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Ref. # 10CFR50.90

CPSES-200001869
Log # TXX-00014
File # 236

September 6, 2000

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446
LICENSE AMENDMENT REQUEST (LAR) 00-04
STEAM GENERATOR TUBE REPAIR USING LASER WELDED SLEEVES

Gentlemen:

Pursuant to 10CFR50.90, TXU Electric hereby requests an amendment to the CPSES Unit 1 Operating License (NPF-87) and CPSES Unit 2 Operating License (NPF-89) by incorporating the attached change into the CPSES Unit 1 and 2 Technical Specifications (TS). These changes apply to CPSES Unit 1 only. Because the Technical Specifications is a common document for both units, the changes are also being submitted for CPSES Unit 2 for administrative purposes only.

The proposed change will revise TS 5.5.9, "Steam Generator Tube Surveillance Program" to permit tube sleeving repair techniques developed by Westinghouse Electric Corporation to be used at CPSES. Sleeving is a steam generator tube repair method where a length of tubing (sleeve), having an outer diameter slightly smaller than the inside of the steam generator tube, is installed spanning the degraded region of the parent tube. TS 5.6.10, "Steam Generator Tube Inspection Report" is being revised to address the reporting requirements for repaired tubes. The proposed change, when approved, will allow installation of a laser welded tube sleeve as an alternative to plugging defective steam generator tubes. Additionally, an editorial correction is being made to Table 5.5-2.

Attachment 1 is the required Affidavit. Attachment 2 provides a detailed description of the proposed changes, a safety analysis of the changes, and TXU Electric's determination that the proposed changes do not involve a significant hazard consideration.

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Attachment 3 provides the affected Technical Specification pages, marked-up to reflect the proposed changes. Attachment 4 provides a retyped copy of affected Technical Specification pages with the proposed changes. Attachment 5 contains markup of the final safety analysis report pages, and are included for information only.

TXU Electric requests approval of the proposed License Amendment by February 28, 2001 to be implemented within 30 days of the issuance of the license amendment. This approval date supports the CPSES Unit 1 outage which is scheduled for the spring of 2001. The amendment is not required to complete the outage and restart the unit, but if the requested license amendment is not received, certain steam generator tubes may have to be plugged rather than sleeved.

In accordance with 10CFR50.91(b), TXU Electric is providing the State of Texas with a copy of this proposed amendment.

Westinghouse Electric Company considers information contained in the enclosed WCAP-13698, Rev. 3, "Laser Welded Sleeves for 3/4 Inch Diameter Tube Feedring Type and Westinghouse Preheater Steam Generators Generic Sleeving Report," and WCAP-15090, "Specific Application of Laser Welded Sleeves for the Comanche Peak Units 1 and 2 Steam Generators," to be proprietary. In accordance with the requirements of 10CFR2.790(b) for withholding of proprietary information from public disclosure, the required Affidavits are enclosed. Correspondence with respect to the proprietary aspects of the supporting Westinghouse Affidavit should be addressed to Westinghouse Electric Company, Attention: Mr. H. A. Sepp , Manager, Regulatory and Licensing Engineering, Westinghouse, Box 355, Pittsburgh, Pennsylvania 15230-0355.

This communication contains no new or revised commitments. Should you have any questions, please contact Obaid Bhatty at (254) 897-5839

Sincerely,

C. L. Terry

By: Roger D. Walker
Roger D. Walker
Regulatory Affairs Manager

OAB/ob

Attachments:
1. Affidavit
2. Description and Assessment
3. A markup of Technical Specifications Pages
4. Retyped Technical Specification Pages
5. A markup of the Final Safety Analysis Report Pages

Enclosures:
1. WCAP-13698, Rev. 3, "Laser Welded Sleeves for 3/4 Inch Diameter Tube Feedring-Type and Westinghouse Preheater Steam Generators," July 1998 (Proprietary)
2. WCAP-13699, Rev. 3, "Laser Welded Sleeves for 3/4 Inch Diameter Tube Feedring-Type and Westinghouse Preheater Steam Generators," July 1998 (Non-Proprietary)
3. WCAP-15090, Rev. 1, "Specific Application of Laser Welded Sleeves for Comanche Peak Units 1 and 2 Steam Generators," March 1999. (Proprietary)
4. WCAP-15091, Rev. 1, "Specific Application of Laser Welded Sleeves for Comanche Peak Units 1 and 2 Steam Generators," March 1999. (Non-Proprietary)
5. Westinghouse "Application for Withholding Proprietary Information From Public Disclosure," regarding WCAP-13698, Rev. 3 and WCAP-15090, Rev. 1.

cc:
E. W. Merschoff, Region IV (NP enclosure only)
J. I. Tapia, Region IV (NP enclosure only)
D. H. Jaffe, NRR (P & NP enclosures)
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Texas Department of Public Health
1100 West 49th Street
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NP = Non-Proprietary
P = Proprietary

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)		
	)		
TXU Electric	)	Docket Nos.	50-445
	)		50-446
(Comanche Peak Steam Electric Station,	)	License Nos.	NPF-87
Units 1 & 2)	)		NPF-89

AFFIDAVIT

Roger D. Walker being duly sworn, hereby deposes and says that he is Regulatory Affairs Manager of TXU Electric, the licensee herein; that he is duly authorized to sign and file with the Nuclear Regulatory Commission this License Amendment Request 00-04; that he is familiar with the content thereof; and that the matters set forth therein are true and correct to the best of his knowledge, information and belief.

Roger D. Walker

Roger D. Walker
Regulatory Affairs Manager

STATE OF TEXAS)
)
COUNTY OF)
Somervell

Subscribed and sworn to before me, on this 6th day of September, 2000.

Gayle R. Peck Jesperson

Notary Public

ATTACHMENT 2 to TXX-00014

DESCRIPTION AND ASSESSMENT

Description and Assessment

1.0 INTRODUCTION

Proposed change LAR-00-04 is a request to revise Technical Specifications (TS) 5.5.9, "Steam Generator Tube Surveillance Program," and TS 5.6.10, "Steam Generator Tube Inspection Report," for Comanche Peak Steam Electric Station (CPSES) Unit 1. Additionally, an editorial correction is being made to Table 5.5-2.

The evaluations performed in support of this License Amendment Request do result in changes to the FSAR per 10CFR50.71(e), the guidance provided by Regulatory Guide 1.181 "Content of the Updated Final Safety Analysis Report in Accordance with 10 CFR 50.71(e)," and NEI 98-03, "Guidelines for Updating Final Safety Analysis Reports." However, TXU Electric is proposing to delete the section detailing "Acceptance Criteria" and "Reports" in Section 5.4.2.2.2 of the FSAR. The bases for deleting the aforementioned section is because it is duplicate of acceptance criteria and reports specified in the TS section 5.5.9. A markup of this deletion is provided in Attachment 5, for information only.

2.0 DESCRIPTION

The proposed change will revise TS 5.5.9, "Steam Generator Tube Surveillance Program" to permit tube sleeving repair techniques developed by Westinghouse Electric Corporation to be used at CPSES. Sleeving is a steam generator tube repair method where a length of tubing (sleeve), having an outer diameter slightly smaller than the inside of the steam generator tube, is installed spanning the degraded region of the parent tube. Under TS 5.5.9e.1 "Acceptance Criteria, As used in this specification" a new criteria for laser welded sleeves is added. The new paragraph, "n) Tube Repair," invokes the applicable topical reports for laser welded sleeves. TS 5.5.9b and TS 5.5.9e.1.h) are revised to identify how "tube repair" is addressed in the testing program. TS 5.5.9e.1.f) revises the plugging limit to address repaired tubes. Several paragraphs and the TS Table (5.5-2) on steam generator tube inspection are revised to address tube repair as well as tube plugging and to address inspection of the tube sleeves as well as the tubes. TS 5.6.10, "Steam Generator Tube Inspection Report" is being revised to address the reporting requirements for repaired tubes. The proposed change, when approved, will allow installation of a laser welded tube sleeve as an alternative to plugging defective steam generator tubes.

In addition, an editorial correction is being made in TS Table 5.5-2. This editorial correction revises the phrase; "Perform action for C-3 result of second sample," to read "Perform action for C-2 result of second sample."

3.0 BACKGROUND

Operating histories throughout the industry have shown a potential for tube wall degradation in the expanded portion of the tube in the tubesheet, in the tube expansion transition, and at the tube support intersections. To maintain tube integrity consistent with the original design margins, an allowable level of tube wall degradation referred to as the plugging limit is established. Currently, tubes which have eddy current indications of degradation in excess of the plugging limit in the CPSES steam generators must be removed from service. Tube sleeving is one technique used to restore locally degraded tubing back to a condition consistent with the original design basis. Tube sleeving is a process where a smaller diameter tube (or sleeve) is positioned to span the degraded portion of the tube. It is subsequently secured to the tube, forming a new pressure boundary and structural element in the area between the attachment.

The laser welded sleeving (LWS) process involves the installation of thermally treated nickel-iron-chromium Alloy 690 sleeves in steam generator tubes in the tubesheet region and at the tube support elevations. Alloy 690 is a Code approved material for this application (ASME SB-163), incorporated in ASME Code Case N-20. Once installed, the laser welded sleeve returns a tube to a condition consistent with its original design basis by spanning the degraded region of the tube. The stresses and fatigue usage limits in the sleeve/tube assembly are compliant with ASME Code requirements, and the tube is leaktight. Reference 1, WCAP-13698, Rev. 3, "Laser Welded Sleeves for 3/4 Inch Diameter Tube Feedring-Type and Westinghouse Preheater Steam Generators Generic Sleeving Report," provides a generic analysis of the laser welded sleeved tube assembly which is intended to envelop the operating regimes of all plants with Westinghouse Model D4 and D5 steam generators. Reference 2, WCAP-15090, "Specific Application of Laser Welded Sleeves for the Comanche Peak Units 1 and 2 Steam Generators," evaluates the applicability of the laser welded sleeving analysis to the Comanche Peak Unit 1 and 2 steam generators. Even though these reports are applicable to both CPSES units, at this time, the application of LWS is requested for only Unit 1.

The installation of sleeves represents, although small, a reduction in total RCS flow rate due primarily to the sleeve inside diameter restriction. The requirement for the minimum RCS flow rate are contained in Technical Specification 3.4.1. Compliance with the limits of TS 3.4.1 ensure the applicable safety analyses remain valid.

Therefore, a license amendment is proposed to permit the repair of steam generator tubing through the installation of Alloy 690 laser welded tube sleeves at degraded tube support plate intersections and within the tubesheet area of the steam generators at CPSES Unit 1. The installation of the laser welded sleeves requires a change to the plugging limit and tube repair definitions included within the plant Technical Specifications. A repair method has been developed which secures to the original tube a short length of tubing with an outer diameter slightly smaller than the inside diameter of the tube, spanning the degraded area of the parent tube. The tube support plate sleeve is attached to the degraded tube by producing an autogenous weld between the original tube and sleeve. Tube support

plate sleeve welds are produced in the free span sections of the tube. The free span welds provide the structural joint between the tube and sleeve and also provide positive (leaktight) leakage integrity. The tubesheet sleeve is secured and supported structurally at the upper section by a free span autogenous weld performed identically to the tube support plate sleeve welds while the tubesheet sleeve lower laser weld joint is a standard mechanical interference fit (MIF) joint. The MIF joint alone provides structural integrity and a high degree of leaktightness. An additional type of tubesheet sleeve, an elevated tubesheet sleeve, can also be used. The elevated tubesheet sleeve is installed using the same processes as the standard tubesheet sleeve. The elevated tubesheet sleeve, however, is shorter in length than the standard tubesheet sleeve. It extends over approximately one-third of the tube length within the tubesheet and is joined to the tube approximately 15 inches above the tubesheet bottom. The elevated tubesheet sleeve permits a greater number of tubes to be sleeved due to its shorter length and lesser potential for obstruction by the channelhead bowl during the installation process. The repair of a degraded tube by the installation of tube support plate sleeves and/or tubesheet sleeves restores the integrity of the primary pressure boundary to a condition consistent with that of the originally supplied tubing; that is, the stresses generated during all plant conditions are bounded by the ASME Code requirements and the tube is leaktight. All welds must be a minimum distance from any detected tube degradation as defined in Reference 1.

Currently, steam generator tubes with indications of degradation in excess of the plugging limit would have to be removed from service, according to the plant Technical Specifications, without provision for tube repair by sleeving. Removal of a tube from service results in a reduction of reactor coolant flow through the steam generator which affects the heat transfer efficiency of the steam generator. Repair of a tube by sleeving maintains the tube in service and results in a much smaller flow reduction. Therefore, the use of sleeving in lieu of plugging minimizes the reduction in the reactor coolant system flow and assists in assuring that reactor coolant flow rates are maintained in excess of that required for operation at full power. Any combination of sleeving and plugging utilized at CPSES Unit 1, up to a level such that the effect of sleeving will not reduce the reactor coolant flow rate to below the limits of Technical Specification 3.4.1, is acceptable.

Also, minimizing the reduction in flow has operational benefits by limiting the increase in heat flux across the tubes remaining in service. Increased heat fluxes have been associated with an increased potential for tube degradation.

The proposed amendment would modify Technical Specification 5.5.9 "Steam Generator (SG) Tube Surveillance Program" to permit the installation of laser welded tube sleeves and to provide the sleeve/tube inspection requirements and acceptance criteria to determine the level of degradation which would require the sleeve to be removed from service.

4.0 TECHNICAL ANALYSIS

4.1 Steam Generator Design

The CPSES Unit 1 steam generators are Westinghouse Model D4 steam generators. The Model D4 steam generators installed in CPSES Unit 1 have tubes that are either full depth hard rolled (~90% of the tubes) or full depth WEXTEX expanded (~10% of the tubes) in the tubesheet and are made of mill annealed Alloy 600 material. The tube support plates for the Unit 1 steam generators are of the drilled hole, carbon steel type.

4.2 Sleeving

A sleeve is a tube slightly smaller in diameter than a SG tube that is inserted into a SG tube to bridge a degraded or susceptible section. The length of a sleeve is selected according to the individual installation circumstance. Generally, they vary in length between one and three feet. The sleeve becomes the pressure boundary and thereby restores the structural integrity of a degraded or potentially degraded portion of the original SG tube.

Prior to the development of sleeve technology, licensees removed defective SG tubes from service by plugging. However, this reduced the heat transfer area. The reduction in heat transfer (or other thermal-hydraulic operating parameters) can be tolerated up to a point before other system consequences of the reduced SG performance become limiting. Beyond this limit, a utility had to make operational changes resulting in reduced electrical generating capacity of the affected unit.

Because sleeves have minimal effect upon the thermal-hydraulics of a SG, their use is essentially unrestricted. This means TXU Electric may restore degraded sections of SG tubes to like new condition without experiencing a serious penalty with regard to unit generating capacity. This characteristic has led to increased use of sleeves versus plugs where practical.

TXU Electric's proposal addresses the use of three basic sleeve designs: a full length tubesheet sleeve (FLTS), an elevated tubesheet sleeve (ETS) and a tube support sleeve (TSS). The FLTS spans from the end of the tube, at the bottom surface of the tubesheet, to a point above the secondary side surface of the tubesheet. The ETS spans from a location within the tubesheet, approximately 15 inches above the tube end, to a point above the secondary side surface of the tubesheet. The TSS is installed centered approximately on a tube support intersection or in a freespan section of SG tube. All sleeve types are first secured by hydraulically expanding the upper and lower portions of the sleeve. The hydraulic expansion brings the sleeve ends into contact with the parent tube in preparation for subsequent welding or rolling. The FLTS and the ETS are installed by means of two different joint types: an autogenous laser weld at the freespan end of the sleeve (the upper joint) and a rolled joint (mechanically expanded) at the tubesheet end of the sleeve (the lower joint). The TSS is laser welded to the SG tube at each freespan end of the sleeve. The material of construction for the sleeve is a nickel-iron-chromium alloy, alloy 690, a Code approved material (ASME SB-163), incorporated in ASME Code Case N-20. The three sleeve designs are further discussed below.

4.2.1 Full Length Tubesheet Sleeves (FLTS) Discussion

The mechanical tests documented in Section 4.0 of References 1 and 2 apply to Comanche Peak Unit 1 as described below. The lower joint of the FLTS was developed for the Model E1 LWS (Doel 4) program and is directly applicable to the sleeve lower joints to be installed in the hardrolled region of the steam generator tubes in CPSES Unit 1; no leakage was recorded for this joint in the qualification test.

4.2.2 Elevated Tubesheet Sleeves (ETS) Discussion

Although the full length tubesheet sleeve lower joints for 3/4 inch tubes have been completely satisfactory, the ETS joints for 3/4 inch tube sleeves have been developed separately. Both types of joints must meet the same pullout and leakage resistance requirements for the respective applications. One of the reasons for separate developments in the past was that the roller expander torque is delivered less efficiently to the sleeve and tube in the elevated case. Another reason is that locating the elevated joints above the tubesheet neutral bending axis causes hole dilatation and in turn, tube inner diameter dilation. The tubemouth joints are not affected by hole and tube ID dilation, during these conditions.

The sleeve installation sequence will also be a roll-last installation sequence at CPSES Unit 1. The roll-last ETS lower joint was developed for the Maine Yankee steam generators, and it involves performing welding and the heat treatment prior to the final expansion of the lower joint. This sequence reduces the tensile far field stresses on the tube above the weld and weld hydraulic expansion upper transition prior to the final expansion of the lower joint. It reduces the tensile far field stresses on the tube above the weld for cases involving locking or suspected locking of the tube at the first tube support plate. The roll-last sequence will be used for CPSES Unit 1 to achieve the lowest possible tube far field stresses above the weld for locked tube or potentially locked tube condition at the first or higher tube support plates.

Relative to the structural adequacy of the lower joint of the elevated tubesheet sleeves to be installed in tubes in CPSES Unit 1 that have been full depth hardrolled in the tubesheet, the lower joint of the elevated tubesheet sleeve is qualified and has been implemented during an LWS campaign at Byron Unit 1.

However, 10% of the tubes in Unit 1 were expanded in the tubesheet during manufacture using a WEXTEX expansion process. The lower joint of the ETS installed in these tubes will be similar to an existing ETS joint made in non-roll expanded tubes in 3/4 inch diameter tubes at Maine Yankee which are shown to be applicable for the CPSES Unit 1 roll-last sequence for joint strength and leakage resistance.

In conclusion, the existing ETS joint processes for 3/4 inch x 0.043 inch wall thickness tubes will provide acceptable pullout resistances for normal operation, faulted, test and upset conditions in

the roll-last sequence for the Model D4 steam generators of CPSES Units 1. The ETS lower joint also provides acceptable leakage resistance; the leakage will be negligible during all plant conditions.

4.2.3 Tube Support Sleeves (TSS) Discussion

The tube support sleeve (TSS) may be installed to bridge degradation located at tube support locations or in freespan locations. Tube support sleeves are first hydraulically expanded in place at the upper and lower joint areas, then, a laser weld is produced within the hydraulic expansion regions. A structural analysis of the sleeve and sleeve joints using bounding temperature and pressure differences, and corrosion testing of prototypic sleeve specimens has been completed. The results of these evaluations and test programs are summarized in this evaluation and described in Reference 1.

4.3 Sleeve Design and Analysis

The steam generator tube sleeve repair is performed per the requirements in Section XI (IWA-4120) of the ASME Code which refers back to Section III (code of construction) as the preferred method of repair. Section III, Paragraph NB 3649 of the ASME Code provides two alternative approaches to qualify a component: analysis or experiment. The tube and the sleeve are qualified by analysis. The evaluation of the laser weld to show compliance with ASME Code requirements for primary stresses is based on Paragraph NB-3649.

The laser welded sleeve and tube geometries for the CPSES Unit 1 Model D4 steam generators are the same as the sleeve and tube geometries considered in the generic LWS structural evaluation for 3/4 inch OD tubes (Reference 1). The umbrella loading conditions used in the generic analysis (Reference 1) include transient loads from the applicable design specifications for the CPSES Unit 1 steam generators. Also, a conservative bounding evaluation was performed for seismic loads, and it is shown that seismic loads result in negligible stress and fatigue usage in the tube and sleeve. The results presented in Reference 1 bound the CPSES Unit 1 plant specific seismic loads.

Thus, with respect to the sleeve, tube and weld geometry, the results and conclusions of Reference 1 apply directly to the CPSES Unit 1 LWS installation. The generic sleeve analyses evaluate three sleeve designs, the full length tubesheet (FLTS), the elevated tubesheet (ETS) and tube support plate (TSS) design. Each of these sleeve geometries was evaluated and concluded to be applicable to CPSES Unit 1.

4.4 Sleeve and Tube Analysis Discussion

In the generic Westinghouse qualification report, the results of a tube/sleeve evaluation for 7/8 inch OD tubes were used to define the location of the limiting section and the condition of the tube (separated or intact) for the 3/4 inch tube sleeve. The stresses generated in the 7/8 inch tube/sleeve analysis were modified to account for changes in geometry by generating small finite element models of the critical region for the 7/8 inch sleeve and the 3/4 inch sleeve designs, and applying various loading conditions (internal pressure, external pressure, etc.). Using the stresses from the detailed models, factors were generated by comparing the 3/4 inch results to those obtained from the 7/8 inch design.

These factors were then used to modify the stresses generated for the 7/8 inch sleeves in order to obtain a stress solution for sleeves installed in 3/4 inch tubes.

The analysis of the laser welded sleeve design utilizes both conventional and finite element techniques. Several finite element models were used. For the tubesheet sleeve analysis, separate models were developed for the upper and lower joints. Interaction between the two models is accomplished by coupling appropriate tube and sleeve nodes. The tubesheet sleeve upper joint model is also used to evaluate the tube support sleeve. The steam generator tubes in the CPSES Units 1 steam generators are full depth expanded in the tubesheet. However, in spite of the actual configuration, the limiting geometry, judged to be partial depth expansion at the bottom of the tubesheet, is considered in the analysis.

In performing the stress evaluation for the sleeve models, thermally induced and pressure induced stresses were calculated separately then combined to determine the total stress distribution using appropriate factors to account for geometry differences between the 7/8 and 3/4 inch tubes. Separate reference pressure cases were run for both an intact and separated parent tube. The analysis considers both undented and dented tubes. Since it results in the highest axial load, the analysis of dented tubes conservatively assumes that only the analyzed tube was locked up[1] at the first tube support plate at 100 percent power conditions.

The ASME Code evaluation results show the primary stress intensities for the tube and sleeve satisfy the allowable ASME Code limits. The evaluation was performed for specific analysis sections using a finite element model. The largest magnitudes of the ratio of calculated stress intensity to allowable stress intensity for steam generators with 3/4 inch tubes are 0.74 for design conditions, 0.33 for faulted conditions, 0.53 for emergency conditions, and 0.77 for test conditions.

1.Recent field experience with the installation of welded sleeves with post weld heat treatment (PWHT) indicated SG tubes may be constrained ("tube lockup") in their tube support plates. The result of such tube locking is distortion of the tube (bowing or bulging) during the PWHT. After the heat treatment is completed, the bow or bulge remains. Measurements of the bowing and bulging have shown them to be of negligible values. These distortions have been analyzed and found to be immaterial to the examination, operation, and safety of the sleeved tubes.

Based on the sleeve design criteria, the fatigue analysis considers a design objective of 40 years for the sleeved tube assemblies. The analysis results show that the ASME Code limits are satisfied.

While the bulk of the verification is based on data found in Reference 1, the sleeve/tube contact pressure assessment uses the finite element results from the evaluation performed for equivalent laser welded sleeves installed in the Byron Unit 1 Model D4 steam generators. Inside the tubesheet, it is important to maintain adequate contact pressure at the hardrolled sleeve/tube interface to prevent pullout and leakage in the elevated tubesheet sleeve configuration. Some of the sleeves for CPSES Unit 1 are to be installed in the upper half of the tubesheet where tubesheet bow during operation tends to increase the diameter of the holes drilled in the tubesheet. In all cases evaluated, the net effect of tubesheet rotations, thermal expansions, and pressure is to increase the contact pressure between the sleeve and the tube. This contact pressure is in addition to the interference pressure between the sleeve and tube and tube and tubesheet during the installation of the sleeves.

4.5 Weld Evaluation

The evaluation of the laser weld to show compliance with ASME Code requirements for primary stress is based on experimental stress analysis following the guidelines of Paragraph NB-3649. The limiting condition for the laser weld in terms of primary membrane pressure stress occurs when the parent tube is assumed to be fully severed inboard (below) the weld. Assuming that the parent tube is not locked to the tube support plates, the shear force in the weld must be in force equilibrium with the end cap load on the parent tube. Since the weld is also the pressure seal, the maximum tube inside radius defines both the pressure drop end cap load and the shear area of the weld.

Test samples were prepared for the most limiting tube/sleeve geometry, pressure tested, and then using the test results, a failure pressure was calculated using the minimum weld width defined in Reference 1, the maximum tube/sleeve interface radius, and the ASME Code minimum strength properties. The resulting failure pressure was then compared with a design pressure load of 1600 psi to determine if a factor of safety of 3 or greater exists, thereby satisfying the ASME Code requirements for primary stress. For the samples where the weld failed, the minimum safety factor was determined to be 4.0. For the remaining samples, where a fish mouth failure of the tube occurred, the minimum calculated safety factor was 3.5.

A conservative analytical fatigue evaluation of the minimum weld engagement length for laser welded sleeves was completed. The fatigue evaluation considered all tube/sleeve geometries, fully separated or intact parent tubes, and locked and unlocked boundary conditions at the tube support plates. All calculated cumulative fatigue usage factors are less than the ASME Code allowable of 1.0 for a 40-year fatigue design life.

4.6 Mechanical Testing

The mechanical test results provided in Reference 1 are directly applicable to the laser welded sleeves to be used for CPSES Unit 1. Mechanical testing is primarily concerned with leak resistance and joint strength.

The strength of mechanical sleeve joints were addressed in a testing program. Prototypic samples were subjected to axial pushout and pullout tests. Sleeve joints were tested subsequent to thermal cycling and fatigue loading. The loads required for first slip and for one inch of sleeve motion were recorded for each tested specimen. The forces acting on a sleeve during operation are related to the pressure differential between the primary and secondary systems and the cross sectional area of the sleeve/tube assembly. Each individual mechanical joint of the sleeved tube assembly was shown to supply the necessary structural characteristics to support this load.

4.7 Sleeving of Previously Plugged Tubes

The requirements for sleeving a degraded active tube would continue to apply to tubes returned to service by sleeving. Additionally, the area of the tube in which the tube plug was located must meet minimum surface finish requirements in order to produce a high quality seal. Requirements for minimum length that identified degradation can exist from structural weld joints must be adhered to (as for active tubes to be sleeved). A new "baseline" inspection of the tube would be required prior to returning the tube to service. The areas of tubes traditionally affected by degradation mechanisms which would cause the tube to be removed from service are not located adjacent to the weld or lower hardroll of the tubesheet sleeve, and therefore, would not be expected to influence sleeving of previously plugged tubes.

4.8 Continued Applicability of Steam Generator Tube Inspection Techniques

The results of the analyses and testing, as well as plant operating experience, demonstrate that the sleeve assembly is an acceptable means of re-establishing tube integrity. Per Regulatory Guide 1.83, Rev. 1 recommendations, the sleeved tube can be monitored through periodic inspections with present eddy current techniques. These measurements will demonstrate that installation of sleeves spanning degraded areas of the tube will restore the tube to a condition consistent with its original design basis.

The sleeve minimum acceptable wall thickness (used for developing the depth based plugging limit for the sleeve) is determined using the guidance of the draft Regulatory Guide (RG) 1.121 and the pressure stress equation of Section III of the ASME Code. With respect to the design of the sleeve, the limiting requirement of the draft RG 1.121 which applies to part throughwall degradation is that the minimum acceptable wall thickness must maintain a factor of safety of three against tube failure under normal operating conditions. Evaluation of the minimum acceptable wall thickness for upset and postulated accident condition loadings indicates these conditions are bounded by the normal operating condition requirement minimum wall thickness. According to the draft RG 1.121 recommendations, an allowance for nondestructive evaluation (NDE) uncertainty and operational growth of existing tube wall degradation indications within the sleeve must be accounted for in determining a sleeve plugging limit based on NDE. While no Westinghouse Alloy 690 sleeves were plugged due to degradation of the sleeve, a conservative tube wall degradation growth rate per cycle and an eddy current uncertainty was assumed for determining the sleeve Technical Specification plugging limit. The sleeve wall degradation extent determined by eddy current examination, which would require plugging sleeved tubes, is determined to be 43% throughwall (plugging limit = 100% - (structural limit + NDE uncertainty + growth)). Removal of tubes/sleeves from service when

degradation indications reach the plugging limit assures that the minimum acceptable wall thickness will not be exceeded during subsequent plant operation and that the draft RG 1.121 criteria continue to be met.

5.0 REGULATORY ANALYSIS

5.1 No significant Hazards Determination

TXU Electric has evaluated whether or not a significant hazards consideration is involved with the proposed changes by focusing on the three standards set forth in 10CFR50.92 as discussed below:

1. Do the proposed changes involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The tubesheet and/or tube support plate intersection laser welded sleeve configurations was designed and analyzed in accordance with the requirements of the ASME Code. Fatigue and stress analyses of the sleeved tube assemblies produced acceptable results. Additionally, mechanical testing for the full length tubesheet sleeves has shown that the structural strength of Alloy 690 sleeves under normal, faulted and upset conditions is within acceptable limits. Leakage testing for these same 3/4 inch tube sleeves has demonstrated that primary to secondary leakage is not expected during any plant conditions. Similar results are anticipated for the lower joints of elevated tubesheet sleeves. Confirmatory mechanical and leak testing will be conducted supporting the installation of elevated tubesheet sleeves at CPSES Unit 1.

   The hypothetical consequences of failure of a sleeve would be bounded by the current steam generator tube rupture analysis included in the Comanche Peak Steam Electric Station (CPSES) Final Safety Analysis Report (FSAR). Due to the slight reduction in diameter caused by the sleeve wall thickness, it is expected that primary coolant release rates would be slightly less than assumed for the steam generator tube rupture analysis (depending on the break location), and therefore, would result in lower total primary fluid mass release to the secondary system. Combinations of tubesheet sleeves and tube support plate sleeves would reduce the primary fluid flow through the sleeved tube assembly due to the series of diameter reductions the fluid would have to pass on its way to the break area. The overall effect would be reduced steam generator tube rupture release rates. The proposed Technical Specification change to support the installation of Alloy 690 laser welded sleeves does not adversely impact any other previously evaluated design basis accident or the results of (LOCA) and non-LOCA accident analyses for the current Technical Specification minimum RCS flow rate.

   Conformance of the sleeve design with the applicable sections of the ASME Code and the successful completion of the leakage and mechanical tests (for the lower sleeve

joint for the elevated tubesheet sleeves (ETS)), support the conclusion that the installation of laser welded tube sleeves will not increase the probability or consequences of an accident previously evaluated. Depending upon the break location for a postulated steam generator tube rupture event, implementation of tube sleeving could act to reduce the radiological consequences to the public due to reduced flow rate through a sleeved tube compared tube a non-sleeved tube based on the restriction afforded by the sleeve wall thickness.

The editorial correction Technical Specification (TS) Table 5.5-2 is typographical in nature and does not require additional evaluation. Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Do the proposed changes create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

Implementation of the laser welded sleeving (LWS) will not introduce significant or adverse changes to the plant design basis. Stress and fatigue analysis of the repair has shown the ASME Code minimum stress values are not exceeded. Implementation of laser welded sleeving restores the overall tube bundle structural and leakage integrity to a level consistent to that of the originally supplied tubing during all plant conditions. Any hypothetical accident as a result of potential tube or sleeve degradation in the repaired portion of the tube is bounded by the existing tube rupture accident analysis. Finally, through the results obtained from the extensive testing and qualification program, the possibility of a common-mode failure, such as multiple simultaneous steam generator tube failures, is not credible. Therefore, it is concluded that the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

The editorial correction TS Table 5.5-2 is typographical in nature and does not require additional evaluation. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Do the proposed changes involve a significant reduction in a margin of safety?

Response: No

The laser welded sleeving repair of degraded steam generator tubes as identified in References 1 and 2 was shown by analysis to restore the integrity of the tube bundle consistent with its original design basis condition. 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 design of the full length tubesheet sleeve lower joints for the 3/4 inch tube sleeves

(roll-first installation sequence) were verified by testing to preclude pullout and primary-to-secondary leakage during normal and postulated accident conditions. The qualification of the lower joint of the TSS, ETS and the full length tubesheet sleeves (FLTS) (roll-last installation sequence) will be confirmed at the time of the sleeving outage. Since the installed sleeve represents a portion of the pressure boundary, a baseline inspection of these areas is required prior to operation with sleeves installed. The portions of the installed sleeve assembly which represent the reactor coolant pressure boundary can be monitored for the initiation and progression of sleeve/tube wall degradation, thus satisfying the recommendations of Regulatory Guide 1.83, Rev. 1. The portion of the tube bridged by the sleeve joints is effectively removed from the pressure boundary, and the sleeve then forms the new pressure boundary. The areas of the sleeved tube assembly which require inspection are defined in WCAP-13698, Rev. 3.

EPRI qualified eddy current techniques will be used for the detection of tube degradation in 3/4 inch laser welded sleeved tubes. Alternate inspection techniques, may be used as they become available, as long as it can be demonstrated that the technique used provides the same degree or greater degree of inspection rigor.

The effect of sleeving on the design transients and accident analyses were reviewed and found to remain valid up to the level of steam generator tube plugging consistent with the minimum reactor flow rate as specified in Technical Specification 3.4.1. Continued compliance with the RCS flow limits of Technical Specification 3.4.1 is assured through precision flow measurements.

Because all relevant safety analyses were reviewed and found to remain valid, and because the appropriate design margins are maintained through compliance with the relevant ASME Code requirements, it is concluded that the proposed change does not involve a significant reduction in a margin of safety.

The editorial correction TS Table 5.5-2 is typographical in nature and does not require additional evaluation. The conforming modifications to the reporting requirements of TS 5.6.10 are administrative only. Therefore, these proposed changes do not involve a significant reduction in a margin of safety.

Based on the above evaluations, TXU Electric concludes that the activities associated with the above described changes present no significant hazards consideration under the standards set forth in 10CFR50.92 and accordingly, a finding by the NRC of no significant hazards consideration is justified.

5.2 Regulatory Safety Analysis

Applicable Regulatory Requirements / Criteria and its analysis:

10 CFR 50.55a requires components which are a part of the primary pressure boundary to be built to the requirements of Section III of the ASME Boiler and Pressure Vessel Code.

The associated materials and processes meet the rules of Section II of the ASME Code and Code Case N-20-3. The NRC has previously endorsed Code Case N-20 in Regulatory Guide 1.85. The design of the sleeve is predicated by the requirements of Section III, NB-3200, "Analysis" and NB-3300, "Wall Thickness". The ASME Boiler and Pressure Vessel Code provides criteria for evaluation of the stress levels in the tubes for design, normal operating, and postulated accident conditions. Any modification, repair or replacement of these components must also meet the requirements of the ASME Code to assure that the basis on which the unit was originally evaluated is unchanged. Essential welding variables, defined in Section IX of the ASME Code, Code Case N-395 which was endorsed by the NRC via Regulatory Guide 1.84, and Section XI, IWB-4300 were used to develop the weld process. The margin of safety is provided, in part, by the inherent safety factors in the criteria and requirements of the ASME Code.

Regulatory Guide 1.121, issued for comment, entitled "Bases for Plugging Degraded PWR Steam Generator Tubes", addresses tubes with both part through-wall and through-wall cracking.

Regulatory Guide 1.83, Rev. 1, "Inservice Inspection of Pressurizer Water Reactor Steam Generator Tubes" (and the Comanche Peak Units 1 and 2 Technical Specifications) is used as the basis to determine the inservice inspection requirements for the sleeve. Additionally, CPSES FSAR section 5.4.2 describes the design and the Inservice Inspection of the Steam Generators.

Analysis

Total plant allowable primary to secondary leakage rates, derived from the requirements of 10 CFR 100, are determined on a plant specific basis. Offsite doses during either a main steam line break, or tube rupture event are not to exceed a small fraction of 10 CFR 100 limits. Since the free span laser welded joints form a hermetic seal between the sleeve and tube, and the tubesheet sleeve lower joints were shown to indicate leaktight performance during operating and faulted condition temperatures and pressure, the installation of laser welded sleeves will not contribute to offsite doses during either a postulated steam line break or any other faulted or upset condition.

The technical analysis performed by TXU Electric in section 4.0 and 5.0 above for the installation of the laser welded sleeves into the CPSES Unit 1 steam generators will provide a level of leak tightness and individual tube integrity equals to that of a non-degraded tube, and such will not adversely affect the safe operation of the steam generators or the entire plant, and thus continues to be compliant with the above regulatory requirements.

Conclusion

The requirements of the draft RG 1.121 are extended to the laser welded sleeve in order to determine the level of degradation which will require removal of the sleeve from service by plugging. By utilizing the requirements for sleeve design according to the ASME Code and the draft Regulatory Guide 1.121 to define acceptance criteria, the design of the sleeve meets the requirements of General Design Criteria (GDC) 14, "Reactor Coolant Pressure Boundary", GDC 15, "Reactor Coolant System Design", and GDC 31, "Fracture Prevention of Reactor Coolant Pressure Boundary."

6.0 ENVIRONMENTAL EVALUATION

TXU Electric has determined that the proposed amendment would change requirements with respect to the installation or use of a facility component located within the restricted area, as defined in 10CFR20, or would change an inspection or surveillance requirement. TXU Electric has evaluated the proposed changes and has determined that the changes do not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amount of effluent that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10CFR51.22 (c)(9). Therefore, pursuant to 10CFR51.22 (b), an environmental assessment of the proposed change is not required.

7.0. REFERENCES

1. WCAP-13698, Rev. 3, "Laser Welded Sleeves for 3/4 Inch Diameter Tube Feedring-Type and Westinghouse Preheater Steam Generators", July 1998

2. WCAP-15090, Rev. 1, "Specific Application of Laser Welded Sleeves for Comanche Peak Units 1 and 2 Steam Generators", March 1999.

3. Comanche Peak Steam Electric Station Final Safety Analysis Report (FSAR), Section 5.4.2.2.2 "Program for Inservice Inspection of Steam Generator Tubing"," TXU Electric.

4. Comanche Peak Steam Electric Station Final Safety Analysis Report (FSAR), Section 15.6.3, "Steam Generator Tube Failures", TXU Electric

8.0. PRECEDENTS

The NRC staff has previously reviewed identical and closely similar documents supporting requests for changes to the TS at other plants. The bulk of the technical and regulatory issues for the present request are identical to those reviewed in previous Safety Evaluations (SEs) concerning the use of Westinghouse laser welded sleeves. Details of prior staff evaluations of Westinghouse sleeves may be found in the SEs for Byron and Braidwood Nuclear Power Stations, Units 1 and 2, Docket Nos. 50-454, -455, -456 and -457, dated March 8, 1994; Maine Yankee Nuclear Power Plant, Docket No. 50-309, dated May 22, 1995; Calvert Cliffs Nuclear Power Plant, Units 1 and 2, Docket Nos. 50-317 and 50-318 dated March 22, 1996; and South Texas Project, Units 1 and 2, Docket Nos. 50-498 and -499 dated September 4, 1997.

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MARKUP OF TECHNICAL SPECIFICATION PAGE

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5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program

Each steam generator shall be demonstrated OPERABLE by performance of the following augmented inservice inspection program.

The provisions of SR 3.0.2 are applicable to the SG Surveillance Program test frequencies.

a. 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 5.5-1.

b. 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 5.5-2. When referring to a steam generator tube, the sleeve shall be considered as part of the tube if the tube has been repaired per Specification 5.5.9e.1n. The inservice inspection of steam generator tubes shall be performed at the frequencies specified in Specification 5.5.9d., and the inspected tubes shall be verified acceptable per the acceptance criteria of Specification 5.5.9e. When applying the exceptions of Specification 5.5.9b.1 through 5.5.9b.3, previous defects or imperfections in the area repaired by sleeving are not considered an area requiring reinspection. The tubes selected for each inservice inspection shall include at least 3% of all the expanded tubes and at least 3% of the remaining number of tubes in all steam generators; the tubes selected for these inspections shall be selected on a random basis except:

1. 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;

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

   a) All nonplugged tubes that previously had detectable wall penetrations (greater than 20%),

   b) Tubes in those areas where experience has indicated potential problems,

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5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

c) A tube inspection (pursuant to Specification 5.5.9e.1.h) shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube inspection, this shall be recorded and an adjacent tube shall be selected and subjected to a tube inspection, and

d) Indications left in service as a result of the application of the tube support plate voltage repair criteria shall be inspected by bobbin probe during all future refueling outages.

3. The tubes selected as the second and third samples (if required by Table 5.5.9-2 during each inservice inspection may be subjected to a partial tube inspection provided:

a) The tubes selected for these samples include the tubes from those areas of the tube sheet array where tubes with imperfections were previously found, and

b) The inspections include those portions of the tubes where imperfections were previously found.

4. Implementation of the steam generator tube/tube support plate repair criteria requires a 100% bobbin coil inspection for hot-leg and cold-leg tube support plate intersections down to the lowest cold-leg support with known outside diameter stress corrosion cracking (ODSCC) indications. The Determination of the lowest cold leg tube support plate intersections having ODSCC indications shall be based on the performance of at least a 20% random sampling of the tubes inspected over their full length.

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

Category	Inspection Results
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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5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

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 must exhibit significant (greater than 10%) further wall penetrations to be included in the above percentage calculations.

c. Steam Generator F* Tube Inspection (Unit 1 only)- In addition to the minimum sample size as determined by Specification 5.5.9b., all F* tubes will be inspected within the tubesheet region. The results of the inspections of F* tubes identified in previous inspections will not be a cause for additional inspections per Tables 5.5-1 and 5.5-2.

d. Inspection Frequencies - The above required inservice inspections of steam generator tubes shall be performed at the following frequencies:

1. The first inservice inspection shall be performed after 6 Effective Full Power Months (EFPM) and before 12 EFPM and shall include a special inspection of all expanded tubes in all steam generators. Subsequent inservice inspections shall be performed at intervals of not less than 12 nor more than 24 calendar months after the previous inspection. If two consecutive inspections, not including the preservice inspection, result in all inspection results falling into the C-1 category or if two consecutive inspections demonstrate that previously observed degradation has not continued and no additional degradation has occurred, the inspection interval may be extended to a maximum of once per 40 months;

2. If the results of the inservice inspection of a steam generator conducted in accordance with Table 5.5-2 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 the subsequent inspections satisfy the criteria of Specification 5.5.9d.1.; the interval may then be extended to a maximum of once per 40 months; and

(continued)

5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

3. Additional, unscheduled inservice inspections shall be performed on each steam generator in accordance with the first sample inspection specified in Table 5.5-2 during the shutdown subsequent to any of the following conditions:

a) Primary-to secondary tube leaks (not including leaks originating from tube-to-tube sheet welds) in excess of the limits of Specification 3.4.5.2, or

b) A seismic occurrence greater than the Operating Basis Earthquake, or

c) A loss-of-coolant accident requiring actuation of the Engineered Safety Features, or

d) A main steam line or feedwater line break.

e. Acceptance Criteria

1. As used in this specification:

a) 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;

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

c) Degraded Tube means a tube containing imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation;

d) % Degradation means the percentage of the tube wall thickness affected or removed by degradation;

e) Defect means an imperfection of such severity that it exceeds the plugging or (for Unit 1 only) repair limit. A tube containing a defect is defective;

(continued)

5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

f) Plugging or Repair Limit means the imperfection depth at or beyond which the tube shall be removed from service by plugging or (for Unit 1 only) repaired by sleeving and is equal to 40% of the wall thickness. The plugging limit for laser welded sleeves is equal to 43% of the nominal wall thickness. This definition does not apply to that portion of the Unit 1 tubing that meets the definition of an F* tube. This definition does not apply to tube support plate intersections for which the voltage-based plugging criteria are being applied. Refer to 5.5.9e.1m) for the repair limit applicable to these intersections;

g) 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 5.5.9d.3., above;

h) Tube Inspection means an inspection of the steam generator tube from the tube end (hot leg side) completely around the U-bend to the top support of the cold leg. For a tube repaired by sleeving (for Unit 1 only), the tube inspection shall include the sleeved portion of the tube.

i) 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;

j) F* Distance (Unit 1 only) is the distance of the hardroll expanded portion of a tube which provides a sufficient length of non-degraded tube expansion to resist pullout of the tube from the tubesheet. The F* distance is equal to 1.13 inches, plus an allowance for eddy current measurement uncertainty, and is measured down from the top of the tubesheet, or the bottom of the roll transition, whichever is lower in elevation;

k) F* Tube (Unit 1 only) is that portion of the tubing in the area of the tubesheet region below the F* distance with a) degradation below the F* distance equal to or greater than 40%, b) which has no indication of degradation within the F* distance, and c) that remains inservice;

(continued)

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5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

l) Hard Roll Expansion (Unit 1 only) is that portion of a tube which has been increased in diameter by a rolling process such that no crevice exists between the outside diameter of the tube and the hole in the tubesheet; and

m) For Unit 1 only, the Tube Support Plate Plugging Limit is used for the disposition of alloy 600 steam generator tubes for continued service that are experiencing predominantly axially oriented outside diameter stress corrosion cracking confined within the thickness of the tube support plates and flow distribution baffle (FDB). At tube support plate intersections (and FDB), the plugging limit is based on maintaining steam generator tube serviceability as described below:

1. Steam generator tubes, whose degradation is attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with bobbin voltages less than or equal to the lower voltage repair limit [1.0 volt], will be allowed to remain in service.

2. Steam generator tubes, whose degradation is attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with the bobbin voltage greater than the lower voltage repair limit [1.0 volt], will be repaired, except as noted in 5.5.9e.1.m)3. below.

3. Steam generator tubes with indications of potential degradation attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with a bobbin voltage greater than the lower voltage repair limit [1.0 volt] but less than or equal to the upper voltage repair limit*, may remain inservice if a rotating pancake coil inspection does not detect degradation. Steam generator tubes, with indications of outside diameter stress corrosion cracking degradation with a bobbin voltage greater than the upper repair limit** will be plugged or repaired.

(continued)

* The upper voltage repair limit is calculated according to the methodology in GL 95-05 as supplemented.

** V_{URL} will differ at the TSPs and flow distribution baffle.

5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

4. Certain intersections as identified in WPT-15949 will be excluded from application of the voltage-based repair criteria as it is determined that these intersections may collapse or deform following a postulated LOCA + SSE event.

5. If an unscheduled mid-cycle inspection is performed, the following mid-cycle repair limits apply instead of the limits identified in 5.5.9e.1.m)1., 5.5.9e.1.m)2., and 5.5.9e.1.m)3. The midcycle repair limits are determined from the following equations:

$$V_{MURL} = \frac{V_{SL}}{1.0 + NDE + Gr\left[\frac{CL - \Delta t}{CL}\right]}$$

$$V_{MLRL} = V_{MURL} - (V_{URL} - V_{LRL})\left[\frac{CL - \Delta t}{CL}\right]$$

where:

V_{URL} = upper voltage repair limit
V_{LRL} = lower voltage repair limit
V_{MURL} = mid-cycle upper voltage limit based on time into cycle
V_{MLRL} = mid-cycle lower voltage repair limit based on V_{MLRL} and time into cycle
Δt = length of time since last scheduled inspection during which V_{URL} and V_{LRL} were implemented
CL = cycle length (the time between two scheduled steam generator inspections)
V_{SL} = structural limit voltage
Gr = average growth per cycle
NDE = 95-percent cumulative probability allowance for nondestructive examination uncertainty (i.e., a value of 20-percent has been approved by the NRC)

Implementation of these mid-cycle repair limits should follow the same approach as in TS 5.5.9e.1.m)1., 5.5.9e.1.m)2., and 5.5.9e.1.m)3.

n. Tube Repair (for Unit 1 only) refers to a process that establishes tube serviceability. Acceptable tube repairs will be performed in accordance with the process described in Westinghouse WCAP-13698, Rev. 3 and WCAP-15090, Rev. 0.

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5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

TABLE 5.5-1

MINIMUM NUMBER OF STEAM GENERATORS TO BE INSPECTED DURING INSERVICE INSPECTION

Preservice Inspection	Four
No. of Steam Generators per Unit	Four
First Inservice Inspection	Two
Second & Subsequent Inservice Inspections	One[1]

TABLE NOTATIONS

1. The two steam generators that were not inspected during the first inservice inspection shall be inspected during the second and third inspections, one in each inspection period. For the fourth and subsequent inspections, the inservice inspection may be limited to one steam generator on a rotating schedule encompassing 12% of the tubes if the results of the previous inspections of the four steam generators indicate that all steam generators are performing in a like manner. Note that under some circumstances, the operating conditions in one or more steam generators may be found to be more severe than those in other steam generators. Under such circumstances the sample sequence shall be modified to inspect the most severe conditions.

(continued)

5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

TABLE 5.5-2
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
					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.
	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 10CFR50.72(b)(2)	All other S.G.s are C-1	None	N.A.	N.A.
			Some S.G.s C-2 but no additional S.G. C-3	Perform action for ~~C-3~~ 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 10CFR50.72(b)(2)	N.A.	N.A.

(continued)

S = 12/n% Where n is the number of steam generators inspected during an inspection

* for Unit 1 only

5.6 Reporting Requirements (continued)

2. 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 5.5-2.

5.6.7 Not used

5.6.8 PAM Report

When a report is required by the required actions of LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

5.6.9 Not used

5.6.10 Steam Generator Tube Inspection Report

a. Within 15 days following the completion of each inservice inspection of steam generator tubes, the number of tubes plugged, repaired or designated as an F* tube in each steam generator shall be reported to the Commission;

b. The complete results of the steam generator tube inservice inspection shall be submitted to the Commission in a report within 12 months following the completion of the inspection. This report shall include:

1) Number and extent of tubes and (for Unit 1 only) 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 to the Commission pursuant to 10 CFR 50.72(b)(2) within four hours of initial discovery, and in a report 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.

(continued)

ATTACHMENT 4 to TXX-00014

RETYPED TECHNICAL SPECIFICATION PAGES

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5.5 Programs and Manuals (continued)

5.5.9 Steam Generator (SG) Tube Surveillance Program

Each steam generator shall be demonstrated OPERABLE by performance of the following augmented inservice inspection program.

The provisions of SR 3.0.2 are applicable to the SG Surveillance Program test frequencies.

a. 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 5.5-1.

b. 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 5.5-2. When referring to a steam generator tube, the sleeve shall be considered as part of the tube if the tube has been repaired per Specification 5.5.9e.1n. The inservice inspection of steam generator tubes shall be performed at the frequencies specified in Specification 5.5.9d., and the inspected tubes shall be verified acceptable per the acceptance criteria of Specification 5.5.9e. When applying the exceptions of Specification 5.5.9b.1 through 5.5.9b.3, previous defects or imperfections in the area repaired by sleeving are not considered an area requiring reinspection. The tubes selected for each inservice inspection shall include at least 3% of all the expanded tubes and at least 3% of the remaining number of tubes in all steam generators; the tubes selected for these inspections shall be selected on a random basis except: 71 71

1. 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;

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

   a) All nonplugged tubes that previously had detectable wall penetrations (greater than 20%),

   b) Tubes in those areas where experience has indicated potential problems, and

(continued)

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

c) A tube inspection (pursuant to Specification 5.5.9e.1.h) shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube inspection, this shall be recorded and an adjacent tube shall be selected and subjected to a tube inspection. | 71

d) Indications left in service as a result of the application of the tube support plate voltage repair criteria shall be inspected by bobbin probe during all future refueling outages. | 70

3. The tubes selected as the second and third samples (if required by Table 5.5.9-2 during each inservice inspection may be subjected to a partial tube inspection provided:

a) The tubes selected for these samples include the tubes from those areas of the tube sheet array where tubes with imperfections were previously found, and

b) The inspections include those portions of the tubes where imperfections were previously found.

4. Implementation of the steam generator tube/tube support plate repair criteria requires a 100% bobbin coil inspection for hot-leg and cold-leg tube support plate intersections down to the lowest cold-leg support with known outside diameter stress corrosion cracking (ODSCC) indications. The Determination of the lowest cold leg tube support plate intersections having ODSCC indications shall be based on the performance of at least a 20% random sampling of the tubes inspected over their full length. | 70

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

Category	Inspection Results
C-1	Less than 5% of the total tubes inspected are degraded tubes and none of the inspected tubes are defective.

(continued)

5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

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 must exhibit significant (greater than 10%) further wall penetrations to be included in the above percentage calculations.

c. Steam Generator F* Tube Inspection (Unit 1 only) - In addition to the minimum sample size as determined by Specification 5.5.9.b., all F* tubes will be inspected within the tubesheet region. The results of the inspections of F* tubes identified in previous inspections will not be a cause for additional inspections per Tables 5.5-1 and 5.5-2. | 71

d. Inspection Frequencies - The above required inservice inspections of steam generator tubes shall be performed at the following frequencies: | 71

1. The first inservice inspection shall be performed after 6 Effective Full Power Months (EFPM) and before 12 EFPM and shall include a special inspection of all expanded tubes in all steam generators. Subsequent inservice inspections shall be performed at intervals of not less than 12 nor more than 24 calendar months after the previous inspection. If two consecutive inspections, not including the preservice inspection, result in all inspection results falling into the C-1 category or if two consecutive inspections demonstrate that previously observed degradation has not continued and no additional degradation has occurred, the inspection interval may be extended to a maximum of once per 40 months;

2. If the results of the inservice inspection of a steam generator conducted in accordance with Table 5.5-2 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 the subsequent inspections satisfy the criteria of Specification 5.5.9d.1; the interval may then be extended to a maximum of once per 40 months; and | 71

(continued)

5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

3. Additional, unscheduled inservice inspections shall be performed on each steam generator in accordance with the first sample inspection specified in Table 5.5-2 during the shutdown subsequent to any of the following conditions:

a) Primary-to secondary tube leaks (not including leaks originating from tube-to-tube sheet welds) in excess of the limits of Specification 3.4.5.2, or

b) A seismic occurrence greater than the Operating Basis Earthquake, or

c) A loss-of-coolant accident requiring actuation of the Engineered Safety Features, or

d) A main steam line or feedwater line break.

e. Acceptance Criteria | 71

1. As used in this specification:

a) 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;

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

c) Degraded Tube means a tube containing imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation;

d) % Degradation means the percentage of the tube wall thickness affected or removed by degradation;

e) Defect means an imperfection of such severity that it exceeds the plugging or (for Unit 1 only) repair limit. A tube containing a defect is defective; |

(continued)

5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

f) Plugging or Repair Limit means the imperfection depth at or beyond which the tube shall be removed from service by plugging or (for Unit 1 only) repaired by sleeving and is equal to 40% of the wall thickness. The plugging limit for laser welded sleeves is equal to 43% of the nominal wall thickness. This definition does not apply to that portion of the Unit 1 tubing that meets the definition of an F* tube. This definition does not apply to tube support plate intersections for which the voltage-based plugging criteria are being applied. Refer to 5.5.9e.1m) for the repair limit applicable to these intersections; | 71 | 70 | 71

g) 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 5.5.9d.3, above; | 71

h) Tube Inspection means an inspection of the steam generator tube from the tube end (hot leg side) completely around the U-bend to the top support of the cold leg. For a tube repaired by sleeving (for Unit 1 only), the tube inspection shall include the sleeved portionof the tube;

i) 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; | 71

j) F* Distance (Unit 1 only) is the distance of the hardroll expanded portion of a tube which provides a sufficient length of non-degraded tube expansion to resist pullout of the tube from the tubesheet. The F* distance is equal to 1.13 inches, plus an allowance for eddy current measurement uncertainty, and is measured down from the top of the tubesheet, or the bottom of the roll transition, whichever is lower in elevation; | 71

k) F* Tube (Unit 1 only) is that portion of the tubing in the area of the tubesheet region below the F* distance with a) degradation below the F* distance equal to or greater than 40%, b) which has no indication of degradation within the F* distance, and c) that remains inservice;

(continued)

5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

l) Hard Roll Expansion (Unit 1 only) is that portion of a tube which has been increased in diameter by a rolling process such that no crevice exists between the outside diameter of the tube and the hole in the tubesheet; and | 71

m) For Unit 1 only, the Tube Support Plate Plugging Limit is used for the disposition of alloy 600 steam generator tubes for continued service that are experiencing predominantly axially oriented outside diameter stress corrosion cracking confined within the thickness of the tube support plates and flow distribution baffle (FDB). At tube support plate intersections (and FDB), the plugging limit is based on maintaining steam generator tube serviceability as described below: | 70

1. Steam generator tubes, whose degradation is attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with bobbin voltages less than or equal to the lower voltage repair limit (1.0 volt), will be allowed to remain in service.

2. Steam generator tubes, whose degradation is attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with the bobbin voltage greater than the lower voltage repair limit (1.0 volt), will be repaired, except as noted in 5.5.9e.1m)3. below. | 71

3. Steam generator tubes with indications of potential degradation attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with a bobbin voltage greater than the lower voltage repair limit (1.0 volt) but less than or equal to the upper voltage repair limit*, may remain inservice if a rotating pancake coil inspection does not detect degradation. Steam generator tubes, with indications of outside diameter stress corrosion cracking degradation with a bobbin voltage greater than the upper repair limit** will be plugged or repaired. | 70

(continued)

* The upper voltage repair limit is calculated according to the methodology in GL 95-05 as supplemented. | 70
** V_{URL} will differ at the TSPs and flow distribution baffle.

5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

4. Certain intersections as identified in WPT-15949 will be excluded from application of the voltage-based repair criteria as it is determined that these intersections may collapse or deform following a postulated LOCA + SSE event. 70

5. If an unscheduled mid-cycle inspection is performed, the following mid-cycle repair limits apply instead of the limits identified in 5.5.9e.1.m)1., 5.5.9e.1.m)2., and 5.5.9e.1.m)3. The midcycle repair limits are determined from the following equations: 71 70

$$V_{MURL} = \frac{V_{SL}}{1.0 + NDE + Gr\left(\frac{CL - \Delta t}{CL}\right)}$$

$$V_{MLRL} = V_{MURL} - (V_{URL} - V_{LRL})\left[\frac{CL - \Delta t}{CL}\right]$$

where:

V_{URL}	=	upper voltage repair limit
V_{LRL}	=	lower voltage repair limit
V_{MURL}	=	mid-cycle upper voltage limit based on time into cycle
V_{MLRL}	=	mid-cycle lower voltage repair limit based on V_{MLRL} and time into cycle
Δt	=	length of time since last scheduled inspection during which V_{URL} and V_{LRL} were implemented
CL	=	cycle length (the time between two scheduled steam generator inspections)
V_{SL}	=	structural limit voltage
Gr	=	average growth per cycle
NDE	=	95-percent cumulative probability allowance for nondestructive examination uncertainty (i.e., a value of 20-percent has been approved by the NRC)

Implementation of these mid-cycle repair limits should follow the same approach as in TS 5.5.9e.1.m)1., 5.5.9e.1m)2., and 5.5.9e.1.m)3. 71

n. Tube Repair (for Unit 1 only) refers to a process that establishes tube serviceability. Acceptable tube repairs will be performed in accordance with the process described in Westinghouse WCAP-13698, Rev. 3 and WCAP-15090, Rev. 0.

(continued)

5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

2. 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 5.5-2.

(continued)

5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

TABLE 5.5-1

MINIMUM NUMBER OF STEAM GENERATORS TO BE INSPECTED DURING INSERVICE INSPECTION

Preservice Inspection	Four
No. of Steam Generators per Unit	Four
First Inservice Inspection	Two
Second & Subsequent Inservice Inspections	One[1]

TABLE NOTATIONS

1. The two steam generators that were not inspected during the first inservice inspection shall be inspected during the second and third inspections, one in each inspection period. For the fourth and subsequent inspections, the inservice inspection may be limited to one steam generator on a rotating schedule encompassing 12% of the tubes if the results of the previous inspections of the four steam generators indicate that all steam generators are performing in a like manner. Note that under some circumstances, the operating conditions in one or more steam generators may be found to be more severe than those in other steam generators. Under such circumstances the sample sequence shall be modified to inspect the most severe conditions.

(continued)

5.5 Programs and Manuals

5.5.9 Steam Generator (SG) Tube Surveillance Program (continued)

TABLE 5.5-2
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
					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.
	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 10CFR50.72(b)(2)	All other S.G.s are C-1	None	N.A.	N.A.
			Some S.G.s C-2 but no additional S.G. 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 10CFR50.72(b)(2)	N.A.	N.A.

(continued)

S = 12/n% Where n is the number of steam generators inspected during an inspection
* for Unit 1 only

5.6 Reporting Requirements (continued)

5.6.7 Not used

5.6.8 PAM Report

When a report is required by the required actions of LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

5.6.9 Not used

5.6.10 Steam Generator Tube Inspection Report

a. Within 15 days following the completion of each inservice inspection of steam generator tubes, the number of tubes plugged, repaired or designated as an F* tube in each steam generator shall be reported to the Commission; | 71

b. The complete results of the steam generator tube inservice inspection shall be submitted to the Commission in a report within 12 months following the completion of the inspection. This report shall include:

1) Number and extent of tubes and (for Unit 1 only) 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 to the Commission pursuant to 10 CFR 50.72(b)(2) within four hours of initial discovery, and in a report 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.

(continued)

ATTACHMENT 5 to TXX-00014

MARKUP OF THE
FINAL SAFETY ANALYSIS REPORT
PAGES
(FOR INFORMATION ONLY)

(Pages 5.4 - 19 through 5.4 - 29; FSAR Table 5.4 - 18 and Page 5.4 - 93)

(1)

continuous blowdown of the steam generators at a high volume. The intakes of these blowdown pipes are located below the center cut-out section of the flow distribution baffle in the low velocity region where sludge may be expected to accumulate. Continuous blowdown provides maximum protection against inleakage of impurities from the condenser. | 7

Thermal treatment of Inconel tubes has been shown to be effective in limiting stress corrosion cracking, especially in the U-bend region and the expanded region at the tubesheet. Tubing used in the Model D5 steam generators (Unit 2) have been thermally treated at the factory. The earlier D4 steam generators (Unit 1) were not thermally treated. To reduce the residual tensile stresses in the Model D4 tubing, Row 1 and Row 2 U-bends have been stress relieved using an in situ thermal process [5], and the hot and cold legs of all active tubes have been shotpeened within the tubesheet region [6]. Application of these processes provides additional margin against inner diameter primary water stress corrosion cracking. | 64

Operating experience, verified in numerous steam generator inspections, indicates that the tube degradation associated with phosphate water treatment is not occurring where only AVT has been utilized. Adherence to the AVT chemical specifications and close monitoring of the condenser integrity will assure the continued good performance of the steam generator tubing. | 7

Additional extensive operating data is presently being accumulated with the conversion to AVT chemistry. A comprehensive program of steam generator inspections, including the requirements of Regulatory Guide 1.83, with the exceptions as stated in Appendix 1A(N) will ensure detection and correction of any unanticipated degradation that might occur in the steam generator.

[INSERT A]

[INSERT A]

Operating histories throughout the industry have shown a potential for tube wall degradation in the expanded portion of the tube in the tubesheet, in the tube expansion transition, and at the tube support intersections. To maintain tube integrity consistent with the margin of safety, an allowable level of tube wall degradation referred to as the plugging limit is established. Currently, tubes which have eddy current indications of degradation in excess of the plugging limit in the CPSES steam generators must be removed from service. Tube sleeving is one technique used to restore locally degraded tubing back to a condition consistent with the original design basis. Tube sleeving is a process where a smaller diameter tube (or sleeve) is positioned to span the degraded portion of the tube. It is subsequently secured to the tube, forming a new pressure boundary and structural element in the area between the attachment.

The laser welded sleeving (LWS) process involves the installation of thermally treated nickel-iron chromium Alloy 690 sleeves in steam generator tubes in the tubesheet region and at the tube support elevations. Alloy 690 is a Code approved material (ASME SB-163), incorporated in ASME Code Case N-20. Once installed, the laser welded sleeve returns a tube to a condition consistent with its original design basis by spanning the degraded region of the tube. The stresses and fatigue usage limits in the sleeve/tube assembly are bounded by ASME Code requirements, and the tube is leaktight. Reference 7, WCAP-13698, Rev. 3, "Laser Welded Sleeves for 3/4 Inch Diameter Tube Feedring Type and Westinghouse Preheater Steam Generators Generic Sleeving Report," provides a generic analysis of the laser welded sleeved tube assembly which is intended to envelop the operating regimes of all plants with Westinghouse Model D4 and D5 steam generators. Reference 8, WCAP-15090, "Specific Application of Laser Welded Sleeves for the Comanche Peak Units 1 and 2 Steam Generators," evaluates the applicability of the laser welded sleeving analysis to the Comanche Peak Unit 1 and 2 steam generators.

The installation of sleeves represents, although small, a reduction in total RCS flow rate due primarily to the sleeve inside diameter restriction. Information is contained in Reference 1 which can be used to estimate the additional flow resistance introduced by the installation of the laser welded sleeves. The additional flow restriction introduced by the installation of sleeves can be used to estimate the impact upon reactor coolant system flow.

FOR INFO ONLY
No CHANGES TO THIS PAGE

(3)

5.4.2.1.4 Monitoring of Secondary Side Water Chemistry

Q122.2 |
1 | The chemistry of the steam generator water and condensate is continuously monitored as described in Section 9.3.2 and 10.4.16 respectively. The conductivity and pH of the secondary side are continuously measured as are dissolved oxygen, sodium and hydrazine content. Addition rates of secondary side chemicals are controlled by the continuous on-line analyzers. Steam generator blowdown is continuous; the rate can be adjusted using the water chemistry as a basis. The steam generator blowdown processing system is described in Section 10.4.8.

Q122.2 |
1 | The approach to monitoring secondary side water chemistry complies with the approach outlined in Branch Technical Position MTEB 5-3.

1 | 5.4.2.1.5 Cleanup of Secondary Side Materials

Several methods are employed to clean operating steam generators of corrosion causing secondary side deposits. Sludge lancing, a procedure in which a hydraulic jet inserted through an access opening (inspection port) loosens deposits which are removed by means of a suction pump, can be performed when the need is indicated by the results of steam generator tube inspection. Blowdown procedures are performed as deemed necessary by regular water chemistry testing. The location of the blowdown piping suction, adjacent to the tubesheet and in a region of relatively low flow velocity, facilitates the efficient removal of impurities that have accumulated on the tubesheet.

5.4.2.2 Steam Generator Inservice Inspection

5.4.2.2.1 Steam Generator Design Characteristics For Inservice Inspection

The steam generator is designed to permit inservice inspection of Class 1 and 2 components, including individual tubes. The design

aspects that provide access for inspection and the proposed inspection program comply with the edition of Section XI of the ASME Code, Division 1, "Rules for Inspection and Testing of Components of Light- Water-Cooled Plants," required by 10 CFR 50.55a, paragraph g. A number of access openings make it possible to inspect and repair or replace a component according to the techniques specified. These openings include four manways, two of them for inspection and maintenance of the steam dryer. Also the Unit 1 steam generators have five 2.5 inch diameter inspection openings and the Unit 2 steam generators have five 6.0 inch diameter handholes and three 2.5 inch diameter inspection openings for additional access through the secondary side pressure boundary. 96

5.4.2.2.2 Program For Inservice Inspection Of Steam Generator Tubing

Steam generator tubing will be inspected in accordance with:

(a) The recommendations given in Regulatory Guide 1.83, "Inservice Inspection of Steam Generator Tubes," Revision 1, July 1975, and

(b) The requirements of ASME Section XI (Eddition and Addenda as required by 10CFR50.55a). 66

(c) Comanche Peak Steam Electric Station Technical Specifications (Section ~~4.0.6.0 through 4.0.6.5~~ 5.5.9). 76

The program consists of the following areas:

Inspection Equipment & Procedures

~~(a)~~ Eddy current testing equipment will be used to inspect the tubing and ~~is capable of locating and identifying stress corrosion cracks and tube wall thinning by chemical wastage, mechanical damage, or other causes.~~ shall be (continued on next page)

(b) The inspection equipment is sensitive enough to detect imperfections of 20 percent or more through the tube wall.

55 (c) The eddy current inspection system, as a minimum, should consists of:

(1) an internal sensing probe,
(2) a two-channel eddy current tester,
(3) a viewing oscilloscope,
(4) a conventional two-channel strip chart recorder, and
(5) a magnetic tape data recorder.

(d) Examination results and reports shall be stored and maintained for the operating life of the facility.

(e) Standards consisting of similar as-manufactured steam generator tubing with known imperfections shall be used to establish sensitivity and to calibrate the equipment. Where practical, these standards will include reference flaws that simulate the length, depth, and shape of actual imperfections that are characteristic of past experience.

(f) The equipment is capable of examining the entire length of the tubes.

(g) The equipment used for eddy current testing is designed so that operators may be shielded or the equipment may be operated remotely to limit operator exposure to radiation.

(h) Personnel engaged in data taking and interpreting the results of the eddy current inspection are tested and qualified in accordance with American Society for Nondestructive Testing Standard SNT-TC-1A and supplements.

(i) ~~The examinations will be performed according to written procedures.~~

Baseline Inspection

(a) All tubes in the steam generators shall be inspected by eddy current or alternative techniques prior to service to establish a baseline condition of the tubing.

(b) If a major change in their secondary water chemistry (e.g., phosphate to volatile treatment) is made during plant lifetime, a baseline inspection will be conducted before resumption of power operation.

Steam Generator Sample Selection and Inspection 55

Steam Generator sample selection and inspection shall be conducted with T.S. 5.5.9

~~At least two steam generators shall be inspected during the first inservice inspection along with a special inspection of all expanded tube regions in all steam generators. The other two steam generators not inspected during the first inservice inspection shall be inspected during the second and third inspections, one in each inspection period. The fourth and subsequent inspections may be limited to one steam generator on a rotating schedule encompassing 12% of the tubes if the results of the previous inspections of the four steam generators indicate that all steam generators are performing in a like manner.~~ 55 76

~~NOTE: Under some circumstances, the operating conditions in one or more steam generators may be found to be more severe than those in other steam generators. Under such circumstances, the sample sequence shall be modified to inspect the most severe conditions.~~ 55

55 ~~Steam Generator Tube Sample Selection and Inspection~~

55 ~~The steam generator tube minimum sample size, inspection result classification, and the corresponding action required shall be as specified in Table 5.4-18. The inservice inspection of steam generator tubes shall be performed at the frequencies specified below under Inspection Frequency and the inspected tubes shall be verified~~
76 ~~acceptable per the Acceptance Criteria listed below. The tubes selected for each inservice inspection shall include at least 3% of all expanded tubes and at least 3% of the remaining number of tubes in all steam generators; the tubes selected for these inspections shall be selected on a random basis except:~~

55 ~~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;~~

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

55 ~~1. All nonplugged tubes that previously had detectable wall penetrations (greater than 20%).~~

55 ~~2. Tubes in those areas where experience has indicated potential problems, and~~

55 ~~3. A tube inspection shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube inspection, this shall be recorded and an adjacent tube shall be selected and subjected to a tube inspection.~~

(8)

c. The tubes selected as the second and third samples (if required by Table 5.4-18) during each inservice inspection may be subjected to a partial tube inspection provided: | 55

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, and | 55

2. The inspections include those portions of the tubes where imperfections were previously found. | 55

The results of each sample inspection shall be classified into one of the following three categories: | 55

Category	Inspection Results	
C-1	Less than 5% of the total tubes inspected are degraded tubes and none of the inspected tubes are defective.	55
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.	55
C-3	More than 10% of the total tubes inspected are degraded tubes or more than 1% of the inspected tubes are defective.	55

NOTE: In all inspections, previously degraded tubes must exhibit significant (greater than 10%) further wall penetrations to be included in the above percentage calculations. | 55

(a)

55 | Inspection Frequencies

55 | The above required inservice inspections of steam generator tubes shall be performed at the following frequencies:

55 | a. The first inservice inspection shall be performed after six (6) Effective Full Power Months (EFPM) and before twelve (12) EFPM and shall include a special inspection of all expanded tubes. Subsequent inservice inspections shall be performed at intervals of not less than twelve (12) nor more than twenty four (24) calendar months after the previous inspection. If two consecutive inspections, not including the preservice inspection, result in all inspection results falling into the C-1 category or if two consecutive inspections demonstrate that previously observed degradation has not continued and no additional degradation has occurred, the inspection interval may be extended to a maximum of once per 40 months;

55 | b. If the results of the inservice inspection of a steam generator conducted in accordance with Table 5.4-18 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 the subsequent inspections satisfy the criteria of Paragraph (a) above; the interval may then be extended to a maximum of once per 40 months; and

55 | c. Additional, unscheduled inservice inspections shall be performed on each steam generator in accordance with the first sample inspection specified in Table 5.4-18 during the shutdown subsequent to any of the following conditions:

55 | 1. Reactor-to-secondary tubes leak (not including leaks originating from tube-to-tube sheet welds) in excess of the limits of Section 3.4.6.2 of the CPSES Technical Specification.

(10)

2. A seismic occurrence greater than the Operating Basis Earthquake, or 55

3. A loss-of-coolant accident requiring actuation of the Engineered Safety Features, or

4. A main steam line or feedwater line break.

Acceptance Criteria

a. As used for this inspection:

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; 55

3. Degraded Tube means 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;

5. Defect means an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective;

6. Plugging Limit means the imperfection depth at or beyond which the tube shall be removed from service and is equal to 40% of the nominal tube wall thickness;

* If imperfections to SG tubes are as a result of events occurring while the SGs are out of service and drained, then the degraded or defective tubes associated with the event do not have to be included in the populations to determine inspection categories C-1, C-2 or C-3; 96

(11)

55 | 7. Unservicable describes the conditions 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 under Inspection Frequencies, above;

55 | 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; and

55 | 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.

55 | b. 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 5.4-18.

55 | Reports.

55 | a. Within 15 days following the completion of each inservice inspection of steam generator tubes, the number of tubes plugged in each steam generator shall be reported to the Commission in a Special Report pursuant to CPSES Technical Specification 6.9.2.

55 | b. The complete results of the steam generator tube inservice inspection shall be submitted to the Commission in a Special

(12)

~~Report pursuant to CPSES Technical Specification 6.9.2 within 12 months following the completion of the inspection. This Special Report shall include:~~ | 55

~~1. Number and extent of tubes inspected,~~ | 55

~~2. Location and percent of wall-thickness penetration for each indication of an imperfection, and~~ | 55

~~3. Identification of tubes plugged.~~ | 55

~~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 CPSES Technical Specification 6.9.2 within 30 days and 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.~~ | 55

5.4.2.3 Design Bases

Steam generator design data are given in Table 5.4-3. Code classifications of the steam generator components are given in Section 3.2. Although the ASME classification for the secondary side is specified to be Class 2, the current philosophy is to design all pressure retaining parts of the steam generator, and thus, both the primary and secondary pressure boundaries, to satisfy the criteria specified in Section III of the ASME Code for Class 1 components. The design stress limits, transient conditions and combined loading conditions applicable to the steam generator, are discussed in Section 3.9N.1. Estimates of radioactivity levels anticipated in the secondary side of the steam generators during normal operation, and the bases for the estimates, are given in Chapter 11. The accident analysis of a steam generator tube rupture is discussed in Chapter 15.

TABLE 5.4-18

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 defective tubes and inspect additional 2S tubes in this S. G.	C-1	None	N. A.	N. A.
			C-2	Plug defective tubes and inspect additional 4S tubes in this S. G.	C-1	None
					C-2	Plug defective tubes
					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.
	C-3	Inspect all tubes in this S. G., plug defective tubes and inspect 2S tubes in each other S. G. Notification to NRC pursuant to 10 CFR 50.72 (b)(2)	All other S. G.s are C-1	None	N. A.	N. A.
			Some S. G.s C-2 but no additional S. G. 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 defective tubes. Notification to NRC pursuant to 10 CFR 50.72 (b)(2)	N. A.	N. A.

76

76

$S = \frac{12}{n}$ % Where n is the number of steam generators inspected during an inspection.

(14)

REFERENCES

1. "Reactor Coolant Pump Integrity in LOCA," WCAP-8163, September 1973.

2. Shabbits, W. O., "Dynamic Fracture Toughness Properties of Heavy Section A533 Grade B Class 1 Steel Plate," WCAP-7623, December 1970.

3. "Evaluation of Steam Generator Tube, Tubesheet and Divider Plant Under Combined LOCA Plus SSE Conditions," WCAP-7832, December 1973.

4. Westinghouse Report "Counterflow Preheat Steam Generator Tube Expansion Report," June 1983 | 41

5. WCAP-11175 (Proprietary), WCAP-11174 (Non-Proprietary),"Row 1 and Row 2 U-Bend Heat Treatment Licensing Report for Comanche Peak Unit 1", July 1986. | 64

6. WCAP-11127 (Proprietary), WCAP-11128 (Non-Proprietary), "Shotpeening Licensing Report for Comanche Peak Unit 1", May 1986.

7. WCAP-13698, Rev. 3, "Laser Welded Sleeves for 3/4 inch Diameter Tube Feedring Type and Westinghouse Preheater Steam Generator Generic Sleeving Report."

8. WCAP-15090, "Specific Application of Laser welded Sleeves for the Comanche Peak Units 1 and 2 Steam Generators."

ENCLOSURE 5 to TXX-00014

Westinghouse "Application For Withholding Proprietary Information From Public Disclosure," regarding WCAP-13698, Rev. 3 and WCAP-15090, Rev. 1.

Westinghouse Electric Company LLC

Box 355
Pittsburgh Pennsylvania 15230-0355

September 1, 2000

CAW-00-1420

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

Attention: Mr. Samuel J. Collins

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

Subject: WCAP-13698, Revision 3 "Laser Welded Sleeves for 3/4 Inch Diameter Tube Feedring-Type and Westinghouse Preheater Steam Generators Generic Sleeving Report," [Proprietary] July, 1998

Dear Mr. Collins:

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-00-1420 signed by the owner of the proprietary information, Westinghouse Electric Company LLC ("Westinghouse"). The affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.790 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying Affidavit by TXU Electric Company.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-00-1420, and should be addressed to the undersigned.

Very truly yours,

John S. Galembush, Acting Manager
Regulatory and Licensing Engineering

Enclosures

cc: S. Bloom, NRR/OWFN/DRPW/PDIV2 (Rockville, MD)1L

CAW-00-1420

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared John S. Galembush, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC ("Westinghouse"), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

John S. Galembush, Acting Manager
Regulatory and Licensing Engineering

Sworn to and subscribed
before me this 1st day
of September, 2000

Lorraine M. Piplica
Notary Public

Notarial Seal
Lorraine M. Piplica, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires Dec. 14, 2003
Member, Pennsylvania Association of Notaries

0540s.doc

(1) I am Acting Manager, Regulatory and Licensing Engineering, in the Nuclear Services Business Unit, of the Westinghouse Electric Company LLC ("Westinghouse"), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rulemaking proceedings, and am authorized to apply for its withholding on behalf of the Westinghouse Energy Systems Business Unit..

(2) I am making this Affidavit in conformance with the provisions of 10CFR Section 2.790 of the Commission's regulations and in conjunction with the Westinghouse application for withholding accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse Energy Systems Business Unit in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.790 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Westinghouse policy and provides the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information which is marketable in many ways. The extent to which such information is available to competitors diminishes the

Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10CFR Section 2.790, it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in WCAP-13698, Revision 3, "Laser Welded Sleeves for ¾ Inch Diameter Tube Feedring-Type and Westinghouse Preheater Steam Generators Generic Sleeving Report," [Proprietary], July, 1998 for Comanche Peak Units 1 and 2 being transmitted by TXU Electric Company letter and Application for Withholding Proprietary Information from Public Disclosure, Mr.

John S. Galembush, Acting Manager, Regulatory and Licensing Engineering, Westinghouse to the Document Control Desk, Attention Mr. Samuel J. Collins. The proprietary information as submitted for use by TXU Electric Company for Comanche Peak Units 1 and 2 is expected to be applicable in other submittals for related license amendment packages.

This information is part of that which will enable Westinghouse to:

(a) Provide documentation to support related license amendments for laser welded sleeves on steam generators.

(b) Establish applicable codes and standards which are to be applied to the process.

(c) Assist its customer to obtain a license.

Further this information has substantial commercial value as follows:

(a) Westinghouse plans to sell the use of similar information to its customers for purposes of meeting NRC requirements for licensing documentation.

(b) Westinghouse can sell support and defense of the technology to its customers in the licensing process.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar products for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar design programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended for the development of replacement modules.

Further the deponent sayeth.

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.790 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) contained within parentheses located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit accompanying this transmittal pursuant to 10 CFR 2.790(b)(1).

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Westinghouse Electric Company

Box 355
Pittsburgh Pennsylvania 15230-0355

September 1, 2000

CAW-00-1421

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

Attention: Mr. Samuel J. Collins

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: WCAP-15090, Revision 1 "Specific Application of Laser Welded Sleeves for the Comanche Peak Units 1 and 2 Steam Generators," [Proprietary] March, 1999

Dear Mr. Collins:

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-00-1421 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.790 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying Affidavit by TXU Electric Company.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-00-1421, and should be addressed to the undersigned.

Very truly yours,

H. A. Sepp, Manager
Regulatory and Licensing Engineering

Enclosures

cc: S. Bloom, NRR/OWFN/DRPW/PDIV-2 (Rockville, MD) 1L

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CAW-00-1421

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared John S. Galembush, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC ("Westinghouse"), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

John S. Galembush, Acting Manager
Regulatory and Licensing Engineering

Sworn to and subscribed
before me this 1st day
of September, 2000

Lorraine M. Piplica
Notary Public

Notarial Seal
Lorraine M. Piplica, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires Dec. 14, 2003
Member, Pennsylvania Association of Notaries

0541s.doc

(1) I am Acting Manager, Regulatory and Licensing Engineering, in the Nuclear Services Business Unit, of the Westinghouse Electric Company LLC ("Westinghouse"), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rulemaking proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10CFR Section 2.790 of the Commission's regulations and in conjunction with the Westinghouse application for withholding accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse Electric Company LLC in designating information as a trade secret, privileged or as confidential commercial or financial information.

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(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

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Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

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(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

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(v) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in WCAP-15090, Revision 1 "Specific Application of Laser Welded Sleeves for the Comanche Peak Units 1 and 2 Steam Generators," [Proprietary] March, 1999, for information in support of Comanche Peak Units 1 and 2 submittal to the Commission, transmitted via TXU Electric Company letter and Application for Withholding Proprietary Information from Public Disclosure, Mr. John S. Galembush, Acting Manager, Regulatory and Licensing Engineering, Westinghouse to the Document Control Desk, Attention Mr. Samuel J. Collins. The proprietary information as submitted for use by TXU Electric Company for Comanche Peak Units 1 and 2 is expected to be applicable in other submittals for related license amendment packages.

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In order for competitors of Westinghouse to duplicate this information, similar design programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended for the development of replacement modules.

Further the deponent sayeth.

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