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SUBJECT: Submits response to request for addl info re GL 92-01,Rev 1, "Reactor Vessel Structural Integrity," for plant.

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AEP:NRC:1173A

Donald C. Cook Nuclear Plant Units 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION FOR GENERIC LETTER 92-01, REVISION 1 (TAC NOS. M83453 and M83454)

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Attn: T. E. Murley

November 29, 1993

Dear Dr. Murley:

This letter is submitted in response to your October 7, 1993 letter requesting additional information regarding our response to Generic Letter (GL) 92-01, Revision 1, "Reactor Vessel Structural Integrity," for the Donald C. Cook Nuclear Plant, Units 1 and 2. The purpose of GL 92-01 is to obtain information needed to assess compliance with requirements set forth in Appendices G and H to 10 CFR Part 50 and commitments made in response to GL 88-11, "NRC Position on Radiation Embrittlement of Reactor Vessel Materials and Its Impact on Plant Operations," regarding reactor vessel structural integrity. The attachment to this letter contains the reqested information.

This letter is submitted pursuant to 10 CFR 50.54(f) and, as such an oath statement is attached.

Sincerely,

E. E. Fitzpatrick
Vice President

dr

Attachment

020001

A028
1/1

cc: A. A. Blind
G. Charnoff
J. B. Martin - Region III
NFEM Section Chief
NRC Resident Inspector
J. R. Padgett

STATE OF OHIO)
COUNTY OF FRANKLIN)

E. E. Fitzpatrick, being duly sworn, deposes and says that he is the Vice President of licensee Indiana Michigan Power Company, that he has read the forgoing RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION FOR GENERIC LETTER 92-01, REVISION 1 (TAC NOS. M83453 and M83454) and knows the contents thereof; and that said contents are true to the best of his knowledge and belief.

E E Fitzpatrick

Subscribed and sworn to before me this 29th

day of November, 19 93.

Rita D. Hill
NOTARY PUBLIC
RITA D. HILL
NOTARY PUBLIC, STATE OF OHIO
MY COMMISSION EXPIRES 6-22-94

REQUEST FOR ADDITIONAL INFORMATION REGARDING GL 92-01, REVISION 1

Donald C. Cook 1 (TAC NO. M83453)

Question 2a in GL 92-01

The response to GL 92-01 indicates that the initial upper-shelf energy (USE) values for all beltline welds, except the surveillance weld, are not known. Either provide the Charpy USE for each beltline weld or provide the Charpy USE and analysis from welds that were fabricated using the same vendor, fabrication time frame, fabrication process, and material specification to demonstrate that all beltline welds will meet the USE requirements of Appendix G, 10 CFR 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.

Attachment 6 of the response lists two sets of USE values for all six beltline plates. Confirm that the transverse USE values (under the heading NMWD) in Table 7 are derived from longitudinal specimens and the corresponding values in Table 8 are actual test data. Also confirm that both sets of USE values are unirradiated ones.

Response

Full charpy test curve data was not developed for each beltline region weld in the Donald C. Cook Unit 1 reactor vessel. The intermediate-to-lower shell circumferential weld seam , 9-442 is made from the same heat and flux of wire used in the Kewaunee and Maine Yankee reactor vessel surveillance programs. Therefore, the charpy test data from the Kewaunee and Maine Yankee reactor vessels will be used for the Donald C. Cook intermediate-to-lower shell circumferential seam weld. The chemical and mechanical properties of the Kewaunee and Maine Yankee reactor vessel material surveillance weld are presented in WCAP-8107[A] and WCAP-12819[B], respectively. The longitudinal seam welds in the Donald C. Cook Unit 1 beltline region were fabricated with a tandem submerged arc process using wire heats 12008 and 13253 with Linde 1092 flux, lot 3791. Full charpy test curve data is not available for this combination of wire and flux; however, charpy data with Linde 1092 flux, lot 3791 is available for the 13253 weld wire and the 12008 weld wire in combination with other tandem welds. The Donald C. Cook Unit 1 reactor vessel material surveillance weld was fabricated from weld wire heat 13253 and Linde 1092 flux, lot 3791. The reactor vessel material surveillance weld for Diablo Canyon Units 1 & 2 and McGuire Unit 1 contain the 12008 weld wire heat in tandem with other weld wires. The Charpy test values for weld wire heat 12008 with Linde 1092 flux , lot 3791 are presented in WCAP-9195[C], WGAP-8465[D] and WCAP-8783[E], for McGuire Unit 1 and Diablo

Canyon Units 1 & 2, respectively. The Diablo Canyon Units 1 & 2 and McGuire Unit 1 reactor vessels were fabricated using the same vendor and the same fabrication process as the Donald C. Cook Unit 1 reactor vessel.

Attachment 6 of the response lists two sets of USE values for all six beltline region plates. The transverse USE values (under the heading NMWD) in Table 7 are 65% of the values from actual test data for longitudinal specimens (under the heading MWD). These tests were performed by Combustion Engineering on unirradiated specimens and are provided on the Materials Certification Reports.

The values in Table 8 are also from actual test data on unirradiated specimens. These tests were performed by Westinghouse on transversely oriented specimens.

Question 2b in GL 92-01

Attachment 3 of the response reports a chemical composition of 0.28% copper and 0.74% nickel for the axial welds (wire heat numbers 13253 and 12008) and the circumferential welds (wire heat number IP3571). This chemistry data is from the surveillance weld of wire heat 13253, and cannot be used for beltline welds with different heat numbers although they all used the same Linde 1092 flux. Either provide the chemistry data for each beltline weld or establish a generic chemistry value from all Linde 1092 welds that were fabricated using the same vendor, fabrication time frame, fabrication process, and material specification. Update the end-of-life (EOL) USE and RT_{PTS} calculations based on this new weld chemistry value to demonstrate that all beltline welds will meet the USE requirements of Appendix G, 10 CFR Part 50 and RT_{PTS} limits of 10 CFR 50.61.

Attachment 6 of the response indicates that the initial RT_{NDT} value for all beltline welds is 0°F. The corresponding value from the pressurized thermal shock (PTS) submittal dated March 19, 1987, is -56°F. Resolve this discrepancy and provide the basis for the single value to be reported.

Response

The chemical properties for the Donald C. Cook Unit 1 intermediate to lower plate seam weld, weld wire heat No. IP3571, are based on the results of chemical analysis presented on page 1 of Attachment 1 and the results of additional chemical analysis of the Kewaunee reactor vessel material surveillance weld, Reference F. An average of the data provides a Cu and Ni content of 0.28% and 0.74%, respectively.

The chemistry data for the Donald C. Cook Unit 1 longitudinal beltline region seam

welds are based on the results of the chemical analysis presented on page 2 of Attachment 1.

> "The longitudinal weld seams in the beltline region of the vessel were made with a tandem submerged arc process using weld wire heats 12008 and 13253 with Linde 1092 flux lot 3791. No as deposited weld chemistry exists for this combination of wires and flux. Four other tandem welds which contained wire heat number 12008 showed as deposited copper contents of 0.19 to 0.27%. The surveillance weld which was made from wire heat 13253 and Linde 1092 flux lot 3791 and which has a copper content of 0.27% is considered to be highly representative of the longitudinal weld seams and the use of its chemistry for the longitudinal weld seams appears appropriate."

The copper and nickel content for the Donald C. Cook Unit 1 reactor vessel material surveillance weld is 0.27% and 0.74%, respectively, per Attachment 6 to the original response.

The Standard Review Plan 5.3.2 and Branch Technical Position 5-2 "Fracture Toughness Requirements", provides the initial guidelines for estimating the initial RT_{NDT} values for materials when drop weight tests or full charpy tests were not performed. These guidelines were used in estimating the initial RT_{NDT} values for the Donald C. Cook Unit 1 welds to be 0°F. This value differs from the values used later in the pressurized thermal shock (PTS) submittal dated March 19, 1987. The PTS submittal followed the guidelines presented in the PTS Rule (10CFR50.61), which states that when measured values of RT_{NDT} are not available that the generic mean values must be used, -56°F for welds made with Linde 1092.

Donald C. Cook Unit 2 (TAC No. M83454)

Question 2a in GL92-01

Attachment 7 of the response listed the USE values for plates C5556-2, C5540-2 and C5592-1 as 90, 110 and 103 ft-lbs. Identify the orientation of the Charpy specimens from which these values were obtained.

Response

Attachment 7 of the response listed the USE values for plates C5556-2, C5540-2 and C5592-1 as 90, 110 and 103 ft-lbs. These values were obtained from tests performed by Westinghouse on transversely oriented specimens.

REFERENCES

[A] WCAP-8107, "Wisconsin Public Service Corp. Kewaunee Nuclear Power Plant Reactor Vessel Radiation Surveillance Program", S. E. Yanichko, et al., April 1973.

[B] WCAP-12819, "Analysis of the Maine Yankee Reactor Vessel Second Wall Capsule Located at 253°", E. Terek, et al., March 1991.

[C] WCAP-9195, "Duke Power Company William B. McGuire Unit No. 1 Reactor Vessel Radiation Surveillance Program", J. A. Davidson and S. E. Yanichko, November 1977.

[D] WCAP-8465, "Pacific Gas and Electric Company Diablo Canyon Unit No. 1 Reactor Vessel Radiation Surveillance Program", J. A. Davidson, et al., January 1975.

[E] WCAP-8783, "Pacific Gas and Electric Company Diablo Canyon Unit No. 2 Reactor Vessel Radiation Surveillance Program", J. A. Davidson and S. E. Yanichko, December 1976.

[F] Safety Evaluation by the Office of Nuclear Reactor Regulation Relating to Fast Neutron Fluence for Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events, 10 CFR 50.61, Wisconsin Public Service Corporation Kewaunee Nuclear Power Station Docket No. 50--305.