

Omaha Public Power District

P.O. Box 399 Hwy. 75 - North of Ft. Calhoun Fort Calhoun, NE 68023-0399
402/636-2000

June 23, 1993
LIC-93-0119

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-137
Washington, DC 20555

- References:
1. Docket 50-285
 2. Letter from LeBoeuf, Lamb, Leiby & MacRae to NRC (H. R. Denton) dated July 17, 1986
 3. Letter from OPPD (W. G. Gates) to NRC (Document Control Desk) dated May 15, 1992 (LIC-92-175R)
 4. Letter from OPPD (W. G. Gates) to NRC (Document Control Desk) dated July 6, 1992 (LIC-92-203R)

Gentlemen:

SUBJECT: Fort Calhoun Station 5-Year Construction Period Recovery

On April 7, 1993, Omaha Public Power District met with the NRC to discuss Fort Calhoun Station (FCS) reactor vessel integrity issues as they pertain to the FCS 5-Year Construction Period Recovery (CPR) request submitted in Reference 2. The NRC indicated at this meeting that the FCS reactor vessel embrittlement management program appeared satisfactory to resolve the reactor vessel integrity issue for the FCS CPR if the following two new items are resolved. These items are 1) benchmarking the FCS reactor vessel fluence data (i.e. the FCS DOT 4 model) using ENDF/B-VI cross sections, and 2) demonstrating an acceptable basis for the predicted end-of-life Upper Shelf Energy for the reactor vessel plate and weld materials.

Via telephone calls on May 11 and June 2, 1993, OPPD presented to the NRC our proposed actions to resolve these items. The purpose of this letter is to place on the docket the agreed upon actions that OPPD will complete regarding these items.

Fluence Code Benchmarking

OPPD plans to use a two phase approach to resolve this item. The first phase involves benchmarking the FCS reactor vessel fluence data (i.e. the FCS DOT 4 model) using ENDF/B-IV (specifically DLC-23F) cross sections to the Pool Critical Assembly (PCA) measurements. This will be accomplished utilizing the BNL-NUREG-34715 Report, "Pressure Vessel Fluence Benchmark Calculations," to serve as the basis of an equivalent benchmark for the current FCS DOT 4 model. In the ENL report the DOT 3.5 code was benchmarked to the PCA and was then used to predict FCS surveillance capsule W-225 results. Comparison of the FCS DOT 4 model results for W-225 to those of the BNL report will provide an equivalent benchmark. The results of this Phase 1 effort will be reported to the NRC in OPPD's CPR submittal planned for August 12, 1993.

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The second, longer term phase includes use of the ENDF/B-VI library to benchmark the FCS reactor vessel fluence data (i.e. the FCS DOT 4 model) to the PCA. OPPD will perform this benchmark following both endorsement of the ENDF/B-VI cross-section library by the ANS Standards Committee and the issuance of the NRC Regulatory Guide on fluence (currently Draft Guide DG-1025). OPPD will complete this Phase 2 work and report the results to the NRC within 18 months after issuance of the subject Regulatory Guide.

Upper Shelf Energy

This item involves the lack of FCS specific initial Upper Shelf Energy (USE) data for the beltline welds (Reference 4). Additional justification for the conclusion that the plate and weld USE values remain greater than or equal to the 10 CFR 50 Appendix G limit of 50 ft-lbs through the year 2013 was requested. OPPD plans to resolve this item as follows:

Plate Materials - Initial transverse orientation USE values and copper content as contained in our Generic Letter 92-01 response (Reference 4) will be used in conjunction with the projected peak inside vessel fluence (at 2013) to predict the USE values at the vessel quarter thickness. The predictions will be made in accordance with Position 1.2 of Reg. Guide 1.99, Rev. 02.

Post-irradiation surveillance plate test results will be extracted from the W-225 and W-265 surveillance capsule evaluations. The results will be analyzed in accordance with Position 2.2 of Reg. Guide 1.99, Rev. 02 and the percent USE reduction will be projected to the year 2013 for the vessel quarter thickness. This percentage reduction will be adjusted for differences in copper content and then applied to all six of the beltline plates.

Weld Materials - Copper content values contained in Reference 4 for beltline welds 2-410 A, B & C and 9-410 will be used in this evaluation. A revised copper content value will be used for the beltline weld 3-410 A, B & C weld wire heat #27204 component as discussed at the April 7, 1993 meeting due the expanded chemistry data recently obtained by OPPD. The most limiting wire heat (based on initial USE and copper content) for the 3-410 weld will be used in this assessment. Values of initial USE for each weld wire heat and weld flux type combination for the beltline welds will be quantified using the following sources:

- a) ORNL PR-EDB (NRC Surveillance Capsule Test Results Database) information extracted under the CEOG USE Equivalent Margins Analysis task.
- b) Weld material certification reports from Combustion Engineering fabricated weldments.

Heat-specific USE measurements will be used in preference to generic (i.e. flux type) data when available. Predicted values of

irradiated USE at the vessel quarter thickness for the year 2013 will be calculated using the projected peak vessel inside surface fluence specific to welds 9-410, 2-410 A, B & C and 3-410 A, B & C. USE predictions will be made in accordance with Position 1.2 of Reg. Guide 1.99, Rev. 02.

Post-irradiation surveillance weld test results will be extracted from reports for the W-225 and W-265 surveillance capsule evaluations. These results will be analyzed in accordance with Position 2.2 of Reg. Guide 1.99, Rev. 02 and the percent USE reduction will be projected to the year 2013 for the vessel quarter thickness. These percentage reductions will be adjusted for weld wire heat-specific copper content and applied to each of the three beltline welds.

Based on the above plan which credits fuel management related flux reduction improvements, OPPD will demonstrate that the minimum USE value in the year 2013 will be greater than the 10 CFR 50 Appendix G threshold value of 50 ft-lbs.

Results of the above USE work also will be reported to the NRC in the CPR submittal planned for August 12, 1993.

In summary, Phase 1 of the fluence code benchmarking and all of the USE work will be completed and the results reported to the NRC by August 12, 1993. Phase 2 of the fluence code benchmarking will be completed within 18 months of issuance of the subject Regulatory Guide. Mr. M. J. Virgilio of the NRC indicated on the May 11, 1993 telephone call that completion of the Phase 1 fluence code benchmarking and USE work is satisfactory to support NRC review and approval of the FCS CPR for these two items.

If you have any questions on the above, please contact me or members of my staff.

W. G. Gates

W. G. Gates
Vice President

WGG/pjc

- c: LeBoeuf, Lamb, Leiby & MacRae
J. L. Milhoan, NRC Regional Administrator, Region IV
S. D. Bloom, NRC Project Manager
R. P. Mullikin, NRC Senior Resident Inspector