

ENCLOSURE 2

Proposed Changed Pages

From the December 19, 1986 Submittal

<u>Unit 1</u>	<u>Revision</u>
Page 3/4 4-9	Replace
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<u>Unit 2</u>	<u>Revision</u>
Page 3/4 4-9	Replace
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REACTOR COOLANT SYSTEM

3/4.4.6 STEAM GENERATORS

LIMITING CONDITION FOR OPERATION

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3.4.6 Each steam generator shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one or more steam generators inoperable, restore the inoperable generator(s) to OPERABLE status prior to increasing T_{avg} above 200°F.

SURVEILLANCE REQUIREMENTS

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4.4.6.0 Each steam generator shall be demonstrated OPERABLE by performance of the following augmented inservice inspection program and the requirements of Specification 4.0.5.

4.4.6.1 Steam Generator Sample Selection and Inspection - Each steam generator shall be determined OPERABLE during shutdown by selecting and inspecting at least the minimum number of steam generators specified in Table 4.4-1.

4.4.6.2 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 4.4-2. The inservice inspection of steam generator tubes shall be performed at the frequencies specified in Specification 4.4.6.3 and the inspected tubes shall be verified acceptable per the acceptance criteria of Specification 4.4.6.4. The tubes selected for each inservice inspection shall include at least 3% of the total number of tubes in all steam generators. When applying the exceptions of 4.4.6.2.a through 4.4.6.2.c, previous defects or imperfections in the area repaired by sleeving are not considered an area requiring reinspection. The tubes selected for these inspections shall be selected on a random basis except:

- a. 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.
- b. The first sample of tubes selected for each inservice inspection (subsequent to the preservice inspection) of each steam generator shall include:

#When referring to a steam generator tube, the sleeve shall be considered a part of the tube if the tube has been repaired per Specification 4.4.6.4.a.9.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

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1. All nonplugged tubes that previously had detectable wall penetrations greater than 20%.
 2. Tubes in those areas where experience has indicated potential problems.
 3. At least 3% of the total number of sleeved tubes in all three steam generators or all of the sleeved tubes in the generator chosen for the inspection program, whichever is less. These inspections will include both the tube and the sleeve.
 4. A tube inspection (pursuant to Specification 4.4.6.4.a.8) shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube or sleeve inspection, this shall be recorded and an adjacent tube shall be selected and subjected to a tube inspection.
- c. The tubes selected as the second and third samples (if required by Table 4.4-2) during each inservice inspection may be subjected to a partial tube inspection provided:
1. The tubes selected for these samples include the tubes from those areas of the tube sheet array where tubes with imperfections were previously found.
 2. The inspections include those portions of the tubes where imperfections were previously found.

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	Less than 5% of the total tubes inspected are degraded tubes and none of the inspected tubes are defective.
C-2	One or more tubes, but not more than 1% of the total tubes inspected are defective, or between 5% and 10% of the total tubes inspected are degraded tubes.
C-3	More than 10% of the total tubes inspected are degraded tubes or more than 1% of the inspected tubes are defective.

Note: In all inspections, previously degraded tubes or sleeves must exhibit significant (greater than 10%) further wall penetrations to be included in the above percentage calculations.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

4.4.6.4 Acceptance Criteria

a. As used in this Specification:

1. 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 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, including the sleeve if the tube has been repaired, that contains imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation.
4. % Degradation means the percentage of the tube or sleeve wall thickness affected or removed by degradation.
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 repaired (i.e., sleeved) or removed from service by plugging and is greater than or equal to 40% of the nominal tube wall thickness. For a tube that has been sleeved, through wall penetration of greater than or equal to 31% of sleeve nominal wall thickness in the sleeve requires the tube to be removed from service by plugging.
7. Unserviceable describes the condition of a tube or sleeve 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 4.4.6.3.c, 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 that has been repaired by sleeving, the tube inspection should include the sleeved portion of the tube.
9. Tube Repair refers to mechanical sleeving, as described by Westinghouse report WCAP-11178 Rev. 1, which is used to maintain a tube in service or return a tube to service. This includes the removal of plugs that were installed as a corrective or preventive measure.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

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10. 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 after the field hydrostatic test and prior to initial POWER OPERATION using the equipment and techniques expected to be used during subsequent inservice inspections.

- b. The steam generator shall be determined OPERABLE after completing the corresponding actions (plug or repair of all tubes exceeding the plugging or repair limit) required by Table 4.4-2.

4.4.6.5 Reports

- a. Following each inservice inspection of steam generator tubes, the number of tubes plugged or repaired in each steam generator shall be reported to the Commission within 15 days of the completion of the plugging or repair effort.
- b. The complete results of the steam generator tube and sleeve 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.
 3. Identification of tubes plugged or repaired.
- c. Results of steam generator tube inspections which fall into Category C-3 shall be considered a REPORTABLE EVENT and shall be reported pursuant to 10CFR50.73 prior to resumption of plant operation. The written report shall provide a description of investigations conducted to determine the cause of the tube degradation and corrective measures taken to prevent recurrence.

TABLE 4.4-2
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 S 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 2S tubes in this S.G.	C-1	None	N/A	N/A
			C-2	Plug or repair defective tubes and inspect additional 4S tubes in this S.G.	C-1	None
			C-2	Plug or repair defective tubes and inspect additional 4S tubes in this S.G.	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	Perform action for C-3 result of first sample	N/A	N/A	N/A	N/A
	C-3	Inspect all tubes in this S.G., plug or repair defective tubes and inspect 2S tubes in each other S.G. Notification to NRC pursuant to 10CFR50.73	All other S.G.s are C-1	None	N/A	N/A
			Some S.G.s C-2 but no additional S.G.s are C-3	Perform action for C-2 result of second sample	N/A	N/A
			Additional S.G. is C-3	Inspect all tubes in each S.G. and plug or repair defective tubes. Notification to NRC pursuant to 10CFR50.73	N/A	N/A

$S = 3 \frac{N}{n} \%$ Where N is the number of steam generators in the unit, and n is the number of steam generators inspected during an inspection

REACTOR COOLANT SYSTEM

BASES

3/4.4.6 STEAM GENERATORS

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 inservice inspection of steam generator tubes is based on a modification of Regulatory Guide 1.83, Revision 1. Inservice 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 inservice conditions that lead to corrosion. Inservice 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.

The plant is expected to be operated in a manner such that the secondary coolant will be maintained within those chemistry limits found to result in negligible corrosion of the steam generator tubes. If the secondary coolant chemistry is not maintained within these limits, localized corrosion may likely result in stress corrosion cracking. The extent of cracking during plant operation would be limited by the limitation of steam generator tube leakage between the primary coolant system and the secondary coolant system (primary-to-secondary leakage = 500 gallons per day per steam generator). Cracks having a primary-to-secondary leakage less than this limit during operation will have an adequate margin of safety to withstand the loads imposed during normal operation and by postulated accidents. Operating plants have demonstrated that primary-to-secondary leakage of 500 gallons per day per steam generator can readily be detected by radiation monitors of steam generator blowdown. Leakage in excess of this limit will require plant shutdown and an unscheduled inspection, during which the leaking tubes will be located and plugged or repaired.

Wastage-type defects are unlikely with proper chemistry treatment of the secondary coolant. However, even if a defect should develop in service, it will be found during scheduled inservice steam generator tube examinations. Plugging or repair will be required for all tubes with imperfections exceeding 40% of the tube nominal wall thickness. If a sleeved tube is found to have through wall penetration of greater than or equal to 31% of sleeve nominal wall thickness in the sleeve, it must be plugged. The 31% limit is derived from R.G. 1.121 calculations with 20% added for conservatism. The portion of the tube and the sleeve for which indications of wall degradation must be evaluated can be summarized as follows:

1. Indications of degradation in the entire length of the sleeve must be evaluated against the sleeve plugging limit.
2. Indication of tube degradation of any type including a complete guillotine break in the tube between the bottom of the upper joint and the top of the lower roll expansion does not require that the tube be removed from service.

REACTOR COOLANT SYSTEM

BASES

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3. The tube plugging limit continues to apply to the portion of the tube in the entire upper joint region and in the lower roll expansion. As noted above the sleeve plugging limit applies to these areas also.
4. The tube plugging limit continues to apply to that portion of the tube above the top of the upper joint.

Steam generator tube inspections of operating plants have demonstrated the capability to reliably detect degradation that has penetrated 20% of the original tube wall thickness.

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 10CFR50.73 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.

REACTOR COOLANT SYSTEM

3/4.4.6 STEAM GENERATORS

LIMITING CONDITION FOR OPERATION
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3.4.6 Each steam generator shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one or more steam generators inoperable, restore the inoperable generator(s) to OPERABLE status prior to increasing T_{avg} above 200°F.

SURVEILLANCE REQUIREMENTS
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4.4.6.0 Each steam generator shall be demonstrated OPERABLE by performance of the following augmented inservice inspection program and the requirements of Specification 4.0.5.

4.4.6.1 Steam Generator Sample Selection and Inspection - Each steam generator shall be determined OPERABLE during shutdown by selecting and inspecting at least the minimum number of steam generators specified in Table 4.4-1.

4.4.6.2 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 4.4-2. The inservice inspection of steam generator tubes shall be performed at the frequencies specified in Specification 4.4.6.3 and the inspected tubes shall be verified acceptable per the acceptance criteria of Specification 4.4.6.4. The tubes selected for each inservice inspection shall include at least 3% of the total number of tubes in all steam generators. When applying the exceptions of 4.4.6.2.a through 4.4.6.2.c, previous defects or imperfections in the area repaired by sleeving are not considered an area requiring reinspection. The tubes selected for these inspections shall be selected on a random basis except:

- a. 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.
- b. The first sample of tubes selected for each inservice inspection (subsequent to the preservice inspection) of each steam generator shall include:

#When referring to a steam generator tube, the sleeve shall be considered a part of the tube if the tube has been repaired per Specification 4.4.6.4.a.9.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

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1. All nonplugged tubes that previously had detectable wall penetrations greater than 20%.
 2. Tubes in those areas where experience has indicated potential problems.
 3. At least 3% of the total number of sleeved tubes in all three steam generators or all of the sleeved tubes in the generator chosen for the inspection program, whichever is less. These inspections will include both the tube and the sleeve.
 4. A tube inspection (pursuant to Specification 4.4.6.4.a.8) shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube or sleeve inspection, this shall be recorded and an adjacent tube shall be selected and subjected to a tube inspection.
- c. The tubes selected as the second and third samples (if required by Table 4.4-2) during each inservice inspection may be subjected to a partial tube inspection provided:
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<u>Category</u>	<u>Inspection Results</u>
C-1	Less than 5% of the total tubes inspected are degraded tubes and none of the inspected tubes are defective.
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C-3	More than 10% of the total tubes inspected are degraded tubes or more than 1% of the inspected tubes are defective.

Note: In all inspections, previously degraded tubes or sleeves must exhibit significant (greater than 10%) further wall penetrations to be included in the above percentage calculations.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

4.4.6.4 Acceptance Criteria

a. As used in this Specification:

1. 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 wall thickness, if detectable, may be considered as imperfections.
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3. Degraded Tube means a tube, including the sleeve if the tube has been repaired, that contains imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation.
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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.
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7. Unserviceable describes the condition of a tube or sleeve 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 4.4.6.3.c, 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 that has been repaired by sleeving, the tube inspection should include the sleeved portion of the tube.
9. Tube Repair refers to mechanical sleeving, as described by Westinghouse report WCAP-11178 Rev. 1, which is used to maintain a tube in service or return a tube to service. This includes the removal of plugs that were installed as a corrective or preventive measure.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

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10. 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 after the field hydrostatic test and prior to initial POWER OPERATION using the equipment and techniques expected to be used during subsequent inservice inspections.

- b. The steam generator shall be determined OPERABLE after completing the corresponding actions (plug or repair of all tubes exceeding the plugging or repair limit) required by Table 4.4-2.

4.4.6.5 Reports

- a. Following each inservice inspection of steam generator tubes, the number of tubes plugged or repaired in each steam generator shall be reported to the Commission within 15 days of the completion of the plugging or repair effort.
- b. The complete results of the steam generator tube and sleeve 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.
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- c. Results of steam generator tube inspections which fall into Category C-3 shall be considered a REPORTABLE EVENT and shall be reported pursuant to 10CFR50.73 prior to resumption of plant operation. The written report shall provide a description of investigations conducted to determine the cause of the tube degradation and corrective measures taken to prevent recurrence.

TABLE 4.4-2
STEAM GENERATOR TUBE INSPECTION

1ST SAMPLE INSPECTION			2ND SAMPLE INSPECTION		3RD SAMPLE INSPECTION	
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A minimum of S 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 2S tubes in this S.G.	C-1	None	N/A	N/A
			C-2	Plug or repair defective tubes and inspect additional 4S tubes in this S.G.	C-1	None
					C-2	Plug or repair defective tubes
			C-3	Perform action for C-3 result of first sample	N/A	N/A
	C-3	Inspect all tubes in this S.G., plug or repair defective tubes and inspect 2S tubes in each other S.G. Notification to NRC pursuant to 10CFR50.73	C-3	Perform action for C-3 result of first sample	N/A	N/A
			All other S.G.s are C-1	None	N/A	N/A
			Some S.G.s C-2 but no additional S.G.s are C-3	Perform action for C-2 result of second sample	N/A	N/A
	Additional S.G. is C-3	Inspect all tubes in each S.G. and plug or repair defective tubes. Notification to NRC pursuant to 10CFR50.73	N/A	N/A		

$S = 3 \frac{N}{n} \%$ Where N is the number of steam generators in the unit, and n is the number of steam generators inspected during an inspection

FARLEY-UNIT 2

3/4 4-15

AMENDMENT NO.

REACTOR COOLANT SYSTEM

BASES

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3/4.4.6 STEAM GENERATORS

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 inservice inspection of steam generator tubes is based on a modification of Regulatory Guide 1.83, Revision 1. Inservice 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 inservice conditions that lead to corrosion. Inservice 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.

The plant is expected to be operated in a manner such that the secondary coolant will be maintained within those chemistry limits found to result in negligible corrosion of the steam generator tubes. If the secondary coolant chemistry is not maintained within these limits, localized corrosion may likely result in stress corrosion cracking. The extent of cracking during plant operation would be limited by the limitation of steam generator tube leakage between the primary coolant system and the secondary coolant system (primary-to-secondary leakage = 500 gallons per day per steam generator). Cracks having a primary-to-secondary leakage less than this limit during operation will have an adequate margin of safety to withstand the loads imposed during normal operation and by postulated accidents. Operating plants have demonstrated that primary-to-secondary leakage of 500 gallons per day per steam generator can readily be detected by radiation monitors of steam generator blowdown. Leakage in excess of this limit will require plant shutdown and an unscheduled inspection, during which the leaking tubes will be located and plugged or repaired.

Wastage-type defects are unlikely with proper chemistry treatment of the secondary coolant. However, even if a defect should develop in service, it will be found during scheduled inservice steam generator tube examinations. Plugging or repair will be required for all tubes with imperfections exceeding 40% of the tube nominal wall thickness. If a sleeved tube is found to have through wall penetration of greater than or equal to 31% of sleeve nominal wall thickness in the sleeve, it must be plugged. The 31% limit is derived from R.G. 1.121 calculations with 20% added conservatism. The portion of the tube and the sleeve for which indications of wall degradation must be evaluated can be summarized as follows:

1. Indications of degradation in the entire length of the sleeve must be evaluated against the sleeve plugging limit.
2. Indication of tube degradation of any type including a complete guillotine break in the tube between the bottom of the upper joint and the top of the lower roll expansion does not require that the tube be removed from service.

REACTOR COOLANT SYSTEM

BASES

3. The tube plugging limit continues to apply to the portion of the tube in the entire upper joint region and in the lower roll expansion. As noted above the sleeve plugging limit applies to these areas also.
4. The tube plugging limit continues to apply to that portion of the tube above the top of the upper joint.

Steam generator tube inspections of operating plants have demonstrated the capability to reliably detect degradation that has penetrated 20% of the original tube wall thickness.

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 10CFR50.73 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.

ENCLOSURE 3

Significant Hazards Evaluation
Pursuant to 10CFR50.92 for the
Proposed Steam Generator Tube Repair
Technical Specification Change

REPAIR OF STEAM GENERATOR TUBES USING SLEEVES
J. M. FARLEY NUCLEAR PLANT UNITS 1 AND 2
SIGNIFICANT HAZARDS CONSIDERATION ANALYSIS

INTRODUCTION

As required by 10 CFR 50.91 (a)(1) this analysis is provided to demonstrate that a proposed license amendment to implement repair of tubes using tube sleeves for the J. M. Farley Unit 1 and 2 steam generators represents no significant hazards consideration. In accordance with the three factor test of 10 CFR 50.92(c), implementation of the proposed license amendment was analyzed using the following standards and found not to: 1) involve a significant increase in the probability or consequences for an accident previously evaluated; or 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety.

Due to the importance of the barrier provided by the steam generator tubes, maintenance of tube bundle integrity has been provided for by regular inspection of the tubes and removal from service of tubes which have indication of degradation in excess of specified criteria. A repair method using sleeves placed inside the tubes at the location of the degradation has been developed. The sleeves are short lengths of tubing with an outside diameter less than the inside diameter of the degraded tube. The sleeve is placed inside the tube and is joined at the top and bottom to sound portions of the tube. The installed sleeve in a degraded or defective tube restores the integrity of the barrier provided by the tubes between the primary and secondary fluids

Using existing Technical Specification tube plugging criteria, tubes with indications of degradation in excess of the plugging criteria would have to be removed from service. Removal of a tube from service results in a reduction of reactor coolant flow through the steam generator. This small

reduction in flow has an impact on the margin in the reactor coolant flow through the steam generator in LOCA analyses and on the heat transfer efficiency of the steam generator. Repair of a tube with sleeving maintains the tube in service and results in a much smaller flow reduction. Therefore the proposed amendment would minimize loss of margin in reactor coolant system flow and assist in assuring that minimum flow rates are maintained in excess of that required for operation at full power. Also minimizing the reduction in flow has operational benefits and minimizes the increase in heat flux across the tubes remaining in service. Increased heat fluxes have been associated with an increased potential for tube corrosion.

The proposed amendment would modify Technical Specification 4.4.6, "Steam Generators" and its bases to allow for the repair of a steam generator tube. Currently, Farley Units 1 and 2 Technical Specifications permits only the removal from service by plugging for those steam generator tubes with eddy current indications showing greater than 40% through wall cracking. These specifications were established before the sleeving repair method which would permit tubes to be repaired and returned to safe operation was developed. The proposed Technical Specification change would permit Alabama Power Company the option of repairing degraded or defective tubes utilizing sleeves or the removal of degraded or defective tubes from service by plugging in the J. M. Farley Units 1 and 2 steam generators. The proposed amendment also includes criteria for allowable wall degradation in the sleeve and in the tube in the region of the sleeve to tube joint.

ANALYSIS

Conformance of the proposed amendments to the standards for a determination of no significant hazard as defined in 10 CFR 50.92 (three factor test) is shown in the following:

- 1) Operation of the Farley Nuclear Plant Unit 1 and 2 in accordance with the proposed license amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The supporting technical and safety evaluations of the subject amendment (Westinghouse WCAP 11178, Rev. 1, "J. M. Farley Units 1 and 2, Steam Generator Sleaving Report, Mechanical Sleeves" (Proprietary); WCAP 11179, Rev. 1, "J. M. Farley Units 1 and 2, Steam Generator Sleaving Report, Mechanical Sleeves" (Non-Proprietary); and SECL-86-352, Rev. 1) demonstrate that repair of degraded tubes using sleeves will result in tube bundle integrity consistent with the original design basis.

The sleeve configuration has been designed and analyzed in accordance with the rules of the ASME Boiler and Pressure Vessel Code. Fatigue and stress analyses of the sleeved tube assemblies produced acceptable results. Mechanical testing has shown that the structural strength of the sleeves under normal, faulted and upset conditions is within acceptable limits. Leak rate testing has demonstrated that the leak rates of the joints between the sleeve and the existing tube under normal, faulted and upset conditions are well below acceptable rates. The existing Technical Specification leakage rate requirements and accident analysis assumptions remain unchanged in the event significant leakage from the sleeve would occur. Any leakage through the sleeved region of the tube due to potential localized tube degradation is fully bounded by leak-before-break considerations and ultimately the existing steam generator tube rupture analysis included in the Farley Nuclear Plant Final Safety Analysis Report. The proposed Technical Specification change does not adversely impact any other previously evaluated design basis accident. The results of the qualification testing, analyses, and plant operating experience demonstrate that the sleeve assembly is an acceptable means of maintaining tubes in service. Furthermore, per Regulatory Guide 1.83 recommendations, the sleeved tube can be monitored through periodic inspections with present eddy current techniques. Plugging limit criteria are established in the technical specifications for the tube in the region of the sleeve and the sleeve. These measures demonstrate that installation of sleeves which span degraded areas of the tube will restore the tube to its original design basis.

- 2) The proposed license amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Implementation of the proposed tube degradation repair method does not introduce significant changes to the plant design basis. Repair of tubes does not provide a mechanism to result in an accident outside of the sleeved area. Any hypothetical accident as a result of potential tube or sleeve degradation in the repaired portion of the tube would be bounded by the existing tube rupture accident analysis.

- 3) The proposed license amendment does not involve a significant reduction in a margin of safety.

The sleeve repair of degraded steam generators tubes has been demonstrated to restore the integrity of the tube bundle under normal and postulated accident conditions. The safety factors used in the design of sleeves for the repair of degraded tubes are consistent with the safety factors in the ASME Boiler and Pressure Vessel Code used in steam generator design. The plugging limit criteria for the sleeve has been established using the method of Regulatory Guide 1.121. The design of the sleeve joints has been verified by testing to preclude significant leakage during normal and postulated accident conditions.

The effect of sleeving on the design transients and accident safety analyses has been reviewed based on the installation of the maximum number of sleeves expected. The installation of sleeves can be evaluated as the equivalent of some level of steam generator tube plugging. The J. M. Farley Units 1 and 2 steam generators are currently licensed to 5 percent steam generator tube plugging (SGTP) and Alabama Power Company has submitted a 10 percent steam generator tube plugging analysis to the NRC for use at Farley Units 1 and 2 to evaluate the effects of tube plugging and reduced reactor coolant system (RCS) flow in the steam generators. An evaluation has shown that flow restriction for a steam generator tube plugging level of 10% is greater than for the equivalent

combination of expected tube plugging and up to the maximum number of sleeves expected to be installed of the design described in Ref. 1. A LOCA evaluation has shown that system parameters for this plugging level are within their allowable limits (i.e., peak clad temperature, DNBR, RCS pressure, etc.). The calculated reactor coolant flowrate with the maximum number of sleeves expected to be installed is greater than the thermal design flow; therefore, the non-LOCA safety analyses and design transients are not adversely impacted by steam generator sleeving. Accordingly, there is no decrease in the safety margins defined in the plant Technical Specifications.

Implementation of tube repair by sleeving will decrease the number of tubes which must be taken out of service with tube plugs. Installation of tube plugs reduces the RCS flow margin, thus implementation of tube repair by sleeving will maintain the margin of flow that would otherwise be reduced in the event of increased plugging. Based on the above, it is concluded that the proposed change does not result in a significant reduction in a loss of margin with respect to plant safety as defined in the Final Safety Analysis Report or the bases of the plant technical specifications.

CONCLUSION

Based on the preceding analysis it is concluded that operation of J. M. Farley Nuclear Plant Units 1 and 2 in accordance with the proposed amendment does not result in the creation of an unreviewed safety question, an increase in the probability of an accident previously evaluated, create the possibility of a new or different kind of accident from any accident previously evaluated, nor reduce any margins to plant safety. Therefore, the license amendment does not involve a Significant Hazards Consideration as defined in 10 CFR 50.92.

REFERENCE

1. Westinghouse WCAP 11178, Rev. 1, "J. M. Farley Units 1 and 2, Steam Generator Sleeving Report, Mechanical Sleeves" (Proprietary)

ENCLOSURE 1

J. M. FARLEY NUCLEAR PLANT - UNITS 1 AND 2
STEAM GENERATOR SLEEVING REPORT
(MECHANICAL SLEEVES)