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July 13, 1994
NTD-NRC-94-4197

Document Control Desk
US Nuclear Regulatory Commission
Washington, DC 20555

Attention: B. Sheron, Director
Division of Engineering, NRR

Subject: Response to Request for Additional Information Items 2B thru 2G

Dear Mr. Sheron:

Attached is one copy of letter report NSD-TAP-3079 "Response to Request for Additional Information (TAC No. MB9116), Items 2B - 2G, in support of the Braidwood Unit 1 Steam Generator Tube Interim Plugging Criteria". This report provides responses to items 2B thru 2G requested by the NRC staff to continue the review of the tube support plate deflection analysis. This report contains information which is proprietary to Westinghouse Electric Corporation. Accordingly, we request that this information be withheld from public disclosure.

We will comply with the requirements of 10 CFR 2.790 to provide proprietary and non-proprietary versions of the above material together with an affidavit as soon as the proprietary and non-proprietary versions have been prepared. We will submit the total required number of copies of the proprietary and non-proprietary versions of the information and the required affidavit at that time.

In the meantime, we have provided sufficient copies for your information and use. M. P. Siemien, Esq. of the NRC Office of the General Counsel, has advised Westinghouse that she concurs with this procedure.

We expect to be able to fully comply with the requirements for the proprietary and non-proprietary versions of the information and an accompanying affidavit within four weeks.

Very truly yours,

Robert Sheeder for
Nicholas J. Liparulo, Manager
Nuclear Safety and Regulatory Activities

GWW/cld
Attachment

CIN432:GWW/071294

B. Sheron, Director
NTD-NRC-94-4197
July 13, 1994

bcc: N. J. Liparulo - EC East 4-10
Project Letter File - EC West 233
T. A. Pitterle - Waltz Mill
R. F. Keating - Waltz Mill
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W. K. Cullen - EC East 4-09
G. W. Whiteman - EC East 4-09
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J. M. Moore - Expo 335
M. D. Beaumont - EC East 4-10
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CIN432-GWW/071394

# ATTACHMENT 1

RESPONSE TO PART ONE OF THE

REQUEST FOR ADDITIONAL INFORMATION

DATED JULY 7, 1994

TO SUPPLEMENT REQUESTED TECHNICAL SPECIFICATION AMENDMENT

COMMONWEALTH EDISON COMPANY

BRAIDWOOD STATION, UNIT 1

Although it may seem on the item by item comparison which follows that the N-16 steam line monitors would be more sensitive and responsive to the control room operators, the October 23, 1993, Braidwood Unit 1 "C" SG primary-to-secondary leak event clearly demonstrated that the existing steam jet air ejector/gland steam process radiation monitor and main steam area radiation monitors provided more than adequate indication to the control room operators of plant conditions. Since that event these radiation monitor setpoints have been reduced to provide even earlier indication of a suspected primary-to-secondary leak. Additionally, trending of these radiation monitor indications has been enhanced since the October 23, 1993, event. Braidwood believes that the marginal increase to safety that would be gained by the installation of N-16 steam line monitors does not offset the approximately $400,000 per unit cost for installation of the modification.

1. The response offered in the attachment to ComEd's letter of May 4, 1994, addressed the expected impact of installing N-16 steam line monitors. The response discussed existing radiation monitoring capabilities considered equivalent to N-16 monitors. To more clearly compare the monitoring methods, please address the following:

   a. Furnish a comparison of the sensitivity of the steam jet air ejector/gland steam process radiation monitor and the N-16 monitor considered under the proposal to install N-16 monitors discussed in the May 4, 1994, letter. Sensitivity should be characterized by the minimum detectable primary-to-secondary leakage levels compared at the same power level, the response time of the instruments, and the delay involved from instrument leakage response to indication available in the control room. Also contrast the ability of the monitoring methods to differentiate the leaking steam generator (SG) in terms of time from leak initiation to indication available to the operators.

      The sensitivity of the existing steam jet air ejector/gland steam process radiation monitor to detect primary-to-secondary leakage is 10 gallons per day (gpd) based on data gathered from the October 23, 1993, Braidwood Unit 1 "C" SG primary-to-secondary leak event. Sensitivity may vary with other parameters such as reactor coolant system activity which can vary significantly during the fuel cycle. Assuming the same power level, N-16 monitors have a sensitivity of 1 gpd based on vendor supplied information.

      The total response time (transit time from the leaking SG to the monitor plus the monitoring processing time which is considered to be negligible) of the existing steam jet air ejector/gland steam process radiation monitor and main steam area radiation monitors to provide indication in the control room of primary-to-secondary leakage is less than 1 minute as compared to almost instantaneously for N-16 monitors.

      The existing steam jet air ejector/gland steam process radiation monitor will not differentiate for the control room operators which SG is affected. The control room operators can, however, use the main steam area radiation monitor indications to determine the affected SG. N-16 monitors would differentiate the affected SG to the control room operators. In either case, the control room operators would immediately know which SG was affected.

b. **Considering the detection methods covered in 1(a), discuss the ability to furnish leak rate trending information to the control room operators.**

The existing steam jet air ejector/gland steam process radiation monitor and main steam area radiation monitors provide indication in the control room to the control room operators. These indications read out in microCuries per milliliter (uCi/ml) and milliRem per hour (mR/hr), respectively. Conversion of these uCi/ml and mR/hr readings to gpd leak rates will be performed by the Chemistry Department using Braidwood Chemistry Procedure (BwCP) 310-4A1, "Steam Generator - Primary to Secondary Leakrate Estimation," Revision 0. Data from the October 23, 1993, Braidwood Unit 1 C SG leak event was used to determine the conversion. These conversions can be performed to provide an estimate within a minute after the control room operators make the request of Chemistry Department personnel.

N-16 monitors would provide the control room operators with an immediate gpd leak rate indication. However, for the indication to be considered accurate, the N-16 monitor would have to be calibrated during a primary-to-secondary leak event and after the leak had been quantified using other methods, i.e., chemistry grab samples.

c. **Explain how the portable N-16 monitor is to be used during a primary-to-secondary leak event. Include what conditions prompt its use, how the instrument is calibrated, the time required to obtain an indication from the time an order is issued to use the portable monitor. Also furnish a sensitivity comparison of this device to the permanently installed monitoring equipment as discussed under 1(a).**

Braidwood Unit 1 Operating Abnormal Procedure (1BwOA) SEC-8, "Steam Generator Tube Leak - Unit 1," Revision 53, Step 5c directs control room operators to monitor secondary radiation monitors for increasing trends during a primary-to-secondary leak event. The portable N-16 monitor is one of the options available to perform this function. If this option were to be utilized an Equipment Operator/Equipment Attendant (EO/EA) would have to be dispatched to physically move, if required, the portable N-16 monitor to the affected steam line. This activity would take 10 to 15 minutes depending upon which steam line was being monitored at the initiation of the event and the actual steam line that was affected. Leak rate indication would be read locally at the monitor by the EO/EA and communicated to the control room operators.

In order for the leak rate indication from the portable N-16 monitor to be considered accurate during a primary-to-secondary leak event, the monitor would have to be calibrated during the event and after the leak had been quantified using other methods, i.e., chemistry grab samples. Therefore, the portable N-16 monitor is not calibrated on a periodic frequency and is considered a tool that is available to operating personnel to evaluate plant conditions.

The sensitivity of the portable N-16 monitor is 1 gpd based on vendor supplied information which is the same as that of permanently installed N-16 monitors.

d. **Discuss, in detail, the method used to estimate primary-to-secondary leak rate from area radiation monitors and process radiation monitor indications.**

In the event that the control room operator suspects a primary-to-secondary leak, the control room operator would contact the Chemistry Department to confirm whether or not a primary-to-secondary leak exists. Several methods are available to the Chemistry Department to determine if a primary-to-secondary leak exists, the quantity of the primary-to-secondary leak, and the affected SG.

The first method is to sample each SG on the affected unit and perform an isotopic analysis utilizing BwCP 310-4, "Steam Generator - Primary to Secondary Tube Leak Rate," Revision 4. The analysis will determine which SG is affected and the quantity of the primary-to-secondary leakage. This method requires a 50 minute sample time in order to provide accurate results and will take approximately 1.5 hours to complete. This is the method that is utilized at Braidwood to determine compliance with the Technical Specification 3.4.6.2.c primary-to-secondary leakage limits.

The second method is to perform a quick count (10 minute versus 50 minute sample) utilizing BwCP 310-4. This limited sample is not accurate enough to be used to determine compliance with the Technical Specification 3.4.6.2.c primary-to-secondary leakage limits, but is sufficient to provide the Operating Department with a reasonably accurate indication of plant conditions.

The third method is to estimate primary-to-secondary leak rates in accordance with BwCP 310-4A1 by converting the current steam jet air ejector/gland steam process radiation monitor and/or main steam area radiation monitor readings to a gpd leak rate as discussed in the response to 1(b) above.

e. **Regarding the monitoring methods discussed in 1(a) and 1(c), compare the work load encountered by the operators during a tube failure event. Discuss sources of errors and chances of operator faults for the monitoring alternatives.**

Using the existing steam jet air ejector/gland steam process radiation monitor and main steam area radiation monitors during a primary-to-secondary leak event, the control room operators would have to obtain the indication from the affected monitor on the RM-11 and notify the Chemistry Department to convert that indication to a gpd leak rate as discussed in the response to 1(b) above. The sources of error would be a miscommunication between the control room operator and Chemistry Department personnel or an error on the part of the Chemistry Department personnel utilizing BwCP 310-4A1.

Using the permanently installed N-16 monitors, the control room operators would be able to obtain a gpd leak rate directly from the RM-11. One source of error is the accuracy of the indicated gpd leak rate. The indication would not be considered accurate until the N-16 monitor was calibrated during a primary-to-secondary leak event and after the leak had been quantified using other methods, i.e., chemistry grab samples. This could lead the operator to take inappropriate actions. Another source of error would be the control room operator obtaining the indication from an unaffected steam line.

Using the portable N-16 monitor during a primary-to-secondary leak event, the control room operators would have to dispatch an EO/EA to the monitor to obtain a gpd leak rate reading. One source of error is the accuracy of the indicated gpd leak rate. The indication would not be considered accurate until the N-16 monitor was calibrated during a primary-to-secondary leak event and after the leak had been quantified using other methods, i.e., chemistry grab samples. This could lead the operator to take inappropriate actions. Another source of error would be a miscommunication between the control room operator and the EO/EA.