Commonwealth Edison Company
1400 Opus Place
Downers Grove, IL 60515

ComEd

September 20, 1995

Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attn: Document Control Desk

Subject: Teleconference between Commonwealth Edison Company and the Nuclear Regulatory Commission dated September 13, 1995, Regarding the Increase in the Interim Plugging Criteria for Byron Unit 1 and Braidwood Unit 1
NRC Docket Numbers: 50-454 and 50-456

References:
1. Teleconference between Commonwealth Edison Company and the Nuclear Regulatory Commission dated September 13, 1995, Regarding the 3 Volt Increase in the Interim Plugging Criteria Request

2. D. Saccomando letter to Nuclear Regulatory Commission dated September 1, 1995, transmitting the response to Request for Additional Information Number 4

3. D. Saccomando letter to the Nuclear Regulatory Commission dated September 2, 1995, transmitting Steam Generator Internals Inspection Plan

In the reference teleconference, the Nuclear Regulatory Commission (NRC) discussed several items with the Commonwealth Edison Company (ComEd) pertaining to the request to increase the interim plugging criteria for the Braidwood Unit 1 and Byron Unit 1 steam generators. The conversation focused on clarification of ComEd's response to Request for Additional Information, number 4 (Reference 2) and ComEd's Steam Generator Internals Inspection Plan (Reference 3). The attachment to this letter documents the issues which were clarified during that teleconference.

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If you have any questions concerning this correspondence please contact this office.

Sincerely,

Harold D. Pontious, Jr.
Nuclear Licensing Administrator

Attachment

cc: D. Lynch, Senior Project Manager-NRR
R. Assa, Braidwood Project Manager-NRR
G. Dick, Byron Project Manager-NRR
S. Ray, Senior Resident Inspector-Braidwood
H. Peterson, Senior Resident Inspector-Byron
H. Miller, Regional Administrator-RIII
Office of Nuclear Safety-IDNS

ATTACHMENT

The following provides clarification on the scope of the visual inspection program.

- Visual inspection of the wedges will be performed on the top tube support plate (TSP) of the 1A steam generator (SG) during the Braidwood Unit 1 refueling.

- The presence of the hot leg TSPs will be verified by eddy current in all SGs at all TSP intersections during the Braidwood Unit 1 refuel and Byron Unit 1 mid-cycle outages.

- The TSP eddy current inspection technique, which is currently being developed in the Electric Power Research Institute (EPRI) program, will be applied to the TSP area adjacent to the anti-rotation devices at the top TSP in all SGs, during the Braidwood Unit 1 refuel and Byron Unit 1 mid-cycle inspection.

- The wrapper alignment will be verified in all SGs during Braidwood Unit 1 refueling (A1R05) and Byron Unit 1 refueling outage (B1R07).

- All of the upper vertical bar welds (24) of the top TSP in the 1A SG will be mechanically cleaned prior to inspection during the Braidwood Unit 1 refueling outage.

- The American Society of Mechanical Engineers (ASME) VT-1 inspection requirements for personnel certification and inspection resolution capabilities shall be met.

- The entire weld length of those vertical support bars and wedges which are inspected shall be examined.

- ComEd believes that all four of the steam generators operate similarly on the secondary side and that all of the components identified for the inspections are under the same chemistry conditions. ComEd has no reason to believe that any one steam generator operates differently than the rest from a chemical environment perspective. While the 1C SG at Braidwood Unit 1 has seen the largest number of tubes with outside diameter stress corrosion cracking (ODSCC) at the TSP intersections, the 1A SG has

seen the second largest number of tubes with this condition. A visual inspection of the top TSP area was performed in 1C SG during the last refueling outage (A1R04). The 1A SG is already scheduled to have scaffolding built to support the girth weld inservice inspection (ISI) during A1R05. Therefore, the 1A SG will be inspected during the Braidwood Unit 1 refueling outage.

- The total number of vertical bar locations is 130 per steam generator. Each location contains 2 bars, one above and one below the support plate, thus there is a total of 260 vertical bars per steam generator or 1040 vertical bars for all four steam generators. Since each vertical bar contains 2 welds, 2080 vertical bar welds exist in all four steam generators. Out of the 130 vertical bar locations per steam generator, portions of 87 are considered to be accessible for visual inspection. The 87 locations (174 bars) contain a total of 348 welds. However, only a portion of these welds are accessible. As stated in Table 3.1 of the ComEd Inspection Plan, a total of 125 welds per steam generator are accessible for visual inspection. These 125 welds were categorized as low, medium, or high risk based on the potential of getting the inspection probe stuck in tight clearance areas. This is also shown in Table 3.1. The visual inspection of these welds at Braidwood are limited to the low risk welds (64) and the extent possible on the medium risk welds (45) as stated in Section 3.1.2 of the ComEd Inspection Plan.

- The welds associated with the wedges of the top TSP in the 1A SG will not be mechanically cleaned prior to inspection based on the following:

  - Approximately 1 person-rem would be required to mechanically clean the welds.

  - The wedges are not taken credit for in the TSP displacement analysis.

  Therefore, ComEd does not believe mechanical cleaning of the wedge welds is warranted.

The following provides clarification to the reporting requirements of the inspection program:

- Should any degradation of the load path internal to the SG be found during the inspection program, the NRC will be promptly notified of the degradation. A summary of the results of this inspection plan

will be submitted to the NRC prior to entering Mode 4. A complete inspection report will be submitted to the Staff within 90 days of plant start-up.

- ComEd will notify the Staff of any cracking occurring in any welds, this includes both wedge welds and vertical bar welds during the inspection.

- ComEd will notify the staff of any TSP cracking detected during the inspection program.

- ComEd will notify the staff of any stay-rod or wrapper anomalies identified during the course of inspection.

ComEd believes the proposed inspection of the tierods is adequate and that tierod shearing is not an issue based on the following:

- The tierod inspection examines either the nut for contact with the TSP or the welds for no shearing of the welds between the nut to TSP and nut to tierod. This inspection confirms that the nut has not loosened from the tierod or that the tierod has had no upward motion away from the TSP or tubesheet. Thus, the inspection verifies that the tierod has not been unthreaded from the tubesheet. If the tierod was unthreaded form the tubesheet or the nut loosens from the tierod, the nut must displace above the top TSP and the weld of the nut to the TSP or the nut to the tierod must have sheared.

- The inspection does not assess conceptual shear of the tierod between the TSPs. There is no credible loading mechanism that could lead to a shear failure in the tierods. Lateral loads may be imposed on the tierods by the support plates under seismic and/or loss-of-coolant-accident (LOCA) conditions, but even in these extreme cases of faulted events, the tierods would simply deflect laterally. The lateral deflections of the TSPs are limited to approximately 0.2 inch, which results from the diametral gap that may exist between the plates/wrapper/shell due to pressure expansion of the shell and thermal expansion effects.

The following gives clarification of ComEd's intent and the need to visually verify the vertical bars are located in their correct positions.

- ComEd will visually verify that those vertical bars selected for inspection are in their correct positions.

- However, it is not critical to the TSP displacement analyses that the bars be tightly toleranced as to position. The structural analysis is performed with the vertical bars in their nominal positions and modeled as a single nodal point. The width of the vertical bars is 2.0 inches and the bars provide support over the width of the bar compared to the point support used in the analyses. Thus, the analysis has a "built-in" positional tolerance of 1/2 the bar width or 1 inch at each bar or 2 inches between bars. The typical tolerance on positioning the bars during manufacture corresponds to an arc length of approximately 0.6 inches so that the analysis tolerance exceeds the expected manufacturing tolerance. Modeling of the bars as a 2 inch long support would tend to reduce displacements compared to the point support applied in the analysis. Thus, modeling of the bars as a pinned, point support has conservatism greater than the "built-in" one inch tolerance on bar location and quantitative measurements of the bar locations during the inspection are not considered to be necessary.

The following clarification is given for the term "TSP Trimming" and its effect on TSP displacement as used in response to Request for Additional Information (RAI) #4 Question 49.b.1.

- Potential trimming of the TSP refers to local mechanical trimming (grinding, for example) at the edges of the plate. During installation of the plates in the SG, selected tube holes in the plates are optically aligned with corresponding tube holes in the tubesheet. Within acceptable tolerances on the plate and wrapper ID, it is possible that interference between the plate and wrapper could prevent acceptable optical alignment. In this case, the plate can be trimmed at the edge to eliminate the interface. This trimming must retain a minimum ligament between the edge (rim) of the plate and the outer tube holes. This minimum ligament is adequate to provide overlap of the plate with the TSP support bars so that the bars retain their support function if the plates are trimmed. For conservatism in the TSP displacement analyses, the bars are assumed to provide only a pinned support rather than the more likely clamped support condition. Therefore, trimming of the TSPs has no affect on the TSP displacements.

The following gives clarification to the term "significant denting"

- Denting of sufficient extent to cause cracking of TSPs has been associated with TSPs that have nearly all (>50%) of the tube

intersections dented, and a large number of TSP intersections not able to pass an interim plugging criteria (IPC) standard probe (i.e., 0.610 inches for 3/4 inch tubing). In addition, hourglassing (partial closure) of the TSP cutouts along the tubelane is generally observed and measurable for plants with cracked TSPs. Substantial denting results in a diametral increase in the plate dimensions which causes high loads at plate lateral supports (wedges) and hourglassing of the tubelane flow slot. The increased loads at the plate lateral supports is a significant factor in the cracking of the TSPs.

Clarification of ComEd's involvement with eddy current anomalies seen at the patch plate location of SGs at other utilities.

- ComEd is aware that eddy current data anomalies have been seen at the TSP patch plate region of SGs at other utilities. ComEd does not have this data and as such has not interpreted it first-hand. Personal communications with other utilities and eddy current experts is the basis for the ComEd understanding that anomalies may be seen adjacent to the patch plate. In response to the possibility that TSP patch plates could cause eddy current data anomalies, the EPRI eddy current program to develop a TSP inspection technique includes a mock-up representative of the patch plate configuration.

Clarification is provided for the non-conformance of the wrapper referenced in RAI #4 Question 49b and how it relates to ability to ensure wrapper alignment.

- The non-conformance involved three topics relative to wrapper alignment considerations. The wrapper was about one inch longer than anticipated which was accommodated by raising the wrapper at the upper wrapper supports to maintain the wrapper to tubesheet gap. A second topic was that the wrapper ends were mismatched after welding by about 7/16 of an inch - i.e., the bottom of the wrapper is not flush at the weld. The third was that the bottom of the wrapper to tubesheet clearance was not uniform and varied by about 3/8 of an inch around the circumference. The latter is believed to be due to the wrapper end mismatch.

- The wrapper alignment inspection for wrapper drop is based on maintaining access from the shell ports through the wrapper cutout for access to the tube bundle. Access has been verified by prior activities such as sludge lancing. The inspection plan confirms that the wrapper has not dropped to cause blockage from the shell port to

the tube bundle. The above identified non-conformances do not impact the inspection for wrapper alignment.