Docket File

50-454
50-456

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 25, 1996

Ms. Irene Johnson, Acting Manager
Nuclear Regulatory Services
Commonwealth Edison Company
Executive Towers West III
1400 Opus Place, Suite 500
Downers Grove, IL 60515

SUBJECT: THIRD REQUEST FOR ADDITIONAL INFORMATION REGARDING THE AUGUST 2, 1996, PROPOSAL TO DELETE THE BRAIDWOOD UNIT 1 MID-CYCLE STEAM GENERATOR TUBE INSPECTION (TAC NO. M96368)

Dear Ms. Johnson:

In your letter dated August 2, 1996, you proposed to delete the Braidwood, Unit 1 mid-cycle steam generator (SG) tube eddy current inspection (ECI) whose purpose was to determine the extent and severity of circumferential outer diameter stress corrosion cracking (ODSCC). At that time, this Braidwood 1 ECI was scheduled to start on October 11, 1996. The staff stated in its letter dated October 3, 1996, transmitting a second request for additional information (RAI) that it did not believe it could reach a decision on your pending proposal prior to the scheduled start of the Braidwood 1 ECI. Subsequently, you started this inspection on October 11, 1996, as previously planned.

In your letter dated October 18, 1996, you proposed to use the same methodology and database as technical justification for your proposal to delete the Byron 1 mid-cycle SG ECI, presently scheduled for September 1997. The purpose of this latter ECI is the same as that for the Braidwood 1 ECI discussed above. Because this proposed methodology and accompanying database continue to be relevant to determining the acceptable length of the operating cycle between ECI inspections for circumferential ODSCC for both Byron 1 and Braidwood 1 SGs, the staff has continued its review of your original proposal of August 2, 1996, including your responses to our two previous RAIs. Accordingly, we have identified a need for additional information which is contained in the attachment to this letter.

DF01/1

If you have any questions on these matters, please contact me at (301) 415-3023.

Sincerely,

Original signed by:

M. David Lynch, Senior Project Manager
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-454, STN 50-456

Enclosure: Request for Additional Information

cc w/encl: see next page

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REQUEST FOR ADDITIONAL INFORMATION

REGARDING THE PROPOSED DELETION OF THE MID-CYCLE EDDY CURRENT INSPECTIONS

OF THE

BYRON, UNIT 1 AND BRAIDWOOD, UNIT 1 STEAM GENERATORS

DOCKET NOS. STN 50-454 AND STN 50-456

1. Eddy current data coil correction factors determined by the staff are not consistent with those discussed in the licensee's response to Question 20 in its submittal dated September 24, 1996. Based on calculations using the data provided in Table 19b, the coil correction factor for converting data normalized to 10-volts on the through-wall hole is 0.98 and 1.03 for maximum and average voltages, respectively. The value discussed in the response to Question 20 was 0.75. The staff believes that the text in the response to this question is incorrect in stating that the factor is for adjusting voltages normalized to 10-volts on the through-wall hole. The basis for this belief is that the staff's calculations determined a coil correction factor of about 0.76 for converting data normalized to 20-volts on the EDM notch. Discuss this apparent discrepancy in the calculated coil correction factor.

2. In its letter dated October 10, 1996, the licensee states that analyst uncertainty is included in the end of cycle (EOC) distributions and does not need to be double counted in the burst and leak correlations by means of an adjustment for scatter in the data from the coil and calibration procedures. Although there is expected to be some level of analyst uncertainty in the data to support the proposed correction factors, the staff cannot confirm whether the scatter is entirely due to analyst variability. Accordingly, assess the degree of scatter in the correction factors due to differences in eddy current data acquisition and setup.

3. As discussed in Question 2 of the staff's letter dated October 3, 1996, voltage correction errors could significantly alter the leak rate correlation. Accordingly, assess and discuss the potential increase in leakage which could occur under postulated main steam line break (MSLB) accident conditions by applying bounding correction factors to the voltages for the leak rate data.

4. In the staff's review of the data used to develop the proposed leakage correlation, it noted that operational leakage data was not incorporated from at least one past forced outage due to excessive primary-to-secondary tube leakage. Specifically, operational leakage data from the shutdown of Arkansas Nuclear One, Unit 2, in March of 1992 was apparently not included in Table 5. In addition, the staff noted that other in-situ pressure test leakage data was not included. Provide a list of all tubes for which leakage (operational or in-situ) data are

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available and discuss the basis for excluding data in the proposed leak rate correlation. Identify the plant, steam generator, tube identification, the year the data was obtained, and the corresponding data on leakage for each of the tubes in this list. Provide the basis for assuming a maximum leak rate of 0.16 gallons per minute (gpm) when in-service leak rate events, similar to that cited above, were determined to have leakage rates at normal operating differential pressures higher than 0.16 gpm.

5. The indication listed in Table 5 with a measured leak rate of 0.29 gpm at a test pressure of 4200 psi appears to be data obtained from a 1996 in-situ pressure test at the Calvert Cliffs Nuclear Power Plant, Unit 1. The inspection coil listed for the eddy current data for this indication is stated to be a 0.080-inch pancake coil. However, the information provided in Table 21 of the licensee's submittal dated September 24, 1996, indicates that data from Calvert Cliffs, was obtained using a 0.115-inch coil. If the data from the tube in question was obtained from inspections at Calvert Cliffs, discuss how the eddy current voltages were obtained. Include in the discussion, a description of the probe and coils used and the voltage calibration procedure for each coil. Indicate the voltage measurements listed in Table 5 that were the actual measured values from the data.

6. The licensee's response to Question 14 in its submittal dated September 24, 1996, states that leakage data were adjusted to MSLB differential pressures and temperatures using the PICEP computer program. Provide a description of how this computer program was benchmarked to assess its accuracy in applications involving steam generator tube circumferential flaws. Include test data to support your conclusions.

7. Given the limited available data for the burst pressure correlation and the fact that only two pulled tube specimens burst circumferentially during testing, the staff believes that a correlation between burst pressure and circumferential crack voltage may not be feasible at present. Specifically, the staff believes that extrapolating a curve to higher voltages to predict the voltage at the structural limit is questionable with the data currently available. Additional data is necessary to support such a correlation. (Refer to Question 6 in the staff's RAI dated September 9, 1996.) Discuss the potential for using a lower bound voltage threshold below which the likelihood for circumferential flaw burst is considered to be low based on available burst and in-situ pressure test data.

8. The staff has identified some differences in the essential variables that were not identified or discussed in the licensee's response to Question 21 provided in its submittal dated September 24, 1996. Inspections at three of the plants listed in Table 21 (ANO, Millstone, and Palo Verde) used 400 kHz as the prime frequency (PF). The remaining data were obtained in inspections using 300 kHz as the PF. If 300 kHz

PF of 400 kHz, discuss how the data were corrected to compensate for differences in flaw voltage response. Provide data that supports your conclusions. Also, the probe extension cable type was not indicated in Table 21. Discuss the influence on flaw voltage response resulting from differences in extension cable length and type, if applicable.

9. One focus of Question 23 provided in the staff's RAI dated September 9, 1996, was to assess the voltage threshold at which the 0.080-inch coil detected potentially more significant tube circumferential flaws with a high degree of assurance. This was the focus of requesting that the licensee provide a relationship between 0.080-inch coil voltages and those measured with a plus point coil. However, the response provided to Question 23 in the submittal dated September 24, 1996, did not include an answer to the staff's question on the relationship between these voltages. Explain the relationship between the circumferential indication eddy current voltages as measured with the 0.080-inch coil to those measured using the plus point coil.