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SUBJECT: Responds to request for addl info re Rev 1 to Generic Ltr 92-01, "Reactor Vessel Integrity." Westinghouse Owners Group forwarded WCAP-13587,Rev 1 to NRC which includes specific analysis of reactor vessel beltline matls.

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Robinson Nuclear Plant
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H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23
ANSWERS TO QUESTIONS REGARDING CP&L'S RESPONSE TO GENERIC LETTER 92-01, REVISION 1 - REACTOR VESSEL INTEGRITY

Gentlemen:

The purpose of this letter is to provide the response to your request for additional information, dated September 29, 1993, regarding the H. B. Robinson Steam Electric Plant, Unit No. 2 (HBR2) response to Generic Letter 92-01, Revision 1 (GL 92-01).

The Westinghouse Owner's Group has forwarded Report WCAP-13587, Revision 1, to the NRC via NUMARC which includes a specific analysis of H. B. Robinson Unit No. 2 reactor vessel beltline materials. The analyses demonstrate that all materials in the beltline region meet the requirements of Appendix G to 10CFR Part 50 with respect to Upper Shelf Energy (USE).

Although the report should be sufficient to resolve all questions with respect to USE, the enclosure to this letter provides responses to all materials' properties and fabrication questions posed by your request with respect to Questions 2a and 2b of GL 92-01 on the following pages to replace those previously supplied in tables and references with added explanatory notes.

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Questions regarding this matter may be referred to Mr. Jan S. Kozyra at (803) 383-1872.

Very truly yours,

Charles R. Dietz
Vice President

JSK:lst
Enclosure
c: Mr. S. D. Ebneter
Ms. B. L. Mozafari
Mr. W. T. Orders

I, C. R. Dietz, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of my information, knowledge and belief; and the sources of my information are officers, employees, contractors, and agents of Carolina Power & Light Company.

Deborah W. Martin
Notary (Seal)

My commission expires: 6/23/98

NRC RAI Question - Question 2a in GL 92-01

The response to GL-92-01 does not specify the unirradiated Charpy Upper-Shelf Energy (USE) values for the Beltline Welds 1-273A, B, C, 2-273A, B, C, 3-273A, B, C, and 11-273. Either provide the unirradiated Charpy USE for these beltline welds or provide the unirradiated Charpy USE and analysis from welds that were fabricated using the same vendor, fabrication time frame, fabrication process, and material specification as the H. B. Robinson, Unit No. 2 (HBR2) beltline welds to demonstrate that the HBR2 beltline welds will meet the requirements of Appendix G of 10CFR Part 50. If this cannot be provided, then submit an analysis which demonstrates that lower values of USE will provide margins of safety against fracture equivalent to those required by Appendix G of the ASME Code.

Answer

Longitudinal Beltline Welds 1-273A, B, C, 2-273A, B, C, and 3-273A, B, C were made with RACO 3 Heat 86054B. The Connecticut Yankee (CY) surveillance weld was made with RACO 3 Heats 86054B and 9565. A Westinghouse investigation (WCAP-10433) determined the two heats and the combination thereof to be essentially identical in chemistry. USE for the CY surveillance weld is reported to be 105 ft. lb. in the EPRI RMATCH DATA SYSTEM, page 16. Chemistries given by RMATCH are:

HEAT	C	Mn	P	S	Si	Mo	Cu	Ni
86054B	.10	1.38	.016	.017	.32	.51	*	*
86054B & 9565	.047	1.36	.02	.019	.35	.48	.22	.054

* Cu and Ni not reported in wire analysis.

Fabrication data are as follows:

Weld	Conn. Yankee Surveillance	HBR2 Welds
Vendor	Combustion Engineering (CE)	CE
Flux	Arcos B5	Arcos B5
Fabrication Time	1966-1967	Oct.-Dec. 1964
Fabrication Process	Submerged Arc, Tandem Electrode	Submerged Arc, Single Electrode

Lower circumferential Weld 11-273 and the Millstone 1 surveillance weld each were made from Heat 34B009. General Electric reported tests of the Millstone 1 weld in NEDC-30299. The USE was reported to be 106 ft. lb., and the chemistry found therein to be:

	C	Mn	P	S	Si	Mo	Cu	Ni
NEDC-30299	.11	1.34	.016	.016	.28	.49	.18	1.03

Other data from Millstone 1 files are as follows:

Weld	Millstone 1 Surveillance	HBR2 Weld 11-273
Vendor	CE	CE
Fabrication	Submerged Arc, Tandem Electrode	Submerged Arc, Tandem Electrode
Fabrication Time Frame	April, 1967	July, 1967
Material Specification	RACO 3 + Ni 200, Linde 1092	RACO 3 + Ni 200, Linde 1092

Question 2a in GL 92-01 (Cont'd)

Using the methodology in Paragraph c.1 of Regulatory Guide 1.99, Revision 2, Upper Shell Plates W10201-1 and W10201-3 have calculated upper shelf energy values less than 50 ft.-lb. In accordance with 10CFR Part 50, Appendix G, provide an analysis to demonstrate that all beltline plates with upper shelf energies less than 50 ft.-lb. will provide margins of safety against fracture that are equivalent to those required by Appendix G of the ASME Code.

Answer

As stated in the introduction to this letter, a plant specific analysis (Westinghouse Report WCAP-13587, Rev. 1) has been provided to the NRC via NUMARC to cover upper shell Plate W10201-1 and other core region plates determined by the methodology of paragraph C.1 of Regulatory Guide 1.99, Revision 2, to have upper shelf energy below 50 ft.-lb. HBR2 is identifiable as Plant 7 in the referenced report.

Within WCAP-135.87, Westinghouse used surveillance data with the Reg. Guide approach to show that the USE for W10201-3 does not fall below 50 ft-lb.

Question 2b in GL 92-01

The response to GL 92-01 reports the amounts of phosphorus and sulfur for all beltline welds except for the lower circumferential weld. The source of the amounts of copper and nickel in the lower circumferential weld is identified as the Millstone 1 surveillance weld and the Robinson-2 head weld. Provide the chemical analyses from these welds and the basis for the conclusion that the lower circumferential weld has 0.17 percent copper and 0.92 percent nickel. Provide the amounts of phosphorus and sulfur for the lower circumferential weld.

Answer

Phosphorus and sulfur are given as .016 percent and .016 percent respectively in the analysis of the Millstone 1 surveillance weld in NED C-30299. As stated before, the Millstone 1 surveillance weld was made using the same weld heat, 34B009, as was used for the HBR2 lower circumferential weld and the HBR2 Reactor Vessel Torus-to-Dome weld.

CP&L researched documents to determine an appropriate method of reporting copper and nickel contents for the lower circumferential weld. The first choice of the PTS Rule stipulates that the mean of measured values for weld samples made with the weld wire heat number that matches the critical vessel weld be used. That approach was used for this response.

DETERMINATION OF COPPER CONTENT

Millstone 1 Surveillance Weld, NED C-30299	0.18% (11 tests)
HBR2 Torus to Dome Weld, Reference 1	0.187% (4 tests)
EPRI Nuclear Power Dir. Report, T. J. Griesbach, et al, "Vessel Integrity Analysis, CE Pad	0.15%
Combustion Engineering Weld Pad, 1/8" Round Wire with Linde 124 flux, from Report of Meeting CE-W-CP&L April 30, 1983	0.17%
Average Copper	0.17%

DETERMINATION OF NICKEL CONTENT

Millstone 1 Surveillance Weld, NED C-30299	1.03% (11 tests)
HBR2 Reactor Head Torus-to-Dome Weld, Westinghouse Test, Reference 1	0.75, 0.84% (Averaged at 0.80%)
Average Nickel	0.92%

Reference 1: Attachment to Westinghouse report to CP&L, entitled Chemical Analysis of Reactor Vessel Head Torus-to-Dome Samples from H. B. Robinson Unit No. 2, R. S. Boggs and M. K. Kunka, April 1984.

Question 2b (Cont'd)

The End-Of-License (EOL) fluence has been provided for the beltline plates and, by extension, the axial welds. However, there are no fluence data for the upper and lower circumferential weld seams. Provide EOL fluences for the upper and lower circumferential welds.

Answer

The End Of License fluence for these welds is estimated at this time to be:

Weld	EFPY	Fluence
Upper Circumferential	29	1.8×10^{19} n/cm^2 > 1 MeV
Lower Circumferential	29	2.0×10^{19} n/cm^2 > 1 MeV