

July 18, 2001

LICENSEE: Union Electric Company

FACILITY: Callaway Plant

SUBJECT: MEETING SUMMARY WITH UNION ELECTRIC COMPANY ON JUNE 7, 2001,
TO DISCUSS ELECTROSLEEVED STEAM GENERATOR TUBES AT
CALLAWAY PLANT (TAC NO. MB1214)

A meeting was held on Thursday, June 7, 2001, between the NRC staff and Union Electric Company, the licensee for the Callaway Plant. The meeting was held at the request of the licensee to explain their application of February 15, 2001, that would remove the restriction on the use of electrosleeved steam generator (SG) tubes in the Callaway Technical Specifications (TSs). The notice for the meeting was issued on May 2, 2001.

Enclosed is the list of attendees. The licensee's handout is in ADAMS at accession number ML011590321. The staff did not provide a handout at the meeting.

BACKGROUND

Amendment No. 132, which was approved on May 21, 1999, allowed the licensee to repair SG tubes with the proprietary electrosleeve tube repair method. Callaway is a four-loop pressurized water reactor with four SGs.

Because of the NRC staff's concerns with the qualification of non-destructive examination (NDE) techniques proposed for the inservice inspection (ISI) of the electrosleeved tubes, the amendment included a two-cycle operating limit which requires that all tubes repaired with electrosleeves be removed from service at the end of two operating cycles following the installation of the first electrosleeved tubes. The safety evaluation (SE) for Amendment No. 132 stated that in order for the NRC staff to approve electrosleeving without limitations, the licensee must submit another license amendment request (LAR) that addresses the staff's concerns regarding the qualification of NDE techniques used for ISI of electrosleeved tubes. The licensee was directed in the SE to address the issues contained in the May 20, 1998, NRC letter to the licensee. The NDE techniques for inspecting electrosleeved tubes are designated the Electrosleeve UT-360 techniques, where UT is ultrasonic testing (UT).

The first electrosleeved tubes were installed in SGs by the licensee in Refueling Outage No. 10 (RF10) that was conducted in the Fall of 1999, approximately 20 months ago. Therefore, the two-cycle operating limit began with that refueling outage. The licensee installed 57 electrosleeves in 2 SGs in that refueling outage. The first inspection of electrosleeved tubes was conducted in RF11, which was conducted in April and May of 2001. No new electrosleeved tubes were installed in RF11.

The licensee submitted its LAR to remove the two-cycle limitation in its application of February 15, 2001 (ADAMS Accession No. ML010520545). Enclosure 2 of the application addressed the staff's concerns about NDE examinations of electrosleeved tubes. Also in the

application, the licensee submitted Revision 4 of the proprietary report BAW-10219P, "Electrosleeving Qualification for PWR Recirculating Steam Generator Tube Repair," dated December 2000, by Framatome, which addresses the qualification of NDE techniques used for ISI of electrosleeved tubes.

MEETING SUMMARY

The licensee provided an overview of its February 15, 2001, application that would remove the two-cycle restriction in Amendment No. 132 from the TSs. The licensee presented the status of the qualification of the seven techniques for inspecting electrosleeved tubes (i.e., the Electrosleeve UT-360 techniques). The following subjects were discussed in the meeting:

- Electrosleeve UT-360 History (page 1 of licensee's slides)
- NDE UT-360 Probe (page 2 of licensee's slides)
- Electrosleeve UT-360 Techniques (page 3 of licensee's slides)
- Electrosleeve UT-360 Peer Review (page 4 of licensee's slides)
- Electrosleeve UT-360 Peer Review (continued) (page 5 of licensee's slides)
- Electrosleeve UT-360 Peer Review (continued) (page 6 of licensee's slides)
- Electrosleeve UT-360 Peer Review Results (page 7 of licensee's slides)
- EPRI [Electrical Power Research Institute] Web Page, presence of techniques on web page (page 8 of licensee's slides)
- Electrosleeve UT-360 Table 12.4.4 BAW-10219 Rev 04, table comparing flaw depth in sleeve to repair limit (page 9 of licensee's slides)
- UT Qualification Summary (page 10 of licensee's slides)
- Electrosleeve UT-360 Callaway Results, overview of Callaway results using UT-360 techniques (page 11 of licensee's slides)
- Electrosleeve UT-360 Callaway Synopsis (page 12 of licensee's slides)
- Electrosleeve UT-360 Callaway Results - Summary, comparison of electrosleeve thickness from outages RF10 and RF11 (pages 13 and 14 of licensee's slides)
- Electrosleeve [Presentation Summary] (page 15 of licensee's slides)

The licensee stated that the seven Electrosleeve UT-360 techniques were qualified per Appendix J of the EPRI SG Examination Guidelines, revision 5, and experienced peer review in 1999 and 2000. The licensee stated that the techniques have been qualified to industry standards.

The licensee presented a summary of its results of the inspection of the 57 electrosleeved tubes in RF11 (pages 11 through 14 of Enclosure 2). The summary is presented as two figures that show the average sleeve thickness from RF10 compared to the average thickness from RF11. The two figures are on pages 13 and 14 of Enclosure 2 and show the data on a micro and a macro scale. The average thickness is the measured average thickness of the electrosleeve after (1) the electrosleeve repair was completed in RF10, and (2) after the inspection in RF11.

The staff and the licensee discussed the results presented from RF10 and RF11. The data for RF10 (shown in the figures by the triangle symbols) forms a 45 degree line which represents the starting line for changes in the measured averaged thickness from RF10. There is no indication on the figures of how many tubes were measured with the average thickness indicated on the figures.

The 57 tubes were then measured during the tube inspections in RF11 and the data is shown in the figures by the box symbol. The data for each electrosleeved tube would be indicated on the figures by the thicknesses measured in RF10 (abscissa of the figures) and RF11 (ordinate of the figures). This is to say that if a tube was measured to have the 0.034 inch thickness in RF10 and then measured to have a thickness 0.033 inches in RF11, this tube would be indicated on the figures at (0.034,0.033) and the box would lie below the triangle on the vertical line of 0.034 inches for RF10 on the figures (i.e., the position in the figures would be (0.034,0.034)). This would indicate that there was 0.001-inch change in average thickness through the intervening operating cycle. However, if the tube was measured in RF11 to have a thickness of 0.034 inches, the box would be top of the triangle, which would indicate that no change in average thickness was measured.

What the licensee is trying to show in the two figures is a measure of the thinning of the 57 electrosleeved tubes in the operating cycle up to RF11. The two dotted 45 degree lines in the figures represent a 0.001 inch change in the average electrosleeve thickness. With no thinning of the electrosleeved tubes through the operating cycle, the triangles (RF10 data) would fall on top of the blocks (RF11 data). The licensee stated that the data indicates that the average electrosleeve thickness for the 57 tubes did not change more than 0.001 inches in one operating cycle, which is also within the uncertainty limits of the UT 360 technique. The data in the figures on pages 13 and 14 of Enclosure 2 is the only data that the licensee presented in the application and the meeting on inspection results regarding degradation mechanisms of the 57 electrosleeved tubes.

The staff expressed concerns about the absence of qualification data on detecting and sizing primary water stress corrosion cracks (PWSCC) on the inside diameter (ID) of the electrosleeve as well as the original parent tube ID flaws in the licensee's application and in the meeting presentation. The staff asked about data from the earlier qualification sets that were submitted for the previous 2-cycle amendment and were not included with the data set submitted in the current application. The licensee replied that the UT data collection procedures had become more proceduralized over time, so that it had been concluded that it was not appropriate to use the old data that had been collected for the previous amendment using different procedures. Also, the specimens that provided the old data were not available because they had been destructively examined.

The licensee summarized what it sees as milestones that have been passed in the staff's review of the electrosleeve repair process (starting from the approval of Amendment No. 132 dated May 21, 1999) and completed its presentation.

The staff caucused and then returned to the meeting. The staff thanked the licensee for its presentation. It stated that the presentation is a good beginning for an interaction between the staff and licensee on the application, and helped focus the staff's review of the application. A request for additional information (RAI) will be developed by the staff over the next few weeks and sent to the licensee. Some of the issues to be addressed in the RAI that were discussed in

the meeting, will be (1) the ability of the Electrosleeve UT-360 techniques to detect cracks from PWSCC in electrosleeved tubes where the tubes had through-wall cracks in the parent material, and (2) the results of the inspections in RF11.

/RA/

Jack Donohew, Senior Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosure: List of Meeting Attendees

cc w/encl: See next page

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ADAMS ACCESSION NO. ML011630355

MEETING NOTICE: ML011220030

PACKAGE: ML011630429

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OFFICIAL RECORD COPY

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LIST OF MEETING ATTENDEES

ELECTROSLEEVED STEAM GENERATOR TUBES AT CALLAWAY PLANT

JUNE 7, 2001

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Where:

NRC	= Nuclear Regulatory Commission
NRR	= Office of Nuclear Reactor Regulation
RES	= Office of Nuclear Regulatory Research
PDIV-2	= Project Directorate IV-Section 2
EMCB	= Materials and Chemical Engineering Branch
MEB	= Materials Engineering Branch
AmerenUE	= Ameren Union Electric Company