Exelon Generation®

200 Exelon Way
Kennett Square, PA 19348

www.exeloncorp.com

10 CFR 50.55a

TMI-14-118

September 19, 2014

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

Three Mile Island Nuclear Station, Unit 1
Renewed Facility Operating License No. DPR-50
NRC Docket No. 50-289

Subject: Submittal of Relief Request RR-14-01 Concerning Alternative Root Mean Square (RMS) Depth Sizing Requirements

Attached for your review is a relief request associated with the fourth Inservice Inspection (ISI) interval for Three Mile Island Nuclear Station (TMI), Unit 1. TMI, Unit 1 is proposing alternative Root Mean Square (RMS) depth sizing requirements in accordance with 10 CFR 50.55a(g)(5)(iii). The fourth interval of the TMI, Unit 1 ISI program complies with the 2004 Edition, no Addenda, of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code. We request your approval by September 19, 2015 in support of the Fall 2015 TMI, Unit 1 refueling outage. Attachment 2 contains Relief Request RR-14-01.

One commitment is contained in Attachment 1.

If you have any questions concerning this letter, please contact Tom Loomis at (610) 765-5510.

Respectfully,

James Barstow
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachments: 1) Summary of Commitments
2) Relief Request RR-14-01

cc: Regional Administrator, Region I, USNRC
USNRC Senior Resident Inspector, TMI
USNRC Project Manager, [TMI] USNRC

Attachment 1

Summary of Commitments

Attachment 1
Summary of Commitments

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)
Inner Diameter (ID) surface breaking flaws greater than 50% through-wall and subsurface flaws greater than 50% through-wall shall be repaired or evaluated prior to plant restart. Evaluations shall be submitted to the NRC for review and approval prior to plant restart.	Prior to plant restart.	Yes	No

Attachment 2

Relief Request RR-14-01

Alternative Root Mean Square (RMS) Depth Sizing in Accordance with 10 CFR 50.55a(g)(5)(iii)

1.0 ASME CODE COMPONENT(S) AFFECTED

These examination categories and item numbers are from Code Case N-770-1 of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI:

Examination Category	Item No.	Description
Augmented (CC N-770-1)	B	Unmitigated Butt Weld at Cold Leg Operating Temperature

- RCT0001RC0009BMWELD Core Flood "B" Nozzle to Safe-End Weld
- RCT0001RC0010BMWELD Core Flood "A" Nozzle to Safe-End Weld
- The Core Flood Nozzles are NPS 14 inch.

(Throughout this request the above examination categories are referred to as "the subject examinations" and ASME Section XI is referred to as "the Code".)

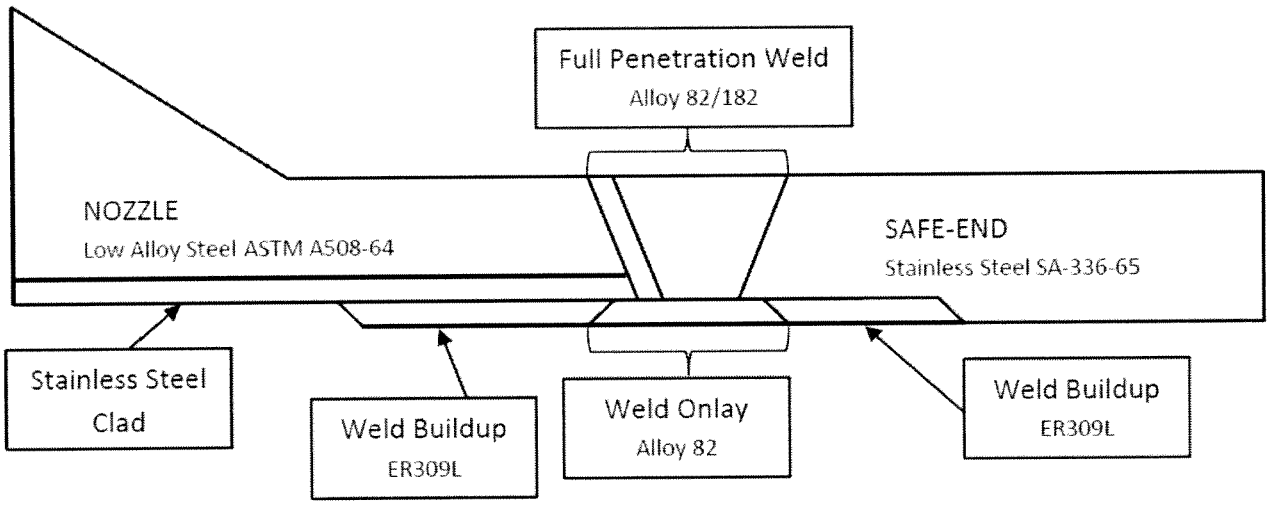

Figure 1: Core Flood "B" Nozzle to Safe-End Weld (RCT0001RC0009BMWELD)

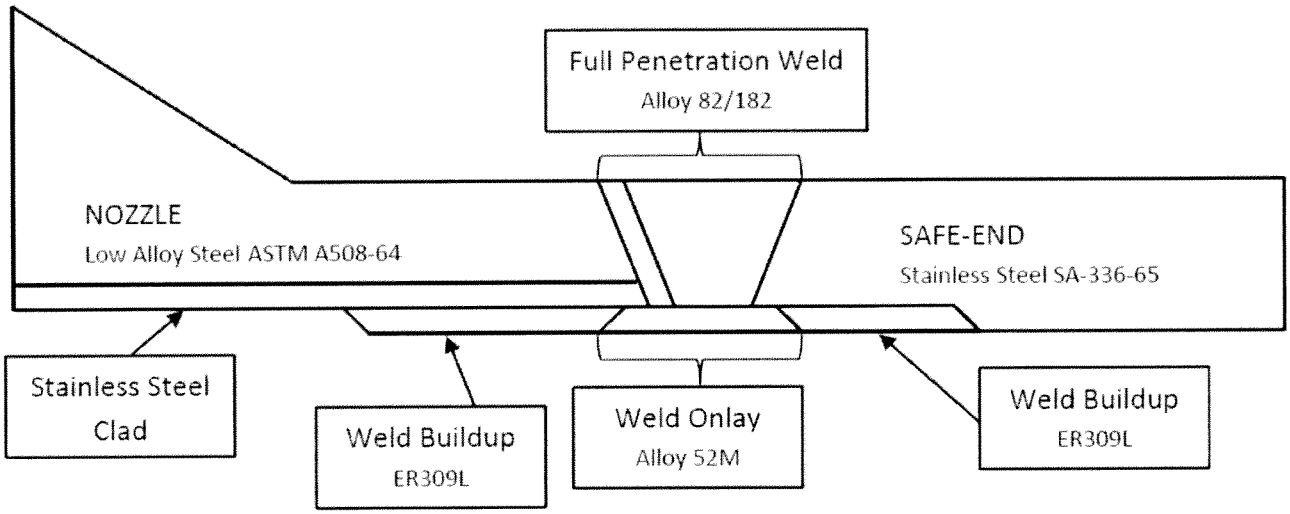

Figure 2: Core Flood "A" Nozzle to Safe-End Weld (RCT0001RC0010BMWELD)

2.0 APPLICABLE CODE EDITION AND ADDENDA

The Three Mile Island Nuclear Station (TMI), Unit 1, complies with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, 2004 Edition, no Addenda.

3.0 APPLICABLE CODE REQUIREMENT

- As required by 10 CFR 50.55a(b)(2)(xv), ASME Section XI, 2001 Edition, Appendix VIII is utilized.

- As required by 10 CFR 50.55a(g)(6)(ii)(F), ASME Code Case N-770-1, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated With UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities, Section XI, Division 1," is utilized as amended by 10CFR50.55a(g)(6)(ii)(F).

- Code Case N-770-1, Table 1, Footnote (4) applies to volumetric examination of Inspection Items B and H, and requires that "Ultrasonic volumetric examination shall be used and shall meet the applicable requirements of Appendix VIII." ASME Section XI 2001 Edition, Appendix VIII, Supplement 10, Paragraph 3.2(b) requires that examination procedures, equipment, and personnel be qualified for depth sizing with a Root Mean Square (RMS) error less than or equal to 0.125 inches. Code Case N-695 provides alternatives to the qualification requirements of Appendix VIII, Supplement 10; however, Section 3.3(c) requires that examination procedures, equipment, and personnel are qualified for depth-sizing with an RMS error less than or equal to 0.125 inches.

- The fourth ten-year ISI program plan for TMI includes Section XI Code Case N-695, "Qualification Requirements for Dissimilar Metal Piping Welds, Section XI, Division 1." This Code Case is listed in Regulatory Guide 1.147, Revision 16, Table 1, "Acceptable Section XI Code Cases."

4.0 REASON FOR REQUEST

This request is being submitted by TMI due to an impracticality of compliance in accordance with 10 CFR 50.55a(g)(5)(iii). TMI will be performing volumetric examinations of the Core Flood Nozzle to Safe-End Dissimilar Metal Welds from the inner diameter during the upcoming T1R21 refueling outage (October 2015) and will implement the requirements of ASME Section XI, Code Case N-695. Code Case N-695, Section 3.3(c), requires that qualified procedures, equipment, and personnel shall demonstrate a flaw depth-sizing error less than or equal to 0.125 inch RMS. The nuclear power industry has attempted to qualify personnel, equipment, and procedures for depth-sizing examinations performed from the inside surface of dissimilar metal welds since November 2002. To date, no known inspection vendor has met the RMS error requirements.

The inability of examination procedures to achieve the required RMS error value is primarily due to a combination of factors such as surface condition (i.e., roughness), scan access, base materials, and the dendritic structure in the welds themselves. The combination of these factors has proven too difficult for vendors to achieve an RMS error value that meets the established requirements. The examination vendor TMI intends to utilize has demonstrated an RMS error of 0.224 inches.

5.0 PROPOSED ALTERNATIVE AND BASIS FOR USE

Exelon Generation Company, LLC (Exelon) proposes to utilize an alternate depth-sizing RMS error value greater than the 0.125 inch RMS error value stated in ASME code case N-695 for the examination of the welds listed above. Exelon proposes to utilize an alternate RMS of 0.224 inch as demonstrated by AREVA for depth sizing. In the event of indications requiring depth-sizing, Exelon proposes to utilize the following approach:

1. The difference between the required RMS error (0.125 inch) and the demonstrated RMS error (0.224 inch) of 0.099 inch shall be added to the through-wall measurement for comparison with the applicable acceptance criteria.
2. Eddy Current examination techniques will be available to perform surface examinations as required to verify a flaw is not surface breaking.
3. Inner Diameter (ID) surface breaking flaws greater than 50% through-wall and subsurface flaws greater than 50% through-wall shall be repaired or evaluated prior to plant restart. Evaluations shall be submitted to the NRC for review and approval prior to plant restart.
4. If an improved depth-sizing RMS is demonstrated prior to examination performance, the excess of this new RMS error over the required RMS will be added to the measured value for comparison to the acceptance criteria.
5. For subsurface planar flaws, the difference between the RMS error and the demonstrated RMS error (0.099 inch) shall be added to both ends of the indication:
   a. 0.099 inches will be added to the lower tip towards the ID surface
   b. 0.099 inches will be added to the upper tip towards the OD surface

All other requirements of the ASME Section XI Code and Code Cases N-695 and N-770-1 shall apply.

Based on the conclusions from EPRI Materials Reliability Program Letter MRP 2012-046, the proposed alternative will provide reasonable assurance that flaws detected during examination will be sized sufficiently for comparison with the acceptance criteria of Code Case N-770-1.

6.0 DURATION OF THE PROPOSED ALTERNATIVE

The proposed relief request is applicable for the TMI, Unit 1 fourth ISI interval which ends April 19, 2022.

Prior to performance of examinations, TMI will review changes in the industry guidance with respect to dissimilar metal welds in addition to ASME Code Cases for applicability. If an approved Code Case allows a different method of depth sizing, then TMI shall utilize this in place of the proposed Relief Request.

7.0 PRECEDENTS

Similar relief requests were approved for: McGuire Nuclear Station, Unit 2; Comanche Peak Nuclear Power Plant, Unit 2; and Braidwood Station, Units 1 and 2 (References 6 thru 8 below).

8.0 REFERENCES

1. ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 2004 Edition, no Addenda.

2. ASME Code, Section XI, 2001 Edition, no Addenda, Appendix VIII, Supplement 10, "Qualification Requirements for Dissimilar Metal Piping Welds."

3. ASME Code Case N-695, "Qualification Requirements for Dissimilar Metal Piping Welds Section XI, Division 1," dated May 21, 2003.

4. EPRI Policy/Procedure Directive 03-01, "Criteria for Issuing Documentation of Depth Sizing Errors That Exceed the 0.125-inch RMS Appendix VIII Criteria."

5. EPRI Materials Reliability Program Letter MRP 2012-046, "Flaw Depth Sizing Uncertainty Root Mean Square (RMS) Error Treatment for Ultrasonic Piping Examinations from the Inside Surface," dated November 26, 2012.

6. NRC Safety Evaluation Report for McGuire Nuclear Station, Unit 2, Relief Request 12-MN-003, dated September 24, 2012 (ML12258A363).

7. NRC Safety Evaluation Report for Comanche Peak Nuclear Power Plant, Unit 2, Relief Request No. B-14, dated April 1, 2014 (ML14073A544).

8. NRC Safety Evaluation Report for Braidwood Station, Units 1 and 2, Relief Request I3R-08, dated April 19, 2012 (ML12108A123).