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AUTH.NAME AUTHOR AFFILIATION
BOUCHEY,G.D. Washington Public Power Supply System
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SCHWENCER,A. Licensing Branch 2

SUBJECT: Forwards corrected P 2 of 830118 evaluation of containment pressure boundary matls re GDC 51,correcting typographical error.

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Washington Public Power Supply System
P.O. Box 968 3000 George Washington Way Richland, Washington 99352 (509) 372-5000

February 8, 1983
G02-83-101

Docket No. 50-397

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Schwencer:

Subject: NUCLEAR PROJECT NO. 2
GENERAL DESIGN CRITERION 51, CLARIFICATION

Reference: G02-83-048, G.D. Bouchey (SS) to A. Schwencer (NRC), Same Subject, dated January 18, 1983

The attachment to the referenced letter provided an evaluation of WNP-2 containment pressure boundary materials with respect to GDC 51. In the word processing of this evaluation a typographical error to Page 2 of the attachment was overlooked. Please replace Page 2 of the evaluation with the attached correct page.

Should you have any questions, please contact Mr. R.M. Nelson, Manager, WNP-2 Licensing.

Very truly yours,

GD Bouchey

G. D. Bouchey
Manager, Nuclear Safety and Regulatory Programs

TME/jca
Attachment

cc: R Auluck - NRC
WS Chin - BPA
A Toth - NRC Site

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After obtaining the K_{Id} values, each value was compared to the K_{Id} Design-reference curve (Figure 1) to determine the NDT temperature relative to the test temperature of the impact specimens. This reference curve is the lower bound K_{Id} values for low and intermediate strength steels. (Figure 2 provides a comparison of the K_{Id} reference curve to the ASME Code K_{IR} curve.)

NDT temperature was then determined by subtracting the difference between the NDT on the reference curve and the location of the calculated K_{Id} value from the specimen test temperature for each component.

The plain strain limit (L) and yield-criterion (YC) were then calculated using the following equations:

$$\text{L Value } K_{Id} = \left(\frac{B (\sigma_{yd})^2}{2.5} \right)^{1/2}$$

$$\text{YC Value } K_{Id} = \left(B (\sigma_{yd})^2 \right)^{1/2}$$

B = thickness in inches
$\sigma_{yd} = \sigma_{ys} + 20$ ksi (equation from AAR R-451)
σ_{ys} = Code Min. Yield Strength

These values were then referenced to the K_{Id} reference curve to determine the NDT+T value for both the L and YC value. These temperatures were plotted on a graph as the abscissa and stress levels as the ordinate (Figures 3-5). The stress levels are in increments of the yield stress level and L corresponds to 0.2 X yield stress level. A straight line was drawn between the two points corresponding to the L and YC values. This line forms an arrest-transition curve. The curve indicates the transition in stress required for propagation of through-thickness cracks. The area to the right of the line indicates that fracture propagation of a through-thickness crack is not possible. The minimum temperature above NDT required to provide fracture arrest of through-thickness cracks upon yield stress loading was then added to the NDT temperature previously determined from the K_{Id} reference curve to determine LSMT.

The Main Steam Isolation Valves LSMT were determined by the original analysis, which used the material information provided in NUREG-0577 and the temperature correction factor from Summer 1977 Addenda of the ASME Code. The reason for the use of this analysis method was that impact test data was not available for the valves (see Section 5.2.3.3.1 of WNP-2 FSAR).

Conclusion

This evaluation provides a more realistic LSMT for the limiting materials used in the containment pressure boundary at WNP-2 than the general analysis previously submitted to the NRC.