

PROPOSED

TECHNICAL SPECIFICATION

MARK-UPS

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

4.4.5.4 Acceptance Criteria

a. As used in this specification:

- 1) Imperfection means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections;
- 2) Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube;
↳ or sleeve
- 3) Degraded Tube means a tube containing imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation;
- 4) % Degradation means the percentage of the tube wall thickness affected or removed by degradation;
↳ or sleeve
- 5) Defect means an imperfection of such severity that it exceeds the plugging or repair limit. A tube or sleeve containing a defect is defective;
- 6) Plugging or Repair Limit means the imperfection depth at or beyond which the tube shall be removed from service by plugging or repaired by sleeving and is equal to 40% of the nominal tube wall thickness. The plugging limit for laser welded sleeves is equal to 39% of the nominal sleeve wall thickness.
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- 7) Unserviceable describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in Specification 4.4.5.3c., above;
- 8) Tube Inspection means an inspection of the steam generator tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg. For a tube repaired by sleeving, the tube inspection shall include the sleeved portion of the tube;

The plugging limit for Electro sleeves is equal to 20% of the nominal sleeve wall thickness;

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SURVEILLANCE REQUIREMENTS (Continued)

- 9) Preservice Inspection means an inspection of the full length of each tube in each steam generator performed by eddy current techniques prior to service to establish a baseline condition of the tubing. This inspection shall be performed prior to initial POWER OPERATION using the equipment and techniques expected to be used during subsequent inservice inspections; ~~and~~
- 10) Tube Repair refers to a process that reestablishes tube serviceability. Acceptable tube repairs will be performed by the following processes:

- a) Laser welded sleeving as described in Westinghouse Technical Report WCAP-14596-P, "Laser Welded Elevated Tube Sheet Sleeves for Westinghouse Model F Steam Generators." March 1996 (W Proprietary)

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- b. The steam generator shall be determined OPERABLE after completing the corresponding actions (plug or repair by sleeving all tubes exceeding the plugging or repair limit and all tubes containing through-wall cracks) required by Tables 4.4-2 and 4.4-3.

4.4.5.5 Reports

- a. Within 15 days following the completion of each inservice inspection of steam generator tubes, the number of tubes plugged or repaired in each steam generator shall be reported to the Commission in a Special Report pursuant to Specification 6.9.2;
- b. The complete results of the steam generator tube inservice inspection shall be submitted to the Commission in a Special Report pursuant to Specification 6.9.2 within 12 months following the completion of the inspection. This Special Report shall include:
- 1) Number and extent of tubes and sleeves inspected,
 - 2) Location and percent of wall-thickness penetration for each indication of an imperfection, and
 - 3) Identification of tubes plugged or repaired.
- c. Results of steam generator tube inspections, which fall into Category C-3, shall be reported in a Special Report to the Commission pursuant to Specification 6.9.2 within 30 days and prior to resumption of plant operation. This report shall provide a description of investigations conducted to determine cause of the tube degradation and corrective measures taken to prevent recurrence.

INSERT A TO TS 4.4.5.4.a.10 (Page 3/4 4-15)

- b) Electrosleeving as described in Framatome Technical Report BAW-10219P, Revision 2, "Electrosleeving Qualification for PWR Recirculating Steam Generator Tube Repair." Any steam generator tube containing an Electrosleeve which has been inservice for 2 cycles of plant operation must be removed from service; and

- 11) Degraded Sleeve means a sleeve containing imperfections greater than 0% but less than 20% of the nominal wall thickness caused by degradation.

TABLE 4.4.3

STEAM GENERATOR REPAIRED TUBE INSPECTION

1ST SAMPLE INSPECTION			2ND SAMPLE INSPECTION	
Sample Size	Result	Action Required	Result	Action Required
A minimum of 20% of repaired tubes (1) (2)	C-1	None	N.A.	N.A.
	C-2	Plug defective repaired tubes and inspect 100% of the repaired tubes in this S.G.	C-1	None
			C-2	Plug defective repaired tubes
			C-3	Perform action for C-3 result of first sample
	C-3	Inspect all repaired tubes in this S.G., plug defective tubes and inspect 20% of the repaired tubes in each other S.G. Notification to NRC pursuant to [50.72 (b)(2) of 10 CFR Part 50	All other S.G.s are C-1	None
Some S.G.s C-2 but no additional S.G. are C-3			Perform action for C-2 result of first sample	
			Additional S.G. is C-3	Inspect all repaired tubes in each S.G. and plug defective tubes. Notification to NRC pursuant to [50.72 (b)(2) of 10 CFR Part 50

- (1) Each repair method is considered a separate population for determination of scope expansion.
 (2) The inspection of repaired tubes may be performed on tubes from 1 to 4 steam generators based on outage plans.

initial inservice inspection and

REACTOR COOLANT SYSTEM

BASES

STEAM GENERATORS (Continued)

The plugging or repair limit for the pressure boundary portion of laser welded sleeves is determined to be 39% through-wall (by NDE). The laser welded sleeve repair limit applicable to the pressure boundary portion of the sleeve is established in WCAP-14596. Appropriate NDE techniques are also discussed in WCAP-14596.

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Whenever the results of any steam generator tubing inservice inspection fall into Category C-3, these results will be reported to the Commission pursuant to Specification 6.9.2 prior to resumption of plant operation. Such cases will be considered by the Commission on a case-by-case basis and may result in a requirement for analysis, laboratory examinations, tests, additional eddy-current inspection, and revision of the Technical Specifications, if necessary.

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION SYSTEMS

The RCS Leakage Detection Systems required by this specification are provided to monitor and detect leakage from the reactor coolant pressure boundary. These Detection Systems are consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973.

3/4.4.6.2 OPERATIONAL LEAKAGE

PRESSURE BOUNDARY LEAKAGE of any magnitude is unacceptable since it may be indicative of an impending gross failure of the pressure boundary. Therefore, the presence of any PRESSURE BOUNDARY LEAKAGE requires the unit to be promptly placed in COLD SHUTDOWN.

Industry experience has shown that while a limited amount of leakage is expected from the RCS, the unidentified portion of this leakage can be reduced to a threshold value of less than 1 gpm. This threshold value is sufficiently low to ensure early detection of additional leakage.

The total steam generator tube leakage limit of 600 gpd for all steam generators not isolated from the RCS ensures that the dosage contribution from the tube leakage will be limited to a small fraction of 10 CFR Part 100 dose guideline values in the event of either a steam generator tube rupture or steam line break. The 600 gpd limit is conservative compared to the assumptions used in the analysis of these accidents. The 150 gpd leakage limit per steam generator ensures that steam generator tube integrity is maintained in the event of a main steam line rupture or under LOCA conditions.

The 10 gpm IDENTIFIED LEAKAGE limitation provides allowance for a limited amount of leakage from known sources whose presence will not interfere with the detection of UNIDENTIFIED LEAKAGE by the Leakage Detection Systems.

The CONTROLLED LEAKAGE limitation restricts operation when the total flow from the reactor coolant pump seals exceeds 8 gpm per RC pump at a nominal RCS pressure of 2235 psig. This limitation ensures adequate performance of the RC pump seals.

INSERT B TO TS BASES 3/4.4.5 (Page B 3/4 4-3)

The plugging or repair limit for the pressure boundary portion of Electrosleeves is determined to be 20% through wall of the nominal sleeve wall thickness (as determined by NDE).

**Request For Additional Information
Regarding Review of License Amendment Request
To Allow Framatome Electrosleeving of Steam Generator Tubes**

A meeting was held between AmerenUE, Framatome Technologies, Inc. (FTI) and the NRC staff on July 7, 1998, to discuss the status of the proposed technical specification amendment to allow installation of electrosleeves in Callaway Plant steam generators. This meeting was proposed by the staff in a May 20, 1998 letter to AmerenUE. In this letter, the staff determined that the technical basis relative to inspectability of the reactor coolant pressure boundary once sleeves are installed was inadequate. In addition, the staff identified concerns with the completeness, technical adequacy, and accuracy of various submittals associated with electrosleeves.

In the meeting on July 7, 1998, we indicated that we planned to pursue the alternative amendment (an option proposed by the staff in the May 20, 1998 NRC letter) that would limit the period of time electrosleeves would be installed and in-service to two operating cycles. This would allow time to resolve the issue of inspectability of the reactor coolant pressure boundary. At that time, we committed to provide amended responses to several questions from the December 18, 1997 letter, and submit an updated topical report and a risk assessment for a two-cycle amendment. This information is included herein.

RAI Question #2

The NRC staff raised a QA issue, because it appeared inaccurate data was being supplied to the staff in Electrosleeve™ submittals. The licensee's RAI response admitted data was being inadvertently transposed and initiated a Corrective Action Request (CAR) to address this issue. However, all the actions required to address this issue and close the CAR were not complete. The NRC staff cannot complete the license amendment request review until the CAR actions are complete, assurances are provided that all other docketed information is correct, and steps have been taken to prevent recurrence. In addition, the CAR discusses preparation of an unknown action called an LDA. The licensee needs to explain what the acronym "LDA" stands for and what an LDA is.

Response #2

Based on prior NRC concerns on the accuracy of licensing submittals, AmerenUE revised our procedure for preparation and submittal of licensing documentation to require an independent review of licensing submittals to the NRC. We also formed a task team to investigate technical specification implementation issues. This task team recommended changes to our process which will ensure license amendments are implemented correctly. Our procedure will be revised by the end of September, 1998.

AmerenUE has determined that the cause for the errors in the RAI responses was inadequate independent review prior to submittal. Our procedure for preparation and submittal of licensing documentation requires an independent review be performed, and we have concluded that the

procedure is adequate, however the amount of time spent on the review and the level of review detail of electrosleeve submittals was insufficient. The action taken to prevent recurrence of this problem is to allow adequate time and to provide adequate resources to process and review licensing submittals to NRC.

In addition, AmerenUE performed an independent Quality Surveillance of FTI's Product Development Section on June 30 and July 1, 1998 in Lynchburg, Virginia. The purpose of the surveillance was to assess NRC Staff's concerns regarding the completeness, technical adequacy and accuracy of responses to requests for additional information associated with electrosleeves. This surveillance concluded that corrective actions have been implemented by FTI to address the quality concerns identified by NRC in the May 20, 1998 letter. These actions include the performance of a self-assessment of all electrosleeve procedures and submittal data issued to Callaway Plant and the NRC. Based on this review, the AmerenUE auditor concluded that FTI is meeting expectations to assure that technical and quality data submitted to Callaway Plant and the NRC is correct and complete.

As a further measure to assure a quality response was provided to NRC, AmerenUE and FTI jointly determined the need for an independent review of the revised topical report. A cognizant FTI engineer not involved in the preparation of Revision 2 of the topical report performed this review. The independent review signature is reflected on the LDA. Based on this review, an additional review was performed for typographical accuracy and source reference validation.

In order to facilitate a response, the FTI portion of the above question has been sub-divided into four parts:

- Part 1 - Are the CAR action items complete?
- Part 2 - Provide assurance that all other docketed information is correct.
- Part 3 - Identify steps taken to prevent recurrence.
- Part 4 - Explain the acronym LDA.

Part 1 - CAR Action Items

An internal FTI document, Corrective Action Request 98-02, was initiated on January 13, 1998 to address quality assurance issues with Electrosleeve submittals. The CAR identified four action items:

- Determine cause for the errors not being identified prior to submittal of the data to the customer (AmerenUE) and the NRC.
- Identify actions taken or being taken to correct these errors and to prevent a recurrence of similar data submittal errors.
- Evaluate the cause for these errors to determine the impact on other data submitted to the customer and NRC.
- Verify compliance to applicable FTI QA Program implementation procedures for submittal of data to the customer and the NRC.

All of the above action items have been completed. An investigation into the issues revealed that the cause for the errors not being identified was instances of inadequate independent review prior to submittal, and personnel not properly following procedures associated with RAIs.

FTI internal procedures (References A and B) define the procedures for preparation and submittal of licensing documentation. Exhibit C of Reference B identifies that an independent review is to be performed and that the reviewer is to sign the License Document Approval (LDA) form, i.e., indicate the review has been performed.

It was concluded that FTI personnel properly followed these procedures, including performing proper review and documentation, for Revision 01 of the Topical Report (Reference E). Subsequent to release of Revision 01, numerous RAIs were received on the Topical Report. It was determined that personnel did not properly follow the procedure (Reference B) for handling RAIs, in that an LDA was not issued for each RAI at the time of response. Additionally, it was determined that in some instances the reviewers failed to perform a thorough review, thus allowing errors to be missed. Based on this, it was concluded that personnel training was required to reinforce procedures and to define the technical review concerning licensing responses as identified in Reference B.

The impact that the errors have on other docketed information was evaluated and is addressed in Part 2, below. Additionally, verification of compliance to the applicable FTI QA program was performed, and actions were taken to prevent recurrence of the problem. These are discussed in Part 3 below.

Part 2 – Assurance of Correct Docketed Information

In order to provide assurance that docketed information is correct, a detailed independent review was performed on all RAI responses associated with the Electrosleeve amendment application. The approach in this review was to insure that any errors were identified and to incorporate corrections of these errors by revising the Topical Report.

The detailed review was performed with the principles emphasized in the training class as noted in Part 3 below. The scope included detailed review of all RAI responses, including all original source documents and technical work supporting the responses. In general, there were three types of common errors found: typographical errors; errors transcribing data from a source document to an RAI response; and errors associated with mislabeling units (mils or inches) with percent throughwall in reporting numerical data.

These errors have been corrected by incorporating the corrected RAI responses into Revision 02 of the Topical Report (Reference C). It should be noted that correction of these documentation errors did not affect the conclusions of the Topical Report.

Part 3 – Steps to Prevent Recurrence

Steps have been taken to insure FTI compliance with QA program requirements and to prevent recurrence of the problem with documentation errors. Note in the following discussion that the Product Development Section is the organization responsible for Electrosleeve licensing submittals within FTI.

An internal audit of FTI's Product Development Section was performed by FTI Quality Assurance Department on June 18, 19 and 22, 1998. The purpose of this audit was to verify compliance with the FTI Quality Assurance Program Manual, the FTI ASME Section III Program Manual, and the FTI ASME Section XI Program Manual. The audit resulted in three findings summarized below:

- Professional Engineer qualification memos were not found for two individuals.
- Seven Non-Conformance Reports were not dispositioned in a timely manner.
- The Personnel Training Record for the FTI Quality Assurance Program Manual had signatures beyond 45 days for signoff.

The internal QA audit concluded that, other than these three discrepancies, Product Development is in compliance with the applicable requirements of the FTI Quality Assurance Program, ASME Section III Program and ASME Section XI Program. The discrepancies were noted to be programmatic in nature and did not affect the quality of the products or services provided to customers.

AmerenUE performed an independent Quality Surveillance of FTI's Product Development Section on June 30 and July 1, 1998 in Lynchburg, Virginia. The purpose of the surveillance was to assess NRC Staff's concerns regarding the completeness, technical adequacy and accuracy of technical specification amendment requests associated with Electrosleeving. The surveillance focused on review of corrective action measures being taken to satisfy the quality concerns identified in Reference D.

The action taken to prevent recurrence of this problem was to hold a specific training class for individuals associated with licensing submittals. This class was held on July 21, 1998. The class provided a detailed review of licensing submittal procedures (References A and B). The training class covered the responsibilities of the individuals involved with licensing documents, the method to follow for processing licensing documents, and the requirements of reviewers. Additional emphasis was placed on types/methods of reviewing licensing documents. The participants were allowed to ask questions to insure that the procedures and requirements for review were fully understood.

Part 4 – Acronym LDA

LDA is an FTI abbreviation for License Document Approval. The LDA is an FTI form associated with procedures for preparation of licensing documents (References A and B).

References for Response #2:

- A. FTI Administrative Procedure 0414-12, "Preparation of Licensing Documents and B&W Owners Group Reports."
- B. FTI Administrative Procedure 0414-13, "Processing Licensing Documents and B&W Owners Group Reports."
- C. FTI Document BAW-10219P, Rev. 02, "Electrosleeving Qualification for PWR Recirculating Steam Generator Tube Repair."

- D. NRC Letter from Samuel Collins, Director, Office of NRR to G. L. Randolph, Vice President and CNO, Union Electric Company. Subject: *Concerns regarding Union Electric Company's responsiveness to NRC requests for information pertaining to the review of the proposed amendment to allow use of the Framatome Electrosleeving process in the Callaway plant steam generators (TAC NO: M95204)*. May 20, 1998.
- E. FTI Document BAW-10219P, Rev. 01, "Electrosleeving Qualification for PWR Recirculating Steam Generator Tube Repair."

RAI Question #7

The staff requested the licensee to update the Electrosleeve™ topical report to reflect new data and changes to Revision 1 of the topical report. The licensee proposed multiple subjects be incorporated into the revised topical report, pending NRC staff review of the February 24, 1998, RAI response. The general method proposed for the update is acceptable to the staff. The staff had the following comments with respect to the details described:

- It does not appear that information from the February 24, 1998 RAI response will be included in the revision. If this is the case, the February 24, 1998, RAI response should be reviewed again because the staff believes that some of the data should be included (e.g., discussion on dent limits and basis for the limits [RAI Questions #9 and #10], and discussion on the IGA issue [RAI Question #11]).
- The staff's understanding is that Electrosleeves™ cannot be applied in the U-Bend region because UT has not been qualified for this region, and because the licensee does not have equipment that can install Electrosleeves™ in that region. This distinction should be stated in the topical report. If the licensee, in fact, intends on applying Electrosleeves™ to the U-Bend region, the licensee needs to provide a discussion of the technical basis to support this.

Response #7

The topical report has been revised with the information from the February 24, 1998 RAI response and contains discussion of the U-Bend regions. The revised topical report is included as an attachment to this submittal. Included with the topical is a record of revision that lists each major change and identifies, by RAI date, the section of the topical that was revised.

RAI Question #8

The staff originally requested the licensee to modify the Callaway technical specifications (TS) to require a 20 percent initial inspection scope of each type of installed sleeve. The licensee responded in the February 24, 1998, RAI response that TS Table 4.4-3 already requires a sample size of 20 percent, and Note 1 of that table requires that each repair method be considered a separate population.

The staff has reviewed note 1 of TS Table 4.4-3. The note specifically states that "Each repair method is considered a separate population for determination of scope expansions." The table

does not require each repair method be considered a separate population for the initial inspection scope (i.e., 1st sample inspection), which is what was requested in the original RAI. The licensee needs to revise Table 4.4-3 accordingly.

Response #8

Callaway Technical Specifications Table 4.4-3 has been revised to clearly indicate that ISI inspections of SG sleeves must consist of a minimum of 20 percent of each type of installed sleeve. This table is included as an attachment to this submittal. In addition, the TS mark-ups have been resubmitted to incorporate the changes made via Amendment #116 and to add a definition for degraded sleeve. These changes do not alter the conclusions of the significant hazards evaluation which was transmitted as part of the original amendment application.