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SUBJECT: Responds to NRC 951219 ltr,providing addl info to confirm util assessment of structural integrity of plant RPV,per GL 92-01,Rev 1,Suppl 1.

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NRC-96-13

January 25, 1996

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

Ladies/Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Reactor Vessel Structural Integrity

References:
1) Letter from C.R. Steinhardt (WPSC) to Document Control Desk (US NRC) dated August 21, 1995

2) Letter from R.J. Laufer (US NRC) to M.L. Marchi (WPSC) dated December 19, 1995

3) Letter from C.R. Steinhardt (WPSC) to Document Control Desk (US NRC) dated April 28, 1995

4) Letter from D.G. McDonald, Jr. (US NRC) to R.E Denton (BGE) dated January 2, 1996

5) Generic Letter 92-01, Revision 1, Supplement 1, dated May 19, 1995

On May 19, 1995, the U.S. Nuclear Regulatory Commission (NRC) issued Generic Letter 92-01, Revision 1, Supplement 1, which requested that licensees identify, collect and report any new data pertinent to the analysis of structural integrity of their reactor pressure vessels (RPVs) and to assess the impact of that data on their RPV integrity analysis. Reference 1 transmitted our response to Generic Letter 92-01, Revision 1, Supplement 1, for the Kewaunee Nuclear Power Plant (KNPP). This response contained three assessments of the affect of surveillance data on the adjusted reference temperature of the limiting beltline material for KNPP.

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Most recently, the NRC issued a letter to Wisconsin Public Service Corporation (WPSC) reporting that the staff had reviewed WPSC's response to Generic Letter 92-01, Revision 1, Supplement 1. However, during their review, the staff determined that additional information was required to confirm WPSC's assessment of the structural integrity of the KNPP RPV.

The NRC requested that WPSC provide a schedule for responding to the following information within 30 days of receipt of reference 2:

1. Demonstrate that -50^0F is a bounding value of initial reference temperature. Compare the unirradiated Charpy impact and drop weight test data that is the basis for the initial reference temperature of -50^0F to the unirradiated Charpy impact and drop weight test data from all other welds (data from sister plants and the ABB/CE database) fabricated using heat number IP 3571 weld wire. If the data is not bounding, the licensee should use the mean value and standard deviation for Combustion Engineering Linde 1092 welds to determine the initial reference temperature and margin term in their reactor vessel integrity assessments.

2. Since the amount of copper reported for welds fabricated using heat number IP 3571 weld wire varies from 0.066% to 0.53%, the licensee should determine the best-estimate copper using a weighted average. The weighted average for heat number IP 3571 weld material should be calculated by:

   (a) determining the amount of copper for each weld in the database;

   (b) determining the number of coils used in the fabrication of the weld; and

   (c) dividing the sum of the products of the average amount of copper for a weld and the number of coils used to fabricate the weld by the number of coils used to produce the welds.

   For each weld sample in the database, identify the location within the sample where the measurements were taken. The best-estimate nickel should be a simple average of the average nickel from each weld in the database. Based on these best-estimate values of copper and nickel and using the surveillance data ratio procedure in Regulatory Guide (RG) 1.99, Revision 2, determine the adjusted reference temperature for heat number IP 3571.

WPSC's response to your request for a schedule for responding to the requested information is provided below.

Item 1

WPSC recently conducted drop weight testing on the surveillance weldment used to monitor the limiting beltline weld material for KNPP. The surveillance weldment is identical to the KNPP beltline girth weld, even to the degree of the stress relieving. Both weldments were made with 3/16 inch diameter B-4 wire, heat number IP 3571, and Linde 1092 flux, lot number 3958, by a submerged arc process. The surveillance program weldment was stress relieved at 1150 +/- 25^{0}F for 19 and 1/4 hours and the KNPP RPV was stress relieved at 1150 ^{0}F for 21 hours. The results of this work were provided to the NRC staff in Reference 3. WPSC performed this work in part to be able to reduce the magnitude of the margin term specified in Regulatory Guide 1.99, Revision 2. This work was performed in accordance with ASTM E208 and ASME Code, Section III, Division 1, NB-2330. These results satisfy 10CFR50.61 requirements and are therefore applicable to the KNPP RPV.

We understand the NRC Staff's concern with respect to variations in the reported data for material properties within a given class of material. However, WPSC questions the technical basis associated with the approach and methodology suggested by the NRC under Item No. 1: Complicating this issue further are the recent revisions to 10CFR50.61 which became effective January 18, 1996. WPSC continues to believe that fracture toughness testing is the best approach for resolving this issue of material properties.

All three PWR Owners Groups have funded programs to perform fracture toughness testing of reactor vessel materials. These programs will confirm that the values of RT_{NDT} determined via Drop Weight/Charpy testing are conservative. Testing on unirradiated material will be performed on various specimens ranging in size from Charpy size to 2T specimens. The Westinghouse Owners Group (WOG) program (MUHP-5058/5059) will include testing of the surveillance weldment used to monitor the limiting beltline weld for KNPP. The WOG program is scheduled to be completed December 30, 1996.

Because of our differing technical position and approach, the need to study the rule revisions, and the knowledge that fracture toughness data for heat IP 3571 will soon be available, WPSC plans to provide a detailed response to Item 1 within 6 months of completion of these Owner's Groups' programs and issuance of their final report.

Item 2

In the past, WPSC did not docket a best-estimate weighted average copper value based on the number of coils used in fabrication of each of the surveillance welds because of the judgement involved in the process. WPSC is unaware of any fabrication record(s) that state the actual

number of coils used to fabricate the welds. Thus, the number of coils used in fabrication of each of the welds must be estimated from information that was documented at the time of fabrication and from additional chemical analysis of each weldment. Information typically required to estimate the number of coils used in fabrication of the welds include: size of the weldment, available chemistry information, and the weight of the coils used to fabricate Combustion Engineering Linde 1092 welds. In order to satisfy the Staff's request for information, WPSC has performed a preliminary calculation to determine the best-estimate weighted average copper value for KNPP based on our estimate of the number of coils used to fabricate each of the welds. This data supports a best-estimate weighted average copper value of 0.297%. The best-estimate value of copper for heat number IP 3571 will be independently verified by the Combustion Engineering Owners Group Reactor Vessel Working Group (CEOG-RVWG).

Summary of Heat IP 3571, Linde 1092 Flux Lot No. 3958 by Group/Weld

Group	Description	Number of Measurements	Simple Ave Cu%	Simple Ave Ni%
CE Weld Qualification	M1.42 (D8669)	1	0.40	0.82
CE Weld Qualification	M1.43 (D8698)[1]	1	0.37	0.75
Maine Yankee	Surveillance Material	19	0.353	0.76
KNPP	Surveillance Material	28	0.219	0.724
LaSalle	Surveillance[1] Material	13	0.21	0.78
Hatch 1	Surveillance[1] Material	1	0.28	0.76
Note (1) Tandem Weld		Sum	1.83	4.59
Best-Estimate Cu % and Ni %		Ave of Ave's	0.305	0.766

The CEOG-RVWG has undertaken a task (No. 902) to further research data files and log books compiled by CE to identify additional data relevant to reactor vessel integrity. This task is focusing on data that may be available in locations other than the plant specific RPV fabrication records which were reviewed in the recently completed CE-Reactor Vessel Group program. Likely areas where additional relevant data may exist include the fabrication records for steam generators and pressurizers. The CEOG-RVWG task will compile and evaluate all available data relevant to reactor vessel integrity to determine best estimate weld chemistry for each CE fabricated weld heat. This evaluation will consider the number of coils used in the fabrication of the weld. WPSC is participating in this task. This program is scheduled to be completed in December 1996.

In the interim, WPSC believes that the information provided above and in Reference 1 is valid for assessing the structural integrity of the KNPP RPV. This data supports a simple average copper value of 0.26% and a nickel value of 0.75%. Averaging the simple average copper and nickel values for each group/weld results in a best-estiinate weighted average Cu % of 0.305 and Ni % of 0.766. Double counting the copper in the tandem welds results in a best-estimate weighted average Cu % of 0.30. And estimating the number of coils used to fabricate each of the welds results in a best-estimate weighted average Cu % of 0.297. If none of these approaches is acceptable for use on an interim basis, WPSC suggests using the approach recently endorsed by the NRC in Reference 4. This approach used a copper value of 0.226%, which is the mean copper value from all Combustion Engineering surveillance welds fabricated with copper primary electrodes.

Summary

WPSC plans to continue working with the other IP 3571 sister plant utilities, NSSS vendors, and Owners Groups to address these issues. This submittal provides a schedule for currently funded industry programs that will address both of the staffs' questions in more detail. Also, provided herein is a preliminary assessment of the best-estimate weighted average Cu% (0.297) for heat number IP 3571 based on WPSC's estimation of the number of coils used to fabricate each of the surveillance weldments. Three different methods of calculating the weighted average Cu% were investigated; all of them result in a Cu% of approximately 0.30. The best-estimate value of copper for heat number IP 3571 will ultimately be determined by the CEOG-RVWG under task 902. And as previously stated, WPSC will provide the staff with a status report following completion of related industry programs.

Should you have any questions or require additional information, please contact a member of my staff.

Sincerely,

Clark R. Steinhardt
Senior Vice President - Nuclear Power

CAT

cc: US NRC Region III
US NRC Senior Resident Inspector

Subscribed and Sworn to
Before Me This 25th Day
of January 1996

Jeanne M. Ferris
Notary Public, State of Wisconsin

My Commission Expires:
June 13, 1999

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