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Note: Attachments 4, 6, and 7 to Enclosure 1 to this letter contain proprietary information.

Docket Number 50-346

10 CFR 50.90

License Number NPF-3

Serial Number 3133

May 22, 2005

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-0001

Subject: Davis-Besse Nuclear Power Station
License Amendment Application to Revise Technical Specification 3/4.4.5, "Steam Generators," to Adopt Alternate Repair Criteria for Axial Tube End Crack Indications in Steam Generator Tubes (License Amendment Request No. 04-0025)

Ladies and Gentlemen:

Pursuant to 10 CFR 50.90, the following amendment is requested for the Davis-Besse Nuclear Power Station, Unit 1 (DBNPS). The proposed amendment would adopt a qualified alternate repair criteria (ARC) for axial tube end cracking (TEC) indications in the DBNPS Once-Through Steam Generator (OTSG) tubes. Specifically, the proposed amendment would revise the Technical Specification (TS) Surveillance Requirements (SR) for steam generator tube inservice inspection to include the TEC ARC. The technical basis for the ARC is provided in Babcock & Wilcox Owners Group Topical Report BAW-2346P, "Alternate Repair Criteria for Tube End Cracking in the Tube-to-Tubesheet Roll Joint of Once-Through Steam Generators," dated April 1999.

License Amendments authorizing use of a TEC ARC have been previously approved for Arkansas Nuclear One (ADAMS No. ML021270238), Crystal River (ADAMS No. ML020670202), and Oconee (ADAMS No. ML993420021).

AP01

Approval of the proposed amendment is requested by February 28, 2006, in order to have the ARC available for the DBNPS fourteenth refueling outage. Once approved, the amendment shall be implemented within 120 days.

The proposed changes have been reviewed by the DBNPS Plant Operations Review Committee and Company Nuclear Review Board. Enclosure 1 includes an evaluation of the proposed amendment. Attachments 4, 6, and 7 to Enclosure 1 contain proprietary information and are being requested to be withheld from public disclosure. An affidavit is provided in Enclosure 2 to address each proprietary attachment. A list of regulatory commitments made in this letter is included in Enclosure 3.

Should you have any questions or require additional information, please contact Mr. Henry L. Hegrat, Supervisor – Fleet Licensing, at (330) 315-6944.

The statements contained in this submittal, including its associated enclosures and attachments, are true and correct to the best of my knowledge and belief. I am authorized by the FirstEnergy Nuclear Operating Company to make this submittal. I declare under penalty of perjury that the foregoing is true and correct.

Executed on May 23, 2005

MAR

Enclosures

cc: J. L. Caldwell, Regional Administrator, NRC Region III
J. B. Hopkins, NRC/NRR Senior Project Manager
N. Dragani, Executive Director, Ohio Emergency Management Agency, State of Ohio (NRC Liaison)
C. S. Thomas, NRC Region III, DB-1 Senior Resident Inspector
Utility Radiological Safety Board

Docket Number 50-346
License Number NPF-3
Serial Number 3133
Enclosure 1

**DAVIS-BESSE NUCLEAR POWER STATION
EVALUATION
FOR
LICENSE AMENDMENT REQUEST NUMBER 04-0025**

(12 pages follow excluding attachments)

DAVIS-BESSE NUCLEAR POWER STATION EVALUATION FOR LICENSE AMENDMENT REQUEST NUMBER 04-0025

Subject: License Amendment Application to Revise Technical Specification 3/4.4.5, "Steam Generators," to Adopt Alternate Repair Criteria for Axial Tube End Crack Indications in Steam Generator Tubes

1.0 DESCRIPTION

This is a request to amend the Davis-Besse Nuclear Power Station, Unit Number 1 (DBNPS) Facility Operating License Number NPF-3.

The proposed amendment would adopt a qualified alternate repair criteria (ARC) for axial tube end cracking (TEC) indications in the DBNPS Once-Through Steam Generator (OTSG) tubes. Specifically, the proposed amendment would revise the Technical Specification (TS) Surveillance Requirements (SR) for steam generator tube inservice inspection to include the TEC ARC. The technical basis for the ARC is provided in Babcock & Wilcox Owners Group Topical Report BAW-2346P, "Alternate Repair Criteria for Tube End Cracking in the Tube-to-Tubesheet Roll Joint of Once-Through Steam Generators," dated April 1999.

2.0 PROPOSED CHANGE

The proposed changes are shown in the marked-up TS pages in Attachment 1 and affect TS 3/4.4.5, "Steam Generators." The proposed changes would revise the steam generator inservice inspection Surveillance Requirements (SR) to permit tubes with TEC indication to remain in service provided certain requirements are satisfied. The specific proposed changes are described in detail below.

SR 4.4.5.2.a.1 currently requires:

> The first sample inspection during each inservice inspection of each steam generator shall include:
>
> 1. All tubes or tube sleeves that previously had detectable wall penetrations (> 20%) that have not been plugged or repaired by repair roll or sleeving in the affected area. (Tubes repaired by sleeving or repair roll remain available for random selection).

The proposed amendment would revise this SR to exclude tubes left in service with TECs from mandatory inclusion in the first inspection sample. A separate 100% inspection of TEC indications left in service is being added as discussed below. Tubes with TECs left in service would remain available for random selection. The revised SR would state:

> 1. All tubes or tube sleeves that previously had detectable wall penetrations (> 20%) and that have not been plugged, repaired by repair roll or sleeving in the affected area, or left in service with axially oriented tube end cracks. (Tubes repaired by sleeving or repair roll or left in service with axially oriented tube end cracks remain available for random selection).

The proposed amendment would also revise SR 4.4.5.3.b, which currently states:

> If the results of the inservice inspection of a steam generator performed in accordance with Table 4.4-2 at 40 month intervals for a given group* of tubes fall in Category C-3,

subsequent inservice inspections shall be performed at intervals of not less than 10 nor more than 20 calendar months after the previous inspection. The increase in inspection frequency shall apply until a subsequent inspection meets the conditions specified in 4.4.5.3a and the interval can be extended to 40 months.

The proposed change would permit excluding TEC indications in the determination of whether a steam generator inspection's results would be classified as Category C-3. The proposed revised SR 4.4.5.3.b would state:

If the results of the inservice inspection of a steam generator performed in accordance with Table 4.4-2 at 40 month intervals for a given group* of tubes fall in Category C-3, subsequent inservice inspections shall be performed at intervals of not less than 10 nor more than 20 calendar months after the previous inspection. The increase in inspection frequency shall apply until a subsequent inspection meets the conditions specified in 4.4.5.3a and the interval can be extended to 40 months. If the Category C-3 inspection results classification is due to including new tubes with tube end cracking (TEC) indications that meet the criteria to remain in service, no increase in inspection frequency is required.

Additionally, a new requirement would be added to require an expanded inspection of steam generator tube ends if it is ever discovered that TEC resulted in an unscheduled inservice inspection due to excessive primary-to-secondary leakage. The following requirement would be added to SR 4.4.5.3.c.1:

If the leak is determined to be from TEC degradation, 100% of the tubes in the affected tubesheet shall be examined in the location of the TEC.

The proposed change would revise the repair limit definition in SR 4.4.5.4.a.7. SR 4.4.5.4.a.7 currently states:

<u>Repair Limit</u> means the imperfection depth at or beyond which the tube shall be removed from service by plugging or repaired by repair roll or sleeving in the affected area because it may become unserviceable prior to the next inspection and is equal to 40% of the nominal tube wall thickness. The process described in Topical Report BAW-2120P will be used for sleeving.

The proposed change would revise this definition to exclude axially-oriented TEC indications that do not extend into the carbon steel tubesheet from requiring repair. The revised SR 4.4.5.4.a.7 would state:

<u>Repair Limit</u> means the imperfection depth at or beyond which the tube shall be removed from service by plugging or repaired by repair roll or sleeving in the affected area because it may become unserviceable prior to the next inspection and is equal to 40% of the nominal tube wall thickness. The process described in Topical Report BAW-2120P will be used for sleeving. Axially-oriented TEC indications in the tube that do not extend beyond the adjacent cladding portion of the tubesheet into the carbon steel portion are not included in this definition provided the tube is located at a tubesheet radius of 54 inches or less. These

indications shall be assessed for continued plant operation in accordance with topical report BAW-2346P, dated April 1999.

The proposed amendment would add the following definition for TEC as SR 4.4.5.4.a.11 to assure proper application of the TEC ARC:

> Tube End Cracks (TEC) are those crack-like eddy current indications, circumferentially and/or axially oriented, that are within the Inconel clad region of the primary face of the upper and lower tubesheets, but do not extend into the carbon steel to Inconel clad interface.

The proposed amendment would also add a new reporting requirement to be included in the annual report. The proposed change would add SR 4.4.5.5.b.4 to require the annual report to include:

> Number of tubes with axially oriented TEC indications left in service, the projected accident leakage, and an assessment of growth for TEC indications.

Finally, a new SR would be added to require a 100% inspection of the TEC indications left in service. This inspection would ensure that TECs growth rates are monitored. The proposed new SR 4.4.5.a.11 would state:

> When steam generator tube inspection is performed as per Section 4.4.5.2, an additional but totally separate inspection shall be performed on 100% of the tubes with in-service TECs that were identified during previous inspections. The inspection shall be limited to the portion of the tube with the TEC and must be performed using an eddy current detection technique demonstrated to be capable of detecting TEC. The inspection data for tubes with axially oriented TEC indications shall be compared to the previous inspection data to monitor the indications for growth.

Additional non-substantive changes are being made to TS Pages 3/4 4-9a, 3/4 4-10, and 3/4 4-10a to enhance specification format. These formatting changes do not affect any requirements.

In summary, the proposed amendment would adopt a qualified alternate repair criteria (ARC) for axial tube end cracking (TEC) indications in the DBNPS Once-Through Steam Generator (OTSG) tubes. Specifically, the proposed amendment would revise the Technical Specification (TS) Surveillance Requirements (SR) for steam generator tube inservice inspection to include the TEC ARC. The technical basis for the ARC is provided in Babcock & Wilcox Owners Group Topical Report BAW-2346P, "Alternate Repair Criteria for Tube End Cracking in the Tube-to-Tubesheet Roll Joint of Once-Through Steam Generators," dated April 1999.

Associated changes to the TS Bases are being made in support of this application. The proposed changes are identified in Attachment 3. These Bases changes are being processed under the DBNPS TS Bases Control Program and are being provided for information only.

3.0 BACKGROUND

Steam Generator Description

The DBNPS reactor coolant system (RCS) contains two steam generators. The steam generators are discussed in DBNPS Updated Safety Analysis Report (USAR) Section 5.5.2, "Steam Generators." The steam generators are vertical, straight tube, once through, counterflow, shell and tube heat exchangers with shell side boiling. The steam generators perform the following safety functions:

- Provide a pressure boundary between the reactor coolant and the secondary side fluid to confine fission products and activation products within the reactor coolant system.
- Provide heat transfer capability to remove the reactor coolant heat produced during normal power operations.
- Provide normal and auxiliary feedwater flow paths and heat transfer capability for both normal and emergency cooldown, and supply steam for the auxiliary feed pump turbines for emergency cooling.

Each steam generator has more than 15,000 Alloy 600 tubes that are spaced on a 7/8 inch triangular pitch. These tubes have a nominal outer diameter of 0.625 inch with a nominal wall thickness of 0.037 inches. The tubesheets are 24 inches thick with a design minimum 1/4 inch Alloy 600 cladding on the primary face. Each original steam generator tube-to-tubesheet joint in service is comprised of a 1-inch minimum roll near the primary face of the tubesheet and a fillet weld attaching the tube to the clad face.

Inspection History

Steam generator inspection activities are performed in accordance with the DBNPS Steam Generator Management Program. The DBNPS Steam Generator Management Program implements the guidance of NEI 97-06, "Steam Generator Program Guidelines." Inspections at plants with Babcock and Wilcox designed OTSGs have revealed crack-like indications near the ends of the expansion roll of some tube-to-tubesheet joints. These indications have been found to extend into the pressure boundary portion of the tube. The proposed ARC would address these indications by allowing them to remain in service provided certain conditions are met.

4.0 TECHNICAL ANALYSIS

The proposed amendment would adopt a qualified ARC for axial TEC indications in the OTSG tubes. The technical basis for the ARC is provided in Babcock & Wilcox Owners Group Topical Report BAW-2346P, "Alternate Repair Criteria for Tube End Cracking in the Tube-to-Tubesheet Roll Joint of Once-Through Steam Generators," dated April 1999. Due to a reevaluation of the DBNPS OTSG response to a Main Steam Line Break following issuance of BAW-2346P, the application of the TEC ARC will be limited to tubes located at a tubesheet radius of 54 inches or less. Plant-specific leak rates to be used for implementation of the ARC are provided in Appendix C of Framatome Technologies Incorporated (FTI) Document 32-5003879-03, "OTSG

Tube End Leak Rate vs. Tubesheet Radius" (Attachment 6). The ARC would allow TEC indications to remain in service provided the following conditions are satisfied:

- The TEC indications are axially-oriented. The ARC does not apply to circumferential, mixed mode, or volumetric indications
- The TEC indications are adjacent to the tubesheet cladding or in the tube end protruding from the cladding. Tubes with any portion of an axial indication directly adjacent to the carbon steel portion of tubesheet must be repaired.
- The combined primary-to-secondary leakage from all sources, including TEC indications left in service, shall not exceed one gallon per minute.
- The tubesheet cladding thickness, as determined by the maximum ultrasonic measurement of a sample of points on the tubesheet, must be less than 0.625 inches in order for ARC to be applied.
- The tube is located at a tubesheet radius of less than 54 inches.

The technical justification for allowing TEC indications to remain in service is based on a combination of structural analyses, mockup testing results, and inservice inspection requirements. Analysis performed in FTI Document 51-5006916-01, "DB - Applicability of TEC ARC," dated December 19, 2000, provided the basis for limited use of the ARC at the DBNPS. The following summarizes key elements of the technical basis for the proposed ARC. Details may be found in Topical Report BAW-2346P (Attachment 4) and FTI Document 51-5006916-01 (Attachment 7).

Analysis and Testing

FTI performed a finite element analysis of the general structural behavior of the OTSGs to determine tube axial loading and tube sheet hole dilation parameters. These parameters provide input into the determination of projected leak rates based on tube location. Structural integrity of the tubes is not a concern for TECs since the TEC location within the tubesheet precludes tube burst.

Mockups were fabricated that were representative of the tube-to-tubesheet joints in the OTSGs, including the tube, original roll expansion, and seal weld. Each test tube had an Electric Discharge Machined (EDM) notch installed prior to being rolled into the tubesheet. Mockup leakage tests were performed under simulated normal operating conditions and Main Steam Line Break (MSLB) conditions. The MSLB is the limiting accident because it produces the greatest pressure differential across the tube-to-tubesheet joint and the greatest potential for primary-to-secondary leakage. The results of these leakage tests were used to determine projected leakage rates from each indication.

Leak Rates

Based on analysis and testing described in Topical Report BAW-2346P and based on DBNPS-specific transient analysis, plant-specific postulated leak rates were determined for tubes with TECs based on the radial position of the tubes. These leak rates are provided in Appendix C to FTI Document 32-5003879-03. For each TEC indication left in service, a leak rate would be assigned. The total projected leakage from all TECs would be adjusted to account for undetected TECs based on the Probability of Detection. The postulated post-accident leakage from TEC indications combined with all other leakage sources would be maintained below the accident-induced leakage limit. This assures that the accident-induced leakage performance criterion of NEI 97-06 would not be exceeded.

Inspection Technique

The eddy current technique used to support the TEC ARC must be able to determine if an axial indication near the tube end protrudes into the portion of tube adjacent to the carbon steel region of the tubesheet. Sizing of TEC indications is not required since the portion of the indication within the pressure boundary is limited to the cladding thickness and since it is conservatively assumed that the degradation is 100% through wall. Tube end examinations at the DBNPS are performed using rotating Plus Point and pancake coils. These techniques are capable of detecting TECs and the carbon steel to cladding interface.

All TEC indications remaining in service as a result of this ARC would be inspected in each planned future inspection outage in order to ensure that the requirements of the ARC remain satisfied. Consistent with NEI 97-06, an inspection of 100% of the inservice tube ends will be performed in any tubesheet where the ARC is utilized.

Growth Monitoring

For the proposed ARC, the length of an indication is not significant provided it does not extend beyond the clad-to-carbon steel interface. As documented in BAW-2346P, a growth rate study was performed that concluded that the growth rate of indication toward the clad-to-carbon steel interface was insignificant, and therefore, no adjustment in leak rate needs to be made to account for growth over an inspection cycle. Consistent with the requirements of BAW-2346P, the growth rate of the population of TECs remaining in service would be evaluated and monitored each outage.

Plant Specific Limitations

Following issuance of BAW-2346P, reanalysis of the DBNPS MSLB accident was performed. This reanalysis identified that certain axial tube loads for the DBNPS MSLB accident were greater than those used in BAW-2346P for qualification of the ARC. The effect of these higher tube loads was evaluated in FTI Document 51-5006916-01. This document concluded that the TEC ARC qualification testing and analyses remained bounding for tubes within a tubesheet radius of 54 inches. Axial tube loads and tubesheet hole dilations at a tubesheet radius greater than 54 inches are not bounded due to potential wetting of peripheral tubes by Auxiliary Feedwater. This limitation on ARC applicability would be imposed by the proposed revised repair limit definition in SR 4.4.5.4.a.7.

Conclusion

Based on the methodology provided in BAW-2346P for leaving tubes with TECs in service, the proposed amendment will assure that steam generator performance criteria will continue to be satisfied. Therefore, the proposed change will have no significant effect on nuclear safety.

5.0 REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

The proposed amendment would adopt a qualified alternate repair criteria (ARC) for axial tube end cracking (TEC) indications in the DBNPS Once-Through Steam Generator (OTSG) tubes. Specifically, the proposed amendment would revise the Technical Specification (TS) Surveillance Requirements (SR) for steam generator tube inservice inspection to include the TEC ARC. The TEC ARC would allow axially-oriented TECs in tubes with a tubesheet radius of 54 inches or less to remain in service provided certain conditions are met. The technical basis for the ARC is provided in Babcock & Wilcox Owners Group Topical Report BAW-2346P, "Alternate Repair Criteria for Tube End Cracking in the Tube-to-Tubesheet Roll Joint of Once-Through Steam Generators," dated April 1999.

An evaluation has been performed to determine whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

   Response: No.

   The proposed amendment does not increase the probability of any accident. Steam generator tube failure is an initiating condition for the steam generator tube rupture (SGTR) accident. The proposed TEC ARC does not affect the probability of an SGTR because the TEC ARC is limited to crack indications that are precluded from burst due to the presence of the tubesheet. Therefore, the proposed change does not involve a significant increase in the probability of an accident previously evaluated.

   The proposed amendment does not increase the consequences of any previously evaluated accident. Primary-to-secondary leakage affects the radiological consequences of accidents evaluated in the Updated Safety Analysis Report. The proposed amendment may result in an increase in post-accident primary-to-secondary leakage. Analyses have been performed to determine the expected post-accident leakage from each TEC left in service. The proposed amendment would impose inservice inspection and leakage assessment requirements that would ensure that the expected post-accident primary-to-secondary leakage through TECs and all other sources is maintained below the value assumed in the accident analyses. Therefore, the proposed change does not involve a significant increase in the consequences of an accident previously evaluated.

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

   Response: No.

   The proposed TEC ARC does not introduce any new failure modes or accident scenarios. Analyses have demonstrated that structural and leakage integrity is maintained for normal operating and accident conditions. Any failure of a tube from a TEC would be bounded by the SGTR analysis. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

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

   Response: No.

   The proposed amendment does not reduce the structural margin of the steam generator tubes. Structural integrity of the tube is maintained since the TEC ARC is limited to crack indications that are precluded from burst due to the presence of the tubesheet. The proposed amendment would impose inservice inspection and leakage assessment requirements that will ensure that the expected post-accident primary-to-secondary leakage through TECs and all other sources is maintained below the value assumed in the accident analyses. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, it is concluded that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is acceptable.

5.2 Applicable Regulatory Requirements/Criteria

Requirements for the DBNPS steam generator are specified, in part, in USAR Section 3D.1.10, "Criterion 14 - Reactor Coolant Pressure Boundary." USAR Section 3D.1.10 states, in part:

> The reactor coolant pressure boundary has been designed, fabricated, erected, and tested to ensure an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.

The steam generator tubes form part of the reactor coolant system pressure boundary. The proposed amendment does not affect any fabrication or erection requirements. The requirements imposed by the proposed amendment ensure that structural integrity is maintained and that primary-to-secondary leakage is maintained at acceptable levels for both post-accident and normal operating conditions. Therefore, the proposed amendment will not adversely affect the probability of abnormal leakage, of rapidly propagating failure, or of gross rupture.

USAR Section 3D.1.26, "Criterion 30 - Quality of Reactor Coolant Pressure Boundary," states, in part:

> Components which are part of the reactor coolant pressure boundary are designed, fabricated, erected, and tested to the highest quality standards practical. Means are provided for detecting and, to the extent practical, identifying the location of the source of reactor coolant leakage.

The proposed change does not alter the quality standards to which the steam generators are tested or the requirements for monitoring operational leakage. The inservice inspection requirements imposed by the propose change provide an acceptable means to identify and quantify expected post-accident leakage.

USAR Section 3D.1.28, "Criterion 32 - Inspection of Reactor Coolant Pressure Boundary," states, in part:

> Components that are part of the reactor coolant pressure boundary are designed to permit (1) periodic inspection and testing of important areas and features to assess their structural and leaktight integrity, and (2) an appropriate material surveillance program for the reactor pressure vessel.

The proposed change does not alter the design of the steam generators regarding the ability to perform periodic inspection and testing. The presence of TECs does not affect the ability to perform eddy current testing of the steam generator tubes.

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

6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 REFERENCES

1. DBNPS Operating License NPF-3, Appendix A Technical Specifications through Amendment 263.

2. DBNPS Updated Safety Analysis Report through Revision 24.

3. Babcock and Wilcox Owners Group Topical Report BAW-2346P, *Alternate Repair Criteria for Tube End Cracking in the Tube-to-Tubesheet Roll Joint of Once Through Steam Generators,* April 1999.

4. Framatome Technologies Incorporated Calculation 32-5003879-03, *OTSG Tube End Crack Leak Rate vs. Tubesheet Radius.*

5. Framatome Technologies Incorporated Calculation 51-5006916-01, *DB - Applicability of TEC ARC.*

6. Nuclear Energy Institute Document NEI 97-06, *Steam Generator Program Guidelines*, Revision 1, January 2001.

8.0 ATTACHMENTS

1. Proposed Mark-Up of Technical Specification Pages

2. Proposed Retyped Technical Specification Pages

3. Technical Specification Bases Pages

4. Proprietary Topical Report BAW-2346P, *Alternate Repair Criteria for Tube End Cracking in the Tube-to-Tubesheet Roll Joint of Once Through Steam Generators.*

5. Non-Proprietary Topical Report BAW-2346NP, *Alternate Repair Criteria for Tube End Cracking in the Tube-to-Tubesheet Roll Joint of Once Through Steam Generators.*

6. Proprietary FTI Calculation 32-5003879-03, *OTSG Tube End Crack Leak Rate vs. Tubesheet Radius.*

7. Proprietary FTI Calculation 51-5006916-01, *DB - Applicability of TEC ARC.*

PROPOSED MARK-UP
OF
TECHNICAL SPECIFICATION PAGES

(11 pages follow)

LIMITING CONDITION FOR OPERATION

3.4.5 Each Steam Generator shall be OPERABLE with a minimum water level of 18 inches and the maximum specified below as applicable:

MODES 1 and 2:

a. The acceptable operating region of Figure 3.4-5.

MODE 3*:

b. 50 inches Startup Range with the SFRCS Low Pressure Trip bypassed and one or both Main Feedwater Pump(s) capable of supplying Feedwater to any Steam Generator.

c. 96 percent Operate Range with:

1. The SFRCS Low Pressure Trip active.

   Or

2. The SFRCS Low Pressure Trip bypassed and both Main Feedwater Pumps incapable of supplying Feedwater to the Steam Generators.

MODE 4:

d. 625 inches Full Range Level

APPLICABILITY: MODES 1, 2, 3, and 4, as above.

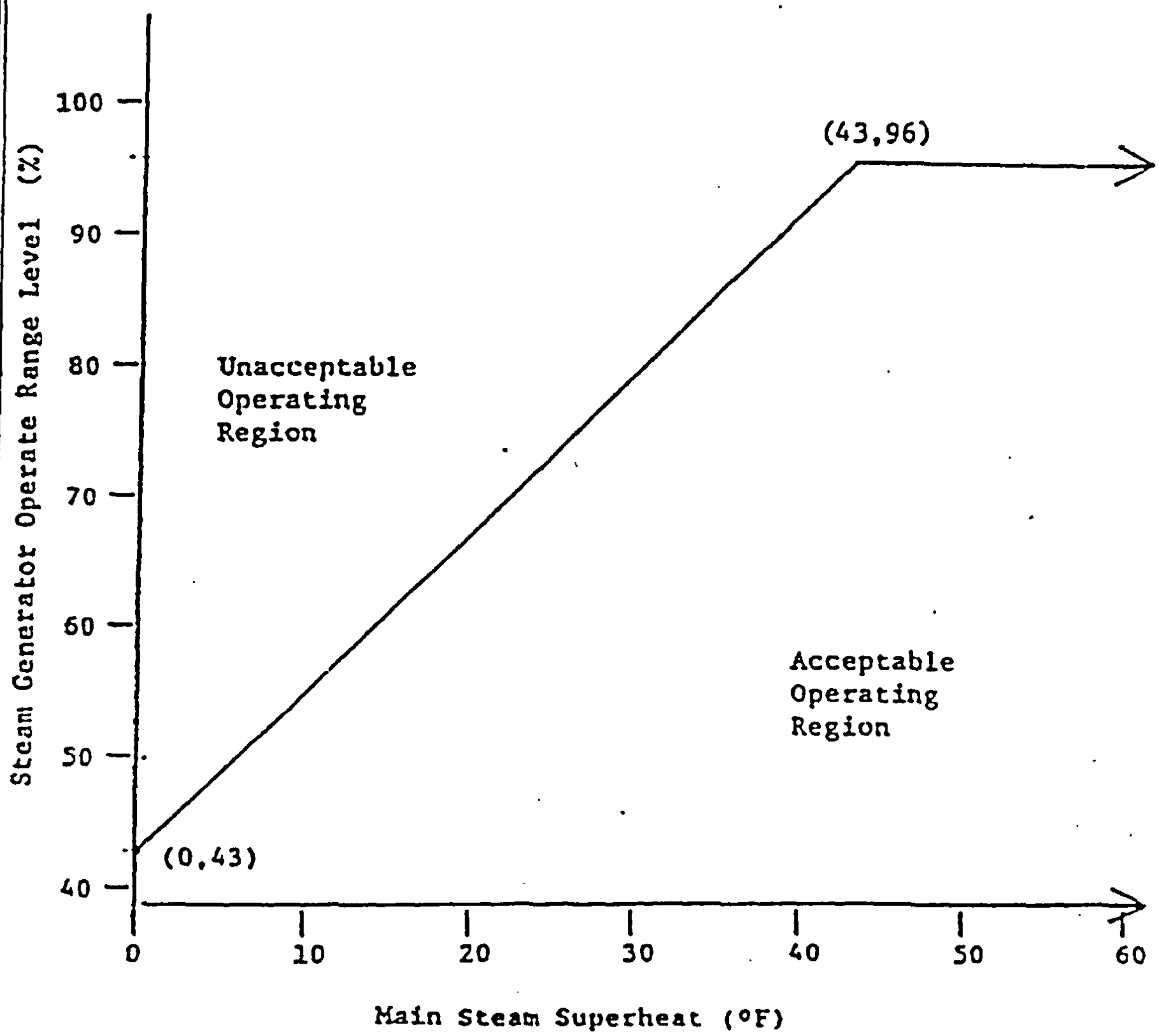
ACTION:

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

b. With one or more steam generators inoperable due to the water level being outside the limits, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the next 30 hours.

*Establish adequate SHUTDOWN MARGIN to ensure the reactor will stay subcritical during a MODE 3 Main Steam Line Break.

Figure 3.4-5
Maximum Allowable Steam Generator Level
in MODES 1 and 2



SURVEILLANCE REQUIREMENTS

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

4.4.5.1 Steam Generator Sample Selection and Inspection - Each steam generator shall be determined OPERABLE during shutdown by selecting and inspecting at least the minimum number of steam generators specified in Table 4-4.1.

4.4.5.2 Steam Generator Tube Sample Selection and Inspection - The steam generator tube minimum sample size, inspection result classification, and the corresponding action required shall be as specified in Table 4.4-2. The inservice inspection of steam generator tubes shall be performed at the frequencies specified in Specification 4.4.5.3 and the inspected tubes shall be verified acceptable per the acceptance criteria of Specification 4.4.5.4. The tubes selected for each inservice inspection shall include at least 3% of the total number of tubes in all steam generators; the tubes selected for these inspections shall be selected on a random basis except:

a. The first sample inspection during each inservice inspection of each steam generator shall include:

   1. All tubes or tube sleeves that previously had detectable wall penetrations (> 20%) and that have not been plugged, ~~or~~ repaired by repair roll or sleeving in the affected area, or left in service with axially oriented tube end cracks. (Tubes repaired by sleeving or repair roll or left in service with axially oriented tube end cracks remain available for random selection).

   2. At least 50% of the tubes inspected shall be in those areas where experience has indicated potential problems.

3. A tube inspection (pursuant to Specification 4.4.5.4.a.9.) 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.

b. Tubes in the following groups may be excluded from the first random sample if all tubes in a group in both steam generators are inspected. No credit will be taken for these tubes in meeting minimum sample size requirements.

1. Group A-1: Tubes within one, two or three rows of the open inspection lane.

2. Group A-2: Tubes having a drilled opening in the 15th support plate.

3. Group A-3: Tubes included in the rectangle bounded by rows 62 and 90 and by tubes 58 and 76, excluding tubes included in Group A-1.*

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 less than a full tube inspection provided:

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

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

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

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.

* Tubes in Group A-3 shall not be excluded after completion of the fifth refueling outage.

Notes: (1) In all inspections, previously degraded tubes must exhibit significant (> 10%) further wall penetrations to be included in the above percentage calculations.

(2) Where special inspections are performed pursuant to 4.4.5.2.b, defective or degraded tubes found as a result of the inspection shall be included in determining the Inspection Results Category for that special inspection but need not be included in determining the Inspection Results Category for the general steam generator inspection.

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

a. Inservice inspections shall be performed at intervals of not less than 12 nor more than 24 calendar months** after the previous inspection. If the results of two consecutive inspections for a given group* of tubes following service under all volatile treatment (AVT) conditions fall 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 for that group may be extended to a maximum of 40 months.

b. If the results of the inservice inspection of a steam generator performed in accordance with Table 4.4-2 at 40 month intervals for a given group* of tubes fall in Category C-3, subsequent inservice inspections shall be performed at intervals of not less than 10 nor more than 20 calendar months after the previous inspection. The increase in inspection frequency shall apply until a subsequent inspection meets the conditions specified in 4.4.5.3a and the interval can be extended to 40 months. If the Category C-3 inspection results classification is due to including new tubes with tube end cracking (TEC) indications that meet the criteria to remain in service, no increase in inspection frequency is required.

c. Additional, unscheduled inservice inspections shall be performed on each steam generator in accordance with the first sample inspection specified in Table 4.4-2 during the shutdown subsequent to any of the following conditions:

1. Primary-to-secondary tube leaks (not including leaks originating from tube-to tube sheet welds) in excess of the limits of Specification 3.4.6.2.

   If the leak is determined to be from a repair roll joint, rather than selecting a random sample, inspect 100% of the repair roll joints in the affected steam generator. If the results of this inspection fall into the C-3 category, perform additional inspections of the new roll areas in the unaffected steam generator.

*A group of tubes means:
(a) All tubes inspected pursuant to 4.4.5.2.b, or
(b) All tubes in a steam generator less those inspected pursuant to 4.4.5.2.b.

**An exception applies for the interval following the March 2002 inspection completed during the Thirteenth Refueling Outage. Under this exception, the next inservice inspection may be delayed until March 31, 2005.

If the leak is determined to be from TEC degradation, 100% of the tubes in the affected tubesheet shall be examined in the location of the TEC.

2. A seismic occurrence greater than the Operating Basis Earthquake.

3. A loss-of-coolant accident requiring actuation of the engineered safeguards.

4. A main steam line or feedwater line break.

d. The provisions of Specification 4.0.2 are not applicable.

4.4.5.4 Acceptance Criteria

a. As used in this Specification:

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

2. 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.

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

4. Degraded Tube means a tube containing imperfections ≥ 20% of the nominal wall thickness caused by degradation that has not been repaired by repair roll or sleeving in the affected area.

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

6. Defect means an imperfection of such severity that it exceeds the repair limit. A defective tube is a tube containing a defect that has not been repaired by repair roll or sleeving in the affected area or a sleeved tube that has a defect in the sleeve.

7. Repair Limit means the imperfection depth at or beyond which the tube shall be removed from service by plugging or repaired by repair roll or sleeving in the affected area because it may become unserviceable prior to the next inspection and is equal to 40% of the nominal tube wall thickness. The process described in Topical Report BAW-2120P will be used for sleeving. Axially-oriented TEC indications in the tube that do not extend beyond the adjacent cladding portion of the tubesheet into the carbon steel portion are not included in this definition provided the tube is located at a tubesheet radius of 54 inches or less. These indications shall be assessed for continued plant operation in accordance with topical report BAW-2346P, dated April 1999.

(Continued) 7. The repair roll process used is described in the Topical Report BAW-2303P, Revision 4. The new roll area must be free of degradation in order for the repair to be considered acceptable.

8. 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 4.4.5.3.c, above.

9. Tube Inspection means an inspection of the steam generator tube from the point of entry completely to the point of exit. The previously existing tube and tube roll, outboard of the new roll area in the tube sheet, can be excluded from future periodic inspection requirements because it is no longer part of the pressure boundary once the repair roll is installed.

~~10. Preservice Inspection means an inspection of the full length of each tube in each steam generator performed by eddy current techniques prior to service to establish a baseline condition of the tubing. This inspection shall be performed prior to initial POWER OPERATION using the equipment and techniques expected to be used during subsequent inservice inspections.~~

~~11. Tube End Cracks (TEC) are those crack-like eddy current indications, circumferentially and/or axially oriented, that are within the Inconel clad region of the primary face of the upper and lower tubesheets, but do not extend into the carbon steel to Inconel clad interface.~~

~~10. Preservice Inspection means an inspection of the full length of each tube in each steam generator performed by eddy current techniques prior to service to establish a baseline condition of the tubing. This inspection shall be performed prior to initial POWER OPERATION using the equipment and techniques expected to be used during subsequent inservice inspections.~~

b. The steam generator shall be determined OPERABLE after completing the corresponding actions (plug or repair by repair roll or sleeving in the affected areas all tubes exceeding the repair limit and all tubes containing through-wall cracks) required by Table 4.4-2.

4.4.5.5 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 submitted on an annual basis in a report for the period in which this 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, sleeved or repair rolled.

   4. Number of tubes with axially oriented TEC indications left in service, the projected accident leakage, and an assessment of growth for TEC indications.

c. Results of steam generator tube inspections which fall into Category C-3 and require notification of the Commission shall be reported 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.

4.4.5.6 The steam generator shall be demonstrated OPERABLE by verifying steam generator level to be within limits at least once per 12 hours.

4.4.5.7 When steam generator tube inspection is performed as per Section 4.4.5.2, an additional but totally separate inspection shall be performed on special interest peripheral tubes in the vicinity of the secured internal auxiliary feedwater header. This testing shall only be required on the steam generator selected for inspection, and the test shall require inspection only between the upper tube sheet and the 15th tube support plate. The tubes selected for inspection shall represent the entire circumference of the steam generator and shall total at least 150 peripheral tubes.

~~the upper tube sheet and the 15th tube support plate. The tubes selected for inspection shall represent the entire circumference of the steam generator and shall total at least 150 peripheral tubes.~~

4.4.5.8 Visual inspections of the secured internal auxiliary feedwater header, header to shroud attachment welds, and the external header thermal sleeves shall be performed on each steam generator through the auxiliary feedwater injection penetrations.

These inspections of the secured internal auxiliary feedwater header, header to shroud attachment welds, and the external header thermal sleeves shall be performed during the third period of each ten-year Inservice Inspection Interval (ISI).

4.4.5.9 When steam generator tube inspection is performed as per Section 4.4.5.2, an additional but totally separate inspection shall be performed on special interest tubes that have been repaired by the repair roll process. This inspection shall be performed on 100% of the tubes that have been repaired by the repair roll process. The inspection shall be limited to the repair roll joint and the roll transitions of the repair roll. Defective or degraded tubes found in the repair roll region as a result of the inspection need not be included in determining the Inspection Results Category for the general steam generator inspection.

4.4.5.10 When steam generator tube inspection is performed as per Section 4.4.5.2, an additional but totally separate inspection shall be performed on 100% of the tubes with in-service TECs that were identified during previous inspections. The inspection shall be limited to the portion of the tube with the TEC and must be performed using an eddy current detection technique demonstrated to be capable of detecting TEC. The inspection data for tubes with axially oriented TEC indications shall be compared to the previous inspection data to monitor the indications for growth.

TABLE 4.4-1

MINIMUM NUMBER OF STEAM GENERATORS TO BE INSPECTED DURING INSERVICE INSPECTION

Preservice Inspection	No			Yes		
No. of Steam Generators per Unit	Two	Three	Four	Two	Three	Four
First Inservice Inspection	All			One	Two	Two
Second & Subsequent Inservice Inspections	One[1]			One[1]	One[2]	One[3]

Table Notation:

1. The inservice inspection may be limited to one steam generator on a rotating schedule encompassing 3 N % of the tubes (where N is the number of steam generators in the plant) if the results of the first or previous inspections 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.

2. The other steam generator not inspected during the first inservice inspection shall be inspected. The third and subsequent inspections should follow the instructions described in 1 above.

3. Each of the other two steam generators not inspected during the first inservice inspections shall be inspected during the second and third inspections. The fourth and subsequent inspections shall follow the instructions described in 1 above.

TABLE 4.4-2
STEAM GENERATOR TUBE INSPECTION

1ST SAMPLE INSPECTION			2ND SAMPLE INSPECTION		3RD SAMPLE INSPECTION	
Sample Size	Result	Action Required	Result	Action Required	Result	Action Required
A minimum of S Tubes per S.G. (1)	C-1	None	N/A	N/A	N/A	N/A
	C-2	Plug or repair by repair rolling or sleeving defective tubes and inspect additional 2S tubes in this S.G.	C-1	None	N/A	N/A
			C-2	Plug or repair by repair rolling or sleeving defective tubes and inspect additional 4S tubes in this S.G.	C-1	None
					C-2	Plug or repair by repair rolling or sleeving 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 by repair rolling or sleeving defective tubes and inspect 2S tubes in each other S.G. Report to the NRC prior to resumption of plant operation.	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 or repair by repair rolling or sleeving defective tubes. Report to the NRC prior to resumption of plant operation.	N/A	N/A

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

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Attachment 2

PROPOSED RETYPED
TECHNICAL SPECIFICATION PAGES

(6 pages follow)

REACTOR COOLANT SYSTEM

STEAM GENERATORS

SURVEILLANCE REQUIREMENTS

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

4.4.5.1 Steam Generator Sample Selection and Inspection - Each steam generator shall be determined OPERABLE during shutdown by selecting and inspecting at least the minimum number of steam generators specified in Table 4-4.1.

4.4.5.2 Steam Generator Tube Sample Selection and Inspection - The steam generator tube minimum sample size, inspection result classification, and the corresponding action required shall be as specified in Table 4.4-2. The inservice inspection of steam generator tubes shall be performed at the frequencies specified in Specification 4.4.5.3 and the inspected tubes shall be verified acceptable per the acceptance criteria of Specification 4.4.5.4. The tubes selected for each inservice inspection shall include at least 3% of the total number of tubes in all steam generators; the tubes selected for these inspections shall be selected on a random basis except:

a. The first sample inspection during each inservice inspection of each steam generator shall include:

   1. All tubes or tube sleeves that previously had detectable wall penetrations (> 20%) and that have not been plugged, repaired by repair roll or sleeving in the affected area, or left in service with axially oriented tube end cracks. (Tubes repaired by sleeving or repair roll or left in service with axially oriented tube end cracks remain available for random selection).

   2. At least 50% of the tubes inspected shall be in those areas where experience has indicated potential problems.

SURVEILLANCE REQUIREMENTS (Continued)

Notes: (1) In all inspections, previously degraded tubes must exhibit significant (> 10%) further wall penetrations to be included in the above percentage calculations.

(2) Where special inspections are performed pursuant to 4.4.5.2.b, defective or degraded tubes found as a result of the inspection shall be included in determining the Inspection Results Category for that special inspection but need not be included in determining the Inspection Results Category for the general steam generator inspection.

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

a. Inservice inspections shall be performed at intervals of not less than 12 nor more than 24 calendar months** after the previous inspection. If the results of two consecutive inspections for a given group* of tubes following service under all volatile treatment (AVT) conditions fall 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 for that group may be extended to a maximum of 40 months.

b. If the results of the inservice inspection of a steam generator performed in accordance with Table 4.4-2 at 40 month intervals for a given group* of tubes fall in Category C-3, subsequent inservice inspections shall be performed at intervals of not less than 10 nor more than 20 calendar months after the previous inspection. The increase in inspection frequency shall apply until a subsequent inspection meets the conditions specified in 4.4.5.3a and the interval can be extended to 40 months. If the Category C-3 inspection results classification is due to including new tubes with tube end cracking (TEC) indications that meet the criteria to remain in service, no increase in inspection frequency is required.

c. Additional, unscheduled inservice inspections shall be performed on each steam generator in accordance with the first sample inspection specified in Table 4.4-2 during the shutdown subsequent to any of the following conditions:

1. Primary-to-secondary tube leaks (not including leaks originating from tube-to tube sheet welds) in excess of the limits of Specification 3.4.6.2.

If the leak is determined to be from a repair roll joint, rather than selecting a random sample, inspect 100% of the repair roll joints in the affected steam generator. If the results of this inspection fall into the C-3 category, perform additional inspections of the new roll areas in the unaffected steam generator.

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*A group of tubes means:
(a) All tubes inspected pursuant to 4.4.5.2.b, or
(b) All tubes in a steam generator less those inspected pursuant to 4.4.5.2.b.

**An exception applies for the interval following the March 2002 inspection completed during the Thirteenth Refueling Outage. Under this exception, the next inservice inspection may be delayed until March 31, 2005.

If the leak is determined to be from TEC degradation, 100% of the tubes in the affected tubesheet shall be examined in the location of the TEC.

2. A seismic occurrence greater than the Operating Basis Earthquake.

3. A loss-of-coolant accident requiring actuation of the engineered safeguards.

4. A main steam line or feedwater line break.

d. The provisions of Specification 4.0.2 are not applicable.

4.4.5.4 Acceptance Criteria

a. As used in this Specification:

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

2. 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.

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

4. Degraded Tube means a tube containing imperfections ≥ 20% of the nominal wall thickness caused by degradation that has not been repaired by repair roll or sleeving in the affected area.

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

6. Defect means an imperfection of such severity that it exceeds the repair limit. A defective tube is a tube containing a defect that has not been repaired by repair roll or sleeving in the affected area or a sleeved tube that has a defect in the sleeve.

7. Repair Limit means the imperfection depth at or beyond which the tube shall be removed from service by plugging or repaired by repair roll or sleeving in the affected area because it may become unserviceable prior to the next inspection and is equal to 40% of the nominal tube wall thickness. The process described in Topical Report BAW-2120P will be used for sleeving. Axially-oriented TEC indications in the tube that do not extend beyond the adjacent cladding portion of the tubesheet into the carbon steel portion are not included in this definition provided the tube is located at a tubesheet radius of 54 inches or less. These indications shall be assessed for continued plant operation in accordance with topical report BAW-2346P, dated April 1999.

(Continued) 7. The repair roll process used is described in the Topical Report BAW-2303P, Revision 4. The new roll area must be free of degradation in order for the repair to be considered acceptable.

8. 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 4.4.5.3.c, above.

9. Tube Inspection means an inspection of the steam generator tube from the point of entry completely to the point of exit. The previously existing tube and tube roll, outboard of the new roll area in the tube sheet, can be excluded from future periodic inspection requirements because it is no longer part of the pressure boundary once the repair roll is installed.

10. Preservice Inspection means an inspection of the full length of each tube in each steam generator performed by eddy current techniques prior to service to establish a baseline condition of the tubing. This inspection shall be performed prior to initial POWER OPERATION using the equipment and techniques expected to be used during subsequent inservice inspections.

11. Tube End Cracks (TEC) are those crack-like eddy current indications, circumferentially and/or axially oriented, that are within the Inconel clad region of the primary face of the upper and lower tubesheets, but do not extend into the carbon steel to Inconel clad interface.

b. The steam generator shall be determined OPERABLE after completing the corresponding actions (plug or repair by repair roll or sleeving in the affected areas all tubes exceeding the repair limit and all tubes containing through-wall cracks) required by Table 4.4-2.

4.4.5.5 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 submitted on an annual basis in a report for the period in which this 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, sleeved or repair rolled.

   4. Number of tubes with axially oriented TEC indications left in service, the projected accident leakage, and an assessment of growth for TEC indications.

c. Results of steam generator tube inspections which fall into Category C-3 and require notification of the Commission shall be reported 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.

4.4.5.6 The steam generator shall be demonstrated OPERABLE by verifying steam generator level to be within limits at least once per 12 hours.

4.4.5.7 When steam generator tube inspection is performed as per Section 4.4.5.2, an additional but totally separate inspection shall be performed on special interest peripheral tubes in the vicinity of the secured internal auxiliary feedwater header. This testing shall only be required on the steam generator selected for inspection, and the test shall require inspection only between the upper tube sheet and the 15th tube support plate. The tubes selected for inspection shall represent the entire circumference of the steam generator and shall total at least 150 peripheral tubes.

4.4.5.8 Visual inspections of the secured internal auxiliary feedwater header, header to shroud attachment welds, and the external header thermal sleeves shall be performed on each steam generator through the auxiliary feedwater injection penetrations.

These inspections of the secured internal auxiliary feedwater header, header to shroud attachment welds, and the external header thermal sleeves shall be performed during the third period of each ten-year Inservice Inspection Interval (ISI).

4.4.5.9 When steam generator tube inspection is performed as per Section 4.4.5.2, an additional but totally separate inspection shall be performed on special interest tubes that have been repaired by the repair roll process. This inspection shall be performed on 100% of the tubes that have been repaired by the repair roll process. The inspection shall be limited to the repair roll joint and the roll transitions of the repair roll. Defective or degraded tubes found in the repair roll region as a result of the inspection need not be included in determining the Inspection Results Category for the general steam generator inspection.

4.4.5.10 When steam generator tube inspection is performed as per Section 4.4.5.2, an additional but totally separate inspection shall be performed on 100% of the tubes with in-service TECs that were identified during previous inspections. The inspection shall be limited to the portion of the tube with the TEC and must be performed using an eddy current detection technique demonstrated to be capable of detecting TEC. The inspection data for tubes with axially oriented TEC indications shall be compared to the previous inspection data to monitor the indications for growth.

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Attachment 3

TECHNICAL SPECIFICATION BASES PAGES

(3 pages follow)

Note: The Bases pages are provided for information only.

3/4.4.4 PRESSURIZER

A steam bubble in the pressurizer ensures that the RCS is not a hydraulically solid system and is capable of accommodating pressure surges during operation. The steam bubble also protects the pressurizer code safety valves and pilot operated relief valve against water relief.

The low level limit is based on providing enough water volume to prevent the low level interlock from de-energizing the pressurizer heaters during steady state operations. The high level limit is based on providing enough steam volume to prevent water relief through the pressurizer relief valves during the most challenging anticipated pressurizer insurge transient, which is a loss of feedwater. Since prevention of water relief is a goal for abnormal transient operation, rather than a Safety Limit, the value for high pressurizer level is nominal and is not adjusted for instrument error.

The ACTION statement provides 1 hour to restore pressurizer level prior to requiring shutdown. The 1-hour completion time is considered to be a reasonable time for restoring pressurizer level to within limits.

The pilot operated relief valve and steam bubble function to relieve RCS pressure during all design transients. Operation of the pilot operated relief valve minimizes the undesirable opening of the spring-loaded pressurizer code safety valves.

3/4.4.5 STEAM GENERATORS

The Surveillance Requirements for inspection of the steam generator tubes ensure that the structural integrity of this portion of the RCS will be maintained. The program for inservice inspection of steam generator tubes is based on a modification of Regulatory Guide 1.83, Revision 1. Inservice inspection of steam generator tubing is essential in order to maintain surveillance of the conditions of the tubes in the event that there is evidence of mechanical damage or progressive degradation due to design, manufacturing errors, or inservice conditions that lead to corrosion. Inservice inspection of steam generator tubing also provides a means of characterizing the nature and cause of any tube degradation so that corrective measures can be taken. A process equivalent to the inspection method described in Topical Report BAW-2120P will be used for inservice inspection of steam generator tube sleeves. This inspection will provide ensurance of RCS integrity.

The plant is expected to be operated in a manner such that the secondary coolant will be maintained within those chemistry limits found to result in negligible corrosion of the steam generator tubes. If the secondary coolant chemistry is not maintained within these chemistry limits, localized corrosion may likely result in stress corrosion cracking. The extent of cracking during plant operation would be limited by the limitation of steam generator tube leakage between the primary coolant system and the secondary coolant system (primary-to-secondary leakage = 150 GPD through any one steam generator). Cracks having a primary-to-secondary leakage less than this limit during operation will have an adequate margin of safety to withstand the loads imposed during normal operation and by postulated accidents. Operating plants have demonstrated that primary-to-secondary leakage of 150 GPD can be detected by monitoring the secondary coolant. Leakage in excess of this limit will require plant shutdown and an unscheduled inspection, during which the leaking tubes will be located and plugged or repaired by repair rolling or sleeving in the affected areas.

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. As described in Topical Report BAW-2120P, degradation as small as 20% through wall can be detected in all areas of a tube sleeve except for the roll expanded areas and the sleeve end, where the limit of detectability is 40% through wall. Tubes with imperfections exceeding the repair limit of 40% of the nominal wall thickness will be plugged or repaired by repair rolling or sleeving the affected areas. Davis-Besse will evaluate, and as appropriate implement, better testing methods which are developed and validated for commercial use so as to enable detection of degradation as small as 20% through wall without exception. Until such time as 20% penetration can be detected in the roll expanded areas and the sleeve end, inspection results will be compared to those obtained during the baseline sleeved tube inspection.

An additional repair method for degraded steam generator tubes consists of rerolling the tubes in the tubesheet to create a new roll area and pressure boundary for the tube. The repair roll process will ensure that the area of degradation will not serve as a pressure boundary, thus permitting the tube to remain in service. The degraded area of the tube can be excluded from future periodic inspection requirements because it is no longer part of the pressure boundary once the repair roll is installed in the tubesheet.

All tubes which have been repaired using the repair roll process will have the new roll area inspected during the inservice inspection. Defective or degraded tube indications found in the new roll area as a result of the inspection of the repair roll and any indications found in the originally rolled region of the rerolled tube need not be included in determining the Inspection Results Category for the general steam generator inspection.

The repair roll process will be performed as described in the Topical Report BAW-2303P, Revision 4. The new roll area must be free of degradation in order for the repair to be considered acceptable. After the new roll area is initially deemed acceptable, future degradation in the new roll area will be analyzed to determine if the tube is defective and needs to be removed from service. Leakage from repair rolls will be accounted for to ensure post-accident primary-to-secondary leakage will not exceed that assumed in the safety analyses.

Whenever the results of any steam generator tubing inservice inspection fall into Category C-3, these results shall be reported to the Commission prior to resumption of plant operation. Such cases will be considered by the Commission on a case-by-case basis and may result in a requirement for analysis, laboratory examinations, tests, additional eddy-current inspection, and revision of the Technical Specifications, if necessary.

The steam generator water level limits are consistent with the initial assumptions in the USAR. While in MODE 3, examples of Main Feedwater Pumps that are incapable of supplying feedwater to the Steam Generators are tripped pumps or a manual valve closed in the discharge flowpath. The reactivity requirements to ensure adequate SHUTDOWN MARGIN are provided in plant operating procedures.

The steam generator minimum water level requirement is met by verifying the indicated steam generator level is greater than or equal to the value that corresponds to the required actual minimum level above the tubesheet.

Tubes in service with axially oriented tube end crack (TEC) indications may remain in service provided they are analyzed and determined to meet criteria established in Topical Report BAW-2346P, April 1999. The TEC ARC assures the combined postulated accident-induced primary-to-secondary leakage from TECs and all other sources is maintained below the accident induced leakage limit of one gallon per minute.

Docket Number 50-346
License Number NPF-3
Serial Number 3133
Enclosure 2

Affidavit Supporting Request to Withhold BAW-2346 P, FTI Calculation 32-5003879-03, and FTI Calculation 51-5006916-01 from Public Disclosure

(3 Pages Follow)

AFFIDAVIT

COMMONWEALTH OF VIRGINIA)
) ss.
CITY OF LYNCHBURG)

1. My name is Gayle F. Elliott. I am Manager, Product Licensing in Regulatory Affairs, for Framatome ANP ("FANP"), and as such I am authorized to execute this Affidavit.

2. I am familiar with the criteria applied by FANP to determine whether certain FANP information is proprietary. I am familiar with the policies established by FANP to ensure the proper application of these criteria.

3. I am familiar with BAW-2346P, "Alternate Repair Criteria for Tube End Cracking in the Tube-to-Tubesheet Rolled Joint of Once Through Steam Generators," dated April 1999; 51-5006916-01, "DB-Applicability of TEC ARC," dated December 2000; 32-5003879-03, "OTSG Tube End Crack Leak Rate vs. Tubesheet Radius," dated November 1999 and referred to herein as "Documents." Information contained in these Documents has been classified by FANP as proprietary in accordance with the policies established by FANP for the control and protection of proprietary and confidential information.

4. These Documents contain information of a proprietary and confidential nature and are of the type customarily held in confidence by FANP and not made available to the public. Based on my experience, I am aware that other companies regard information of the kind contained in these Documents as proprietary and confidential.

5. These Documents have been made available to the U.S. Nuclear Regulatory Commission in confidence with the request that the information contained in this Document be withheld from public disclosure.

6. The following criteria are customarily applied by FANP to determine whether information should be classified as proprietary:

(a) The information reveals details of FANP's research and development plans and programs or their results.

(b) Use of the information by a competitor would permit the competitor to significantly reduce its expenditures, in time or resources, to design, produce, or market a similar product or service

(c) The information includes test data or analytical techniques concerning a process, methodology, or component, the application of which results in a competitive advantage for FANP.

(d) The information reveals certain distinguishing aspects of a process, methodology, or component, the exclusive use of which provides a competitive advantage for FANP in product optimization or marketability.

(e) The information is vital to a competitive advantage held by FANP, would be helpful to competitors to FANP, and would likely cause substantial harm to the competitive position of FANP.

7. In accordance with FANP's policies governing the protection and control of information, proprietary information contained in this Document have been made available, on a limited basis, to others outside FANP only as required and under suitable agreement providing for nondisclosure and limited use of the information.

8. FANP policy requires that proprietary information be kept in a secured file or area and distributed on a need-to-know basis.

9. The foregoing statements are true and correct to the best of my knowledge, information, and belief.

SUBSCRIBED before me this 15th

day of April, 2005.

Danita R. Kidd
NOTARY PUBLIC, COMMONWEALTH OF VIRGINIA
MY COMMISSION EXPIRES: 12/31/08

Danita R. Kidd
NOTARY PUBLIC
Commonwealth of VA
Comm. Expires: 12-31-08

Docket Number 50-346
License Number NPF-3
Serial Number 3133
Enclosure 3

COMMITMENT LIST

The following list identifies those actions committed to by the Davis-Besse Nuclear Power Station (DBNPS) in this document. Any other actions discussed in the submittal represent intended or planned actions by the DBNPS. They are described only for information and are not regulatory commitments. Please notify the Supervisor – Fleet Licensing (330-315-6944) of any questions regarding this document or any associated regulatory commitments.

COMMITMENTS	DUE DATE
Consistent with NEI 97-06, an inspection of 100% of the inservice tube ends will be performed in any tubesheet where the ARC is utilized.	N/A