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Employment with Equal Opportunity

November 10, 2005
LIC-05-0121

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Reference: Docket No. 50-285

**SUBJECT: Fort Calhoun Station Unit No. 1 License Amendment Request,
"Deletion of Sleeving as a Steam Generator Tube Repair Method"**

Pursuant to 10 CFR 50.90, Omaha Public Power District (OPPD) hereby proposes to change the Fort Calhoun Station (FCS) Technical Specifications by deleting the sleeving repair alternative to plugging for steam generator tubes. The FCS replacement steam generators (RSGs) to be installed during the fall of 2006 are manufactured by Mitsubishi Heavy Industries, Ltd. (MHI). The change is being requested because OPPD has determined that the sleeving repair alternative to plugging will not be used for the MHI RSGs.

The proposed Technical Specification change has been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c); it has been determined that this change involves no significant hazards considerations. The bases for these determinations, information supporting the change, a no significant hazards consideration, and an environmental consideration are included in the attached submittal.

Attachment 1 provides the No Significant Hazards Consideration and the Applicable Regulatory Requirement/Criteria for this requested change to the Technical Specifications. Attachment 2 contains the marked-up pages and Attachment 3 contains the clean version reflecting the requested Technical Specification and Basis changes.

OPPD requests approval of the proposed amendment by November 1, 2006, to support scheduling implementation during the 2006 refueling outage. OPPD requests that the effective date for this Technical Specification change be the end of the 2006 refueling outage to allow for implementation of these proposed changes. No new commitments are made to the NRC in this letter.

In accordance with 10 CFR 50.91, a copy of this application is being submitted to the designated Nebraska State Official.

"Highest in Customer Satisfaction With Residential Electric Service Among Medium-Sized Utilities."

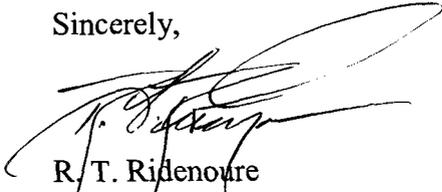
For the fourth year in a row, OPPD has received an award for Highest Customer Satisfaction With Residential Electric Service. J.D. Power and Associates 2004 Electric Utility Residential Customer Satisfaction Study.SM Study based on a total of 25,657 consumer responses. The top 21 medium electric companies were ranked in the study. www.jdpower.com.

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I declare under penalty of perjury that the foregoing is true and correct. (Executed on November 10, 2005)

If you have any questions or require additional information, please contact Mr. T. C. Matthews at (402) 533-6938.

Sincerely,



R. T. Ridenoure
Vice President
Omaha Public Power District

DJB/RLJ/rj

Attachments:

1. Omaha Public Power District's Evaluation
2. Markup of Technical Specification Pages
3. Proposed Technical Specifications (clean)

c: Division Administrator - Public Health Assurance, State of Nebraska

ATTACHMENT 1

Omaha Public Power District’s Evaluation For Amendment of Operating License

Deletion of Sleaving as a Steam Generator Tube Repair Method

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Omaha Public Power District's Evaluation for Amendment of Operating License

1.0 DESCRIPTION

This letter is a request to amend Operating License DPR-40 for Fort Calhoun Station, Unit No. 1 (FCS). The proposed changes delete steam generator tube sleeving as an alternative to plugging for steam generator tube repairs.

2.0 PROPOSED CHANGE

Omaha Public Power District (OPPD) proposes to change Technical Specification (TS) 3.17, *Steam Generator Tubes*, and its Basis by removal of all text and requirements related to the leak tight tube sleeves. Corresponding changes are proposed for Table 3-13, *Steam Generator Tube Inspection*. Finally, deletion of Table 3-14, *Steam Generator Tube Sleeve Inspection*, is proposed.

3.0 BACKGROUND

The sleeving repair method for Combustion Engineering steam generators was added to the FCS Technical Specifications by Amendment 195 (Reference 7.1). During the 2006 Refueling Outage, replacement steam generators (RSGs) will be installed at FCS. Because the RSGs are manufactured by Mitsubishi Heavy Industries, Ltd. (MHI), the RSG tubes do not have an approved sleeving repair alternative to plugging. Therefore, OPPD is requesting the deletion of the sleeving capability from the Technical Specifications because analyses supporting the existing specification are not applicable to the MHI steam generators.

4.0 TECHNICAL ANALYSIS

The proposed changes remove text in the Technical Specifications related to the surveillance requirements of leak tight sleeves, and the reference to the EPRI PWR Steam Generator Examination Guidelines in the basis. Other TS changes, not related to tube sleeving, made during the process of approving Amendment 195 are not being affected or altered.

The proposed changes remove the capability for the repair of degraded steam generator tubes using sleeving which was approved for the original Combustion Engineering steam generators. These generators are being replaced in the fall of 2006 with steam generators manufactured by Mitsubishi Heavy Industries, Ltd. (MHI) which are not expected to use the tube sleeving alternative to tube plugging. The proposed changes eliminate tube sleeving as a repair for the replacement steam generator tubes. These changes are necessary, not as a result of new or enhanced analyses or evaluations, but as a consequence of MHI's steam generator operating experience which has not resulted in the need to develop the sleeving repair option.

The proposed changes do not alter, degrade, or prevent actions described or assumed in any accident analysis. They will not change any assumptions previously made in evaluating radiological consequences or affect any fission product barriers, nor do they increase any challenges to safety systems. Therefore, the proposed change does not increase or have any impact on the consequences of events described and evaluated in Chapter 14 of the Fort Calhoun Updated Safety Analysis Report (USAR).

5.0 REGULATORY ANALYSIS

5.1. No Significant Hazards Consideration

Omaha Public Power District has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. **Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?**

Response: No.

The elimination from the Technical Specifications surveillance requirements of leak tight sleeves as a repair method alternative to plugging defective steam generator tubes does not introduce an initiator to any previously evaluated accident. The frequency or periodicity of performance of the remaining surveillance requirements for steam generator tubes (including plugged tubes) is not affected by this change. Elimination of the tube repair method has no effect on the consequences of any previously evaluated accident. The proposed changes will not prevent safety systems from performing their accident mitigation function as assumed in the safety analysis.

Therefore, this change does not involve a significant increase in the probability or consequences of any accident previously evaluated.

2. **Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?**

Response: No.

The proposed change only affects the Technical Specifications surveillance requirements. The proposed change is a result of installation of replacement steam generators. The proposed change will eliminate a steam generator tube repair alternative which cannot be utilized or credited for the replacement steam generators. This change will not alter assumptions made in the safety analysis and licensing bases.

Therefore, this change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. **Does the proposed change involve a significant reduction in a margin of safety?**

Response: No.

The proposed change deletes surveillance requirements for a steam generator tube repair alternative which will no longer be necessary or applicable. The remaining Technical Specification steam generator tube surveillance requirements, including inspection and plugging requirements, will continue to maintain the applicable margin of safety.

Therefore, this Technical Specification change does not involve a significant reduction in the margin of safety.

Based on the above, Omaha Public Power District concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of “no significant hazards consideration” is justified.

5.2 Applicable Regulatory Requirements/Criteria

The proposed Technical Specifications changes are deleting surveillance requirements for a steam generator tube repair alternative (sleeving) which will no longer be utilized or credited. Likewise, the analyses supporting the tube sleeving repair alternative are not applicable and are not planned to be applied to the replacement steam generators. Thus, the proposed changes eliminate requirements not applicable for the replacement steam generators. The Technical Specifications will still contain the steam generator tube surveillance requirements which existed before tube sleeving was incorporated by Amendment 195 (Reference 7.1). Other TS changes, not related to tube sleeving, made by Amendment 195 are not being affected or altered. In accordance with the FCS general design criteria (Reference 7.2), the FCS Technical Specifications are being revised as a result of a change in facility equipment.

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission’s regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

Based on the above considerations, the proposed amendment does not involve and will not result in a condition which significantly alters the impact of Fort Calhoun Station on the environment. Thus, the proposed changes meet the eligibility criteria for categorical exclusion set forth in 10 CFR Part 51.22(c)(9), and, pursuant to 10 CFR Part 51.22(b), no environmental assessment need be prepared.

7.0 REFERENCES

- 7.1. Letter from NRC (L. R. Wharton) to OPPD (S. K. Gambhir) dated March 1, 2001, Issuance of Amendment Re: Leak Tight Sleeves as an Alternative Tube Repair Method To Plugging Defective Steam Generator Tubes (TAC No. MA9653) (NRC-01-012)
- 7.2. Fort Calhoun Station Updated Safety Analysis Report, Responses to 70 Criteria, Appendix G.

ATTACHMENT 2

Mark-up of Technical Specification Pages

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS - TABLES

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TABLE

3-14	Steam Generator Tube Sleeve Inspection	Section 3.17
5.2-1	Minimum Shift Crew Composition	Section 5.0

TECHNICAL SPECIFICATIONS

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2-9	RCS Pressure Isolation Valves	Section 2.1
3-6	Reactor Coolant Pump Surveillance	Section 3.3
1-1	RPS LSSS	Section 1.0
3-13	Steam Generator Tube Inspection	Section 3.17
3-14	Steam Generator Tube Sleeve Inspection	Section 3.17
2-11	Toxic Gas Monitoring Operating Limits	Section 2.22

TECHNICAL SPECIFICATIONS

3.0 SURVEILLANCE REQUIREMENTS

3.17 Steam Generator Tubes

Applicability

Applies to in-service surveillance of steam generator tubes.

Objective

To ensure the integrity of the steam generator tubes.

Specifications

Each steam generator shall be demonstrated OPERABLE by performance of the following in-service inspection program.

(1) Steam Generator Sample Selection and Inspection Methods

The in-service inspection shall be performed on each steam generator on a rotating schedule. Under some circumstances, the operating conditions in one steam generator may be found to be more severe than those in the second steam generator. Under such circumstance, the sample sequence shall be modified to inspect the steam generator with the most severe conditions.

(2) Steam Generator Tube Sample Selection and Inspection

The steam generator tube minimum sample size, inspection result classification, and the corresponding action required shall be as specified in Table 3-13. The in-service inspection of steam generator tubes shall be performed according to Specification 3.17(4)(i), "Tube Inspection," and at the frequencies specified in Specification 3.17(3). The inspected tubes shall be verified acceptable per the acceptance criteria of Specification 3.17(4). ~~When applying the exceptions of (i), (ii) and (iii) below, previous degradation, imperfections or defects in the area of the tube repaired by sleeving are not considered an area requiring reinspection or inspection of adjacent tubes.~~ The tubes selected for each in-service inspection shall include at least 3% of the total tubes in the steam generators and the tubes selected for these inspections shall be selected on a random basis, except:

- (i) If the tube is recorded as a degraded tube, then an adjacent tube shall be inspected.
- (ii) The first sample inspection during each in-service inspection of each steam generator shall include all non-plugged tubes that previously had detectable wall penetrations (>20%) and shall also include tubes in those areas where experience has indicated potential problems.
- (iii) The second and third sample inspections, if required, may be less than an entire tube length inspection provided the inspection concentrates on those areas of the

TECHNICAL SPECIFICATIONS

3.0 SURVEILLANCE REQUIREMENTS

3.17 Steam Generator Tubes (Continued)

tube sheet array and on those portions of the tubes where defects were previously detected.

- (iv) To the extent practical, where experience in similar plants with similar water chemistry indicates critical areas to be inspected, then at least 50% of the tubes inspected shall be from these critical areas.

The results of each sample inspection shall be classified into one of the following three categories (~~this classification shall apply to the inspection of tubes and is exclusive of the sleeve inspection requirements in Specification 3.17(2a)~~).

<u>Category</u>	<u>Inspection Results</u>
C-1	No more than 5% of the tubes inspected are degraded and none of the inspected tubes are defective.
C-2	No more than 1% of the tubes inspected are defective, or between 5% and 10% of the tubes inspected are degraded.
C-3	More than 1% of the tubes inspected are defective, or more than 10% of the tubes inspected are degraded.

NOTE: In all inspections, previously degraded tubes must exhibit growth of greater than 10% through wall ~~or growth of greater than 25% of the repair limit~~ to be included in the above calculations.

~~(2a) Steam Generator Tube Sleeve Sample Selection and Inspection~~

~~The steam generator tube sleeve minimum sample size, inspection result classification, and the corresponding action required shall be as specified in Table 3-14. The in-service inspection of steam generator tube sleeves shall be performed according to Specification 3.17(4)(i), "Tube Sleeve Inspection," and at the frequencies specified in Specification 3.17(3). The inspected tube sleeves shall be verified acceptable per the acceptance criteria of Specification 3.17(4). The tube sleeves selected for each in-service inspection shall include at least 20% of the total number of tube sleeves in the steam generators and the tube sleeves selected for these inspections shall be selected on a random basis, except:~~

- ~~(i) If the tube sleeve is recorded as a degraded tube sleeve and an adjacent tube sleeve exists, then an adjacent tube sleeve shall be inspected.~~
- ~~(ii) The first sample inspection during each in-service inspection of each steam generator shall include all tube sleeves in non-plugged tubes that previously had detectable wall penetrations (>20%) and shall also include tube sleeves in those areas where experience has indicated potential problems.~~

TECHNICAL SPECIFICATIONS

3.0 SURVEILLANCE REQUIREMENTS

3.17 Steam Generator Tubes (Continued)

- (iii) ~~To the extent practical, where experience in similar plants with similar water chemistry indicates critical areas to be inspected, then at least 50% of the tube sleeves inspected shall be from these critical areas. Where the number of sleeves in the critical areas represent less than 50% of the initial sample, all sleeves in the critical areas shall be inspected.~~

~~The results of each sample inspection shall be classified into one of the following three categories (this classification shall apply to the inspection of sleeves and is exclusive of the tube inspection requirements in Specification 3.17(2)).~~

~~Category Inspection Results~~

- ~~C-1 No more than 5% of the tube sleeves inspected are degraded and none of the inspected tube sleeves are defective.~~
- ~~C-2 No more than 1% of the tube sleeves inspected are defective, or between 5% and 10% of the tube sleeves inspected are degraded.~~
- ~~C-3 More than 1% of the tube sleeves inspected are defective, or more than 10% of the tube sleeves inspected are degraded.~~

~~**NOTE:** In all inspections, previously degraded tube sleeves must exhibit growth of greater than 10% through wall or growth of greater than 25% of the repair limit to be included in the above calculations.~~

(3) Inspection Frequencies

The above required in-service inspections of steam generator tubes and tube sleeves shall be performed at the following frequencies (inspections shall be performed, unless otherwise specified, coincident with refueling outages or any scheduled cold shutdown for plant repair and maintenance):

- (i) In-service inspections shall be performed at intervals of not less than 12 nor more than 24 calendar months after the previous inspection, subject to the following clarifications and exceptions.
1. If a plant operating cycle is less than 12 months, inspections may be performed at the end of that cycle.
 2. If two consecutive tube inspections following service under all volatile treatment conditions result in all inspection results falling into the C-1 category or if two consecutive tube inspections demonstrate that previously observed degradation has not continued and no additional degradation has occurred, the tube inspection interval may be extended to a maximum of once per 40 months.

TECHNICAL SPECIFICATIONS

3.0 **SURVEILLANCE REQUIREMENTS**

3.17 **Steam Generator Tubes (Continued)**

~~3. The inspections of tube sleeves shall be configured to ensure that each individual tube sleeve is inspected at least once in 60 months, with the following exception: if the 60 month time frame falls during an operating cycle, completion of that cycle is acceptable prior to meeting this requirement.~~

(ii) Increased Inspection Frequencies

1. If results of the in-service inspection of the steam generator tubes conducted in accordance with Table 3-13 at 40-month intervals fall in Category C-3, the inspection frequency shall be increased to at least once per 20 months. The increase in inspection frequency shall apply until a subsequent inspection meets the conditions specified in Section 3.17(3)(i)2 above, at which time the interval can be extended to a 40-month period.

~~2. If results of the in-service inspection of tube sleeves conducted in accordance with Table 3-14 fall into Category C-3, the inspection frequency shall be increased such that 100% of the tube sleeves in the affected steam generator are inspected during subsequent inspections. The increase in inspection frequency shall apply until two consecutive tube sleeve inspections meet the conditions for Category C-1 or two consecutive tube sleeve inspections demonstrate that previously observed degradation has not continued and no additional degradation has occurred, at which time the inspection frequency of Specification 3.17(3)(i)3 shall again apply.~~

(iii) Unscheduled in-service inspections shall be performed on each steam generator in accordance with the first sample inspection specified in Tables 3-13 and 3-14 during the shutdown subsequent to any of the following conditions:

1. Primary-to-secondary tube leaks (not including leaks originating from tube-to-tube sheet welds) in excess of the limits of Section 2.1.4 of the Technical Specifications,
2. A seismic occurrence greater than the Operating Basis Earthquake,
3. A loss-of-coolant accident requiring actuation of the engineered safeguards, or
4. A main steam line or main feedwater line break.

TECHNICAL SPECIFICATIONS

3.0 **SURVEILLANCE REQUIREMENTS**

3.17 **Steam Generator Tubes (Continued)**

(4) **Acceptance Criteria**

(i) As used in this specification:

Imperfection means an exception to the dimensions, finish or contour of a tube or sleeve from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube or sleeve wall thickness, if detectable, may be considered as imperfections.

Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube or sleeve.

Degraded Tube or Sleeve means a tube or sleeve containing imperfections $\geq 20\%$ of the nominal wall thickness caused by degradation. Any tube which does not permit the passage of the eddy-current inspection probe through its entire length and U-bend shall be deemed a degraded tube. Any tube sleeve which does not permit the passage of the eddy-current inspection probe through its entire length shall be deemed a degraded sleeve.

% Degradation means the percentage of the tube or sleeve wall thickness affected or removed by degradation.

Defect means an imperfection of such severity that it exceeds the plugging or repair-limit.

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 in the affected area because it may become unserviceable prior to the next inspection. Plugging or repair-limit is equal to 40% of the nominal tube wall thickness for the original tube wall. Sleeved tubes shall be plugged upon detection of unacceptable degradation in the pressure boundary region of the sleeve.

Unserviceable describes the condition of a tube or sleeve if it leaks in excess of analyzed limits 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.

Tube or Tubing means that portion of the tube which forms the primary system to the secondary system pressure boundary.

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, excluding any areas defined under "Tube Sleeve Inspection".

TECHNICAL SPECIFICATIONS

3.0 **SURVEILLANCE REQUIREMENTS**

3.17 Steam Generator Tubes (Continued)

~~Tube Repair or Sleeve refers to a process that re-establishes tube serviceability. Acceptable tube repairs will be performed using the Combustion Engineering, Inc. Leak Tight Sleeve as described in the proprietary Combustion Engineering, Inc. Report, CEN-630-P, Revision 02, "Repair of 3/4" O.D. Steam Generator Tubes Using Leak Tight Sleeves," June 1997.~~

~~Tube repair includes the removal of plugs that were previously installed as a corrective or preventive measure for the purpose of sleeving the tube. A tube inspection as defined herein is required prior to returning previously plugged tubes to service.~~

~~Tube Sleeve Inspection refers to inspection of the section of the steam generator tube repaired by sleeving. This includes the pressure retaining portions of the parent tube in contact with the sleeve, the sleeve to tube weld, and the pressure retaining portion of the sleeve.~~

- (ii) ~~The steam generator shall be determined OPERABLE after completing the corresponding actions (plug or repair all tubes exceeding the plugging or repair limit and all tubes containing through-wall cracks, plug all tubes with sleeves containing defects) required by Tables 3-13 and 3-14.~~

(5) Reporting Requirements

- (i) Following each in-service inspection of steam generator tubes, the number of tubes plugged ~~or repaired~~ in each steam generator shall be reported to the Commission within 30 days.
- (ii) The complete results of the steam generator tube in-service inspection shall be reported to the Commission within 6 months following completion of the inspection. This report shall include:
 - 1. Number and extent of tubes ~~and tube sleeves~~ inspected.
 - 2. Location and percent of wall thickness penetration for each imperfection.
 - 3. Identification of tubes plugged.
 - 4. ~~Identification of tubes repaired by sleeving.~~

TECHNICAL SPECIFICATIONS

TABLE 3-13

STEAM GENERATOR TUBE INSPECTION

1st Sample Inspection			2nd Sample Inspection		3rd Sample Inspection	
Sample Size	Result	Action Required	Result	Action Required	Result	Action Required
A minimum of 300 tubes per S.G.	C-1	None	N/A	N/A	N/A	N/A
	C-2	Plug or repair defective tubes and inspect additional 600 tubes in this S.G.	C-1	None	N/A	N/A
			C-2	Plug or repair defective tubes and inspect additional 1200 tubes in this S.G.	C-1	None
			C-2		C-2	Plug or repair defective tubes
			C-3	Perform action for C-3 result of first sample	C-3	Perform action for C-3 result of first sample
	C-3	Inspect all tubes in this S.G., plug or repair defective tubes and inspect 600 tubes in other S.G. Prompt notification to NRC pursuant to specification 5.6	The second S.G. is C-1	None	N/A	N/A
			The second S.G. is C-2	Perform action for C-2 result of second sample	N/A	N/A
			The second S.G. is C-3	Inspect all tubes in the second S.G. and plug or repair defective tubes. Prompt notification to NRC pursuant to specification 5.6	N/A	N/A

N/A Not applicable

TABLE 3-14

STEAM GENERATOR TUBE SLEEVE INSPECTION

1st Sample Inspection			2nd Sample Inspection	
Sample Size	Result	Action Required	Result	Action Required
A minimum of 20% of the installed tube sleeves	C-1	None	N/A	N/A
	C-2	Plug tubes containing defective sleeves and inspect all remaining installed sleeves in this S.G.	C-1	None
			C-2	Plug tubes containing defective sleeves
			C-3	Perform action for C-3 result first sample
	C-3	Inspect all installed sleeves in this S.G., plug tubes containing defective sleeves, and inspect a minimum of 20% of the installed sleeves in other S.G. Add the tubes with defective sleeves to the number of defective tubes list for NRC notification per Table 3-13	The second S.G. is C-1	None
			The second S.G. is C-2	Perform action for C-2 result first sample
			The second S.G. is C-3	Inspect all sleeves in the second S.G. and plug tubes containing defective sleeves. Add the tubes with defective sleeves to the number of defective tubes list for NRC notification per Table 3-13

3.0 SURVEILLANCE REQUIREMENTS

3.17 Steam Generator Tubes (Continued)

Basis

The surveillance requirements for inspection of the steam generator tubes and tube sleeves ensure that the structural integrity of this portion of the RCS will be maintained. The program for in-service inspection of the steam generator tubes is based on a modification of Regulatory Guide 1.83, Revision 1, dated July 1975. ~~The program for in-service inspection of steam generator tube sleeves is based on a modification of EPRI PWR Steam Generator Examination Guidelines, Revision 5, Dated September 1997.~~ In-service inspection of steam generator tubing and tube sleeves is essential in order to maintain surveillance of the conditions of the tubes and sleeves in the event that there is evidence of mechanical damage or progressive degradation due to design, manufacturing errors, or in-service conditions that lead to corrosion.

In-service inspection of steam generator tubing and tube sleeves also provides a means of characterizing the nature and cause of any tube or sleeve degradation so that corrective measures can be taken.

~~Tubes with defects may be repaired by a Combustion Engineering, Inc. Leak Tight Sleeve. The technical bases for sleeving repair are described in the Proprietary Combustion Engineering, Inc. Report CEN-630-P, Revision 02, "Repair of 3/4" O.D. Steam Generator Tubes Using Leak Tight Sleeves," June 1997.~~

Whenever the results of any steam generator tubing in-service inspection fall into Category C-3, these results will be promptly reported to the Commission prior to the 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.

ATTACHMENT 3

Proposed Technical Specification Pages

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS - TABLES

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TABLE

5.2-1 Minimum Shift Crew CompositionSection 5.0

I

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3-6	Reactor Coolant Pump Surveillance	Section 3.3
1-1	RPS LSSS	Section 1.0
3-13	Steam Generator Tube Inspection	Section 3.17
2-11	Toxic Gas Monitoring Operating Limits	Section 2.22

TECHNICAL SPECIFICATIONS

3.0 **SURVEILLANCE REQUIREMENTS**

3.17 **Steam Generator Tubes**

Applicability

Applies to in-service surveillance of steam generator tubes.

Objective

To ensure the integrity of the steam generator tubes.

Specifications

Each steam generator shall be demonstrated OPERABLE by performance of the following in-service inspection program.

(1) **Steam Generator Sample Selection and Inspection Methods**

The in-service inspection shall be performed on each steam generator on a rotating schedule. Under some circumstances, the operating conditions in one steam generator may be found to be more severe than those in the second steam generator. Under such circumstance, the sample sequence shall be modified to inspect the steam generator with the most severe conditions.

(2) **Steam Generator Tube Sample Selection and Inspection**

The steam generator tube minimum sample size, inspection result classification, and the corresponding action required shall be as specified in Table 3-13. The in-service inspection of steam generator tubes shall be performed according to Specification 3.17(4)(i), "Tube Inspection," and at the frequencies specified in Specification 3.17(3). The inspected tubes shall be verified acceptable per the acceptance criteria of Specification 3.17(4). The tubes selected for each in-service inspection shall include at least 3% of the total tubes in the steam generators and the tubes selected for these inspections shall be selected on a random basis, except:

- (i) If the tube is recorded as a degraded tube, then an adjacent tube shall be inspected.
- (ii) The first sample inspection during each in-service inspection of each steam generator shall include all non-plugged tubes that previously had detectable wall penetrations (>20%) and shall also include tubes in those areas where experience has indicated potential problems.
- (iii) The second and third sample inspections, if required, may be less than an entire tube length inspection provided the inspection concentrates on those areas of the tube sheet array and on those portions of the tubes where defects were previously detected.

TECHNICAL SPECIFICATIONS

3.0 **SURVEILLANCE REQUIREMENTS**

3.17 **Steam Generator Tubes (Continued)**

- (iv) To the extent practical, where experience in similar plants with similar water chemistry indicates critical areas to be inspected, then at least 50% of the tubes inspected shall be from these critical areas.

The results of each sample inspection shall be classified into one of the following three categories.

<u>Category</u>	<u>Inspection Results</u>
C-1	No more than 5% of the tubes inspected are degraded and none of the inspected tubes are defective.
C-2	No more than 1% of the tubes inspected are defective, or between 5% and 10% of the tubes inspected are degraded.
C-3	More than 1% of the tubes inspected are defective, or more than 10% of the tubes inspected are degraded.

NOTE: In all inspections, previously degraded tubes must exhibit growth of greater than 10% through wall to be included in the above calculations.

(3) **Inspection Frequencies**

The above required in-service inspections of steam generator tubes shall be performed at the following frequencies (inspections shall be performed, unless otherwise specified, coincident with refueling outages or any scheduled cold shutdown for plant repair and maintenance):

- (i) In-service inspections shall be performed at intervals of not less than 12 nor more than 24 calendar months after the previous inspection, subject to the following clarifications and exceptions.
1. If a plant operating cycle is less than 12 months, inspections may be performed at the end of that cycle.
 2. If two consecutive tube inspections following service under all volatile treatment conditions result in all inspection results falling into the C-1 category or if two consecutive tube inspections demonstrate that previously observed degradation has not continued and no additional degradation has occurred, the tube inspection interval may be extended to a maximum of once per 40 months.

TECHNICAL SPECIFICATIONS

3.0 **SURVEILLANCE REQUIREMENTS**

3.17 **Steam Generator Tubes (Continued)**

- (ii) Increased Inspection Frequencies
 - 1. If results of the in-service inspection of the steam generator tubes conducted in accordance with Table 3-13 at 40-month intervals fall in Category C-3, the inspection frequency shall be increased to at least once per 20 months. The increase in inspection frequency shall apply until a subsequent inspection meets the conditions specified in Section 3.17(3)(i)2 above, at which time the interval can be extended to a 40-month period.
- (iii) Unscheduled in-service inspections shall be performed on each steam generator in accordance with the first sample inspection specified in Table 3-13 during the shutdown subsequent to any of the following conditions:
 - 1. Primary-to-secondary tube leaks (not including leaks originating from tube-to-tube sheet welds) in excess of the limits of Section 2.1.4 of the Technical Specifications,
 - 2. A seismic occurrence greater than the Operating Basis Earthquake,
 - 3. A loss-of-coolant accident requiring actuation of the engineered safeguards, or
 - 4. A main steam line or main feedwater line break.

TECHNICAL SPECIFICATIONS

3.0 **SURVEILLANCE REQUIREMENTS**

3.17 **Steam Generator Tubes (Continued)**

(4) **Acceptance Criteria**

(i) As used in this specification:

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.

Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube.

Degraded Tube means a tube containing imperfections $\geq 20\%$ of the nominal wall thickness caused by degradation. Any tube which does not permit the passage of the eddy-current inspection probe through its entire length and U-bend shall be deemed a degraded tube.

% Degradation means the percentage of the tube wall thickness affected or removed by degradation.

Defect means an imperfection of such severity that it exceeds the plugging limit.

Plugging Limit means the imperfection depth at or beyond which the tube shall be removed from service by plugging because it may become unserviceable prior to the next inspection. Plugging limit is equal to 40% of the nominal tube wall thickness for the original tube wall.

Unserviceable describes the condition of a tube if it leaks in excess of analyzed limits 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.

Tube or Tubing means that portion of the tube which forms the primary system to the secondary system pressure boundary.

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.

TECHNICAL SPECIFICATIONS

3.0 **SURVEILLANCE REQUIREMENTS**

3.17 **Steam Generator Tubes** (Continued)

- (ii) The steam generator shall be determined OPERABLE after completing the corresponding actions (plug all tubes exceeding the plugging limit and all tubes containing through-wall cracks) required by Table 3-13.

(5) **Reporting Requirements**

- (i) Following each in-service inspection of steam generator tubes, the number of tubes plugged in each steam generator shall be reported to the Commission within 30 days.
- (ii) The complete results of the steam generator tube in-service inspection shall be reported to the Commission within 6 months following completion of the inspection. This report shall include:
 - 1. Number and extent of tubes inspected.
 - 2. Location and percent of wall thickness penetration for each imperfection.
 - 3. Identification of tubes plugged.
- (iii) Results of steam generator tube inspections which fall into Category C-3 and require prompt notification of the Commission shall be reported prior to resumption of plant operation. The written followup of this report shall provide a description of investigations conducted to determine cause of the tube degradation and corrective measures taken to prevent recurrence.

TECHNICAL SPECIFICATIONS

TABLE 3-13

STEAM GENERATOR TUBE INSPECTION

1st Sample Inspection			2nd Sample Inspection		3rd Sample Inspection	
Sample Size	Result	Action Required	Result	Action Required	Result	Action Required
A minimum of 300 tubes per S.G.	C-1	None	N/A	N/A	N/A	N/A
	C-2	Plug defective tubes and inspect additional 600 tubes in this S.G.	C-1	None	N/A	N/A
			C-2	Plug defective tubes and inspect additional 1200 tubes in this S.G.	C-1	None
			C-2		C-2	Plug defective tubes
	C-3		C-3	Perform action for C-3 result of first sample	C-3	Perform action for C-3 result of first sample
	C-3	Inspect all tubes in this S.G., plug defective tubes and inspect 600 tubes in other S.G. Prompt notification to NRC pursuant to specification 5.6	The second S.G. is C-1	None	N/A	N/A
			The second S.G. is C-2	Perform action for C-2 result of second sample	N/A	N/A
			The second S.G. is C-3	Inspect all tubes in the second S.G. and plug defective tubes. Prompt notification to NRC pursuant to specification 5.6	N/A	N/A

N/A Not applicable

TECHNICAL SPECIFICATIONS

3.0 **SURVEILLANCE REQUIREMENTS**

3.17 **Steam Generator Tubes** (Continued)

Basis

The surveillance requirements for inspection of the steam generator tubes ensure that the structural integrity of this portion of the RCS will be maintained. The program for in-service inspection of the steam generator tubes is based on a modification of Regulatory Guide 1.83, Revision 1, dated July 1975. In-service inspection of steam generator tubing is essential in order to maintain surveillance of the conditions of the tubes in the event that there is evidence of mechanical damage or progressive degradation due to design, manufacturing errors, or in-service conditions that lead to corrosion.

In-service inspection of steam generator tubing also provides a means of characterizing the nature and cause of any tube degradation so that corrective measures can be taken.

Whenever the results of any steam generator tubing in-service inspection fall into Category C-3, these results will be promptly reported to the Commission prior to the 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.