

10 CFR 50.55a

January 24, 2011

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

Peach Bottom Atomic Power Station, Units 2 and 3
Renewed Facility Operating License Nos. DPR-44 and DPR-56
NRC Docket Nos. 50-277 and 50-278

Subject: Proposed Relief Request associated with the Requirements of 10 CFR 50.55a
Concerning Reactor Pressure Vessel Circumferential Shell Welds

Attached for your review and approval is a proposed alternative in accordance with 10 CFR 50.55a(a)(3)(i), associated with the extended period of operation (August 8, 2013 through August 8, 2033 for Unit 2, and July 2, 2014, through July 2, 2034, for Unit 3) for the Inservice Inspection Program for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3.

This relief request satisfies Commitment 24 of the PBAPS license renewal Safety Evaluation Report, which requires resubmittal of the reactor vessel circumferential shell weld relief request prior to the period of extended operation (i.e., prior to August 8, 2013, for Unit 2, and July 2, 2014, for Unit 3).

We request your review and approval by January 24, 2012.

There are no regulatory commitments contained in this letter.

If you have any questions or require additional information, please contact Tom Loomis (610-765-5510).

Respectfully,



David P. Helker
Manager - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachment: Relief Request I4R-51

cc: USNRC Region I, Regional Administrator
USNRC Senior Resident Inspector, PBAPS
USNRC Project Manager, PBAPS
R. R. Janati, Bureau of Radiation Protection
S. T. Gray, State of Maryland

ATTACHMENT

RELIEF REQUEST I4R-51

**Relief Request I4R-51 Concerning Reactor Pressure Vessel Circumferential Shell Welds
in Accordance with 10 CFR 50.55a(a)(3)(i)
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1. ASME CODE COMPONENTS AFFECTED

Code Class: 1

Reference: Table IWB-2500-1, Examination Category B-A, Item B1.11
(Circumferential Shell Welds)

Examination Category: B-A

Item Number: B1.11

Description: Permanent relief from circumferential shell weld examinations for
the extended period of operation

Weld Number: RPV-C1, RPV-C2, RPV-C3, RPV-C4 and RPV-C5

2. APPLICABLE CODE EDITION AND ADDENDA

The current edition for the Inservice Inspection (ISI) interval is the ASME Section XI, 2001 Edition through 2003 Addenda.

3. APPLICABLE CODE REQUIREMENT

ASME Section XI, 2001 Edition through 2003 Addenda, Table IWB-2500-1, Examination Category B-A, Item B1.11, requires a volumetric examination of the circumferential shell welds each interval.

4. REASON FOR REQUEST

Exelon Generation Company, LLC (Exelon) is requesting a proposed alternative in accordance with 10 CFR 50.55a(a)(3)(i) on the basis that this alternative provides an acceptable level of quality and safety. This relief request would provide relief from circumferential weld examinations as currently required by the ASME Code for the extended period of operation.

A permanent relief (i.e., “for the remaining time in the current 40-year operating terms for the units”) from the requirements of Item B1.11 concerning examination of circumferential shell welds was approved for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3 in an NRC Safety Evaluation Report dated June 15, 2000 (Reference 1).

The renewal of the PBAPS operating license is discussed in the “Safety Evaluation Report Related to the License Renewal of Peach Bottom Atomic Power Station, Units 2 and 3,” NUREG-1769, dated March 2003 (Reference 2). As discussed in Section 4.2.3.3 (“Conclusion”):

“The staff has reviewed the information in LRA Section 4.2.3, “Reactor Vessel Circumferential Weld Examination Relief.” On the basis of this review, the staff concludes that the applicant has adequately evaluated the reactor vessel circumferential weld examination relief TLAA, as required by 10 CFR 54.21(c)(1). The staff has also reviewed

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the UFSAR Supplement and the staff concludes that, the applicant has provided an adequate description of its evaluation of this TLAA for the period of extended operation as required by 10 CFR 54.21(d)."

Additionally, commitment 24 of the PBAPS license renewal Safety Evaluation Report (Reference 2) commits to resubmitting the circumferential shell weld relief request prior to the period of extended operation.

Accordingly, this relief request is provided to extend the relief from the reactor vessel circumferential weld examinations for the extended period of operation.

5. PROPOSED ALTERNATIVE AND BASIS FOR USE

The following information from the Reference 2 Safety Evaluation Report (Section 4.2.3.2) is provided as the basis for use of the proposed alternative:

"Sections 4.2.3 and A.5.1.2 of the LRA discuss inspection of the Peach Bottom RPV circumferential welds. These sections of the LRA indicate that Peach Bottom will use an approved technical alternative in lieu of ultrasonic testing of RPV circumferential shell welds. The technical alternative is discussed in the staff's final SER of the BWRVIP-05 report, which is enclosed in a July 28, 1998 letter to Carl Terry, BWRVIP Chairman. In this letter, the staff concludes that since the failure frequency for circumferential welds in BWR plants is significantly below the criterion specified in RG 1.154, "Format and Content of Plant-Specific Pressurized Thermal Shock Safety Analysis Reports for Pressurized Water Reactors," and the core damage frequency (CDF) of any BWR plant, since that continued inspection would result in a negligible decrease in an already acceptably low value, elimination of the ISI for RPV circumferential welds is justified. The staff's letter indicated that BWR applicants may request relief from inservice inspection requirements of 10 CFR 50.55a(g) for volumetric examination of circumferential RPV welds by demonstrating that (1) at the expiration of the license, the circumferential welds satisfy the limiting conditional failure probability for circumferential welds in the evaluation, and (2) the applicants have implemented operator training and established procedures that limit the frequency of cold over-pressure events to the frequency specified in the report. The letter indicated that the requirements for inspection of circumferential RPV welds during an additional 20-year license renewal period would be reassessed, on a plant specific basis, as part of any BWR LRA.

Section A.4.5 of report BWRVIP 74 indicates that the staff's SER conservatively evaluated the BWR RPVs to 64 effective full power years (EFPYs), which is 10 EFPYs greater than what is realistically expected for the end of the license renewal period. Since this was a generic analysis, the staff issued RAI 4.2-6 requesting the applicant to submit plant-specific information to demonstrate that the Peach Bottom beltline materials meet the criteria specified in the report. To demonstrate that the vessel has not become embrittled beyond the basis for the technical alternative, the applicant must supply (1) a comparison of the neutron fluence, initial RT_{NDT} , chemistry factor, amounts of copper and nickel, delta RT_{NDT} and mean RT_{NDT} of the limiting circumferential weld at the end of the renewal period to the 64 EFPYs reference case in Appendix E of the staff's SER, and (2) an estimate of conditional failure probability of the RPV at the end of the license renewal term based on the comparison of the mean RT_{NDT} for the limiting circumferential weld and the reference case. Should the applicant request relief from augmented ISI requirements for volumetric examination of circumferential RPV welds during the period of extended operation, the

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applicant is requested to demonstrate that (1) at the expiration of the license, the circumferential welds satisfy the limiting conditional failure probability for circumferential welds in the evaluation, and (2) the applicant has implemented operator training and established procedures that limit the frequency of cold overpressure events to the frequency specified in the report. In response to the RAI, the applicant compared the limiting circumferential weld properties for Peach Bottom Units 2 and 3 to the information in Table 2.6-4 and Table 2.6-5 of the staff SER on BWRVIP-05 dated July 28, 1998.

The NRC staff used the mean RT_{NDT} value for materials to evaluate failure probability of BWR circumferential welds at 32 and 64 EFPYs in the staff SER dated July 28, 1998. The mean RT_{NDT} value is defined as the sum of the initial (unirradiated) reference temperature (initial RT_{NDT}) and the mean value of the adjustment in reference temperature caused by irradiation (ΔRT_{NDT}); it does not include a margin (M). The neutron fluence used in this evaluation was the neutron fluence clad-weld (inner) interface. The mean RT_{NDT} for Peach Bottom Units 2 and 3 is determined to provide a comparison with the values documented in the staff SER. The 54 EFPYs mean RT_{NDT} values thus determined are 12 °F and 17 °F for Units 2 and 3, respectively. The staff confirmed these values of mean RT_{NDT} using the data for 54 EFPYs neutron fluence at the clad-weld interface provided by the applicant and the data for Ni and Cu contents in the girth welds from the Peach Bottom Updated Final Safety Analysis Report, Volume 1. For Unit 2, the 54 EFPYs fluence is $1.8E18$ n/cm², and Cu and Ni contents are 0.056 and 0.96 wt%, respectively. For Unit 3, the 54 EFPYs fluence is $1.4E18$ n/cm², and Cu and Ni contents are 0.102 and 0.942 wt%. These 54 EFPYs values mean that RT_{NDT} values for Units 2 and 3 are bounded by the 64 EFPYs mean RT_{NDT} value of 70.6 °F used by NRC for determining the conditional failure probability of a circumferential girth weld. The 64 EFPYs mean RT_{NDT} value from the staff SER dated July 28, 1998, is for a Chicago Bridge and Iron (CB&I) weld because CB&I welded the girth welds in the Peach Bottom vessels. Since the Peach Bottom 54 EFPYs value is less than the 64 EFPYs value from the staff SER dated July 28, 1998, the staff concludes that the Peach Bottom RPV conditional failure probability is bounded by the NRC analysis.

The procedures and training used to limit cold overpressure events will be the same those approved by the NRC when Peach Bottom requested to use the BWRVIP-05 technical alternative for the current term (letter from James Hutton of PECO Nuclear to NRC dated February 7, 2000). The staff find the applicant's response to RAI 4.2-6 acceptable because the 54 EFPYs mean RT_{NDT} value for the circumferential weld is bounded by the NRC analysis in the staff SER dated July 28, 1998, and Peach Bottom will be using procedures and training to limit cold overpressure events during the period of extended operation. The UFSAR Supplement needs to include the additional information contained in the applicant's response to RAI 4.2-6 regarding the evaluation of this TLAA. In a letter dated November 26, 2002, responding to this Confirmatory Item, the applicant provided a revision to Section A.5.1.1.3 of the UFSAR Supplement, which describes the analysis of the circumferential welds and adequately addresses this issue."

SER Section 4.2.3.3 concludes:

"The staff has reviewed the information in LRA Section 4.2.3, "Reactor Vessel Circumferential Weld Examination Relief." On the basis of this review, the staff concludes that the applicant has adequately evaluated the reactor vessel circumferential weld examination relief TLAA, as required by 10 CFR 54.21(c)(1). The staff has also reviewed the UFSAR Supplement and the staff concludes that, the applicant has provided an

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adequate description of its evaluation of this TLAA for the period of extended operation as required by 10 CFR 54.21(d).“

Exelon has reviewed the above conclusions and has confirmed they are still valid for the extended period of operation. Therefore, the proposed alternative as discussed above, and as previously evaluated in the Reference 2 SER, provides an acceptable level of quality and safety for the extended period of operation.

6. DURATION OF PROPOSED ALTERNATIVE

This relief is requested for examinations of the reactor vessel circumferential shell welds for the extended period of operation at the PBAPS, Unit 2 (August 8, 2013 through August 8, 2033) and Unit 3 (July 2, 2014 through July 2, 2034).

7. PRECEDENTS

A similar relief was approved for Oyster Creek Nuclear Generating Station (Reference 3).

8. REFERENCES

1. Letter from J. W. Clifford (U.S. Nuclear Regulatory Commission) to J. A. Hutton (PECO Energy Company), "Request for Relief from Performing Augmented Inspections of the Circumferential Reactor Vessel Shell Welds, Peach Bottom Atomic Power Station, Units 2 and 3 (TAC NOS. MA8195, MA8196)," dated June 15, 2000.
2. "Safety Evaluation Report Related to the License Renewal of Peach Bottom Atomic Power Station, Units 2 and 3," NUREG-1769, dated March 2003.
3. Letter from H. K. Chernoff (U.S. Nuclear Regulatory Commission) to C. G. Pardee (Exelon Generation Company, LLC), "Oyster Creek Nuclear Generating Station – Relief Request for Alternative Examination for Reactor Pressure Vessel Circumferential Shell Welds (TAC NO. ME0890)," dated September 15, 2009.