



WISCONSIN PUBLIC SERVICE CORPORATION

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November 8, 1994

10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Ladies/Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Proposed Amendment 128 to
the Kewaunee Nuclear Power Plant Technical Specifications
for a Steam Generator Tube Support Plate Voltage-Based Repair Limit

- References:
- 1) NRC Draft Generic Letter 94-XX: "Voltage-Based Repair Criteria For The Repair of Westinghouse Steam Generator Tubes Affected By Outside Diameter Stress Corrosion Cracking," Noticed in the Federal Register on August 12, 1994.
 - 2) Letter from C.R. Steinhardt (WPSC) to Document Control Desk (NRC) dated March 3, 1993 submitting Proposed Amendment 113A.
 - 3) EPRI Draft Report TR-100407, Revision 1, "PWR Steam Generator Tube Repair Limits-Technical Support Document for Outside Diameter Stress Corrosion Cracking at Tube Support Plates," submitted to the NRC on August 31, 1993.
 - 4) Letter from Alex Marion (NEI) to U.S. Nuclear Regulatory Commission dated September 14, 1994 submitting industry comments on NRC Generic Letter 94-XX.

Wisconsin Public Service Corporation (WPSC) is submitting a Technical Specification (TS) amendment request to allow application of a voltage-based repair limit for the Kewaunee steam generator (SG) tube support plate (TSP) intersections experiencing outside diameter stress corrosion cracking (ODSCC). The proposed criteria will allow TSP indications with bobbin voltages of less than or equal to 2.0 volts, or indications between 2.0 and 5.6 volts if not confirmed by the motorized rotating pancake coil (MRPC) probe, to remain in service. Application of this criteria will be supplemented by additional tube inspection requirements, a

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reduced operating leakage limit and projected end-of-cycle main steam line break leakage and conditional burst probability calculations.

This proposed amendment (PA) request is based on the information contained in references 1 through 4 listed above. WPSC recognizes that the NRC staff provided guidance to licensees interested in obtaining a voltage-based plugging criteria in reference 1. However, the draft generic letter (GL) contains guidelines for application of a voltage-based repair limit which have previously not been implemented by other licensees. WPSC has reviewed this draft GL and incorporated the appropriate recommendations into this PA request with the exception of three areas.

These three areas are; the threshold value recommended for the conditional burst probability calculation (Section 2.a of Enclosure 1); the data acquisition and analysis guidelines (Section 3.c of Enclosure 1); and the number and frequency of obtaining pulled tube samples (Section 4.a of Enclosure 1). Comments were provided on all of these issues in reference 4. We concur with the comments provided in this transmittal and understand that the staff is working with industry to reach resolution prior to issuance of the final GL and subsequent rulemaking on steam generator degradation specific management.

While these issues are being resolved on a generic basis WPSC will implement the program requirements discussed below. For performing the calculated conditional burst probability a threshold value of 2.5×10^{-2} will be used. This value is based on NUREG-0844, "NRC Integrated Program for the Resolution of Unresolved Safety Issues A-3, A-4 and A-5, Regarding Steam Generator Tube Integrity" and is consistent with the threshold value used at other plants currently operating with a voltage-based repair limit. For data acquisition and analysis, the methodology contained in Appendix A of WCAP-12985, Revision 2, "Kewaunee Steam Generator Plugging Criteria for ODSCC at Tube Support Plates," will be implemented. This WCAP was submitted to the NRC in reference 2. The data acquisition and analysis guidelines in Appendix A were developed specifically for application of a voltage-based repair limit at TSP intersections experiencing ODSCC at Kewaunee and are similar to those currently in use at other plants operating with voltage-based repair limits.

In addition, we will follow the industry proposed tube pull program that is currently being reviewed by the staff. The industry proposed tube pull program satisfies the objectives outlined in the draft GL and provides a reasonable limit on the number of tube pulls required by each plant choosing to apply a voltage based repair limit. Establishing a reasonable limit is necessary since tube pull data is very costly to obtain, consumes critical path outage time, and results in increased radiation exposure. Three tube sections, (total of five TSP intersections) were removed from the Kewaunee SGs during the 1993 refueling outage. These specimens had a range of TSP indications with a maximum bobbin probe signal of 2 volts. These specimens were examined nondestructively, burst tested and then examined destructively. The burst pressures of the corroded TSP regions were well above the safety limitations with a range of 9,537 to 9,756 psig. The destructive examination of the TSP regions revealed axially oriented OD intergranular stress corrosion cracking (IGSCC) as the dominant form of corrosion. Taking corrosion morphology into account, the examination results of the Kewaunee SG tubes are consistent with the results from other plants experiencing ODSCC at the TSP intersections.

November 8, 1994

Page 3

Based on having recent pulled tube data, WPSC does not plan on pulling additional tubes during the 1995 refueling outage.

This PA request affects TS Sections 3.1.d, "Leakage of Reactor Coolant" and 4.2.b, "Steam Generator Tubes." In addition a change is being proposed to Section 3.4.a, "Steam Generators", to lower the secondary side dose equivalent iodine-131 activity from 1.0 $\mu\text{Ci/cc}$ to 0.1 $\mu\text{Ci/cc}$. This change is based on a calculation performed by Westinghouse to determine the maximum permissible primary to secondary leakage during a steam line break event based on a limiting site boundary dose of 30 rem thyroid. The proposed activity level was used in the offsite dose analysis and is consistent with the value specified in Standard Technical Specifications.

Attachment 1 contains the background information, a description of the proposed change, a safety evaluation, significant hazards determination, and environmental considerations. Attachment 2 contains the affected TS pages. TS Section 3.4 is also affected by PAs 120 and 125 which are currently under staff review.

In accordance with the requirements of 10CFR50.36(b), this submittal has been signed and notarized. A copy of this submittal has been transmitted to the State of Wisconsin as required by 10CFR50.91(b)(1). We would like review and approval of the PA request by February 1995, to allow application of a voltage-based repair limit during the April 1995 refueling outage. Pages 2, 3, and 4 of Attachment 1 specify the commitments that will be implemented following NRC staff approval of this PA. Please feel free to contact a member of my staff if you have any questions or require additional information.

Sincerely,

C. R. Steinhardt for

C. R. Steinhardt

Senior Vice President - Nuclear Power

SLB/san

Attach.

cc - US NRC Region III
US NRC Senior Resident Inspector

Subscribed and Sworn to
Before Me This 8th Day
of November 1994

Jeanne M. Ferris
Notary Public, State of Wisconsin

My Commission Expires:

June 18, 1995

ATTACHMENT 1

Letter from C. R. Steinhardt (WPSC)

To

Document Control Desk (NRC)

Dated

November 8, 1994

INTRODUCTION

Wisconsin Public Service Corporation (WPSC) is submitting this proposed Technical Specification (TS) amendment request to allow the application of a voltage-based repair limit for the Kewaunee steam generator (SG) tube support plate (TSP) intersections experiencing outside diameter stress corrosion cracking (ODSCC). The proposed criteria will allow TSP indications with bobbin coil voltages of less than or equal to 2 volts, or indications between 2.0 and 5.6 volts if not confirmed by the motorized rotating pancake coil (MRPC) probe, to remain in service. Application of this criteria will be supplemented by additional tube inspection requirements, a reduced operating leakage limit and projected end-of-cycle main steam line break (MSLB) leakage and conditional burst probability calculations.

BACKGROUND

The Kewaunee SGs are Westinghouse model 51. The SGs are constructed of mill-annealed Inconel 600 7/8 inch diameter tubing with carbon steel drilled-hole TSPs. Degradation occurring at the tube sheet crevices and tube-to-TSP intersections has necessitated significant tube sleeving and plugging. Inservice inspection results and tubes pulled in 1990 and 1993 have identified intergranular stress corrosion cracking on the OD of the tubes in the crevice regions. This form of degradation is referred to as ODSCC.

In 1993 three tube sections (total of five TSP intersections) were removed from the SGs with a range of tube-to-TSP indications; the maximum indication was 2 volts. These specimens were examined nondestructively, burst tested, and then examined destructively. The burst pressure of the corroded TSP regions were well above the safety limitations with a range of 9,537 to 9,756 psig. The corrosion micro-cracks for the burst openings were 12 to 18% deep on average over micro-crack lengths of 0.27 to 0.42 inch. These burst pressure test results are in the upper 95% prediction interval of the APC burst pressure versus bobbin voltage correlation. (Reference EPRI Draft Report TR-100407, Revision 1, Figure 3-2.)

The current depth-based repair criteria specified in TS 4.2 is overly conservative for highly localized short cracks such as those exhibited by the tubes in the Kewaunee SGs. Application of the proposed voltage-based repair criteria for the tube-to-TSP intersections experiencing ODSCC will allow tubes with structural integrity to remain in service. The technical and regulatory basis for the voltage-based repair criteria are contained in EPRI Draft Report TR-100407, Revision 1, "PWR Steam Generator Tube Repair Limits- Technical Support Document for Outside Diameter Stress Corrosion Cracking at Tube Support Plates," and WCAP-12985, Revision 2, "Kewaunee Steam Generator Tube Plugging Criteria for ODSCC at Tube Support Plates."

The proposed voltage-based repair criteria will be implemented as follows:

- 1) A bobbin probe inspection of 100% of the hot leg TSP intersections and cold leg intersections down to the lowest cold leg TSP with known ODSCC will be performed. The determination of TSPs having ODSCC will be based on a minimum 20% random sample of tube inspections over their full length.
- 2) Degradation within the bounds of the TSPs with a bobbin probe voltage less than or equal to 2.0 volts will be allowed to remain in service.
- 3) Degradation within the bounds of the TSPs with a bobbin probe voltage greater than 2.0 volts will be plugged or repaired except as noted in 4 below.
- 4) Degradation within the bounds of the TSPs with a bobbin probe voltage greater than 2.0 volts but less than or equal to 5.6 volts may remain in service if MRPC examinations do not detect or confirm the degradation. Degradation with a bobbin voltage of greater than 5.6 volts will be plugged or repaired.
- 5) The data acquisition and analysis guidelines, included as Appendix A to WCAP-12985, Revision 2, dated March 1993, will be incorporated into the Kewaunee eddy current data analysis guidelines with the following clarifications:

Section A.2.1 of Appendix A specifies testing all straight sections of tubing with a 0.720" OD probe. Due to hot leg sleeves, tubes in rows 1 through 10 must be examined from the cold leg side. The tight radius of the low row u-bends makes it difficult, if not impossible, to pass a 0.720" probe through the u-bend. Therefore, we will inspect the tubes in row 1 through 10 with a .700" O.D. probe.

Section A.2.2 of Appendix A specifies a calibration standard of four 0.033" diameter through wall holes, 90 degrees apart in a single plane around the tube circumference. The hole diameter tolerance shall be ± 0.001 ". The standard used at Kewaunee contains only one 100% through wall hole which satisfies the requirements of Section V of the ASME Code. The tolerance for all hole diameters is ± 0.003 " as opposed to ± 0.001 ".

Section A.2.3 of Appendix A discusses application of the bobbin coil probe wear standard. In place of this requirement WPSC proposes to use the method presented to the NRC staff on November 3, 1994. Specifically; "if a probe is found to be out-of-specification, all indications with voltages exceeding 70% of the voltage based repair limit since the last successful calibration should be re-inspected with the new calibrated probe."

- 6) All indications with a bobbin probe voltage of greater than 1.5 volts will be inspected with a MRPC probe if the tube is to be left in service. For tubes that will be removed from service a MRPC inspection will not be performed.
- 7) A sample MRPC inspection of a minimum of 100 TSP intersections will be performed. This sample will include all intersections with a bobbin probe dent voltage exceeding 5 volts. Other intersections in the sample population will be based on inspecting intersections indicating copper deposits or large mix residuals that could cause a 1-volt bobbin signal to be missed or misread.
- 8) The proposed voltage-based repair criteria will not be applied to intersections with a bobbin probe dent voltage exceeding 5 volts. These intersections will be inspected with an MRPC probe (reference item 7 above) and dispositioned in accordance with the depth-based repair criteria.
- 9) The operating primary to secondary leakage limit will be reduced from 500 gallons per day (gpd) to an average of 150 gpd in either SG when the voltage-based repair limit is applied. A review will be performed of the leakage monitoring procedures to ensure timely detection, trending and response to rapidly increasing leaks. Tubes with known leakage will be repaired prior to returning the SGs to service following an inspection outage.
- 10) The projected end-of-cycle (EOC) primary to secondary leak rate for a faulted SG during a postulated main steam line break (MSLB) event will be calculated. The calculation will be performed using a methodology similar to that described in draft GL 94-XX. The projected dose from a MSLB event must remain below 30 rem thyroid dose at the site boundary. A leak rate of 34.0 gpm was determined to be the upper limit primary-to-secondary leakage for a faulted SG and with a leak rate of 0.1 gpm in the non-faulted loop. Should the limit of 34.0 gpm be exceeded indications will be repaired or removed from service until the projected leakage is less than or equal to 34.0 gpm.

The calculation as described in the draft GL for performing the projected EOC MSLB leakage will be used until the industry comments on this method are resolved. Once final guidance becomes available the new methodology will be implemented as appropriate based on timing of the final guidance with regard to the start of the refueling outage.

- 11) A conditional burst probability calculation will be performed to assess the voltage distribution of projected EOC indications left in service against a threshold value. A threshold value of 2.5×10^{-2} will be used. The calculation methodology will be in

accordance with the guidance provided in the draft GL. If the threshold value or guidance for performing the calculation changes as a result of industry comments the new methodology will be implemented as appropriate based on timing of the resolution with regard to the start of the refueling outage.

- 12) The reporting guidelines contained in proposed TS 4.2.b.6.d and Section 6.b of Enclosure 1 to the draft GL will be implemented. If the reporting guidelines change with issuance of the final GL the newer reporting recommendations will be reviewed and implemented as appropriate.

Following is a description of the proposed TS changes, a safety evaluation, a 10 CFR 50.92 significant hazards determination and an environmental considerations statement. Attachment 2 contains the affected TS pages.

DESCRIPTION OF PROPOSED TS CHANGES

This PA request modifies Kewaunee TS 3.1.d, "Leakage of Reactor Coolant," TS 4.2.b, "Steam Generator Tubes," and TS 3.4.a, "Steam Generators." The specific changes are as follows:

- 1) TS 3.1.d.2 is being revised to lower the primary to secondary leakage through any one SG from 500 to an average of 150 gpd when the voltage-based repair criteria is applied. This reduced operating leakage limit is to ensure tube integrity is maintained in the event of a MSLB or loss-of-coolant accident.
- 2) TS 3.4.a.1.C is being revised to lower the secondary side dose equivalent I-131 activity from 1.0 $\mu\text{Ci/cc}$ to 0.1 $\mu\text{Ci/cc}$. This change is based on a calculation performed by Westinghouse to determine the maximum permissible primary to secondary leak rate during a postulated MSLB event based on a limiting site boundary dose of 30 rem thyroid. The proposed activity level is the value used to perform the calculation and is consistent with the value specified in Standard Technical Specifications.
- 3) TS 4.2.b is being revised to incorporate the requirements for application of a voltage-based repair requirement. The proposed wording is similar to that contained in Enclosure 2 of the draft GL with minor wording changes since Kewaunee is a custom TS plant.

-TS 4.2.b.2.a and c are being expanded to include inspection requirements for the TSPs experiencing ODSCC;

-TS 4.2.b.4 is being expanded to make it clear that the depth based plugging limit does not apply for the TSP intersections experiencing ODS/CC;

-A new TS 4.2.b.5 is being added to specify the voltage-based repair criteria for the TSP intersections; and

-A new TS 4.2.b.6.d is being added to specify the reporting requirements for implementation of the voltage-based repair requirements.

Concurrent with these changes the appropriate basis pages have been revised and are being submitted for your information.

SAFETY EVALUATION

The proposed voltage-based plugging criteria involves a correlation between the eddy current bobbin probe signal amplitude (voltage) versus tube burst pressure and leak rate. EPRI draft report TR-100407, Revision 1, "PWR Steam Generator Tube Repair Limits- Technical Support Document for Outer Diameter Stress Corrosion Cracking at Tube Support Plates," submitted to the NRC on August 31, 1993, provides the technical basis for this amendment request.

Figure 3-2 of report TR-100407 is the updated burst pressure curve for 7/8 inch tubes. This curve was developed from industry pulled tube samples and model boiler data. Based on this curve the beginning of cycle (BOC) structural limit for 7/8 inch tubing is 9.6 volts. Applying an allowance of 20% for NDE uncertainty and 50% for crack growth over an operating cycle results in a voltage repair limit of 5.6 volts. The proposed repair limit of 2 volts is very conservative compared to the 5.6 volt repair limit taking into account the low average growth rates experienced at Kewaunee and the high tube burst pressures.

In developing the voltage-based plugging criteria, Regulatory Guide (RG) 1.121, "Bases for Plugging Degraded PWR Steam Generator Tubes" and RG 1.83, "Inservice Inspection of PWR Steam Generator Tubes" were used as the bases for determining that SG tube integrity considerations are maintained within acceptable limits. RG 1.121 describes a method acceptable to the NRC staff for meeting General Design Criteria (GDC) 2, 14, 15, 31 and 32 by reducing the probability and consequences of SG tube rupture. This is accomplished by determining the limiting safe conditions of degradation in SG tubing beyond which tubes should be removed from service by plugging or repair. This RG uses safety factors on loads for tube burst that are consistent with the requirements of Section III of the ASME Boiler and Pressure Vessel Code.

For degradation occurring at SG TSPs, tube burst criteria are inherently satisfied during normal operating conditions by the presence of the support plate. The presence of the TSP enhances the integrity of the degraded tubes in that region by precluding tube deformation beyond the diameter of the drilled hole. It is not certain that the TSP would function to provide a similar constraining effect during accident condition loadings. Therefore, no credit is being taken for the presence of the TSP under accident loading conditions for implementation of the 2 volt plugging criteria. Conservatively, the existing data base burst testing shows that the safety requirements for tube burst margins during both normal and accident condition loadings can be satisfied with bobbin coil signal amplitudes of about 8.82 volts or less, regardless of the depth of tube wall penetration. RG 1.83 describes a method acceptable for implementing GDC 14, 15, 31 and 32 through periodic inservice inspection for the detection of significant tube wall degradation.

No tube leakage is expected to occur during normal operating conditions with the application of a 2 volt plugging criteria even with the presence of through wall cracks. This is the case because the ODSCC occurring at the TSPs in the Kewaunee SGs are short tight, axially oriented micro cracks. No leakage has been observed during normal operating conditions in the field for crack indications with signal amplitudes less than 6.5 volts. Relative to the expected leakage during accident condition loadings, the limiting event with respect to primary-to-secondary leakage is a postulated MSLB event. Field and laboratory data show minimal leakage for TSP intersections with amplitudes less than 10.0 volts.

In support of the voltage repair limit a Kewaunee specific calculation was performed to determine the maximum permissible primary-to-secondary leakage during a postulated MSLB event. The evaluation considered both pre-accident and accident initiated iodine spikes. The results of the evaluation show that the accident initiated spike yielded the limiting leak rate. This case was based on a limit of 30 rem thyroid dose at the site boundary and initial primary and secondary coolant iodine activity levels of 1.0 $\mu\text{Ci/gm}$ and 0.1 $\mu\text{Ci/gm}$ dose equivalent iodine-131, respectively. A leak rate of 34.0 gpm was determined to be the upper limit for allowable primary to secondary leakage in the SG in the faulted loop. The SG in the intact loop was assumed to leak at a rate of 0.1 gpm (150 gpd.)

The combined effects of a LOCA plus SSE on the SGs were assessed as required by GDC 2. This issue was addressed for the Kewaunee SGs through the application of leak-before-break (LBB) principles to the primary loop piping. Based on the results of this analysis, it is concluded that the LBB is applicable to the Kewaunee primary loops and, thus, the probability of breaks in the primary loop piping is sufficiently low that they need not be considered in the structural design basis of the plant. Excluding breaks in the primary loops, the LOCA loads from the large branch lines were also assessed and found to be of insufficient magnitude to result in SG tube collapse. Based on these analyses results, no tubes are expected to collapse or deform to the degree that secondary-to-primary in-leakage

would be increased over currently expected levels. On this basis no tubes need to be excluded from the voltage-based repair criteria for reasons of deformation resulting from combined LOCA and SSE loadings.

Application of the voltage-based repair limit will be supplemented with a projected EOC, MSLB leakage calculation and conditional burst probability assessment. The methodology for performing these calculations will be consistent with that discussed in the draft GL. Once final guidance becomes available the new methodology will be implemented as appropriate based on timing with regard to the start of the refueling outage. Should the projected MSLB leakage be exceeded the highest voltage indications will be repaired or removed from service until the projected leakage is less than or equal to 34.0 gpm.

Based on the above discussion, application of a voltage-based repair limit will ensure that the radiological consequences from the tubes remaining in service both under normal and postulated accident conditions will not exceed a small fraction of the 10 CFR 100 limits.

SIGNIFICANT HAZARDS DETERMINATION

This proposed change was reviewed in accordance with the provisions of 10 CFR 50.92 to show no significant hazards exist. The proposed change will not:

- 1) Involve a significant increase in the probability or consequences of an accident previously evaluated.

Testing of model boiler specimens for free span tubing (no TSP restraint) at room temperature conditions show burst pressures in excess of 5,000 psig for indications of ODSCC with voltage measurements as high as 19 volts. Burst testing performed on five intersections pulled from the Kewaunee SGs with up to a 2 volt indication showed measured tube burst in the range of 9,537 to 9,756 psig. Burst testing performed on pulled tubes from other plants with up to 7.5 volt indications show burst pressures in excess of 6,300 psi at room temperatures. Correcting for the effects of temperature on material properties and the minimum strength levels, tube burst capability significantly exceeds the safety factor requirements of RG 1.121.

Tube burst criteria are inherently satisfied during normal operating conditions due to the presence of the TSPS. Test data indicates that tube burst cannot occur within the TSP, even for tubes with through wall EDM notches 0.75 inch long, when the notch is adjacent to the TSP. Since tube burst is precluded during normal operating conditions, the criterion that must be satisfied to demonstrate adequate tube integrity is a safety margin of 1.43 times MSLB pressure differential. From Figure 3-2 of EPRI report TR-100407, the BOC structural limit for 7/8 inch diameter tubing is 9.6 volts. Applying an allowance of 20% for

NDE uncertainty and 50% for crack growth rate over an operating cycle results in a voltage repair limit of 5.6 volts. The proposed repair limit of 2 volts is very conservative when compared to the 5.6 volts taking into account the low average growth rates experienced at Kewaunee and the high tube burst pressures.

Relative to the expected leakage during accident condition loadings, a plant specific calculation was performed to determine the maximum primary-to-secondary leakage during a postulated MSLB event. The evaluation considered both pre-accident and accident initiated iodine spikes. The results of the evaluation show that the accident spike yielded the limiting leak rate. This case was based on a 30 rem thyroid dose at the site boundary and initial primary and secondary coolant activity levels of 1.0 $\mu\text{Ci/gm}$ and 0.1 $\mu\text{Ci/gm}$ dose equivalent iodine -131, respectively. A leak rate of 34.0 gpm was determined to be the upper limit for allowable primary to secondary leakage in the SG in the faulted loop. The SG in the intact loop was assumed to leak at a rate of 0.1 gpm (150 gpd).

Application of the voltage-based repair limit will be supplemented with a projected EOC MSLB leakage calculation and conditional burst probability assessment. The methodology for performing these calculations will be consistent with that discussed in the draft GL until final guidance is published. Should the projected MSLB leakage be exceeded indications will be repaired or removed from service until the projected leakage is less than or equal to 34.0 gpm.

Application of the voltage-based repair limit will not adversely affect SG tube integrity. Therefore, the proposed amendment will not increase the probability or consequences of an accident previously evaluated.

- 2) Create the possibility of a new or different kind of accident from any previously evaluated.

Implementation of the proposed voltage-based repair limit will not reduce the overall safety or functional requirements of the SG tube bundles. The tube burst criteria will be satisfied during normal operating conditions by the presence of the TSPs. The RG 1.121 criteria that must be satisfied during accident loading conditions is 1.43 times MSLB differential pressure. Conservatively, the existing data base of burst testing shows that the tube burst margins can be satisfied with bobbin coil signal amplitudes of about 8.82 volts or less regardless of the depth of tube wall penetration.

The proposed repair criteria will be supplemented with a reduced operating leakage requirement of 150 gpd average through either SG to preclude the potential for excessive leakage during operating conditions. The 150 gpd restriction will provide for timely leakage detection and plant shutdown in the event of the occurrence of an unexpected single crack

resulting in leakage that is associated with the longest permissible crack length. The operating leakage limit is based on leak-before break considerations, critical crack length and predicted leakage.

The SG tube integrity will continue to be maintained through inservice inspections and primary-to-secondary leakage monitoring. Therefore, the proposed change will not create the possibility of a new or different kind of accident.

3) Involve a significant reduction in the margin of safety.

Application of the voltage-based repair criteria has been demonstrated to maintain tube integrity commensurate with the RG 1.121 criteria. RG 1.121 describes a method acceptable to the staff for meeting GDCs 2, 14, 15, 31 and 32. This is accomplished by determining the limiting degradation of SG tubing as established by inservice inspection, beyond which tubes should be removed from service. Upon implementation of the repair criteria, even under the worst case conditions, the occurrence of ODSCC at the TSPs is not expected to lead to a SG tube rupture event during normal or faulted conditions. The most limiting event would be a potential increase in leakage during a MSLB event. Excessive leakage during a MSLB is precluded by verifying that the expected EOC crack distribution of ODSCC indications at TSP locations would result in an acceptably low primary-to-secondary leakage. Therefore, the radiological consequences from tubes remaining in service is a small fraction of the 10 CFR 100 limits.

The combined effects of a LOCA plus SSE on the SGs were assessed as required by GDC 2. This issue was addressed for the Kewaunee SGs through the application of leak-before-break (LBB) principles to the primary loop piping. Based on the results of this analysis, it is concluded that the LBB is applicable to the Kewaunee primary loops and, thus, the probability of breaks in the primary loop piping is sufficiently low that they need not be considered in the structural design basis of the plant. Excluding breaks in the primary loops, the LOCA loads from the large branch lines were also assessed and found to be of insufficient magnitude to result in SG tube collapse. Based on these analysis results, no tubes are expected to collapse or deform to the degree that secondary-to-primary in-leakage would be increased over currently expected levels. On this basis no tubes need to be excluded from the voltage-based repair criteria for reasons of deformation resulting from combined LOCA and SSE loadings.

Addressing the RG 1.83 considerations, implementation of the voltage-based repair criteria will include a 100% bobbin coil probe inspection of all TSP intersections with known ODSCC down to the lowest cold leg TSP identified. This will be supplemented by a reduced operating leakage limit, enhanced eddy current data analysis guidelines, MRPC inspection

Document Control Desk
November 8, 1994
Attachment 1, Page 10

requirements and a projected EOC voltage distribution. It is concluded that the proposed change will not result in a significant reduction in the margin of safety.

ENVIRONMENTAL CONSIDERATIONS

This proposed amendment involves a change to the inspection requirements with respect to the installation or use of a facility component located within the restricted area. Wisconsin Public Service Corporation has determined that the proposed amendment involves no significant hazards considerations and no significant change in the types of any effluent that may be released off site and that there is no significant increase in individual or cumulative occupational radiation exposure. Accordingly, this proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). This proposed amendment also involves changes in record keeping, reporting or administrative procedures or requirements. Accordingly, with respect to these items, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(10). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with this proposed amendment.