (inches)
64-1	0.40	0.40
64-2	NA	0.30
76-1	0.08	0.10
76-2	0.16	0.10

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

c.2 In accordance with Note 3 of the NRC acceptance for WCAP-15987-P-Revision 2, (See Reference 4, TAC No. MB8997) the final NDE performed on Penetrations 64 and 76 will include Performance Demonstration Initiative (PDI) UT of the nozzle and PT of the overlaid area. This will constitute 100% of the required examinations for the final NDE on the repair during B1R17.

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For the ISI NDE of the repair for Penetrations 64 and 76 starting with refueling outage B1R18, Note 3 does not apply since the repair location is in the "VHP Nozzle OD below J-groove weld." Therefore, ISI NDE of the repair for Penetrations 64 and 76 will be performed in accordance with Code Case N-729-1, as amended by 10 CFR 50.55a(g)(6)(ii)(D).

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) Westinghouse WCAP-15987, Revision 2-A, "Technical Basis for the Embedded Flaw Process for Repair of Reactor Vessel Head Penetrations," December 2003
- (4) 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
- (5) 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"
- (6) 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"

**ATTACHMENT 2
SUMMARY OF REGULATORY COMMITMENTS**

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The following table identifies commitments made in this document. Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.

COMMITMENT	COMMITTED DATE OR "OUTAGE"	COMMITMENT TYPE	
		ONE-TIME ACTION (Yes/No)	Programmatic (Yes/No)
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.	Byron Unit 1 refueling outages, beginning with B1R18.	No	Yes