PSEG Nuclear LLC
P.O. Box 236, Hancocks Bridge, New Jersey 08038-0236

10 CFR 50.90

PSEG
Nuclear LLC

FEB 23 2007

LR-N07-0033

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

SALEM GENERATING STATION –UNIT 1
FACILITY OPERATING LICENSE NO. DPR-70
NRC DOCKET NO. 50-272

Subject: **RESPONSE TO RAIs ON LCR S07-01**
ONE TIME LICENSE CHANGE REQUEST
STEAM GENERATOR ALTERNATE REPAIR CRITERIA (17 INCH INSPECTION DISTANCE)

References: (1) Letter from PSEG to NRC: LCR S07-01, "One Time License Change Request, LCR S07-01, Steam Generator Alternate Repair Criteria (17 Inch Inspection Distance), Salem Nuclear Generating Station - Unit 1, Docket No. 50-272, Facility Operating License DPR-70," dated January 18, 2007

In accordance with the requirements of 10 CFR 50.90, PSEG Nuclear LLC (PSEG) previously submitted License Change Request (LCR) S07-01, dated January 18, 2007, to amend the Technical Specifications (TS) for Salem Generating Station Unit 1 (Reference 1). LCR S07-01 proposed a one time license change for a 17 inch inspection length alternate repair criteria for Salem Unit 1 Steam Generators.

PSEG received a Request for Additional Information (RAI) from the NRC Staff on LCR S07-01 (Attachment 1). The response to the RAI, Westinghouse Letter LTR-CDME-07-35, (which includes proprietary and non-proprietary attachments) is provided in Attachment 2. Attachment 3 contains the Westinghouse affidavit on conforming to the provisions of 10CFR2.390 for withholding the proprietary letter attachment from public disclosure. Additional changes to the TS are provided in Attachment 4.

PSEG has evaluated the additional information provided in Attachment 2 in accordance with 10CFR50.91(a)(1), using the criteria in 10CFR50.92(c), and has determined there is no impact to the no significant hazards consideration provided in Reference 1. There is also no impact to the 10 CFR 51.22(c)(9) environmental assessment provided in Reference 1.

A001

Please note that the original requested date for this License amendment was March 1, 2007 (as provided in Reference 1). PSEG requests a revised amendment date of March 27, 2007 to support the Salem Unit 1 Spring outage.

If you have any questions or require additional information, please do not hesitate to contact Mr. Jamie Mallon at (610) 765-5507.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 2/23/07
(Date)

Sincerely,

Thomas P. Joyce
Site Vice President
Salem Generating Station

Attachments 4

C Mr. S. Collins, Administrator - Region I
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. R. Ennis, Licensing Project Manager - Salem
U. S. Nuclear Regulatory Commission
Mail Stop 08B1
Washington, DC 20555

USNRC Senior Resident Inspector – (Salem X24)

Mr. K. Tosch, Manager IV
Bureau of Nuclear Engineering
P. O. Box 415
Trenton, NJ 08625

REQUEST FOR ADDITIONAL INFORMATION

REGARDING PROPOSED LICENSE AMENDMENT

STEAM GENERATOR ALTERNATE REPAIR CRITERIA

SALEM NUCLEAR GENERATING STATION, UNIT NO. 1

DOCKET NO. 50-272

By letter dated January 18, 2007, PSEG Nuclear LLC (PSEG or the licensee) submitted an amendment request for Salem Nuclear Generating Station, Unit No. 1 (Salem). The amendment request proposes a one-time change to the Technical Specifications (TSs) regarding the steam generator (SG) tube inspection and repair required for the portion of the SG tubes passing through the tubesheet region. Specifically, for Salem Unit No. 1 refueling outage 18 (planned for Spring 2007) and the subsequent operating cycle, the proposed TS changes would limit the required inspection (and repair if degradation is found) to the portions of the SG tubes passing through the upper 17 inches of the approximate 21-inch tubesheet region.

The Nuclear Regulatory Commission (NRC) staff has reviewed the information the licensee provided that supports the proposed amendment and would like to discuss the following issues to clarify the submittal.

Background

Argonne National Laboratory (ANL), under contract to the NRC, is performing generic studies relating to the leakage behavior of SG tube-to-tubesheet joints (TS joints) under postulated severe accident conditions. As part of this work, ANL benchmarked its finite element model of the TS joint against pullout and leakage tests carried out by Westinghouse (WCAP-15932-P) on tube-to-collar joint specimens (to simulate tube-to-tubesheet joints) for Callaway. While performing this benchmarking study, ANL observed that the split in contact pressure (between the tube and tubesheet) between that due to differential thermal expansion effects and that due to the roll expansion process, calculated indirectly by Westinghouse based on the test results, is much different than that calculated by ANL. ANL states that this may be due to an incorrect choice of thermal expansion coefficients for the tubesheet collar specimens used in the Westinghouse tests. The test specimen collars were made from cold-worked 1018 steel instead of the actual tubesheet material which is A508 forging. Although the yield strengths of these two materials are comparable, their coefficients of thermal expansion are somewhat different. ANL believes that the difference between the ANL results and the Westinghouse results is because Westinghouse assumed thermal expansion properties of A508 rather than 1018 steel when analyzing their test results. ANL reported this finding to the NRC on December 29, 2006.

The Westinghouse tests for Callaway are similar to those performed in support of the October 2, 2006, and January 18, 2007, amendment requests for Salem Unit 1 relating to tubesheet inspections. The October 2, 2006, amendment request enclosed Westinghouse report WCAP-16640-P, "Steam Generator Alternate Repair Criteria for Tube Portion Within the Tubesheet at Salem Unit 1." The NRC staff notes that the pullout and leakage tests described in this report also utilized collar specimens fabricated from 1018 steel compared to the SA-508 material from which the Salem Unit 1 tubesheets were actually fabricated.

Requested Information

Based on the above, the NRC staff is requesting the following information:

1) Please comment on ANL's observation regarding the possibility of an incorrect choice of thermal expansion coefficient for the tubesheet collar specimens used in the Westinghouse tests in terms of how it may apply to Salem Unit 1. If you disagree with the ANL observations pertaining to Callaway or if you believe the ANL observations not to be relevant to Salem, explain why.

2) If there is a problem with the assumed values of thermal expansion coefficient, please characterize the problem and provide any necessary corrections to Westinghouse report WCAP-16640-P. Of priority interest to the NRC staff, to support timely completion of the staff's review, are any needed revisions to Tables 6-5 through 6-8, Tables 7-6 through 7-13, Figures 7-3 through 7-7, and Figures 8-1 through 8-4.

3) Provide any revisions or corrections to WCAP-16640-P to reflect any new Westinghouse crevice pressure test data and analyses which may be relevant to H* and B* applications at Salem Unit 1. Of priority interest to the NRC staff, to support timely completion of the staff's review, are any needed revisions to Tables 6-5 through 6-8, Tables 7-6 through 7-13, Figures 7-3 through 7-7, and Figures 8-1 through 8-4.

4) WCAP-16640-P Tables 6-5 through 6-8, Tables 7-6 through 7-13, Figures 7-3 through 7-7, and Figures 8-1 through 8-4 address the hot leg only. Provide similar information for the cold leg. Alternatively, provide your plans for revising the scope of the amendment to apply to the hot leg side only.

5) The proposed revision to TS 6.8.4.i c uses the word "degradation" in two places. The current TS uses the word "flaws" rather than "degradation." Please discuss your plans for revising your proposal to refer to "flaws" or "tubes with flaws" rather than "degradation."

LTR-CDME-07-35 NP-Attachment

PSEG Nuclear, LLC

Response to NRC Request for Additional Information on LCR S07-01 (TAC MD4034) One Time License Change Request Steam Generator Alternate Repair Criteria (17 Inch Inspection Distance) for Salem Unit 1

February 19, 2007

Westinghouse Electric Company LLC
P.O. Box 158
Madison, PA 15663

Response to Request for Additional Information on LCR S07-01 (TAC MD4034) One Time License Change Request Steam Generator Alternate Repair Criteria (17 Inch Inspection Distance)

NRC Question 1:

Please comment on ANL's observation regarding the possibility of an incorrect choice of thermal expansion coefficient for the tubesheet collar specimens used in the Westinghouse tests in terms of how it may apply to Salem Unit 1. If you disagree with the ANL observations pertaining to Callaway or if you believe the ANL observations not to be relevant to Salem, explain why.

NRC Question 2:

If there is a problem with the assumed values of thermal expansion coefficient, please characterize the problem and provide any necessary corrections to Westinghouse report WCAP-16640-P. Of priority interest to the NRC staff, to support timely completion of the staff's review, are any needed revisions to Tables 6-5 through 6-8, Tables 7-6 through 7-13, Figures 7-3 through 7-7, and Figures 8-1 through 8-4.

Response to NRC Questions 1 and 2:

It is the opinion of Westinghouse (Reference 1) that the choice of the thermal expansion coefficients (TEC) cited in WCAP- 16640-P is correct. This opinion is based on the ASTM definition of A1018/A108 specifications for cold finished, steel bar stock (Reference 2) that cite a maximum carbon range of 0.28% or less for the type of A1018 steel used to manufacture the test specimen collars. A value of 0.28% or less carbon content in steel is in the range for plain carbon, low alloy and carbon manganese steels in Material Group A of the 1995 ASME B&PV Code, Section II Part D (Reference 3). The TEC values listed in the 1995 Code for Materials Group A were the values used in the test specimen analysis for the residual contact pressure due to the hydraulic expansion of the tube within the simulated tube sheet collar. The TEC values for Materials Group A are also the values used for metals with the chemical composition of SA-508 Class 2 steel. It is appropriate to use the values previously cited by Westinghouse for the test specimen collars to generate the residual contact pressure data for use in the H* and B* calculations because the TEC values accurately represent the material properties of A1018 steel. The table below lists the TEC for Materials Group A from Reference 3. It is not necessary to revise Tables 6-5 through 6-8, Tables 7-6 through 7-13, Figures 7-3 through 7-7, and Figures 8-1 through 8-4 to account for a reduced coefficient of thermal expansion.

Table 1: Thermal Expansion Coefficient Values for A1018 and SA-508 Class 2 Steel

	Thermal Expansion Coefficient	
Temperature	Plain Carbon Steel	SA-508 Class 2
70 °F	6.50	6.50
400 °F	7.07	7.07
600 °F	7.42	7.42

TEC in units of 10^{-6} in/in/°F

NRC Question 3:

Provide any revisions or corrections to WCAP-16640-P to reflect any new Westinghouse crevice pressure test data and analyses which may be relevant to H* and B* applications at Salem Unit 1. Of priority interest to the NRC staff, to support timely completion of the staff's review, are any needed revisions to Tables 6-5 through 6-8, Tables 7-6 through 7-13, Figures 7-3 through 7-7, and Figures 8-1 through 8-4.

NRC Question 4:

WCAP-16640-P Tables 6-5 through 6-8, Tables 7-6 through 7-13, Figures 7-3 through 7-7, and Figures 8-1 through 8-4 address the hot leg only. Provide similar information for the cold leg. Alternatively, provide your plans for revising the scope of the amendment to apply to the hot leg side only.

Response to NRC Questions 3 and 4:

Tables 7-6 through 7-13, Figures 7-3 through 7-7, and Figures 8-1 through 8-4 of WCAP-16640-P have been revised to reflect the new crevice pressure data and analyses and to reflect a divider plate which is assumed to be non-functional and are provided below (Reference 4). Note that in this context the term "non-functional" refers only to the ability of the divider plate to restrict vertical displacements of the tubesheet. Crevice pressure ratios of 0.3686 and 0.6977 were used to implement the new pressure test data for the steam line break and normal operating conditions, respectively. A divider plate factor of 1.00 is used to eliminate any restraint of the vertical tubesheet displacements. Similar information is provided for both the hot leg and the cold leg. The revised tables and figures for the hot leg are provided first followed by the same tables and figures for the cold leg.

Based on a review of Tables 7-6 through 7-13 (and 7-6a through 7-13a), considering the new crevice pressure data and analyses and a divider plate which is assumed to be non-functional, the bounding condition for the determination of the H* length is the normal operating performance criteria. The minimum contact length increases from 7.05 inches (in Zone D to resist pullout during a postulated FLB) reported in WCAP-16640-P to 11.51 inches (in Zone C necessary to resist pullout during normal operating conditions with the required factor of safety of 3.0). The reduced crevice pressure differential significantly reduces the driving head on any leaked fluid. Therefore, the relationship that determines the depth into the tubesheet to meet the required limitation of twice normal operating primary-to-secondary leak rate during a postulated SLB is not affected. In fact, the depth necessary to meet the leak rate requirements will decrease despite the reduced contact pressure between the tube and the tubesheet. The net effect of the reduced crevice pressure differential is to reduce the required depth into the tubesheet to maintain the bellwether principle.

Referring to revised Figures 7-3 through 7-7 and Figures 8-1 through 8-4, a comparison of the curves at the various elevations leads to the conclusion for at least a length of 6.5 inches above the elevation of 4.13 inches above the bottom of the tubesheet there is an increase in the contact pressure in going from normal operating to a postulated SLB condition at all radial locations (See Figures 8-1 and 8-2). Hence, it is reasonable to omit any consideration of the inspection of bulges or other artifacts below a depth of 17 inches from the top of the tubesheet. The trend is consistent, at radii (near the periphery) where the contact pressure decreases or the increase is not as great near the bottom of the tubesheet, the increase in contact pressure at 10.5 inches above the bottom of the tubesheet is significant. Therefore, applying a very conservative inspection

sampling length of 17 inches downward from the top of the tubesheet during the next Salem Unit 1 outage provides a high level of confidence that the potential leak rate from indications below 17 inches from the top of the tubesheet during a postulated SLB will be bounded by twice the normal operating primary-to-secondary leak rate.

HOT LEG RESULTS

Table 7-6. Tube/Tubesheet Maximum & Minimum Contact Pressures and H* Depths for Salem Unit 1 Steam Generators (Hot Leg), DP Factor= 1.00

a,c,e

Notes:

c. Contact pressures values do not include the residual from the tube installation.

d. All H* values include a 0.3 inch bounding allowance for the elevation of the BET relative to the TTS

Table 7-7. Cumulative Forces Resisting Pull Out from the TTS Salem Unit 1 Hot Leg Normal Conditions – T_{hot} = 601.8°F P_{sec} = 731 psig, DP Factor = 1.00

a,c,e

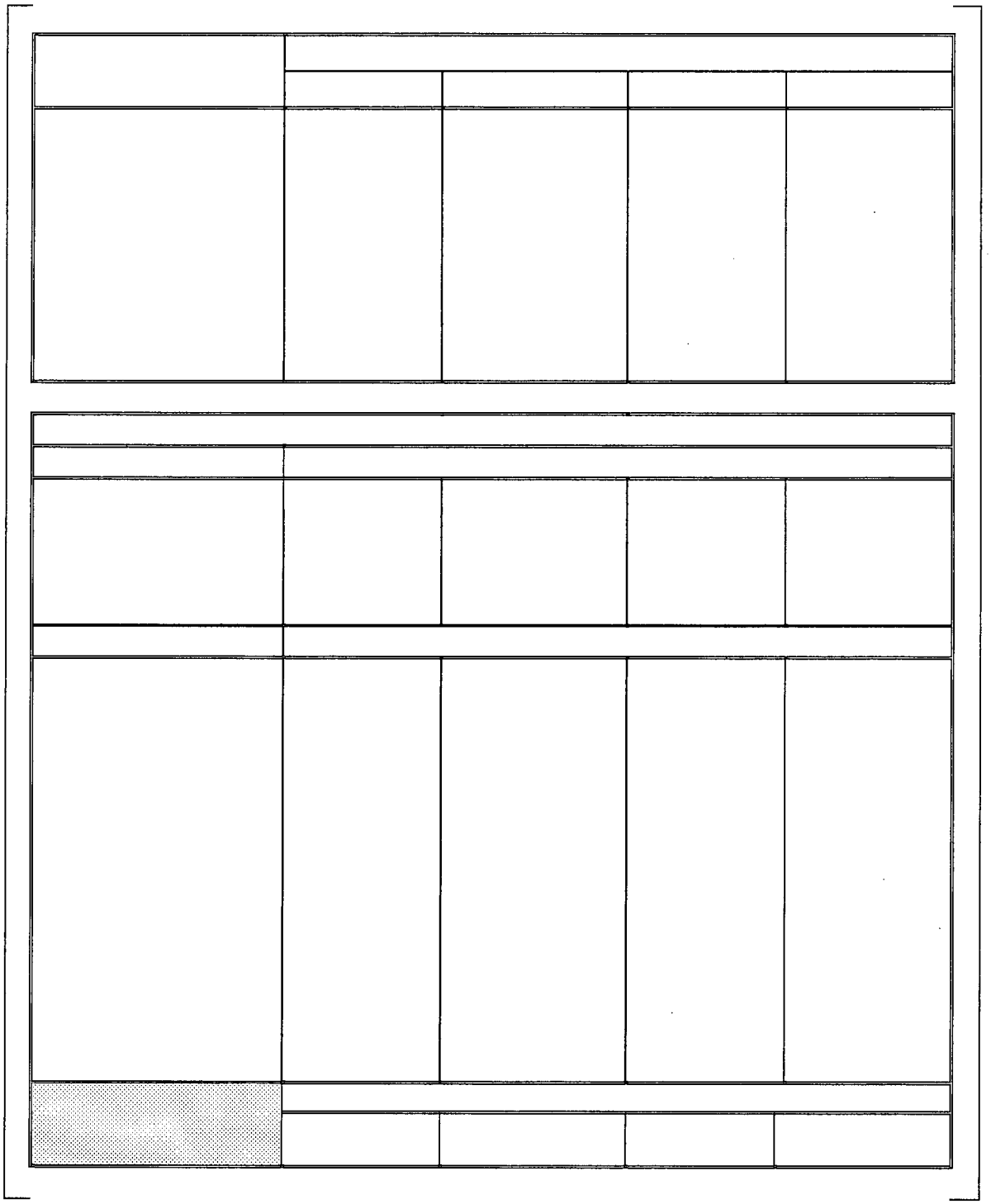

Table 7-8. Cumulative Forces Resisting Pull Out from the TTS Salem Unit 1 Hot Leg Normal Conditions – T_{hot} = 613.1°F, P_{sec} = 807 psig , DP Factor = 1.00

a,c,e

Table 7-9. Cumulative Forces Resisting Pull Out from the TTS Salem Unit 1 Faulted (SLB) Conditions, Hot Leg, DP Factor = 1.00

a,c,e

Table 7-10. Cumulative Forces Resisting Pull Out from the TTS Salem Unit 1 FLB Conditions, T_{hot} = 601.8°F, DP Factor = 1.00

a,c,e

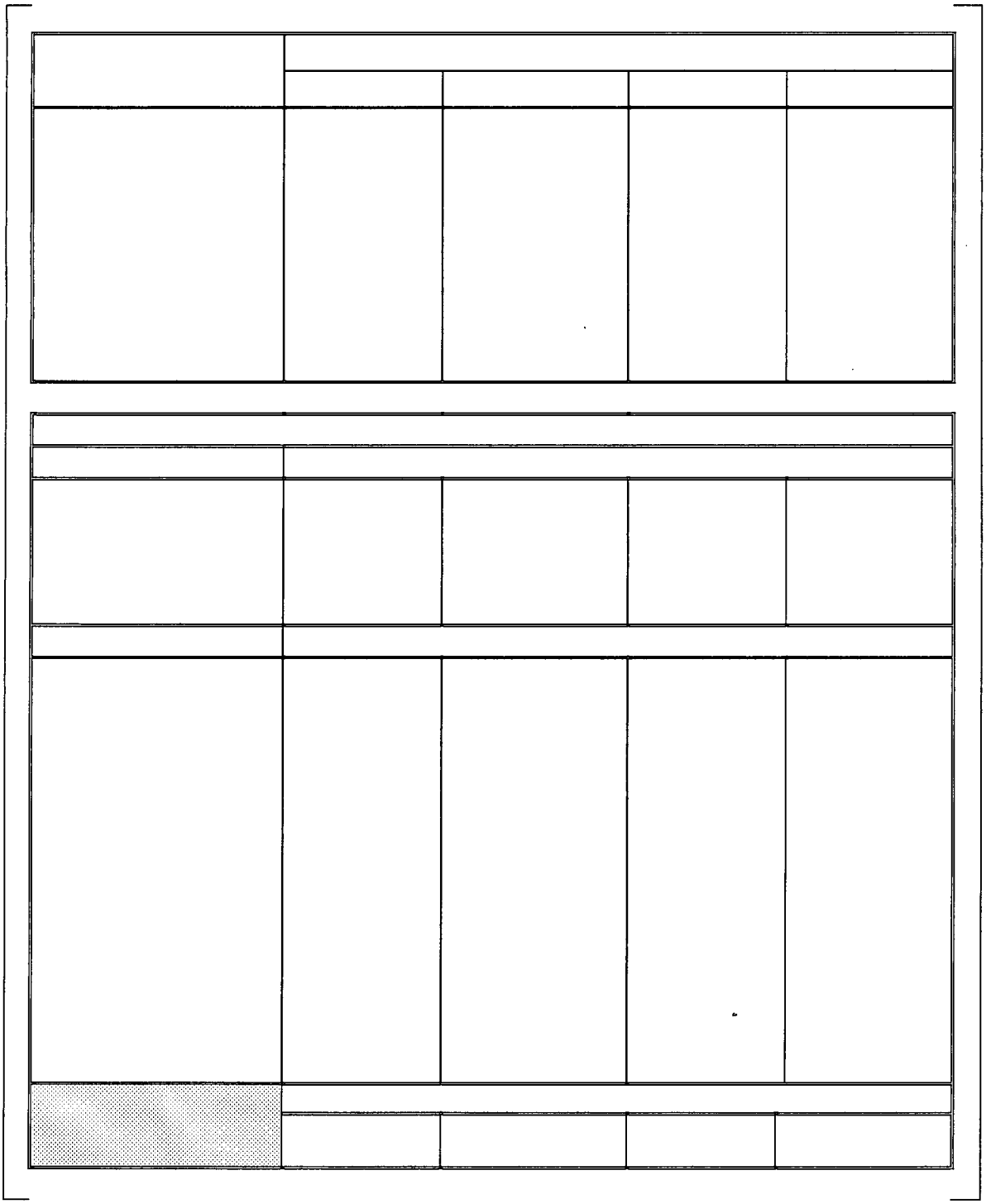

Table 7-11. Cumulative Forces Resisting Pull Out from the TTS Salem Unit 1 FLB Conditions, T_{hot} = 613.1°F, DP Factor = 1.00

a,c,e

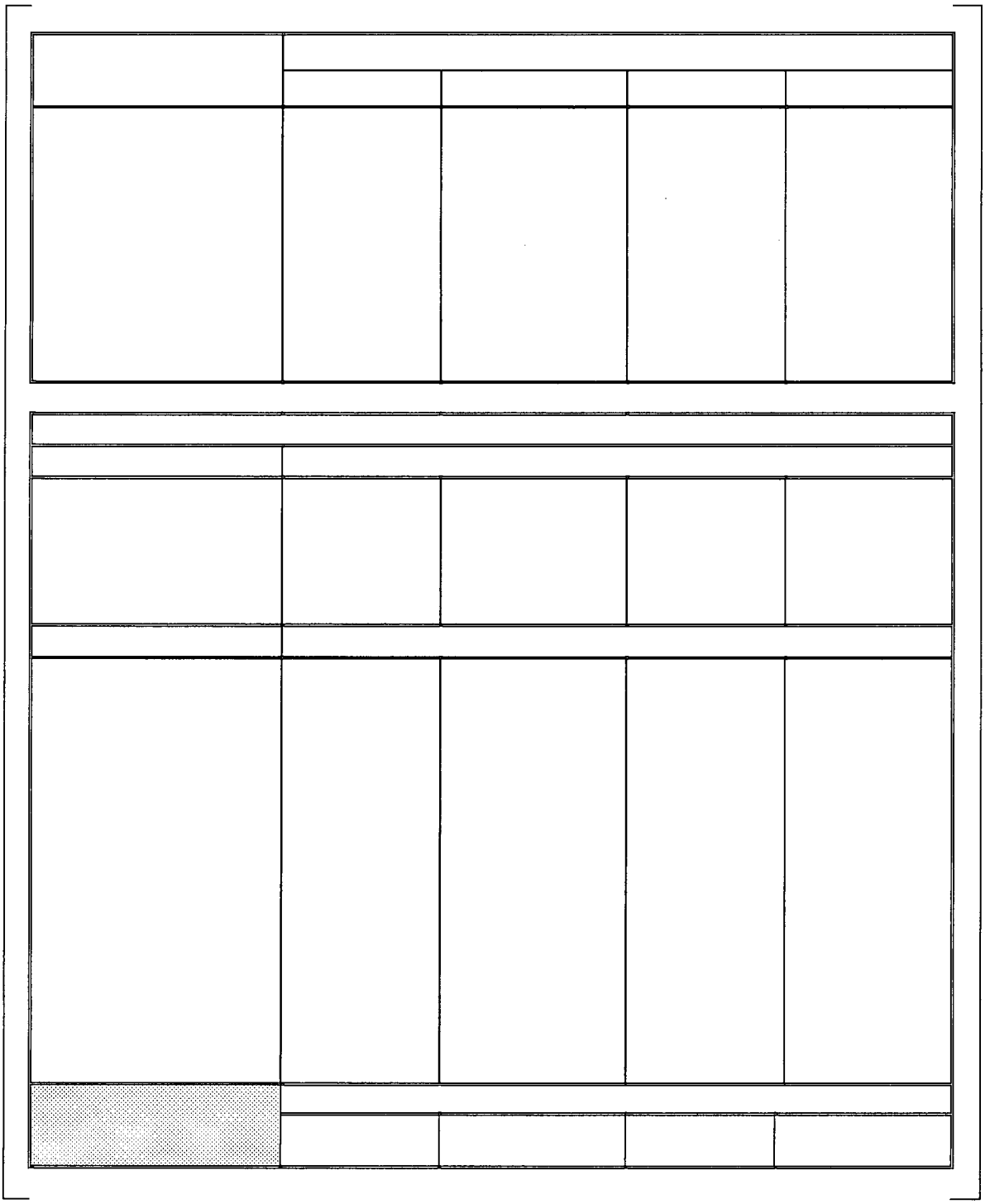

Table 7-12. Summary of H* Calculations for Salem Unit 1 (Hot Leg Only), DP Factor = 1.00

a,c,e

Table 7-13. H* Summary Table Structural Criteria Required Engagement, DP Factor = 1.00		
Zone	Limiting Loading Condition	Engagement from TTS (inches)
		Hot Leg
A	$3 \cdot \Delta P_{NOp}$ (1,2)	10.64 (3)
B	$3 \cdot \Delta P_{NOp}$ (1,2)	10.65 (3)
C	$3 \cdot \Delta P_{NOp}$ (1,2)	9.58 (3)
D	$3 \cdot \Delta P_{NOp}$ (1,2)	3.22 (3)

Notes:

1. Seismic loads have been considered and are not significant in the tube joint region (Reference 25).
2. The scenario of tubes locked at support plates is not considered to be a credible event in Model F SGs as they are manufactured with stainless steel support plates. However, conservatively assuming that the tubes become locked at 100% power conditions, the maximum force induced in an active tube as the SG cools to room temperature is [1082 lbs., which is significantly less than the critical end cap load.][a,c,e]
3. 0.3 inches has been added to the H* values to account for the BET location relative to the TTS.

a.c.e

Figure 7-3. Contact Pressures for Normal Condition (Hot Leg) at Salem Unit 1, DP Factor = 1.00

a.c.e

Figure 7-4. Contact Pressures for Normal Condition (High T_{avg}) at Salem Unit 1, DP Factor = 1.00

a.c.e

Figure 7-5. Contact Pressures for SLB Faulted Condition at Salem Unit 1, DP Factor = 1.00

a,c,e

Figure 7-6. Tube/Tubesheet Contact Pressures FLB Faulted Conditions Salem Unit 1 Hot Leg Low T_{avg}, DP Factor = 1.0

a,c,e

Figure 7-7. Tube/Tubesheet Contact Pressures FLB Condition
Salem Unit 1 Hot Leg, High T_{avg}, DP Factor = 1.0

a,c,e

Figure 8-1. Change in Contact Pressure at the Bottom of the Tubesheet, DP Factor = 1.0

a,c,e

Figure 8-2. Change in Contact Pressure at 16.9 Inches Below the TTS, DP Factor = 1.0

a,c,e

Figure 8-3. Change in Contact Pressure at 10.515 Inches Below the TTS, DP Factor = 1.0

a,c,e

Figure 8-4. Change in Contact Pressure at 6.00 Inches Below the TTS, DP Factor = 1.00

COLD LEG RESULTS

Table 7-6a. Tube/Tubesheet Maximum & Minimum Contact Pressures and H* Depths for Salem Unit 1 Steam Generators (Cold Leg), DP Factor = 1.0

a,c,e

Notes:

1. Contact pressures values do not include the residual from the tube installation.
2. All H* values include a 0.3 inch bounding allowance for the elevation of the BET relative to the TTS

Table 7-7a. Cumulative Forces Resisting Pull Out from the TTS Salem Unit 1 Cold Leg Normal Conditions – T_{hot} = 601.8°F P_{sec} = 731 psig, DP Factor = 1.00

a,c,e

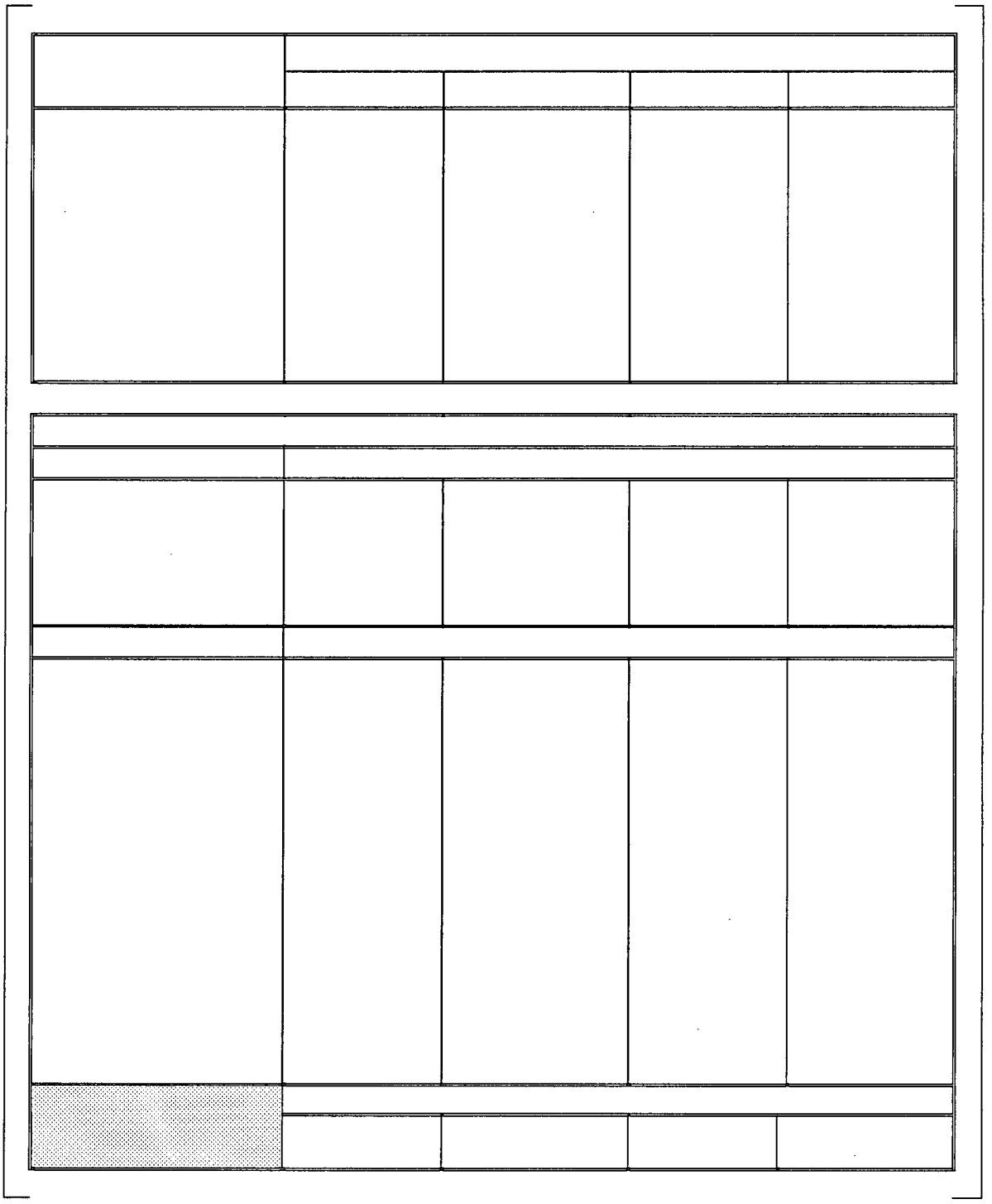

Table 7-8a. Cumulative Forces Resisting Pull Out from the TTS Salem Unit 1 Cold Leg Normal Conditions – T_{hot} = 613.1°F, P_{sec} = 807 psig, DP Factor = 1.00

a,c,e

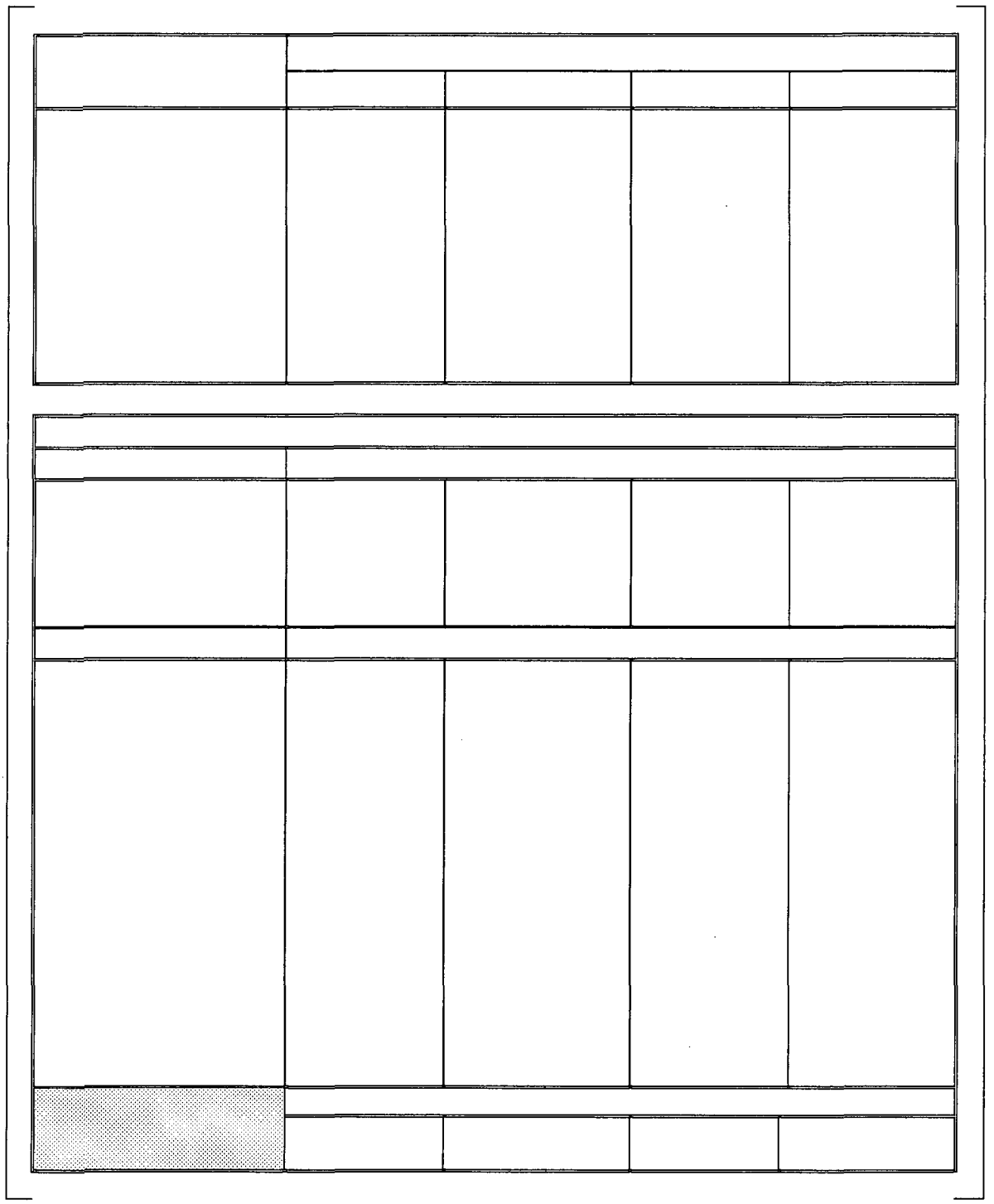

Table 7-9a. Cumulative Forces Resisting Pull Out from the TTS Salem Unit 1 Faulted (SLB) Conditions, Cold Leg, DP Factor = 1.00

a,c,e

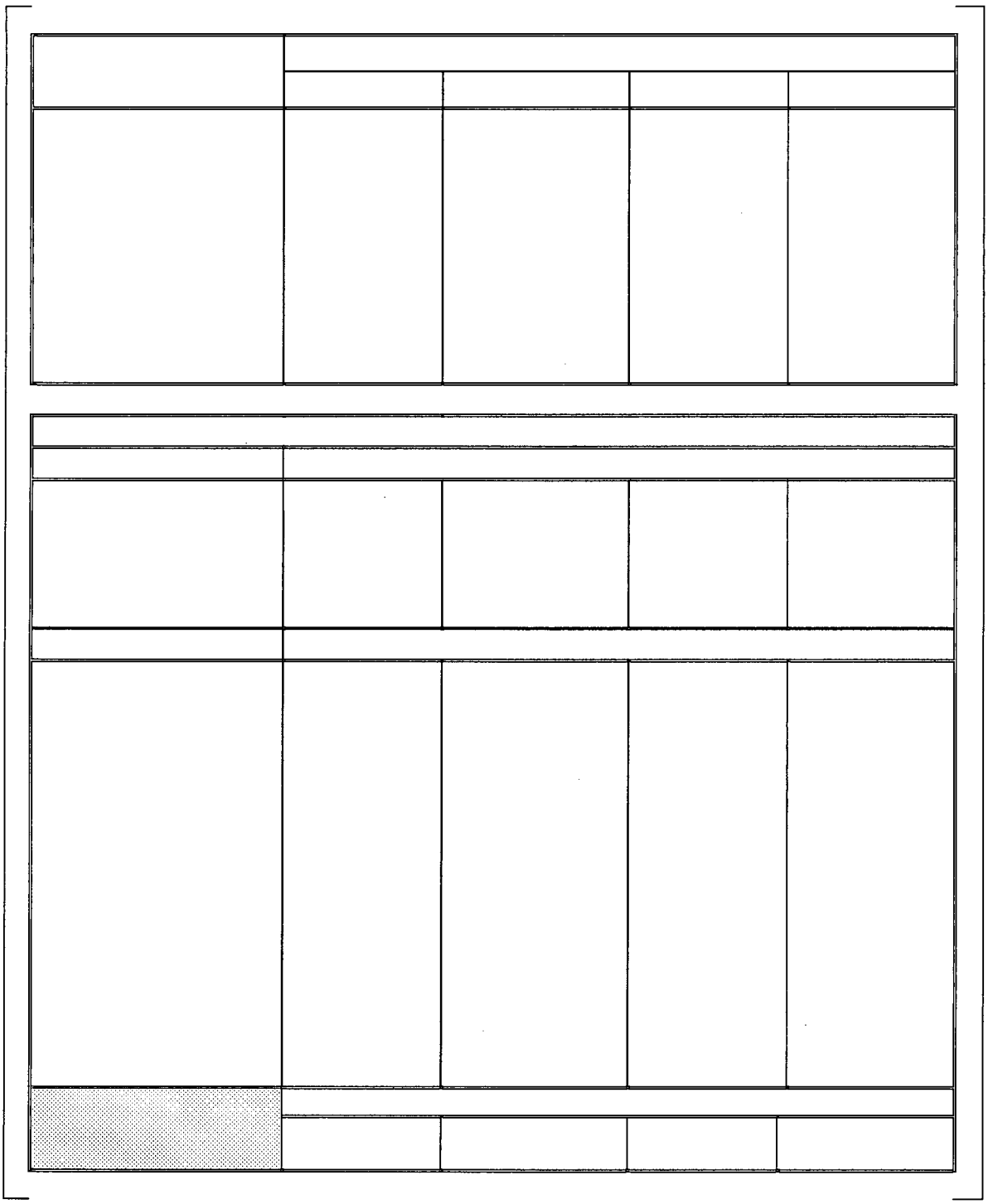

Table 7-10a. Cumulative Forces Resisting Pull Out from the TTS Salem Unit 1 FLB Conditions, T_{hot} = 601.8°F, Cold Leg, DP Factor = 1.00

a,c,e

Table 7-11a. Cumulative Forces Resisting Pull Out from the TTS Salem Unit 1 FLB Conditions, T_{hot} = 613.1°F, Cold Leg, DP Factor = 1.0

a,c,e

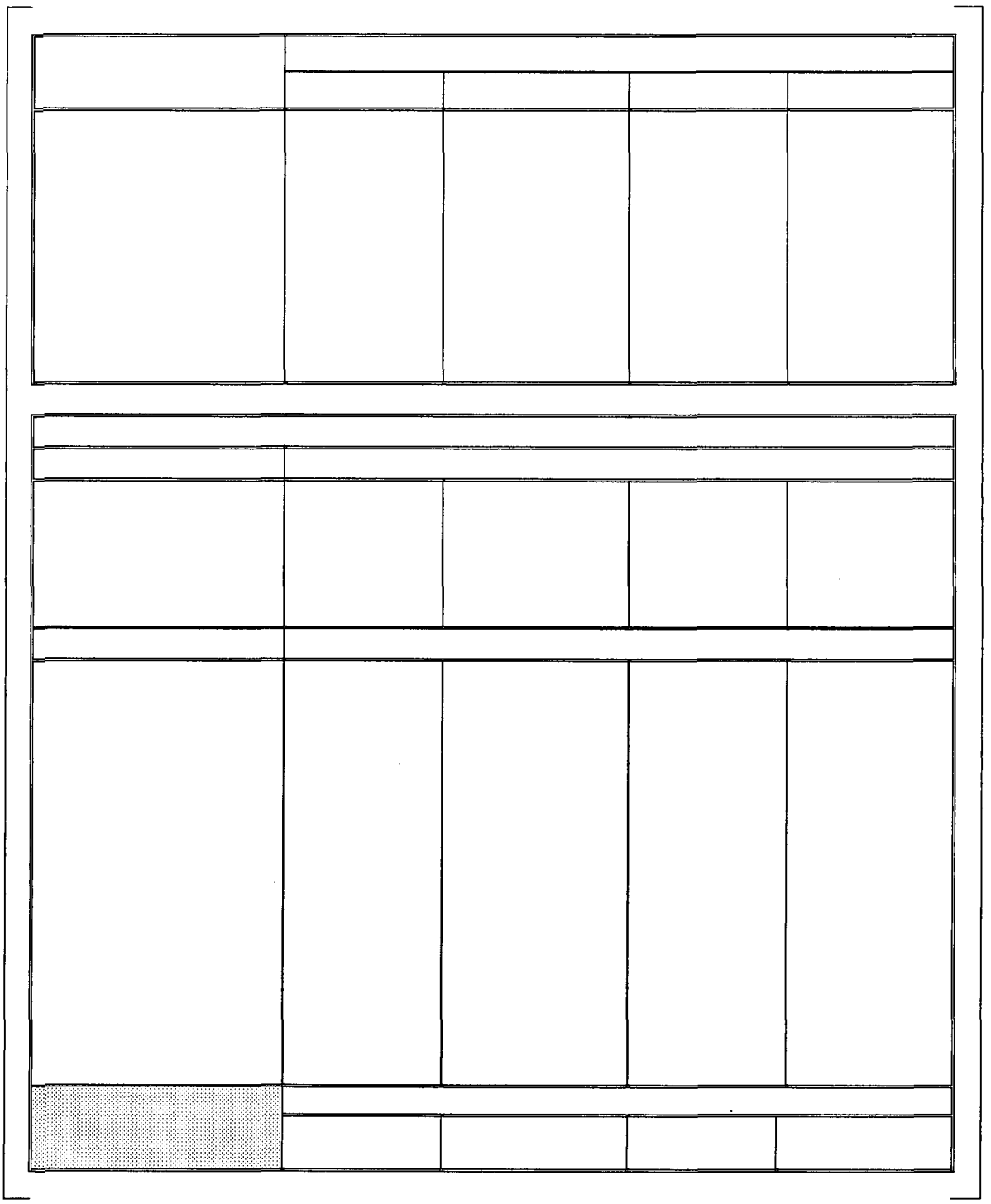

Table 7-12a. Summary of H* Calculations for Salem Unit 1 (Cold Leg Only), DP Factor = 1.00

a,c,e

Table 7-13a. H* Summary Table

Structural Criteria Required Engagement, DP Factor = 1.00

Zone	Limiting Loading Condition	Engagement from TTS (inches)
		Cold Leg
A	$3 \cdot \Delta P_{NOp}$ (1,2)	11.49(3,)
B	$3 \cdot \Delta P_{NOp}$ (1,2)	11.51(3)
C	$3 \cdot \Delta P_{NOp}$ (1,2)	10.80(3)
D	$3 \cdot \Delta P_{NOp}$ (1,2)	4.82(3)

Notes:

1. Seismic loads have been considered and are not significant in the tube joint region.
2. The scenario of tubes locked at support plates is not considered to be a credible event in Model F SGs as they are manufactured with stainless steel support plates. However, conservatively assuming that the tubes become locked at 100% power conditions, the maximum force induced in an active tube as the SG cools to room temperature is [1082 lbs., which is significantly less than the critical end cap load.][a,c,e]
3. 0.3 inches has been added to the H* values to account for the BET location relative to the TTS.

a.c.e

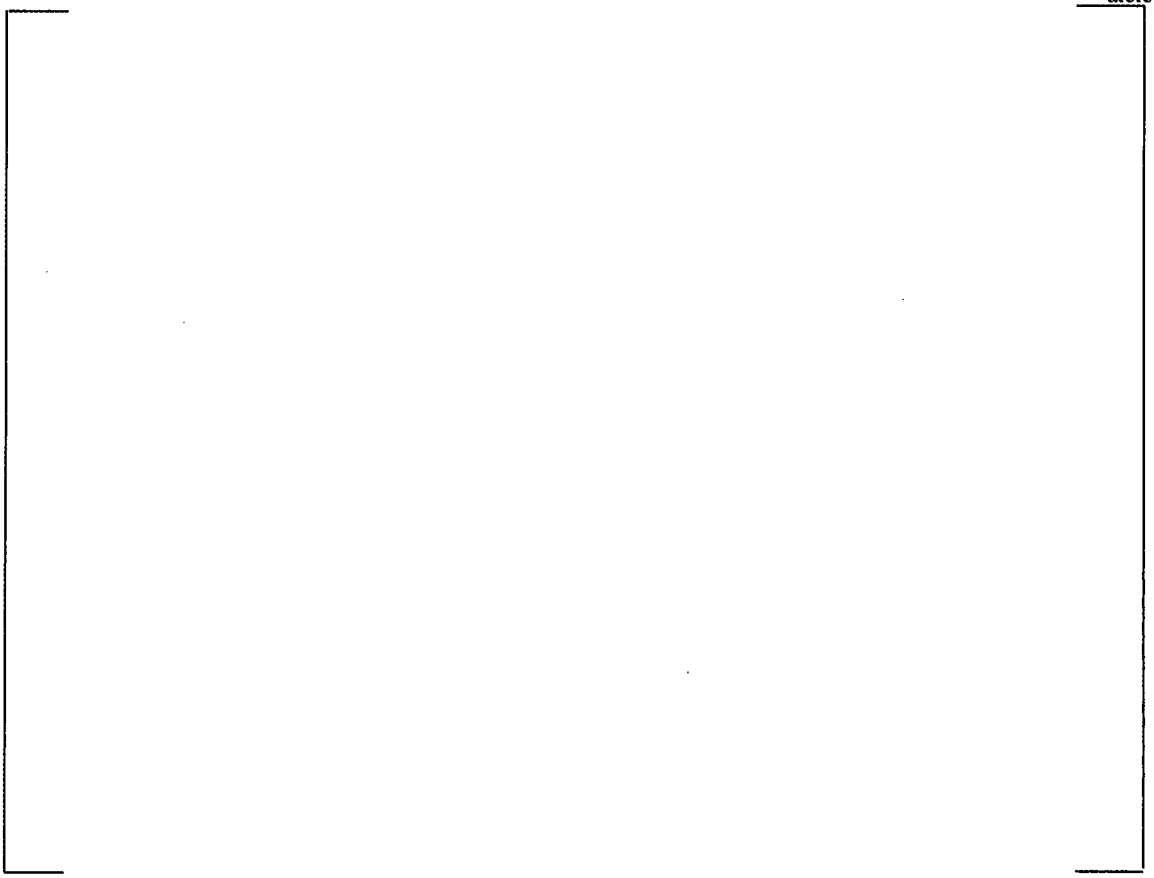

Figure 7-3a. Contact Pressures for Normal Condition (Cold Leg) at Salem Unit 1, DP Factor = 1.00

a.c.e

Figure 7-4a. Contact Pressures for Normal Condition (High T_{avg}) at Salem Unit 1, DP Factor = 1.00

a.c.e

Figure 7-5a. Contact Pressures for SLB Faulted Condition at Salem Unit 1, DP Factor = 1.00

a,c,e

Figure 7-6a. Tube/Tubesheet Contact Pressures FLB Faulted Conditions Salem Unit 1 Cold Leg Low T_{avg}, DP Factor = 1.0

a,c,e

Figure 7-7a. Tube/Tubesheet Contact Pressures FLB Condition
Salem Unit 1 Cold Leg, High, T_{avg}, DP Factor = 1.00

a,c,e

Figure 8-1a. Change in Contact Pressure at the Bottom of the Tubesheet, DP Factor = 1.00

a,c,e

Figure 8-2a. Change in Contact Pressure at 16.9 Inches Below the TTS, DP Factor = 1.00

a,c,e

Figure 8-3a. Change in Contact Pressure at 10.515 Inches Below the TTS, DP Factor = 1.00

a,c,e

Figure 8-4a. Change in Contact Pressure at 6.00 Inches Below the TTS, DP Factor = 1.00

NRC Question 5:

The proposed revision to TS 6.8.4.1 c used the word "degradation" in two places. The current TS uses the word "flaws" rather than "degradation". Please discuss your plans for revising your proposal to refer to "flaws" or "tubes with flaws" rather than "degradation".

Response to NRC Question 5:

TS 6.8.4.i.c will be revised as follows:

The following repair criteria are applicable only for Refueling Outage 18 and the subsequent operating cycle:

In lieu of the 40% of the nominal wall thickness repair criteria, the portion of the tube within the tubesheet of the inspected SGs shall be plugged in accordance with the following alternate repair criteria: **Flaws located below 17 inches from the top of the tubesheet may remain in service regardless of size**. Flaws identified in the portion of the tube from the top of the tubesheet to 17 inches below the top of the tubesheet shall be plugged on detection.

References

5. STD-MCE-07-7, R.E. Gold, February 2007.

6. ASTM A108-03, "Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished," ASTM International, © 2003.

7. 1995 ASME Boiler and Pressure Vessel Code, Section II, Part D, *Properties.*

8. LTR-CDME-07-29, C.D. Cassino, February 2007.

AFFIDAVIT FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE IN ACCORDANCE WITH 10CFR2.390

(Westinghouse Letter CAW-07-2247, February 19, 2007)

Westinghouse Electric Company
Nuclear Services
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-0001

Direct tel: (412) 374-4643
Direct fax: (412) 374-4011
e-mail: greshaja@westinghouse.com

Our ref: CAW-07-2247

February 19, 2007

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: LTR-CDME-07-35 P-Attachment, "Response to NRC Request for Additional Information on LCR S07-01 (TAC MD4034) One Time License Change Request Steam Generator Alternate Repair Criteria (17 Inch Inspection Distance) for Salem Unit 1," dated February 19, 2007 (Proprietary)

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-07-2247 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 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying affidavit by PSEG Nuclear LLC.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-07-2247, and should be addressed to J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Very truly yours,

B. F. Maurer, Acting Manager
Regulatory Compliance and Plant Licensing

Enclosures

cc: Jon Thompson (NRC O-7E1A)

bcc: J. A. Gresham (ECE 4-7A) 1L
R. Bastien, 1L (Nivelles, Belgium)
C. Brinkman, 1L (Westinghouse Electric Co., 12300 Twinbrook Parkway, Suite 330, Rockville, MD 20852)
RCPL Administrative Aide (ECE 4-7A) 1L (letter and affidavit only)
G. W. Whiteman, Waltz Mill
H. O. Lagally, Waltz Mill
C. D. Cassino, Waltz Mill
N. R. Brown, Waltz Mill
J. P. Molkenthin, Windsor

CAW-07-2247

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared B. F. Maurer, 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:

B. F. Maurer, Acting Manager
Regulatory Compliance and Plant Licensing

Sworn to and subscribed before me
this 19th day of February, 2007

Notary Public

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Sharon L. Markle, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires Jan. 29, 2011
Member, Pennsylvania Association of Notaries

(1) I am Acting Manager, Regulatory Compliance and Plant Licensing, in Nuclear Services, 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 rule making 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 10 CFR Section 2.390 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 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 2.390 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 that 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 10 CFR Section 2.390, 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 LTR-CDME-07-35 P-Attachment, "Response to NRC Request for Additional Information on LCR S07-01 (TAC MD4034) One Time License Change Request Steam Generator Alternate Repair Criteria (17 Inch Inspection Distance) for Salem Unit 1," dated February 19, 2007 (Proprietary), for submittal to the Commission, being transmitted by PSEG Nuclear LLC Application for Withholding Proprietary Information from Public Disclosure to the Document Control Desk. The proprietary information as submitted for use by Westinghouse for Salem Unit 1 is expected to be applicable to other licensee submittals in support of implementing a limited inspection of the tube joint within the tubesheet region of the steam generators and is provided in response to a NRC request for additional information on WCAP-16640-P, "Steam Generator Alternate Repair Criteria for Tube Portion Within the Tubesheet at Salem Unit 1," dated August 2006.

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

(a) Provide documentation of the analyses, methods, and testing for the implementation of an alternate repair criteria for the portion if the tubes within the tubesheet of the Salem Unit 1 steam generators.

(b) Assist the customers in the licensing and NRC approval of the Technical Specification changes associated with the alternate repair criteria.

Further this information has substantial commercial value as follows:

(a) Westinghouse plans to sell the use of similar information to its customers for the 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 calculation, evaluation and licensing defense services 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 technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

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 2.390 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) 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 2.390(b)(1).

COPYRIGHT NOTICE

PSEG Nuclear, LLC

Letter for Transmittal to the NRC

The following paragraphs should be included in your letter to the NRC:

Enclosed are:

1. 1 copy of LTR-CDME-07-35 P-Attachment, "Response to NRC Request for Additional Information on LCR S07-01 (TAC MD4034) One Time License Change Request Steam Generator Alternate Repair Criteria (17 Inch Inspection Distance) for Salem Unit 1," dated February 19, 2007 (Proprietary)

2. 1 copy of LTR-CDME-07-35 NP-Attachment, "Response to NRC Request for Additional Information on LCR S07-01 (TAC MD4034) One Time License Change Request Steam Generator Alternate Repair Criteria (17 Inch Inspection Distance) for Salem Unit 1," dated February 19, 2007 (Non-Proprietary).

Also enclosed is Westinghouse authorization letter CAW-07-2247 with accompanying affidavit, Proprietary Information Notice, and Copyright Notice.

As Item 1 contains information proprietary to Westinghouse Electric Company LLC, it is supported by an affidavit signed by Westinghouse, the owner of the information. The affidavit 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 Section 2.390 of the Commission's' regulations.

Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

Correspondence with respect to the copyright or proprietary aspects of the items listed above or the supporting Westinghouse affidavit should reference CAW-07-2247 and should be addressed to B.F. Maurer, Acting Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Additional Changes to the Technical Specifications

outage during which the SG tubes are inspected or plugged to confirm that the performance criteria are being met.

b. Performance criteria for SG tube integrity. SG tube integrity shall be maintained by meeting the performance criteria for tube structural integrity, accident induced leakage, and operational leakage.

1. Structural integrity performance criterion: All in-service steam generator tubes shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cool down and all anticipated transients included in the design specification) and design basis accidents. This includes retaining a safety factor of 3.0 against burst under normal steady state full power operation primary-to-secondary pressure differential and a safety factor of 1.4 against burst applied to the design basis accident primary-to-secondary pressure differentials. Apart from the above requirements, additional loading conditions associated with the design basis accidents, or combination of accidents in accordance with the design and licensing basis, shall also be evaluated to determine if the associated loads contribute significantly to burst or collapse. In the assessment of tube integrity, those loads that do significantly affect burst or collapse shall be determined and assessed in combination with the loads due to pressure with a safety factor of 1.2 on the combined primary loads and 1.0 on axial secondary loads.

2. Accident induced leakage performance criterion: The primary-to-secondary accident induced leakage rate for any design basis accident, other than a SG tube rupture, shall not exceed the leakage rate assumed in the accident analysis in terms of total leakage rate for all SGs and leakage rate for an individual SG. Leakage is not to exceed 1 gallon per minute per SG.

3. The operational leakage performance criterion is specified in LCO 3.4.6.2, "Reactor Coolant System Operational Leakage."

c. Provisions for SG tube repair criteria. Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged.

INSERT A HERE →

d. Provisions for SG tube inspections. Periodic SG tube inspections shall be performed. The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet to the tube-to-tubesheet weld at the tube outlet, and that may satisfy the applicable tube repair criteria.

INSERT B HERE →

The tube-to-tubesheet weld is not part of the tube. In addition to meeting the requirements of d.1, d.2, and d.3 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection. An assessment of degradation shall be performed to determine the type and location of flaws to which the tubes may be susceptible and,

INSERT A

The following repair criteria are applicable only for Refueling Outage 18 and the subsequent operating cycle:
In lieu of the 40% of the nominal wall thickness repair criteria, the portion of the tube within the tubesheet of the inspected SGs shall be plugged in accordance with the following alternate repair criteria: ~~Degradation~~ Flaws located below 17 inches from the top of the tubesheet may remain in service regardless of size. ~~Degradation~~ Flaws identified in the portion of the tube from the top of the tubesheet to 17 inches below the top of the tubesheet shall be plugged on detection.

INSERT B

In lieu of the above, the following inspection criteria are applicable only for Refueling Outage 18 and the subsequent operating cycle:
The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube beginning 17 inches from the top of the tubesheet on the tube hot leg side to 17 inches below the top of the tubesheet on the tube cold leg side.

2. WCAP-8385, Power Distribution Control and Load Following Procedures - Topical Report, September 1974 (W Proprietary) Methodology for Specification 3/4.2.1 Axial Flux Difference. Approved by Safety Evaluation dated January 31, 1978.

3. WCAP-10054-P-A, Rev. 1, Westinghouse Small Break ECCS Evaluation Model Using NOTRUMP Code, August 1985 (W Proprietary), Methodology for Specification 3/4.2.2 Heat Flux Hot Channel Factor. Approved for Salem by NRC letter dated August 25, 1993.

4. WCAP-10266-P-A, Rev. 2, The 1981 Version of Westinghouse Evaluation Model Using BASH Code, Rev. 2. March 1987 (W Proprietary) Methodology for Specification 3/4.2.2 Heat Flux Hot Channel Factor. Approved by Safety Evaluation dated November 13, 1986.

5. WCAP-12472-P-A, BEACON - Core Monitoring and Operations Support System, Revision 0, (W Proprietary). Approved February 1994.

6. CENPD-397-P-A, Rev. 1, Improved Flow Measurement Accuracy Using Crossflow Ultrasonic Flow Measurement Technology, May 2000.

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any mid-cycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

6.9.1.10 STEAM GENERATOR TUBE INSPECTION REPORT

A report shall be submitted within 180 days after the initial entry into HOT SHUTDOWN following completion of an inspection performed in accordance with the Specification 6.8.4.i, "Steam Generator (SG) Program." The report shall include:

a. The scope of inspections performed on each SG,

b. Active degradation mechanisms found,

c. Nondestructive examination techniques utilized for each degradation mechanism,

d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,

e. Number of tubes plugged during the inspection outage for each active degradation mechanism,

f. Total number and percentage of tubes plugged to date, and

INSERT C HERE

g. The results of condition monitoring, including the results of tube pulls and in-situ testing.

INSERT C

h. The following reporting requirements are applicable only for Refueling Outage 18 and the subsequent operating cycle:
The number of indications detected in the upper 17 inches of the tubesheet thickness along with their location, measured size, orientation, and whether the indication initiated on the primary or secondary side.

i. The following report requirement is applicable only for Refueling Outage 18 and the subsequent operating cycle:
The operational primary to secondary leakage rate observed in each steam generator during the cycle preceding the inspection and the calculated accident leakage rate for each steam generator from the lowermost 4 inches of tubing (the tubesheet is nominally 21.03 inches thick) for the most limiting accident. If the calculated leak rate is less than 2 times the total observed operational leakage rate, the 180 day report should describe how the calculated leak rate is determined.

For Refueling Outage 18 and the subsequent operating cycle only, the following definition applies:
A SG tube is defined as the length of the tube beginning 17 inches from the top of the tubesheet on the tube hot leg side to 17 inches below the top of the tubesheet on the tube cold leg side as defined in LCR S07-01 (including WCAP-16640-P).

3/4.4.4 PRESSURIZER

The limit on the maximum water volume in the pressurizer assures that the parameter is maintained within the normal steady-state envelope of operation assumed in the SAR. The limit is consistent with the initial SAR assumptions. The 12 hour periodic surveillance is sufficient to assure that the parameter is restored to within its limit following expected transient operation. The maximum water volume also ensures that a steam bubble is formed and thus the RCS is not a hydraulically solid system. The requirement that a minimum number of pressurizer heaters be OPERABLE assures that the plant will be able to establish natural circulation.

3/4.4.5 STEAM GENERATOR (SG) TUBE INTEGRITY

The LCO requires that SG tube integrity be maintained. The LCO also requires that all SG tubes that satisfy the repair criteria be plugged in accordance with the Steam Generator Program.

During an SG inspection, any inspected tube that satisfies the Steam Generator Program repair criteria is removed from service by plugging. If a tube was determined to satisfy the repair criteria but was not plugged, the tube may still have tube integrity.

In the context of this Specification, a SG tube is defined as the entire length of the tube, including the tube wall, between the tube-to-tubesheet weld at the tube inlet and the tube-to-tubesheet weld at the tube outlet.

The tube-to-tubesheet weld is not considered part of the tube.

A SG tube has tube integrity when it satisfies the SG performance criteria. The SG performance criteria are defined in Specification 6.8.4.i, "Steam Generator (SG) Program," and describe acceptable SG tube performance. The Steam Generator Program also provides the evaluation process for determining conformance with the SG performance criteria.

There are three SG performance criteria: structural integrity, accident induced leakage, and operational leakage. Failure to meet any one of these criteria is considered failure to meet the LCO.

The structural integrity performance criterion provides a margin of safety against tube burst or collapse under normal and accident conditions, and ensures structural integrity of the SG tubes under all anticipated transients included in the design specification. Tube burst is defined as, "The gross structural failure of the tube wall. The condition typically corresponds to an unstable opening displacement (e.g., opening area increased in response to constant pressure) accompanied by ductile (plastic) tearing of the tube material at the ends of the degradation." Tube collapse is defined as, "For the load displacement curve for a given structure, collapse occurs at the top of the load versus displacement curve where the slope of the curve becomes zero." The structural integrity performance criterion provides guidance on assessing loads that significantly affect burst or collapse. In that context, the term "significant" is defined as, "An accident loading condition other than differential pressure is considered significant when the addition of such loads in the assessment of the structural integrity performance criterion could cause a lower structural limit or limiting burst/collapse condition to be established." The determination of whether thermal loads are primary or secondary loads is based on the ASME definition