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PSEG Nuclear LLC

LR-N06-0277
LCR S05-07

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

RESPONSE TO RAIs ON LCR S05-07: REQUEST TO CHANGE TO TECHNICAL SPECIFICATIONS TO REVISE STEAM GENERATOR TUBE SURVEILLANCE REQUIREMENTS IN ACCORDANCE WITH WCAP-14797, REVISION 2 (W* METHODOLOGY)
SALEM GENERATING STATION - UNIT 2
DOCKET NO. 50-311
FACILITY OPERATING LICENSE NO. DPR-75

References: (1) Letter from PSEG to NRC: "Request for Change to Technical Specifications, to Revise Steam Generator Tube Surveillance Requirements in Accordance with WCAP-14797, Revision 2 (W* Methodology), Salem Nuclear Generating Station, Units 2, Facility Operating License DPR-75, Docket No. 50-311", dated September 15, 2005

On September 15, 2005, PSEG Nuclear LLC (PSEG) submitted a License Change Request (LCR S05-07) to Facility Operating License DPR-75, for Salem Generating Station Unit 2 (Reference 1).

Following discussion with the NRC Staff, PSEG received a Request for Additional Information (RAI) on LCR S05-07. The RAI contained nine questions (or individual RAIs) that required responses from PSEG. The responses to these nine RAIs are provided in Attachment 1. The changes to the Technical Specifications (TS) required by these responses are provided in Attachment 2; the changes to the TS Bases are provided in Attachment 3.

Should you have any questions regarding this additional information related to LCR S05-07, please contact Mr. Jamie Mallon at (610) 765-5507.

A001

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

Executed on 6/20/06
(Date)

Sincerely,

Thomas P. Joyce
Site Vice President
Salem Generating Station

Attachments (3)

C Mr. S. Collins, Administrator - Region I
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SALEM GENERATING STATION – UNIT 2
FACILITY OPERATING LICENSES NOS. DPR-75
DOCKET NO. 50-311

RESPONSE TO NRC RAIs ON LCR S05-07: CHANGE TO TECHNICAL SPECIFICATIONS TO REVISE STEAM GENERATOR TUBE SURVEILLANCE REQUIREMENTS IN ACCORDANCE WITH WCAP-14797, REVISION 2 (W* METHODOLOGY)

1. *The staff has approved several W* submittals. It appears that your submittal was developed prior to staff review and approval of at least one of these submittals. As a result, it is not clear whether your intent was to provide justification for a new leakage model or whether your intent was to propose a model that was previously approved (or was in the process of being approved). To this end, please address the following:*

   a. *Confirm that a leak rate of $9x10^{-5}$ gallons per minute (gpm) will be assigned to all inservice tubes to account for potentially undetected indications that may exist below 12-inches from the top of the tubesheet.*

   b. *Confirm that a leak rate of either 0.0033 gpm or 0.0045 gpm will be assigned to indications either detected or postulated to be present between 8 and 12 inches from the top of the tubesheet. These values were previously approved for other plants. The leak rate of 0.0033 gpm value was approved by the staff following its review of an original proposal for a leak rate of 0.0028 gpm (similar to yours). If it is not your intent to use one of these two values (i.e., you are intending to justify a different leakage value such as 0.0028 gpm), please address the applicable questions that were sent to Diablo Canyon Units 1 and 2 when it proposed this value. These questions are contained in Diablo Canyon's response to a request for additional information dated August 25, 2005 (ML052440396).*

   c. *Confirm that the severity of the indications (axial and circumferential) detected in the top 8-inches of the tubesheet region are generally limited and are not expected to leak during postulated accident conditions. Please confirm that if any indications are of such severity that they have the possibility to leak, that you will use the constrained crack or crevice length leakage data to determine the leakage and the resultant leakage value will be provided to the NRC (consistent with your new proposed Technical Specification reporting requirement).*

RESPONSE

1.a PSEG Confirms that a leak rate of $9x10^{-5}$ gallons per minute (gpm) will be assigned to all inservice tubes to account for potentially undetected indications that may exist below 12-inches from the top of the tubesheet. The TS Bases in LCR S05-07 (LR N05-0397) provided information for addressing leakage below 12-inches from the top of the tubesheet, and has subsequently been improved to clarify this leakage assumption (Attachment 3, Insert 2 of this submittal).

1.b The leak rate value of 0.0033 gpm for indications between 8 and 12 inches below the TTS, as similarly addressed in ML052440396, will be utilized for Salem Unit 2

in place of the 0.0028 gpm leak value originally stated in LR-N05-0397. The TS Bases have been revised accordingly in Attachment 3.

1.c PSEG confirms that the severity of the indications (axial and circumferential) detected in the top 8-inches of the tubesheet region are generally limited and are not expected to leak during postulated accident conditions. Furthermore, a review of the most recent outage inspection results (including outage 2R13 and 2R14) indicate that the axial and circumferential degradation in the top 8-inches of the tubesheet region are generally low voltage indications, and are typically well below the leakage threshold criteria (VTHR-L) provided in the EPRI Steam Generator In Situ Pressure Test Guidelines Revision 2 (EPRI Document 1007904). PSEG also confirms that if any indications are of such severity that they have the possibility to leak, the constrained crack leakage data will be used to determine the appropriate leakage. In addition, to clarify that the constrained crack leakage data will be used, the TS bases was improved by eliminating reference to WCAP 14797 in the sentence: "The leak rate potential for axial, circumferential, and volumetric indications within 12 inches from the top of the tubesheet can be conservatively calculated using the constrained crack model as delineated in WCAP 14797 Revision 2 and Westinghouse LTR-CDME-05-30." The TS Bases have been revised accordingly in Attachment 3. In addition, the resultant leakage value will be provided to the NRC, consistent with our proposed Technical Specification reporting requirement (see response to RAI number 3).

2. *Regarding your methodology for determining the number of indications detected between 8 and 12 inches from the top of the tubesheet, please address the following:*

   a. *You have proposed to assume that there are 48 postulated indications in this region of the steam generator (i.e., 8 to 12 inches below the top of the tubesheet). This value is based on past operating data. Since this is a permanent request and it is possible that future results may follow different trends than that previously observed, it is not clear that simply assuming one value is appropriate. To this end, either (a) demonstrate (for the remaining licensed period for the plant) that 48 indications is bounding or (b) propose a specific methodology (e.g., specifying which regression line, etc) for determining the number of indications in the 8 to 12 inch region. The staff notes that it has previously approved such a methodology for several plants.*

   b. *Please confirm the data presented in Table 7 of LTR-CDME-05-30-P. The staff notes that some of the values in the text do not match those in the table (e.g., page 34 of 53 indicates that a cumulative total of 321 indications were reported through 2R11; however, Table 7 indicates that total is 319).*

RESPONSE

2.a PSEG proposes to estimate the number of undetected indications in the 8 and 12 inch region below the top of tubesheet (TTS) by fitting a regression line to the cumulative inspection data (detected indications) from all SGs and projecting the number of indications (to minus 12 inches below TTS) using a 95-percent probability prediction bound (as similarly discussed in Westinghouse LTR-CDME-05-30). The cumulative indications from all steam generators are conservatively assumed to be in one SG (similar to figure 16 of Westinghouse LTR-CDME-05-30). The regression analysis utilizes inspection data of cumulative indications from previous outages (currently up to outage 2R14) and will also use subsequent outage inspection data when available (2R15, etc). Therefore, PSEG's proposed conservative assumption that there are 48 postulated undetected indications within the 8 and 12 inch region below the TTS for the life of the SGs will be superceded by the regression analysis method using a 95-percent probability prediction bound which is updated/validated each outage. Review of Diablo Canyon's NRC approved W* submittal (Amendments 182 and 184, dated November, 11, 2005) indicates that PSEG's proposal is similar, however PSEG proposes to utilize a 95-percent probability predication bound as opposed to Diablo Canyon's 90-percent.

2.b Review of Table 7 has determined that 319 cumulative tubesheet indications reported for 2R11 is accurate for the purposes of this submittal. The inconsistency is a result of a tube plugged (SG 24 row 13 column 12) during outage 2R11 that had two indications, however this tube had no WEXTEX tube expansion. This particular tube does not represent degradation within a WEXTEX expanded tubesheet, and therefore this tube was not included in the assessment of degradation in the WEXTEX assessment provided in LTR-CDME-05-30. Therefore, 321 indications is an accurate cumulative indication count, however 319 is the appropriate WEXTEX cumulative indication count for 2R11 and the assessment provided in LTR-CDME-05-30. It is also noted that inclusion of these 2 indications would not change the overall conclusions, or have a meaningful affect on the conservatism already established in the assessment provided in LCR S05-07 (as supported by LTR-CDME-05-30).

3. *Please discuss your plans to include the following W* reporting requirement in your technical specifications (TS): The projected end-of-cycle (EOC) accident-induced leakage from tubesheet indications shall be combined with the postulated EOC accident-induced leakage from all other sources. If the estimated total projected EOC accident-induced leakage from all sources exceeds the leakage limit (from the plant's design and licensing basis), the NRC staff shall be notified prior to unit restart.*

Please confirm that the cumulative number of indications detected in the tubesheet region as a function of elevation in the tubesheet will be provided as part of your proposed reporting requirement to assess whether the results were consistent with expectations. If it is not your intent to provide this information as part of this reporting requirement, please discuss your plans to modify your technical specifications to include this as a reporting requirement.

RESPONSE

3. PSEG proposes the following clarification in TS 4.4.6.5.b.4, to include: "...the cumulative number of indications detected in the tubesheet region as a function of elevation within the tubesheet, the condition monitoring and operational assessment main steam line leak rate (including aggregate calculated main steam line break leak rate from all other sources)...". In addition TS 4.4.6.5.d was created in attachment 2 to clarify leakage reporting in regard to the design and licensing basis as follows: "...A notification to the NRC shall be provided prior to unit restart if the estimated main steam line leak rate from 4.4.6.5.b.4 exceeds the design and licensing basis...". The TS Bases have also been revised accordingly; Attachment 2 and 3 of this submittal provides the TS and Bases pages with changes.

4. *Given that this amendment is intended for more than one operating cycle, please discuss what controls will be placed on primary temperature and steam generator secondary side pressure to ensure these parameters stay within the bounds of (or remain conservative with respect to) the evaluation for Salem Unit 2 (Westinghouse LTR-CDME-05-30). For example, if the steam pressure is greater than that assumed in the W* integrity evaluation, the pressure tightening effect will be less. Similarly, if the steam pressure is lower than that assumed in the generic analysis, the amount of tubesheet bow would be affected.*

RESPONSE

4. PSEG will establish additional controls within plant procedure(s) to monitor that the primary temperature and steam generator secondary side pressure parameters stay within the bounds of (or remain conservative with respect to) the W* integrity evaluation for Salem Unit 2 (Westinghouse LTR-CDME-05-30). If these parameters are not adhered to, an evaluation will be required to assess the impact on the W* integrity evaluation.

5. *Please clarify your proposed technical specification requirement which "requires a 100 percent inspection of the hot leg tubesheet W* distance." If this statement is intended to indicate that implementation of the W* methodology requires an*

inspection of 100% of the tubes for the entire hot leg tubesheet W distance, please discuss your plans to modify this proposed requirement.*

RESPONSE

5. The statement in the proposed TS requirement is intended to indicate that implementation of the W* methodology requires an inspection of 100% of the inservice tubes for the entire hot leg tubesheet W* distance. The wording of the proposed TS has been clarified accordingly in Attachment 2 of this submittal.

6. *In your proposed definition for the W* distance you indicated that it is conservatively defined as a minimum of 8.0 inches below the top of the tubesheet or the W* distance as defined in WCAP-14797, Revision 2, whichever is greater. The reference to WCAP-14797, Revision 2 could result in confusion on what is the appropriate distance. This potential confusion stems from various definitions cited throughout your submittal. For example, you indicated that the bottom of the WEXTEX Transition (which is used in part of the definition of the W* distance) is defined in WCAP-14797 as approximately 0.25 inches from the top of the tubesheet. The staff would not agree with this definition since the location of the bottom of the expansion transition for each and every tube must be determined (i.e., it is not acceptable to define it as 0.25 inches from the top of the tubesheet unless it has been determined that the bottom of the expansion transition for all tubes is less than 0.25 inches from the top of the tubesheet). As a result of the above, please discuss your plans to modify your proposed TS definition for the W* distance. For example, the W* distance is the larger of the following two distances as measured from the top-of-the-tubesheet (TTS): (a) 8-inches below the TTS or (b) the non-degraded distance from the TTS to the bottom of the W* length, including the distance from the TTS to the bottom of the WEXTEX transition (BWT) and Non-Destructive Examination (NDE) measurement uncertainties (i.e., W* distance = W* length + distance to BWT + NDE uncertainties).*

RESPONSE

6. PSEG agrees that there could be confusion in what is the appropriate distance, based on the current proposed TS definition wording. Accordingly, the proposed TS definition has been clarified in Attachment 2 and Attachment 3 of this submittal to state: "The W* distance is the larger of the following two distances as measured from the top-of-the-tubesheet (TTS): (a) 8-inches below the TTS or (b) the non-degraded distance from the TTS to the bottom of the W* length, including the distance from the TTS to the bottom of the WEXTEX transition (BWT) and Non-Destructive Examination (NDE) measurement uncertainties (i.e., W* distance = W* length + distance to BWT + NDE uncertainties)." In addition, attachment 3 was clarified to state: "Non-Destructive Examination determines the

distance to the BWT for each tube". Therefore removing the potential confusion that an assumption of 0.25 inch for all BWT in every tube is appropriate.

7. *On page 7 of Attachment 1 to your September 21, 2005 submittal, you indicate that the maximum NDE uncertainty on the W* length is 0.12-inch. The staff agrees that this is the NDE uncertainty associated with determining the W* length; however, it may not be the appropriate uncertainty in all cases (e.g., when a flaw is located near the bottom of the inspection distance). In this latter case, the uncertainty value may be 0.28-inches. Since the actual NDE uncertainty value will depend on the inspection results (e.g., a flaw present near the W* distance) and the reference point for the measurement (as discussed in WCAP-14797), please confirm that you will apply the appropriate NDE uncertainty value from WCAP-14797 in determining your inspection extent and dispositioning flaws.*

RESPONSE

7. PSEG confirms that the appropriate NDE uncertainty value from WCAP-14797 will be utilized in determining inspection extent and dispositioning flaws. Accordingly, the proposed TS Bases has been clarified in Attachment 3 to include the following: "The nondestructive examination (NDE) measurement uncertainty is provided from WCAP-14797 Revision 2".

8. *Please discuss your plans to modify your TS Bases consistent with your responses to the above questions. In addition, please address the following:*

   a. *The proposed Bases does not indicate that the W* distance is the more limiting of the two criteria discussed in question 6 above (refer to 1st paragraph of insert 2). Please discuss your plans to correct this.*

   b. *Please clarify the following sentence: "The conservative leakage assigned to each assumed unidentified indication between 8 and 12 inches below the TTS is 0.0028 gpm multiplied by the number of estimated indications."*

   c. *As currently proposed, the Bases would not require the W* accident induced leakage to be combined with other sources of accident induced leakage. Please clarify that the W* accident induced leakage will be combined with all other sources of accident induced leakage for comparison with your leakage limits (i.e., those that are consistent with your design and licensing basis).*

RESPONSE

8. PSEG has modified the TS Bases in Attachment 3 to this submittal, based on our responses to the RAIs, including items a, b and c above.

9. *Please provide your accident induced leakage limit (i.e., the most limiting limit that is consistent with your design and licensing basis).*

RESPONSE

9. The accident induced leakage limit is provided in the Salem Alternate Source Term (AST) Amendments 271 and 252, with a 1 gpm limit and ~0.35 gpm assigned to the affected SG. Furthermore, the accident analysis is currently being revised in preparation for the replacement Salem Unit 2 SGs (2R16), and to provide additional margin for the implementation of W* for the currently installed SGs. Therefore, the accident analysis calculations are being revised with conservative assumption of additional accident leakage (above ~0.35 gpm) within the affected SG. The subsequent increases in the affected SG leakage, and the related calculated doses, will be limited so these changes do not result in more than a minimal increase in the consequences of an accident previously evaluated in the updated final safety analysis report as required by 10 CFR 50.59. Total doses will be maintained to less than allowable regulatory limits. Also note approval of Salem AST Amendments were provided subsequent to initial W* submittal, and therefore the TS Bases (see Attachment 3) reference to 10 CFR 100 was replaced accordingly with reference to 10 CFR 50.67.

TECHNICAL SPECIFICATION PAGES WITH PROPOSED CHANGES

The following Technical Specifications for Salem Unit 2 Facility Operating License DPR-75 are affected by this change request:

Technical Specification	Page
3/4.4.6, "Steam Generators"	3/4 4-10, 4-12 and 4-13

2. Tubes in those areas where experience has indicated potential problems.

3. A tube inspection (pursuant to Specification 4.4.6.4.a.8) shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube inspection, this shall be recorded and an adjacent tube shall be selected and subjected to a tube inspection.

c. The tubes selected as the second and third samples (if required by Table 4.4-2) during each inservice inspection may be subjected to a partial tube inspection provided:

1. The tubes selected for these samples include the tubes from those areas of the tube sheet array where tubes with imperfections were previously found.

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

d. Implementation of the steam generator WEXTEX expanded region inspection methodology (W*), requires a 100 percent inspection of the inservice tubes for the entire hot leg tubesheet W* distance.

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.
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.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

4.4.6.4 Acceptance Criteria

a. As used in this Specification:

1. Imperfection means an exception to the dimensions, finish or contour of a tube 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.

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

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

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. This definition does not apply to service induced degradation identified in the W* distance. Tubes with service induced degradation identified in the W* distance shall be removed from service on detection by tube plugging.

7. Unserviceable describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in 4.4.6.3.c, above.

8. Tube Inspection means an inspection of the steam generator tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg, excluding the portion of the tube within the tubesheet below the W* distance, the tube to tubesheet weld and the tube end extension.

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 establish a baseline condition of the tubing. This inspection shall be performed after the field hydrostatic test and prior to initial POWER OPERATION using the equipment and techniques expected to be used during subsequent inservice inspections.

INSERT 1 →

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 4.4-2.

4.4.6.5 Reports

a. Following each inservice inspection of steam generator tubes, the number of tubes plugged in each steam generator shall be reported to the Commission within 15 days.

b. The complete results of the steam generator tube inservice inspection shall be included in the Annual Operating Report for the period in which the inspection was completed. This report shall include:

1. Number and extent of tubes inspected.

2. Location and percent of wall-thickness penetration for each indication of an imperfection.

3. Identification of tubes plugged.

4. Information regarding the application of W* inspection methodology; including the number of indications, the location of indications (relative to the BWT and TTS), the orientation (axial, circumferential, volumetric), the severity of each indication (e.g., near through-wall or not through wall), the tube side where the indication initiated (inside or outside diameter), the cumulative number of indications detected in the tubesheet region as a function of elevation within the tubesheet, the condition monitoring and operational assessment main steam line leak rate (including aggregate calculated main steam line break leak rate from all other sources), and an assessment of whether the results were consistent with expectations regarding the number of flaws and flaw severity (and if not consistent, a description of the proposed corrective action).

c. Results of steam generator tube inspections which fall into Category C-3 shall be evaluated for reportability pursuant to 10CFR50.72 and 10CFR50.73. The evaluation shall be documented, and shall provide a description of investigations conducted to determine cause of the tube degradation and corrective measures taken to prevent recurrence.

d. A notification to the NRC shall be provided prior to unit restart if the estimated main steam line leak rate from 4.4.6.5.b.4 exceeds the design and licensing basis.

INSERT 1

10. Bottom of WEXTEX transition (BWT) is the highest point of contact between the tube and the tubesheet at, or below the top-of-tubesheet, as determined by eddy current testing.

11. W* Length is defined as the length of tubing below the bottom of the WEXTEX transition (BWT) that must be demonstrated to be non-degraded in order for the tube to maintain structural and leakage integrity. For the hot leg, the W* length is 7.0 inches, which represents the most conservative hot leg length defined in WCAP-14797, Revision 2.

12. W* Distance is defined in WCAP-14797, Revision 2, as the non-degraded distance from the top of the tubesheet to the bottom of the W* length, including the distance from the top-of-tubesheet to the bottom of the WEXTEX transition (BWT) and Non-Destructive Examination (NDE) measurement uncertainties (i.e., W* distance = W* length + distance to BWT + NDE uncertainties). The W* Distance ~~shall be conservatively defined as a minimum of 8.0 inches below the TTS, or the W* distance as defined in WCAP-14797, Revision 2, whichever is greater.~~ is the larger of the following two distances as measured from the top-of-the-tubesheet (TTS): (a) 8-inches below the TTS or (b) the non-degraded distance from the TTS to the bottom of the W* length, including the distance from the TTS to the bottom of the WEXTEX transition (BWT) and Non-Destructive Examination (NDE) measurement uncertainties (i.e., W* distance = W* length + distance to BWT + NDE uncertainties)

PROPOSED CHANGES TO TS BASES PAGES

The following Technical Specifications Bases for Salem Unit 2, Facility Operating License No. DPR-75, are affected by this change request:

Salem Unit 2

Technical Specification	Page
Bases 3/4.4.6	B 3/4 4-3 through B 3/4 4-4

3/4.4.6 STEAM GENERATORS (continued)

Wastage-type defects are unlikely with proper chemistry treatment of the secondary coolant. However, even if a defect should develop in service, it will be found during scheduled inservice steam generator tube examinations. Plugging will be required for all tubes with imperfections exceeding the plugging limit of 40% of the tube nominal wall thickness. Steam generator tube inspections of operating plants have demonstrated the capability to reliably detect degradation that has penetrated 20% of the original tube wall thickness.

INSERT 2 →

INSERT 2

The W* criteria incorporate the guidance provided in WCAP-14797, Revision 2, "Generic W* Tube Plugging Criteria for 51 Series Steam Generator Tubesheet Region WEXTEX Expansions" and supporting information provided from Westinghouse Letter Report LTR-CDME-05-30, "W* Integrity Evaluation for Salem Unit 2 Limited SG Tube RPC Examination (Based on WCAP-14797, Revision 2). The W* length is the undegraded length of tubing into the tubesheet below the bottom of the WEXTEX transition (BWT) that precludes tube pullout in the event of a complete circumferential separation of the tube below the W* length. The W* distance is the larger of the following two distances as measured from the top-of-the-tubesheet (TTS): (a) 8-inches below the TTS or (b) the non-degraded distance from the TTS to the bottom of the W* length, including the distance from the TTS to the bottom of the WEXTEX transition (BWT) and Non-Destructive Examination (NDE) measurement uncertainties (i.e., W* distance = W* length + distance to BWT + NDE uncertainties). Non-Destructive Examination determines the distance to the BWT for each tube. The nondestructive examination (NDE) measurement uncertainty is provided from WCAP-14797 Revision 2. Tubes with indications detected within the W* distance will be removed from service by tube plugging. ~~is the undegraded distance from the top of the tubesheet to the bottom of the W* length including the distance from the top of the tubesheet to the BWT and measurement uncertainties.~~

Tubes to which WCAP-14797 is applied can experience through-wall degradation up to the limits defined in Revision 2 without increasing the probability of a tube rupture or large leakage event. Tube degradation of any type or extent below the W* distance, including a complete circumferential separation of the tube, is acceptable and therefore may remain in service. As applied at Salem Unit 2, the W* methodology (WCAP-14797) is used to define the required tube inspection depth into the tubesheet, and is not used to permit degradation in the W* distance to remain in service. Furthermore, potential primary to secondary leakage in the W* distance, and below the W* distance, can be conservatively evaluated using WCAP-14797 Revision 2 and LTR-CDME-05-30. The leak rate potential for axial, circumferential, and volumetric indications within 12 inches from the top of the tubesheet can be conservatively calculated using the constrained crack model as delineated in Westinghouse LTR-CDME-05-30.

The postulated leakage during a steam line break shall be equal to the following equation, as supported by LCR S05-07 (WCAP-14797 Rev 2 and LTR-CDME-05-30):

Postulated SLB Leakage = Assumed Leakage $_{0"-8" <TTS}$ + Assumed Leakage $_{8"-12" <TTS}$ + Assumed Leakage $_{>12" <TTS}$

Where: Assumed Leakage $_{0"-8" <TTS}$ is the postulated leakage for indications that are deemed via flaw depth estimation techniques to be 100% throughwall, and therefore present a potential leak path. This term is applicable to detected indications during an in-service inspection and potentially undetected indications in the steam generator tubes left in service between 0 inches and 8 inches

below the top of the tubesheet (TTS). Since tubes with indications detected between 0 and 8 inches below the TTS are plugged upon detection, the calculation of this term for the assessment of SLB leakage for the subsequent operation cycle following an in-service inspection only requires consideration of potentially undetected indications. The calculation of this term for the assessment of SLB leakage for the previous operation cycle, following an in-service inspection, requires consideration of both detected and potentially undetected indications.

Assumed Leakage $_{"8\text{-}12" <TTS}$ is the conservatively estimated ~~assumed~~ leakage from the total of identified and postulated unidentified indications in steam generator tubes ~~left in service~~ between 8 and 12 inches below the top of the tubesheet. The methodology for calculating potentially unidentified indications between 8 and 12 inches below the TTS is provided by fitting a regression line to the cumulative inspection data (detected indications) from all SGs and projecting the number of indications (to minus 12 inches below TTS) using a 95-percent probability prediction bound (as similarly discussed in Westinghouse LTR-CDME-05-30). The cumulative indications from all steam generators are conservatively assumed to be in one SG (similar to figure 16 of Westinghouse LTR-CDME-05-30). ~~delineated in The conservative assigned to each assumed unidentified between 8 and 12 inches below the TTS~~ The leakage rate for the unidentified indications is 0.00332~~8~~ gpm multiplied by the number of ~~estimated~~ indications. ~~All postulated unidentified indications will be conservatively assumed to be in one steam generator. The highest number of i~~ Identified indications ~~left in service~~ between 8 and 12 inches below TTS ~~in any one steam generator~~ will be assessed for leak rate using the constrained crack model as delineated in Westinghouse LTR-CDME-05-30 ~~included in this term~~.

Assumed Leakage $_{>12" <TTS}$ is the calculated ~~conservatively assumed~~ leakage from the ~~bounding~~ steam generator tubes left in service below 12 inches from the top of the tubesheet. This is 0.00009 gpm times number of tubes left in service in the ~~least plugged~~ steam generator.

Each SG is assessed for Main Steam Line Break (MSLB) leakage individually in accordance with the discussion above, and the SG with the most calculated leakage is conservatively assigned as the affected SG.

The calculated MSLB leakage provided above, including MSLB leakage from all other sources, shall be reported to the NRC in accordance with applicable Technical Specifications. The Calculated MSLB Leakage must be less than the maximum allowable MSLB leak rate limit in any one steam generator in order to maintain doses within 10 CFR 50.67 ~~100~~ guideline values and within GDC-19 values during a postulated main steam line break event.