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Docket Number 50-346

License Number NPF-3

Serial Number 2694

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United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Subject: Additional Information Related to Inservice Inspection Relief Requests RR-A19
and RR-A20 (TAC Number MA7210)

Ladies and Gentlemen:

The FirstEnergy Nuclear Operating Company (FENOC) submitted a request to the NRC for relief from certain requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI for the Davis-Besse Nuclear Power Station, Unit 1 (DBNPS) on November 13, 1999 (FENOC letter Serial Number 2622). On December 14, 2000, discussions were held between the NRC and DBNPS staffs concerning Relief Requests RR-A19 and RR-A20. During these discussions, information was provided to the NRC to resolve their questions concerning Relief Requests RR-A19 and RR-A20. The attached formally transmits that information to support approval of these relief requests.

Should you have any questions or require additional information, please contact Mr. David H. Lockwood, Manager-Regulatory Affairs at (419) 321-8450.

Very truly yours,



RMC/

Attachments

cc: J. E. Dyer, Regional Administrator, Region III
S. P. Sands, NRC Project Manager
K. S. Zellers, DB-1 Senior Resident Inspector
Utility Radiological Safety Board

A047

ADDITIONAL INFORMATION FOR RELIEF REQUEST RR-A19

Background:

Relief Request RR-A19 requests relief from Section XI of the ASME B&PV Code, 1986 Edition, No Addenda, Table IWB-2500-1, Examination Categories B-A and B-D. Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds," requires the examination coverage of Class 1 welds be greater than 90 percent. Due to the configuration of the DBNPS Reactor Vessel, it is not possible to obtain greater than 90 percent examination coverage on the Reactor Vessel Lower Shell to Bottom Head Circumferential Weld, the Reactor Vessel Bottom Head Circumferential Weld, the Outlet Nozzle to Reactor Vessel Shell Welds, and the Core Flood Nozzle Inner Radius Sections.

Additional Information:

1. NRC Question:

Are the examinations of these welds part of the one time augmented inspection?

FENOC Response:

Weld 34 (the Reactor Vessel Lower Shell to Bottom Head Circumferential Weld) is a weld requiring augmented inspection per 10 CFR 50.55a(g)(6)(ii)(A). The remaining welds addressed in this relief request are either a circumferential head weld, nozzle to shell welds, or nozzle inside radius sections to which 10 CFR 50.55a(g)(6)(ii)(A) is not applicable.

2. NRC Question:

Have these examinations been completed? If yes,

- a. What was the actual coverage obtained?
- b. Were they single side examinations? Provide the coverage obtained.
- c. Have you since qualified the single side examination procedure to Appendix VIII?

FENOC Response:

- a. These examinations were completed in April 2000. The actual examination coverages were as follows: All examination coverages are as noted in Relief Request RR-A19 with the exception of welds WR-34 and WR-13/14/72-Z. The coverage of WR-34 was increased from 60% to 62% due to improvement in proximity for scanning. The coverage of weld WR-13/14/72-Z was reduced from 64% to 62% due to surface roughness of the nozzle.

Weld Number	Examination Coverage
WR-34	62%
WR-35	72%
WR-13/14/72-X	64%
WR-13/14/72-Z	62%
WR-54/55/W-IR	52%
WR-54/55/Y-IR	52%

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- b. All examinations were performed from both sides of the weld with exception of the areas that could not be examined due to obstructions or the configuration of the nozzle as described in this relief request. When the weld could be examined from only one side, no credit was taken for the opposite side scan direction when determining the examination coverage.
- c. The procedures use to examine the DBNPS Reactor Vessel have not been qualified for single sided examinations in accordance with ASME Section XI Appendix VIII and 10 CFR 50.55a. This qualification is not necessary because the DBNPS has not taken any credit for single sided examinations.

3. NRC Question:

Which figure, Figure IWB-2500-1(a) or Figure IWB-2500-1(b), is applicable?

FENOC Response:

Figure IWA-2500-1(b) is applicable to weld WR-34, which is a shell to lower head weld.

ADDITIONAL INFORMATION FOR RELIEF REQUEST RR-A20

Background:

Relief Request RR-A20 requests relief from paragraph IWA-2232 of Section XI of the ASME B&PV Code, 1986 Edition, No Addenda, for the DBNPS Reactor Vessel Flange to Shell Weld (Weld Number RC-RPV-WR-19). This paragraph requires ultrasonic examinations of vessel welds be performed in accordance with Article 4 of ASME Section V. FENOC proposed to examine the Reactor Vessel Flange to Shell Weld in accordance with Appendix VIII of the 1995 Edition, 1996 Addenda of ASME Section XI using the Performance Demonstration Initiative (PDI) protocol.

Additional Information:

1. NRC Question:

The licensee states they are able to obtain "full examination coverage." It is unclear what this means. What coverage criteria will they (or did they) use, Article 4 of Section V, or Section XI as modified by 10 CFR 50.55a?

FENOC Response:

Full examination coverage means that 100% of the weld volume requiring examination in accordance with Figure IWB-2500-4 was examined with all the required directions and angles. This weld was examined from both sides using examination techniques qualified in accordance with the PDI. The PDI meets Section XI as modified by 10 CFR 50.55a with the exception of flaw length sizing and root mean square (RMS) error calculations.

2. NRC Question:

Perform a comparison of the examination procedure used and the standard ASME Section V, Article 4 and NRC Regulatory Guide 1.150 procedures.

FENOC Response:

Table 1 provides a comparison of the procedure used to examine the DBNPS Reactor Vessel Flange to Shell Weld with ASME Section V, Article 4 and NRC Regulatory Guide 1.150 requirements. The attributes compared in Table 1 are those which were compared in the Safety Evaluation Report for Point Beach Relief Request RR-1-18 (TAC No. MA1159). Point Beach Relief Request RR-1-18 is similar to DBNPS Relief Request RR-A20.

The configuration of the DBNPS Reactor Vessel Flange to Shell Weld is similar to the Reactor Vessel Circumferential Shell Welds. Access to examine the flange to shell weld is available from both sides of the weld.

Weld WR-19 was examined using Framatome Technologies Procedure 54-ISI-800-03, "Ultrasonic Examination of Reactor Vessel Welds in accordance with ASME Section XI, Appendix VIII, Supplements 4 and 6". This procedure has been qualified in accordance with the PDI protocol to detect and size flaws and notches contained in the PDI program test blocks.

TABLE 1 - COMPARISON OF REACTOR PRESSURE VESSEL SHELL WELD EXAMINATION TECHNIQUES

Description (Code Reference)	ASME Section V Article 4, 1986 Edition ASME Section XI, 1986 Edition NRC Regulatory Guide 1.150 Revision 1, February 1983.	FTI Examination Procedure 54-ISI-800-03 Requirements
Examination Angles	Section V, Article 4, T-441 requires the volume of weld and adjacent base material be scanned by straight and angle beam techniques. Two angle beams, having nominal angles of 45 and 60 degrees with respect to a perpendicular to the examination surface, shall generally be used. Other pairs of angle beams are permitted provided the measured difference between the angles is at least 10 degrees.	Examination was conducted with angles of 45° shear wave and 45° longitudinal wave transducers. Additionally a 70° longitudinal wave transducer was used for examining the near surface region. These examination angles were successfully qualified under the PDI protocol using the PDI program test blocks.
Instrument Calibrations	Section V, Article 4, T-431 requires that instrument screen height and amplitude linearity be evaluated at least every three months. Section XI, IWA-2232 requires that these screen height and linearity checks be performed at the beginning and end of the weld examination performed on a vessel during one outage.	Instrument screen height and amplitude linearity were checked prior to and following completion of the examinations of the DBNPS reactor vessel.
System Calibrations	Section V, Article 4, T-432 requires that the original system calibration be performed on the Code basic calibration block. T-432 allows the use of different types of reference blocks and electronic simulators to perform system calibration verifications.	Initial calibration of the data acquisition system was performed on the Code basic calibration block. Periodic system checks and final calibration check was performed using simulator blocks as permitted by Section V, Article 4, T-432.
Scanning Sensitivity	Section V, Article 4, T-424 permits scanning be performed at the reference level when electronic distance-amplitude correction (DAC) is used with automated recording.	Scanning was performed at 10% of DAC.

<p>Description (Code Reference)</p>	<p>ASME Section V Article 4, 1986 Edition ASME Section XI, 1986 Edition NRC Regulatory Guide 1.150 Revision 1, February 1983.</p>	<p>FTI Examination Procedure 54-ISI-800-03 Requirements</p>
<p>Recording Level</p>	<p>Section V, Article 4, T-441 requires recording and evaluation of reflectors that produce a response equal to or greater than 50% DAC. Regulatory Guide 1.150 requires recording and evaluation at 20% DAC for the inner 25% of material thickness.</p>	<p>In the near surface region, non-geometric indications with a maximum amplitude greater than or equal to 20% DAC were recorded. In the subsurface region, non-geometric indications which have a maximum amplitude greater than 10% DAC for the 45° longitudinal scan and 20% DAC for the 45° shear wave were recorded.</p>
<p>Scan Index and Pulse Repetition Rate</p>	<p>Section V, Article 4, T-424 requires each pass of the search unit overlap a minimum of 10% of the transducer piezoelectric element dimension perpendicular to the direction of the scan. Section XI, IWA-2232 requires each pass of the search unit overlap at least 50% of the transducer piezoelectric element dimension perpendicular to the direction of the scan. NRC Regulatory Guide 1.150 requires a 25% maximum overlap for detection and 0.25 inch maximum increments for sizing.</p>	<p>A scan index of 0.50" was used for detection. A scan index of 0.20" was used for sizing. This scan index meets the requirements of T-424, IWA-2232 and Regulatory Guide 1.150.</p>
<p>Flaw Sizing and Evaluation</p>	<p>Section V, Article 4, T-441 requires amplitude based sizing at 50% DAC. Section V, Article 4, T-451 permits evaluation to alternative standards.</p>	<p>All recorded indications are evaluated and categorized as either geometric or non-geometric indications. Tip diffraction or satellite signals are used for measuring flaw through wall dimension. If the flaw image cannot identify evidence of flaw tips or satellite signals, amplitude based sizing techniques are used. Length sizing is performed using amplitude based techniques.</p>

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COMMITMENT LIST

The following list identifies those actions committed to by the Davis-Besse Nuclear Power Station (DBNPS) in this document. Any other actions discussed in the submittal represent intended or planned actions by the DBNPS. They are described only for information and are not regulatory commitments. Please notify the Manager - Regulatory Affairs (419-321-8450) at the DBNPS of any questions regarding this document or associated regulatory commitments.

COMMITMENTS

DUE DATE

None