



Crystal River Nuclear Plant
Docket No. 50-302
Operating License No. DPR-72

Ref: 10 CFR 50.90

August 12, 2005
3F0805-06

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

Subject: Crystal River Unit 3 – License Amendment Request #290, Revision 1
Probabilistic Methodology to Determine the Contribution to Main Steam Line Break
Leakage Rates for the Once-Through Steam Generator from the Tube End Crack
Alternate Repair Criteria

Reference: PEF to NRC letter dated January 27, 2005, Crystal River Unit 3 – License Amendment
Request #290, Revision 0, “Probabilistic Methodology to Determine the Contribution
to Main Steam Line Break Leakage Rates for the Once-Through Steam Generator from
the Tube End Crack Alternate Repair Criteria”

Dear Sir:

Florida Power Corporation, doing business as Progress Energy Florida, Inc. (PEF), hereby submits
License Amendment Request (LAR) #290, Revision 1. This Revision to LAR #290 proposes to
incorporate Crystal River Unit 3 (CR-3) specific Addenda B and C to BAW-2346P, Revision 0 into
the CR-3 Improved Technical Specification (ITS) 5.6.2.10.2.f.

Attachments A and B have been updated to discuss the proposed ITS change provided in
Attachments C (shadowed format) and D (revision bar format). CR-3 considers that the No
Significant Hazards Consideration Determination conclusion provided in LAR #290, Revision 0,
does not need to be re-noticed in the Federal Register due to the inclusion of Addenda B and C into
the CR-3 ITS.

This LAR is proposing to utilize a probabilistic methodology to determine the contribution to Main
Steam Line Break (MSLB) leakage rates for the Once-Through Steam Generator (OTSG) from the
Tube End Crack (TEC) Alternate Repair Criteria (ARC) described in CR-3 Improved Technical
Specifications (ITS) 5.6.2.10.2.f. The probabilistic methodology is being provided in Attachment E
as Addendum B to Topical Report BAW-2346P, Revision 0.

Attachment F to this submittal contains Addendum C to Topical Report 2346P, Revision 0, which
provides the method for projecting the TEC leakage that may develop during the next operating
cycle. This method will be applied to each subsequent operating cycle after inspection results are
obtained from the previous operating cycle.

A001

Progress Energy Florida, Inc.
Crystal River Nuclear Plant
15760 W. Powerline Street
Crystal River, FL 34428

*Encl does not contain
prop info per Am*

Attachment G provides the CR-3 response to an NRC Request for Additional Information (RAI) regarding LAR #290. The RAI was provided to CR-3 by electronic mail and was discussed with the NRC staff on July 7, 2005.

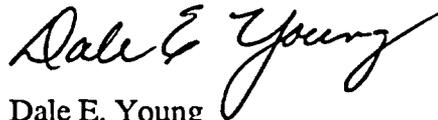
PEF respectfully requests NRC review of LAR #290, Revision 1, be performed to support an approval date of October 1, 2005.

This letter establishes no new regulatory commitments.

The CR-3 Plant Nuclear Safety Committee has reviewed this request and recommended it for approval.

If you have any questions regarding this submittal, please contact Mr. Sid Powell, Supervisor, Licensing and Regulatory Programs at (352) 563-4883.

Sincerely,



Dale E. Young
Vice President
Crystal River Nuclear Plant

DEY/lvc

Attachments:

- A. Background, Description of Proposed Change, Reason for Request and Evaluation of Request
- B. Regulatory Analysis (No Significant Hazards Consideration Determination, Applicable Regulatory Requirements and Environmental Impact Evaluation)
- C. Proposed Improved Technical Specification Page – Shadowed format
- D. Proposed Improved Technical Specification Page – Revision Bar Format
- E. Addendum B Dated August 10, 2005 to Topical Report BAW-2346P, Revision 0, Probabilistic Leakage Assessment of Crystal River Unit 3 Steam Generator (SG) Tube End Cracks
- F. Addendum C Dated August 12, 2005 to Topical Report BAW-2346P, Revision 0
- G. Response to Request for Additional Information (RAI) Regarding License Amendment Request #290, Revision 0

xc: NRR Project Manager
Regional Administrator, Region II
Senior Resident Inspector

STATE OF FLORIDA

COUNTY OF CITRUS

Dale E. Young states that he is the Vice President, Crystal River Nuclear Plant for Florida Power Corporation, doing business as Progress Energy Florida, Inc.; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission the information attached hereto; and that all such statements made and matters set forth therein are true and correct to the best of his knowledge, information, and belief.


Dale E. Young
Vice President
Crystal River Nuclear Plant

The foregoing document was acknowledged before me this 12 day of August, 2005, by Dale E. Young.



Signature of Notary Public
State of Florida



(Print, type, or stamp Commissioned
Name of Notary Public)

Personally Known -OR- Produced Identification

PROGRESS ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302/LICENSE NUMBER DPR-72

ATTACHMENT A

LICENSE AMENDMENT REQUEST #290, REVISION 1

**Background, Description of Proposed Change, Reason for Request and
Evaluation of Request**

Background

On October 1, 1999, the NRC issued License Amendment No. 188 for Crystal River Unit 3 (CR-3) approving an alternate repair criteria to be applied to steam generator tubes with crack-like indications within the upper and lower tubesheet areas. The technical basis for the alternate repair criteria is contained in a Babcock and Wilcox Owners Group topical report, "Alternate Repair Criteria for Tube End Cracking in the Tube-to-Tubesheet Roll Joint of Once Through Steam Generators," BAW-2346P, Revision 0 (Proprietary).

The leakage integrity of the steam generator tubes was demonstrated in the topical report by leak testing. Before leak testing, a finite element model to analyze structural behavior of the tubes was used to determine test parameters that would give the least tight test roll joints, which in turn would give maximum possible leak rates in the leakage tests.

Topical Report BAW-2346P, Revision 0, specifies a number of requirements and limitations in order to implement the alternate repair criteria on tubes having Tube End Crack indications (TEC). Calculation of the combined total leakage from all primary-to-secondary sources, including TEC indications left in service, is one of the requirements contained in the topical report. The approved Alternate Repair Criteria (ARC) required that the combined total leakage from all primary-to-secondary sources, including TEC indications left in service, shall not exceed the main steam line break (MSLB) accident leakage limit (one gallon per minute for CR-3) minus operational leakage (150 gallons per day per steam generator). For tubes with multiple indications, a separate leak rate for each indication must be used.

The current CR-3 TEC leakage assessment is based on a deterministic relationship of tube location in the bundle (tubesheet radius) and tubesheet hole dilation during a Main Steam Line Break (MSLB) event. Probabilistic estimates plus actual tube loading are more realistic and provide better predictions for actual leakage.

The condition monitoring evaluation performed as part of the steam generator inspection conducted during Refueling Outage 13 (October 2003), identified the postulated leakage from the as-found indications did exceed the MSLB limit. CR-3 reported that condition in LER 50-302/2004-004-00.

Use of the probabilistic method and actual tube loading will result in increased margin to total MSLB leakage. The increased margin in combination with a more conservative method to project TEC leakage for the subsequent cycle (Attachment F) will ensure future CR-3 MSLB leakage results remain within required ITS limits.

The actual operating primary-to-secondary leakage values for CR-3 are significantly under the 5 gallon per day threshold limit from the Electrical Power Research Institute (EPRI) Primary-to-Secondary Leak Guidelines.

Description of the Proposed License Amendment Request

License Amendment Request (LAR) #290, Revision 1, is proposing to utilize a probabilistic methodology to determine the contribution to the MSLB leakage rates for the Once-Through Steam Generator (OTSG) from the TEC ARC described in the CR-3 Improved Technical Specifications (ITS) 5.6.2.10.2.f. Attachment E to this submittal contains Addendum B to Topical Report 2346P, Revision 0, which is the basis of the proposed probabilistic methodology.

Attachment F to this submittal contains Addendum C to Topical Report 2346P, Revision 0, which provides the method and the technical justification for projecting the TEC leakage that may develop during the next operating cycle following each inservice inspection of the CR-3 OTSGs.

This LAR revision involves a change to ITS 5.6.2.10.2.f to incorporate the methodologies of Addenda B and C which are provided in Attachments E and F of this submittal.

The methodology change for TEC leakage calculation proposed in this LAR, and provided in Addendum B, utilizes the same probabilistic process approved by the NRC Generic Letter (GL) 95-05, "Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking."

Description of the Proposed ITS 5.6.2.10.2.f Text Change

The following text will be added to ITS 5.6.2.10.2.f to incorporate the methodologies in Addenda B and C:

"The contribution to MSLB leakage rates from TEC indications shall be determined utilizing the methodology in Addendum B dated August 10, 2005 to Topical Report BAW-2346P, Revision 0. The projection of TEC leakage that may develop during the next operating cycle shall be determined using the methodology in Addendum C dated August 12, 2005 to Topical Report BAW-2346P, Revision 0."

Reason for Request

The process described in Topical Report BAW-2346P, Revision 0, and approved in License Amendment No. 188 for calculating leakage and currently used by CR-3 uses a very conservative, deterministic method. CR-3 is seeking approval for a leakage calculation method (Addendum B, Attachment E of this submittal) which removes some of the excessive conservatism inherent in the current approach while providing conservative results at a high level of confidence. The process described in Topical Report BAW-2346P, Revision 0, does not include the method to project the TEC leakage that may develop during the next operating cycle other than accounting for POD of undetected indications. CR-3 is providing this method and its technical justification in Addendum C (Attachment F of this submittal).

Evaluation of Request

Current TEC Leak Rate Calculation Methodology

Tubesheet distortion caused by differential thermal and pressure effects during a MSLB alters the tightness of the roll expanded tube-to-tubesheet joint. During the initial development of BAW-2346P, Revision 0, finite element analyses were performed to conservatively determine key parameters including joint tightness and axial tube load under MSLB conditions. It was determined that joint tightness and axial tube load vary with the distance from the center of the tubesheet. Consequently, a number of concentric tubesheet zones were defined for use in determining TEC leakage based upon the tightness of the joint.

A series of bounding leak tests using 100% through-wall (TW) Electrical Discharge Machined (EDM) notches confirmed that there is a correlation between leakage and joint tightness. Based upon the leakage tests and the defined zones, a leakage value was assigned to all tubes within each zone. The assigned value is the maximum leakage for any tube within that zone. Under the current leakage calculation method, each TEC within a particular zone is assigned that zone's leakage value. The total leakage for all zones is the estimated OTSG leakage resulting from TEC under MSLB conditions.

This approach conservatively assumes that every TEC has perforated the tube wall and will leak, when in fact, many TEC have not advanced to that depth. It also conservatively assumes that multiple TEC within a particular tube will each contribute to the overall TEC leakage, when in fact, the leakage from a tube is limited not by the number of cracks present but by the tightness of the joint. Finally, it assumes that the axial tube load applied during the tests was representative of the load which would occur during a CR-3 MSLB, while the CR-3 MSLB loads are much lower than the tests. These assumptions yield very conservative leakage estimates.

The initial submittal of LAR #249, Revision 0, indicated that CR-3 would use specific leak rates for CR-3 based on the MSLB tube loads. These were to be included in an addendum to BAW-2346P. Addendum A was submitted on May 28, 1999. The submittal stated that the Addendum included the CR-3 plant specific MSLB tube loads. In actuality, the Addendum leak rates were partially based upon the bounding laboratory test results with an applied axial load of 3,060 pounds. The increased effect of this laboratory applied axial load on tube tubesheet hole dilation (i.e., change from round to oval) has been neglected in Topical Report BAW-2346P, Revision 0, and the subsequent Addendum A. Similarly, this effect was neglected in the development of the CR-3 delta dilations in the topical report and addendum. Neglecting this effect produces overly conservative leakage estimates because the axial load applied during the tests (3,060 pounds) was significantly larger than the maximum axial

load which would occur during a CR-3 MSLB (663 pounds). This submittal includes an accounting of the affect of the reduced axial load on tube dilation for both the laboratory test results and the CR-3 MSLB conditions, and provides a more realistic result yet remains conservative.

Probabilistic Methodology

The methodology described in Framatome ANP, "Probabilistic Leakage Assessment of Crystal River Unit 3 Steam Generator (SG) Tube End Cracks," (Attachment E), reduces some of the conservatisms in the current approach while generating appropriately conservative, high confidence leakage estimates.

The methodology relies on the same accident analyses described in Topical Report BAW-2346P, Revision 0, and License Amendment Request #249, Revision 0, and utilizes the same leakage test data and leakage limit. The methodology preserves the assumption that multiple cracks within the same tube will multiply the leakage from that tube. Unlike the GL 95-05 approach, which assumes that some cracks are not capable of leaking (probability of leakage), the probabilistic approach described herein, assumes that every crack leaks.

The currently approved method for calculating leakage assumes that all cracks within a given zone will leak at the maximum level for that zone. In the proposed methodology, each crack is evaluated with respect to its radial position in the tubesheet. The difference in axial loads between CR-3 and the leakage test program are accounted for in this approach. One significant difference between the current method of TEC leakage calculation and the new method proposed herein, is that instead of assigning each crack a fixed quantity of leakage based on its position in the tubesheet, the proposed method assigns individual leakage values probabilistically.

Consistent with the NRC-approved GL 95-05, "Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking," dated August 3, 1995, the probabilistic approach for TEC leakage calculation accounts for the uncertainties associated with the leakage correlation, in this case, the correlation of leakage to joint tightness during a MSLB. Total OTSG leakage is determined by summing the individual probabilistic leakage for each crack. Thousands of estimates of OTSG leakage are developed and processed to determine the upper 95th percentile/95% confidence estimate for total OTSG leakage. This proposed statistical method concludes, with a 95% confidence, that there is a 95% probability the actual leakage will be less than the calculated value.

Conclusion

The results in Attachment E show that the proposed methodology estimates a lower total leak rate for the CR-3 OTSGs than the deterministic method. Although the proposed methodology preserves conservatisms not assumed in the GL 95-05 approach, it employs the same GL 95-05 calculational methodology which provides a realistic bounding approach to leakage calculation and a high level of confidence.

References

1. CR-3 to NRC letter, 3F0599-02, dated May 5, 1999, "License Amendment Request #249, Revision 0, Once Through Steam Generator Tube Surveillance Program, Alternate Repair Criteria for Axial Tube End Crack Indications" (includes BAW-2346P, Revision 0)
2. CR-3 to NRC letter, 3F0599-21, dated May 28, 1999, "License Amendment Request #249, Revision 0, Once Through Steam Generator Tube Surveillance Program (TAC No. MA5395), Addendum to Babcock & Wilcox Owners Group Topical Report BAW 2346P" (includes BAW-2346P, Revision 0, Addendum A)
3. NRC to CR-3 letter, 3N1099-01, dated October 1, 1999, "Crystal River Unit 3 – Issuance of Amendment Regarding Alternate Repair Criteria for Steam Generator Tubing" (TAC No. MA5395)
4. Generic letter 95-05, "Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking," dated August 3, 1995
5. Licensee Event Report 50-302/2004-004-00 dated November 22, 2004
6. CR-3 to NRC letter, 3F0105-03, dated January 27, 2005, "Crystal River Unit 3 – License Amendment Request #290, Revision 1, Probabilistic Methodology to Determine the Contribution to Main Steam Line Break Leakage Rates for the Once-Through Steam Generator from the Tube End Crack Alternate Repair Criteria"

PROGRESS ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302/LICENSE NUMBER DPR-72

ATTACHMENT B

LICENSE AMENDMENT REQUEST #290, Revision 1

Regulatory Analysis

**No Significant Hazards Consideration Determination
Applicable Regulatory Requirements
Environmental Impact Evaluation**

No Significant Hazards Consideration Determination

License Amendment Request (LAR) #290, Revision 0, proposed change consists of a change in methodology for Tube End Crack (TEC) leakage calculation and the addition of a method to project the number of TEC indications that may initiate during the next operating cycle.

This LAR proposes to utilize a probabilistic methodology (Addendum B dated August 10, 2005 to Topical Report BAW-2346P, Revision 0) to determine the contribution to the Main Steam Line Break (MSLB) leakage rates from the Once-Through Steam Generator (OTSG) TEC Alternate Repair Criteria (ARC) approved in License Amendment No. 188. This LAR also proposes to add the methodology provided in Addendum C dated August 12, 2005, to Topical Report BAW-2346P, Revision 0, to project the TEC leakage that may develop at Crystal River Unit 3 (CR-3) during the next operating cycle. Reference to Addenda B and C has been added to Improved Technical Specifications (ITS) 5.6.2.10.2.f.

1. *Does not involve a significant increase in the probability or consequences of an accident previously evaluated.*

This LAR proposes to change the method to determine the projected MSLB leakage rates for TEC. Potential leakage from OTSG tubes, including leakage contribution from TEC, is bounded by the MSLB evaluation presented in the CR-3 Final Safety Analysis Report (FSAR) and testing performed during the development of Topical Report BAW-2346P, Revision 0. The inspection required by the ARC will continue to be performed as required by CR-3 ITS 5.6.2.10. This inspection provides continuous monitoring of tubes with TEC indications remaining in service, and ensures that degradation of new tubes containing TEC indications is detected. The proposed change in method to determine MSLB leakage rates for TEC and the addition of a method to project the TEC leakage that may develop during the next operating cycle do not change any accident initiators.

Therefore, granting this LAR does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. *Does not create the possibility of a new or different type of accident from any accident previously evaluated.*

This LAR proposes to change the method to determine the projected MSLB leakage rates for TEC and the addition of a method to project the TEC leakage that may develop during the next operating cycle. The changes introduce no new failure modes or accident scenarios. The proposed changes do not change the assumptions made in Topical Report BAW-2346P, Revision 0, which demonstrated structural and leakage integrity for all normal operating and accident conditions for CR-3. The addition of a method to project the TEC leakage provides an additional means to monitor the initiation of TEC. The design and operational characteristics of the OTSGs are not impacted by the use of a probabilistic methodology to determine MSLB leakage rates.

Therefore, the proposed change will not create the possibility of a new or different kind of accident from any previously evaluated.

3. *Does not involve a significant reduction in the margin of safety.*

This LAR proposes to change the method to determine the projected MSLB leakage rates for TEC and the addition of a method to project the TEC leakage that may develop during the next operating cycle. The resulting leakage estimates will be lower than the estimates from the old method. However, the estimates from the proposed method will be more realistic and do not impact the acceptance criteria. The methodology relies on the same accident analyses described in Topical Report BAW-2346P, Revision 0, and License Amendment Request #249, Revision 0, and utilizes the same leakage test data and leakage limit. The CR-3 FSAR analyzed accident scenarios are not affected by the change and remain bounding. The limits established in CR-3 ITS 3.4.12 and 5.6.2.10.2.f have not been changed. The addition of a method to project the TEC leakage that may develop during the next operating cycle provides an additional means to monitor the initiation of TEC. Therefore, the proposed change does not reduce the margin of safety.

Based on the above, Progress Energy Florida, Inc. (PEF) concludes that the proposed LAR presents a 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 justified.

Applicable Regulatory Requirements

PEF has evaluated the Regulatory Requirements applicable to the proposed changes. PEF has determined that the proposed changes do not require any exemptions or relief from regulatory requirements other than the change in methodology for TEC leakage calculation. The probabilistic methodology is being provided as Addendum B to Topical Report BAW-2346P, Revision 0. Addendum B supersedes the previously approved Addendum A. Addendum C to Topical Report BAW-2346P, Revision 0, provides the method to project the TEC leakage that may develop during the next operating cycle.

Environmental Impact Evaluation

10 CFR 51.22(c)(9) provides criteria for identification of licensing and regulatory actions eligible for categorical exclusion from performing an environmental assessment. A proposed amendment to an operating license for a facility requires no environmental assessment if operation of the facility in accordance with the proposed amendment would not:

- (i) involve a significant hazards consideration,
- (ii) result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, and
- (iii) result in a significant increase in individual or cumulative occupational radiation exposure.

PEF has reviewed proposed License Amendment Request #290, Revision 1, and concludes it meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(c), no environmental impact statement or environmental assessment needs to be prepared in connection with this request.

PROGRESS ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302/LICENSE NUMBER DPR-72

ATTACHMENT C

LICENSE AMENDMENT REQUEST #290, REVISION 1

PROPOSED IMPROVED TECHNICAL SPECIFICATION PAGE

Shadowed Format

Shadowed Text Indicates Added Text

5.6 Procedures, Programs and Manuals

5.6.2.10 OTSG Tube Surveillance Program (continued)

The inspection data for tubes with axially oriented TEC indications shall be compared to the previous inspection data to monitor the indications for growth.

Tubes with axially oriented TEC may be left in-service using the method described in Topical Report BAW-2346P, Revision 0, provided the combined projected leakage from all primary-to-secondary leakage, including axial TEC indications left in-service, does not exceed the Main Steam Line Break (MSLB) accident leakage limit of one gallon per minute, minus 150 gallons per day, per OTSG. The contribution to MSLB leakage rates from TEC indications shall be determined utilizing the methodology in Addendum B dated August 10, 2005 to Topical Report BAW-2346P, Revision 0. The projection of TEC leakage that may develop during the next operating cycle shall be determined using the methodology in Addendum C dated August 12, 2005 to Topical Report BAW-2346P, Revision 0.

If the plant is required to shut down due to primary-to-secondary leakage and the cause is determined to be degradation of the TEC portion of the tubes, 100% of the tubes with TEC in that OTSG shall be examined in the location of the TEC. If more than 1% of the examined tubes are defective tubes, 100% of the tubes with TEC in the other OTSG shall be examined in the location of the TEC.

Tubes with crack-like indications within the carbon steel portion of the tubesheet shall be repaired or removed from service using the appropriate approved method. Tubes with circumferentially oriented TEC or volumetric indications within the Inconel clad region of the tubesheet shall be repaired or removed from service using the appropriate approved method.

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

----- NOTE-----
In all inspections, previously degraded tubes whose degradation has not been spanned by a sleeve must exhibit significant (>10%) further wall penetrations to be included in the below percentage calculations.

----- NOTE-----
For the inspection conducted in accordance with 5.6.2.10.2.f, only tubes with TEC indications identified after the 1997 inspection will be included in the below percentage calculations.

<u>Category</u>	<u>Inspection Results</u>
C-1	Less than 5% of the total tubes inspected are degraded tubes and none of the inspected tubes are defective.
C-2	One or more tubes, but not more than 1% of the total tubes inspected are defective, or between 5% and 10% of the total tubes inspected are degraded tubes.

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PROGRESS ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302/LICENSE NUMBER DPR-72

ATTACHMENT D

LICENSE AMENDMENT REQUEST #290, REVISION 1

PROPOSED IMPROVED TECHNICAL SPECIFICATION PAGE

Revision Bar Format

5.6 Procedures, Programs and Manuals

5.6.2.10 OTSG Tube Surveillance Program (continued)

The inspection data for tubes with axially oriented TEC indications shall be compared to the previous inspection data to monitor the indications for growth.

Tubes with axially oriented TEC may be left in-service using the method described in Topical Report BAW-2346P, Revision 0, provided the combined projected leakage from all primary-to-secondary leakage, including axial TEC indications left in-service, does not exceed the Main Steam Line Break (MSLB) accident leakage limit of one gallon per minute, minus 150 gallons per day, per OTSG. The contribution to MSLB leakage rates from TEC indications shall be determined utilizing the methodology in Addendum B dated August 10, 2005 to Topical Report BAW-2346P, Revision 0. The projection of TEC leakage that may develop during the next operating cycle shall be determined using the methodology in Addendum C dated August 12, 2005 to Topical Report BAW-2346P, Revision 0.

If the plant is required to shut down due to primary-to-secondary leakage and the cause is determined to be degradation of the TEC portion of the tubes, 100% of the tubes with TEC in that OTSG shall be examined in the location of the TEC. If more than 1% of the examined tubes are defective tubes, 100% of the tubes with TEC in the other OTSG shall be examined in the location of the TEC.

Tubes with crack-like indications within the carbon steel portion of the tubesheet shall be repaired or removed from service using the appropriate approved method. Tubes with circumferentially oriented TEC or volumetric indications within the Inconel clad region of the tubesheet shall be repaired or removed from service using the appropriate approved method.

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

----- NOTE-----
In all inspections, previously degraded tubes whose degradation has not been spanned by a sleeve must exhibit significant (>10%) further wall penetrations to be included in the below percentage calculations.

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For the inspection conducted in accordance with 5.6.2.10.2.f, only tubes with TEC indications identified after the 1997 inspection will be included in the below percentage calculations.

<u>Category</u>	<u>Inspection Results</u>
C-1	Less than 5% of the total tubes inspected are degraded tubes and none of the inspected tubes are defective.
C-2	One or more tubes, but not more than 1% of the total tubes inspected are defective, or between 5% and 10% of the total tubes inspected are degraded tubes.

(continued)