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SUBJECT: Proposed Amend 144b to License DPR-43, allowing laser-welded repair of Westinghouse hybrid expansion joint sleeved SG tubes. Non-proprietary & proprietary repts encl. Proprietary repts withheld.

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WISCONSIN PUBLIC SERVICE CORPORATION

600 North Adams • P.O. Box 19002 • Green Bay, WI 54307-9002

April 22, 1997

10 CFR 50.90

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

Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Proposed Amendment 144b to the Kewaunee Nuclear Power Plant Technical Specifications:
Laser Welded Repair of Degraded Westinghouse Hybrid Expansion Joint Sleeves

- References:
- 1) Letter from C.R. Steinhardt (WPSC) to U.S. Nuclear Regulatory Commission dated April 18, 1996.
 - 2) Letter from C.R. Steinhardt (WPSC) to U.S. Nuclear Regulatory Commission dated September 6, 1996.
 - 3) Letter from M.L. Marchi (WPSC) to U.S. Nuclear Regulatory Commission dated January 23, 1997.

Wisconsin Public Service Corporation (WPSC) is submitting this proposed Technical Specification (TS) amendment to allow a laser-welded repair of Westinghouse hybrid expansion joint sleeved steam generator (SG) tubes. This proposed TS amendment request replaces PA 144, submitted on September 6, 1996, and PA 144a, submitted January 23, 1997, in their entirety. The proposed repair process is to fuse the tube to the sleeve in the upper joint of the existing hybrid expansion joint (HEJ) sleeved tubes. The repair weld can be made in either the hardroll expansion, or upper hydraulic expansion region of the HEJ. By fusing the tube to the sleeve, parent tube degradation below the weld is isolated and a new pressure boundary is formed. The new pressure boundary satisfies both the structural and leakage integrity requirements of the sleeved tube assembly with no change in the flow or heat transfer characteristics of the sleeved tube.

Laser-welded repair efforts have been in-progress since November 1996 in the Kewaunee Nuclear Power Plant (KNPP) SGs. A number of difficulties have been encountered during the repair efforts. WPSC, Westinghouse and the NRC have met several times to discuss the status of the LWR efforts and actions taken to address the issues identified. These meetings took place on October 10, 1996; December 17, 1996; January 14, 1997; March 24, 1997; and April 14, 1997.

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April 22, 1997
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At the March 24, and April 14, 1997, meetings, WPSC and Westinghouse presented the root cause evaluation performed to determine why a number of the welds in the hydraulic expansion region sheared during the post-weld stress relief process, and the basis for why welds with acceptable non-destructive examination test results are safe to place in-service. The technical basis for determining acceptability of the LWR process is documented in WCAP-14685, Revision 2, "Laser Weld Repair of Hybrid Expansion Joint Sleeves for Kewaunee Nuclear Power Plant," and Addendum 1 to WCAP-14685, "Evaluation of Weld Repaired HEJ Sleeved Tubes," both dated April 1997.

This proposed amendment affects TS section 4.2.b, "Steam Generator Tubes." Attachment 1 contains background information, a description of the proposed change, a safety evaluation, the no significant hazards determination and environmental considerations. Attachment 2 contains the affected TS pages. Attachment 3 contains WCAP-14685, Revision 2 (proprietary and non-proprietary versions), Addendum 1 (non-proprietary), and the accompanying affidavit request.

In accordance with the requirements of 10 CFR 50.36(b), this submittal has been signed and notarized. A copy of this submittal has been transmitted to the State of Wisconsin as required by 10 CFR 50.91(b)(1). Please contact a member of my staff if you have any questions or require additional information.

Sincerely,

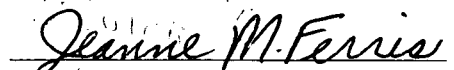


C. R. Steinhardt
Senior Vice President-Nuclear Power

SLB
Attach.

cc - US NRC - Region III
Senior Resident Inspector, US NRC
Mr. Lanny Smith, PSCW

Subscribed and Sworn to
Before Me This 22nd Day
of April, 1997



Notary Public, State of Wisconsin

My Commission Expires:
June 13, 1999

ATTACHMENT 1

Letter from C. R. Steinhardt (WPSC)

To

Document Control Desk (NRC)

Dated

April 22, 1997

Proposed Amendment 144b

Background
Description of Proposed Change
Safety Evaluation
Significant Hazards Determination
Environmental Considerations

INTRODUCTION

Wisconsin Public Service Corporation (WPSC) is submitting this proposed Technical Specification (TS) amendment request to allow a laser-welded repair (LWR) of Westinghouse hybrid expansion joint (HEJ) sleeved steam generator (SG) tubes. This proposed TS amendment request replaces PA 144, submitted on September 6, 1996, and PA 144a, submitted on January 23, 1997, in their entirety.

The proposed repair process, illustrated on Figure 1, is performed by fusing the parent tube and the sleeve using an autogenous laser welding technique. The repair weld is formed in either the approximate mid-point of the hardroll (HR), or in the upper hydraulic expansion (HE) of the upper HEJ. By fusing the sleeve to the tube, parent tube degradation below the weld location is isolated and a new pressure boundary is formed. The new pressure boundary (the weld) satisfies both the structural and leakage integrity requirements of the sleeved tube assembly with no change in the flow or heat transfer characteristics of the sleeved tube. Extensive testing and analytical work has been performed by WPSC and Westinghouse to demonstrate the acceptability of the LWR process. The results of this work are documented in the reports SGO-ATD-96-13, "Interim Report on Laser Weld Repair of Hybrid Expansion Joint Sleeves," dated April 4, 1996; WCAP-14685, Revision 2, "Laser Weld Repair of HEJ Sleeves for Kewaunee Nuclear Power Plant," dated April 1997; and Addendum 1 to WCAP-14685, "Evaluation of Weld Repaired HEJ Sleeved Tubes," dated April 1997.

BACKGROUND

The KNPP has two Westinghouse Model 51 SGs with 7/8" OD tubing. The KNPP SGs have been experiencing tube wall degradation attributed to outside diameter intergranular attack and outside diameter stress corrosion cracking (ODSCC). As a result of this degradation, significant tube plugging and sleeving have been required. Tube plugging initially began in 1983 as a corrective measure. During the 1988 and 1989 outages a large scale preventative sleeving program was implemented in the hot leg tubesheet crevice region. All of the sleeves installed were Westinghouse mechanical HEJs. Additional sleeving occurred in 1991 using the Westinghouse HEJs, and in 1992 with the Combustion Engineering welded sleeves. As a result of these sleeving programs a total of 2195 HEJs and 12 CE sleeves were installed in SG A, and 2133 HEJs and 4 CE sleeves were installed in SG B.

During the 1994 refueling outage the upper HEJs were inspected using the I-coil, a motorized rotating pancake coil (MRPC) probe developed for sleeve inspections. A total of 77 circumferential crack-like indications were detected in the parent tubes; i.e., PTIs. Sixty-six of the indications were within the pressure boundary as defined in the KNPP TSs and were removed from service by plugging the tubes. The remaining 11 indications were below the upper joint pressure boundary. In 1995, the upper HEJs were inspected with the MRPC +point probe.

During this inspection 753 PTIs were detected; 657 in the TS defined pressure boundary and 92 below the pressure boundary. The 657 PTIs located within the defined pressure boundary were removed from service by plugging the tubes. Three HEJs with PTIs were removed for testing and destructive evaluation.

On September 21, 1996, the KNPP shut down for a refueling and SG tube inspection outage. As a part of the planned outage work scope, plugs were removed from 550 previously plugged HEJ sleeved tubes. All of the in-service and unplugged HEJs were inspected using the +point probe. The results of this eddy current inspection found 1202 HEJ sleeved tubes in SG A, and 708 HEJ sleeved tubes in SG B, with PTIs within the pressure boundary as defined in TS 4.2.b.4.b. Based on the number of tubes affected, KNPP elected to perform a laser welded repair and removed seven (7) of the HEJs with PTIs for structural and leakage testing. A proposed TS amendment request to allow the LWR was submitted to the NRC staff on September 6, 1996, and presented at a meeting on October 10, 1996. The original amendment request specified the weld location as the approximate center of the upper HEJ hardroll (HR) expansion. The technical basis for the HR repair welding process was presented in WCAP-14685, Revision 0, dated August 1996.

Welding in the HR region of the upper HEJs was performed in the KNPP SGs during November and early December of 1996. During the HR welding effort difficulties were encountered with poor weld quality and conflicting eddy current results. WPSC stopped the repair efforts in early December until improvements could be made in weld quality, and the eddy current differences were resolved. The plan for addressing these issues was discussed with the NRC staff in a meeting on December 17, 1996.

During the December 1996 and early January 1997 time frame, significant resources were expanded by both WPSC and Westinghouse to resolve these two issues with close to 350 weld samples being prepared to support the program. As a result of this effort, weld process changes were made and a new welding specification was qualified in accordance with the requirements of the ASME Code for performing welded repairs. The most significant change to the welding process was to move the weld location from the HR expansion, to the upper hydraulic expansion (HE) region. With regard to the eddy current inspection issue, WPSC elected to use the +point probe to verify weld integrity. The results of the weld quality improvement and eddy current inspection efforts were presented to the NRC staff in a meeting on January 14, 1997. In addition, the NRC performed a follow-up visit to the Westinghouse Waltz Mill site to review the +point qualification work on January 22 and 23, 1997. WCAP-14685 was revised to reflect welding in both the HR and HE locations. WCAP-14685, Revision 1, was submitted to the NRC as PA 144a on January 23, 1997.

Welding in the HE location proceeded during January employing the sequence of welding, ultrasonic (UT) inspection of the weld, post-weld stress relief, and then +point eddy current (ECT) inspection. Based on the UT and ECT data there was a high acceptance rate for the HE

LWRs. On January 31, 1997, the secondary side of SG B was filled in preparation for plant start-up and shortly thereafter four tubes with HEJs that had been weld repaired were noted to be either dripping water or wet. Steam Generator A was then filled and a number of LWR sleeved tubes were also noted to also have indications of dripping. Video inspection of the dripping tubes showed that the leakage appeared to be from the annulus between the sleeve and tube; i.e., over the top rim of the sleeve ID. Immediate actions were taken to re-inspect, with both UT and ECT, the tubes which appeared to be dripping. This re-inspection revealed no change in the ECT data, but there was a significant change in the UT data.

Based on the change in UT data, all of the tubes that received a LWR in either the HR or HE location were re-inspected with UT. The results of the re-UT inspection showed that a number of the welds located in the HE region which were initially acceptable (UT and ECT) exhibited insufficient weld width, or an apparent lack of fusion between the sleeve and tube, following the post-weld stress relief application. This information was reported to the NRC in accordance with 10 CFR 50.73 in Licensee Event Report 97-002, dated March 7, 1997.

A number of actions were taken as a result of finding the degradation in the HE welds. A total of six (6) LWR tubes (five with HE welds and one with a HR weld) were removed to determine the leakage path, root cause of the weld failure and to validate the UT and ECT data. The LWR tubes pulled represented a range of UT conditions. The HR welded tube and four (4) of the HE welded tubes were destructively examined and structurally tested.

The destructive examination of the pulled tubes revealed the presence of small hot cracking at the weld/sleeve/tube interface. The cracking was the result of imposed stresses at high temperature conditions possibly exacerbated by the presence of contaminants in the weld pool. In the case of the welds located in the HR, the far-field stresses are evenly distributed across the weld and the weld remained intact during the post-weld stress relief. For the HE welds, the stress level is not evenly distributed across the weld and some of the welds mechanically sheared during the post-weld stress relief process. The destructive examination results also showed that the UT correlated well with the actual weld condition, i.e., the UT was detecting the areas of weld shearing by indicating that insufficient weld width existed. Moreover, the structural testing demonstrated that in locations where the UT determined the weld to be acceptable, there was sufficient structural margin relative to the three times normal operating pressure differential guideline of RG 1.121.

A status report on the root cause work was presented to the NRC in a meeting on March 24, 1997, and the NRC visited the Westinghouse Science and Technology Center on April 8 and 9, 1997, to review the destructive examination and structural test results in detail. The completed root cause evaluation and basis for why there are no significant safety issues associated with placing HR and HE welds in-service that have acceptable UT and ECT was presented to the NRC staff at a meeting on April 14, 1997.

Full tube primary side leak tests (insitu) was performed in SG A on March 28 and 29, and in SG B April 19, 1997. The insitu pressure testing was performed on welds with both acceptable and unacceptable UT indications. The results of the insitu pressure testing from SG A were presented to the NRC staff in a meeting on April 14, and the results of the insitu pressure testing in SG B were presented to the staff in a meeting on April 21, 1997. In summary, the insitu testing showed that welds with acceptable UT indications did not leak at up to main steam line break differential pressures, and welds with unacceptable UT indications either did not leak, or leaked at a very low rate. All of the insitu leak test data is documented in WCAP-14685, Addendum 1.

Based on the results of the root cause evaluation, the structural testing, the insitu leakage testing, and the analytical evaluation, there are no safety issues associated with operating the KNPP with LWRs in-service that are acceptable based on the post-weld stress relief NDE. The basis for this conclusion was discussed in detail at the April 14, 1997, meeting and is documented in WCAP-14685, Revision 2, Addendum 1, "Evaluation of Weld Repaired HEJ Sleeved Tubes." In addition to providing the supplemental safety evaluation information, WCAP-14685, Revision 2, requires that the UT inspection be performed after the post-weld stress relief step to determine final weld acceptability and the corrosion assessment information for the HE welds has been relocated from Section 5 to the Addendum.

WCAP-14685, Revision 2, discusses the ability to perform an in-board repair weld if welding at the first (outboard) location in either the HE or HR is not successful. The in-board repair weld was not performed at KNPP and will not be attempted at any time in the future.

Provided below is a description of the proposed change, a safety evaluation, a 10 CFR 50.92 significant hazards determination and an environmental considerations statement. Attachment 2 contains the affected TS pages and Attachment 3 contains WCAP-14685, Revision 2 and Addendum 1.

DESCRIPTION OF PROPOSED CHANGE

This proposed amendment request will modify KNPP TS 4.2.b, "Steam Generator Tubes," and the associated bases to permit a laser-welded repair of HEJ sleeved tubes. Specifically the changes are as follows:

- 1) TS 4.2.b is being revised to add a definition for "Laser Weld Repaired Sleeved Tube",
- 2) New TS 4.2.b.2.e is being proposed to specify the in-service requirements for laser weld repaired sleeved tubes,
- 3) Table TS 4.2-3 on repaired tube inspections is being revised to allow repair or plugging of previously repaired steam generator tubes,

- 4) TS 4.2.b.4.a is being revised to allow steam generator tube repair in accordance with WCAP-14685, Revision 2 and Addendum 1,
- 5) TS 4.2.b.4.b is being revised to reflect a sleeve wall plugging limit of 24%, and
- 6) The associated basis section is being revised to discuss HEJ sleeved tube repair.

SAFETY EVALUATION

Currently, SG tubes at KNPP with indications of degradation in excess of the repair criteria are removed from service by plugging or repaired by sleeving. Removal of tubes from service results in a reduction of reactor coolant flow through the SG. This reduction in flow can have a significant impact on the margins of reactor coolant flow through the SG in the loss-of-coolant accident (LOCA) and non-LOCA analyses, and on the heat transfer efficiency of the SGs.

The purpose of this amendment request is to allow laser-weld repair of HEJ sleeved tubes. The LWR tubes must have acceptable ECT results based on examination with the +point probe, and UT results following application of the post-weld stress relief process. Extensive testing and analysis has been performed to demonstrate that the LWR joint has adequate structural and leakage integrity. Based on the results of analytical evaluations, structural testing on actual pulled LWR tube and insitu leakage testing data performed in the KNPP SGs, there are no significant safety issues associated with operating KNPP with the LWRs in-service. The details of the safety evaluation are contained in WCAP-14685, Revision 2, and Addendum 1.

In support of this proposed TS amendment request the following information is summarized below:

- Generic Structural Assessment
- Leakage Assessment
- Corrosion Assessment
- Conclusion

Generic Structural Assessment

The weld repair process, as described in WCAP-14685, Revision 2, has been evaluated to Section III, Subsection NB-3200, of the 1989 Edition of the ASME Code, and includes the fatigue and stress analyses of the repaired HEJ sleeved tube assembly for both the HE and HR weld locations. WCAP-14685 also discusses performing an inboard repair weld at both the HE and HR weld locations should the outboard weld not be successful. The inboard repair welds were not performed in the KNPP SGs and will not be attempted in the future.

The sleeve and weld structural analysis uses a generic set of design and transient loading inputs which are intended to bound all plants with Westinghouse model 51 SGs. The temperature and pressure variances used in the assumed operating conditions and generic transients are conservative when compared to the KNPP operating conditions. The structural evaluation considers the effect of operation on the assembly by considering cases of free and fixed tube support plate conditions and intact and separated tube conditions upon the applied stress. The results of the primary stress evaluation, primary plus secondary stress intensity range evaluation and fatigue evaluation indicate that the ASME Code allowable limits for the repair weld, sleeve and tube are not exceeded. That is, stress intensities are bounded by the Code minimum limits for SB-163 material and the cumulative usage factor is less than 1.0.

Draft Regulatory Guide 1.121, "Bases for Plugging Degraded PWR Steam Generator Tubes" and the ASME Code are used to develop the plugging limit of the sleeve determined by the NDE, should sleeve wall degradation occur. Potentially degraded sleeves are shown (by analysis) to retain burst strength in excess of three times the normal operating pressure differential at the end of cycle conditions. No credit for the presence of the parent tube behind the sleeve is assumed when performing the minimum wall/burst evaluation.

An ultrasonic inspection is performed following the post-weld stress relief step prior to placing the weld into operation. The UT inspection is used to verify that the minimum acceptable fusion zone thickness of the weld is present. This minimum acceptable fusion zone thickness has been shown by analysis to satisfy the requirements of the ASME Code with regard to acceptable stress levels and fatigue usage during operating and accident conditions. The loading cycles that were applied to the repaired sleeve assemblies were those for a 40-year life cycle. Therefore, the fatigue analysis is conservative for the KNPP.

A total of six (6) LWRs were pulled from the KNPP SGs; five (5) tubes with HE welds and one (1) tube with a HR weld. Actual structural testing was performed on weld sections. This testing demonstrated that welds with acceptable ECT and UT were structurally sound and exceeded the three times normal operating pressure differential criteria recommended by RG 1.121.

The plugging limit for the HEJ sleeve was determined by updating the minimum wall thickness calculations using the ASME Code minimum material properties and the KNPP specific steam pressure and temperature. At the time of licensing the HEJ sleeves for KNPP, the accepted practice was to use the lower tolerance limit material properties for Alloy 690 as determined by Westinghouse. Since then, sleeve plugging limit methodology has been to use the ASME Code minimum material property values for the plugging limit determination. Using conservative allowances for growth and NDE uncertainty, the HEJ sleeve plugging limit for repaired and non-repaired sleeves has been determined to be 24% throughwall.

Leakage Assessment

WPSC will not place any known or suspected leaking LWR tubes in service.

The LWR joint uses an autogenous tube-to-sleeve weld similar to that used for laser welded sleeves. Leakage testing of 3/4 inch and 7/8 inch full length laser welded sleeve tube assemblies under conditions considered to be more severe than expected during all operating plant conditions has shown that the laser weld does not introduce any primary-to-secondary leakage during a postulated steam line break event. In addition, six (6) pulled LWRs leak tested in the laboratory, and 18 tubes that were insitu leak tested demonstrated that welds with acceptable ECT and UT are leak tight at up to main steam line break differential pressures.

Previously submitted data regarding the lower HEJ indicates that the lower joint will remain leak tight during all operating and faulted plant conditions. Therefore, the repair process does not introduce additional primary-to-secondary leakage during faulted conditions, and laser weld repaired tubes with acceptable ECT and UT do not need to be considered as leakage contributors in any offsite dose analysis. Evaluation of tubesheet deflection for the Model 51 SGs at KNPP operating conditions indicate that the joint will not experience a reduction in radial contact pressure due to tubesheet bow effects as can be experienced if the lower joint is located above the radial neutral bending axis of the tubesheet.

Corrosion Assessment

Thermally treated Alloy 600 and Alloy 690 laser welded sleeved tube assemblies have performed well historically with regard to corrosion. Accelerated test results show that the free span laser welded joint for initially installed laser welded sleeves (with post-weld stress relief) are capable of exhibiting a resistance to corrosion of greater than 10 times that of rolled tube transitions. Accelerated corrosion tests also show that non-heat treated LWS free span joints exhibit corrosion resistance equal to or greater than rolled tube transitions. These factors suggest postulated sleeve joint degradation, even in a non-heat treated condition, would occur at a relatively slow rate, and be able to be detected by routine NDE inspection prior to reaching any applicable safety margins. The free span laser welded joint heat treatment process is designed to achieve sufficient stress reduction such that rapid crack initiation and propagation in the joint is not expected.

For the purposes of the corrosion assessment, the LWRs are treated as two separate populations, the welds in the HE location and the welds in the HR location. The reason for this is that the stresses and loadings experienced during the welding and post-stress relief application were not the same due to the differing geometric configurations.

For the HR welds, accelerated corrosion testing (doped steam) was performed with bounding tube stress conditions through the use of a specially designed test flxture. This fixture is used to apply

an axial load to the tube during the corrosion test, thereby simulating locked tube stress conditions. Corrosion test pre-loads were determined by using the peak installation stresses for a LWR HEJ tube for the area above the weld and included the stress input due to pressure end cap loads. Corrosion samples were fabricated from a tube heat of Alloy 600 known to be susceptible to PWSCC. The test results, documented in Section 5 of WCAP-14685, Revision 2, demonstrate that the LWRs located in the HR location do not have a rapid corrosion potential as measured against roll transition control samples and reported times to crack within the industry and at KNPP.

For the HE welds, a corrosion assessment was performed based on the results of the pulled tube data and information from LWRs performed at the Doel 4 plant. The corrosion assessment is documented in Section 8.0 of Addendum 1 to WCAP-14685. The results of the pulled tubes destructive examinations of the HE welds found that the parent tube exhibited a bulge on the order of 0.010 to 0.015 inches in the region of the weld, and there were small hot cracks present in the weld fusion zone. The hot cracks started at the sleeve/tube interface and extended into the weld metal. A review of the information from Doel 4 concluded that the presence of the bulges does not represent a condition which will aggravate stress corrosion at the weld location. Results of the pulled tube destructive examination verified that the weldment was Alloy 690 which is generally immune to PWSCC. Therefore the cracks are not expected to propagate in-service.

Conclusion

Based on the results of the root cause evaluation, the structural testing, the insitu leakage testing and analytical evaluations, there are no safety issues associated with operating the KNPP with LWRs in-service that have acceptable UT and ECT results.

SIGNIFICANT HAZARDS DETERMINATION

This proposed change was reviewed in accordance with the provisions of 10 CFR 50.92 to show no significant hazards exists.

- 1) Operation of the KNPP in accordance with the proposed license amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The laser weld repair of HEJ sleeved tubes in either the HR or HE location will not affect the tube, sleeve or weld stress conditions or fatigue usage factors such that the limits of the ASME Boiler and Pressure Vessel Code are exceeded. Accelerated corrosion testing performed on prototypic HR welds, and a corrosion assessment performed for the HE welds concluded that the repair welds will not result in aggravated stress corrosion cracking at the weld-repair location. Any postulated sleeve joint degradation would occur at a relatively slow rate and would be

detectable by routine NDE inspection prior to reaching any applicable safety margins. Therefore, use of the laser-weld repair process will not result in an increased probability of an accident previously evaluated.

A post-weld stress relief UT inspection is required to verify minimum acceptable weld thickness to ensure that weld stresses do not exceed ASME Code limits for both stress intensity and fatigue usage. Leakage testing of LWS joints, and insitu leakage testing of the LWRs at KNPP, demonstrate a leak tight joint at pressures up to main steam line break. Mechanical testing of 7/8 inch laser welded tubesheet sleeves installed in roll expanded tubes has shown that the individual joint structural strength of Alloy 690 laser welded sleeves under normal, upset and faulted conditions provides margin to acceptable limits. These acceptable limits bound the most limiting (3 times normal operating pressure differential) recommended by RG 1.121.

The HEJ sleeve plugging limit as currently defined in TSs is reduced from 31% to 24% throughwall due to the use of ASME code minimum material properties values for the sleeve material. Minimum wall thickness requirements (used for developing the depth based plugging limit for the sleeve) are determined using the guidance of RG 1.121 and the pressure stress equation of Section 3 of the ASME Code.

The hypothetical consequences of failure of the laser-welded repaired HEJ would be bounded by the current SG tube rupture analysis covered in the KNPP Updated Safety Analysis Report. Due to the slight reduction in diameter caused by the sleeve wall thickness, primary coolant release rates would be slightly less than assumed for the SGTR, and therefore would result in lower primary fluid mass release to the secondary system. The laser weld repair process does not change the existing reactor coolant system flow conditions; therefore, existing LOCA and non-LOCA analysis results will be unaffected. Plant response to design basis accidents for the current tube plugging and flow conditions are not affected by the repair process; no new tube diameter restrictions are introduced. Therefore, the application of the repair weld will not increase the consequences of a previously evaluated accident.

- 2) The proposed license amendment request does not create the possibility of a new or different kind of an accident from any accident previously evaluated.

Application of laser-welded repair for the HEJ sleeved tubes will not introduce significant or adverse changes to the plant design basis. The general configuration of the HEJ sleeve is unaffected by the repair process. The repair process also does not represent a potential to affect any other plant component. Stress and fatigue analysis of the repair has shown that the ASME Code and RG 1.121 criteria are not exceeded. Application of the laser weld repair to the HEJ sleeved tubes maintains overall tube bundle structural and leakage integrity. Extensive testing and evaluation including examination of actual pulled tube samples verified adequate structural and leakage integrity of repair HEJs which had acceptable NDE.

Any hypothetical accident as a result of potential tube or sleeve degradation in the repaired portion of the joint is bounded by the existing tube rupture accident analysis. Therefore, use of the laser-welded repair process will not create the possibility of a new or different kind of accident from any accident previously evaluated.

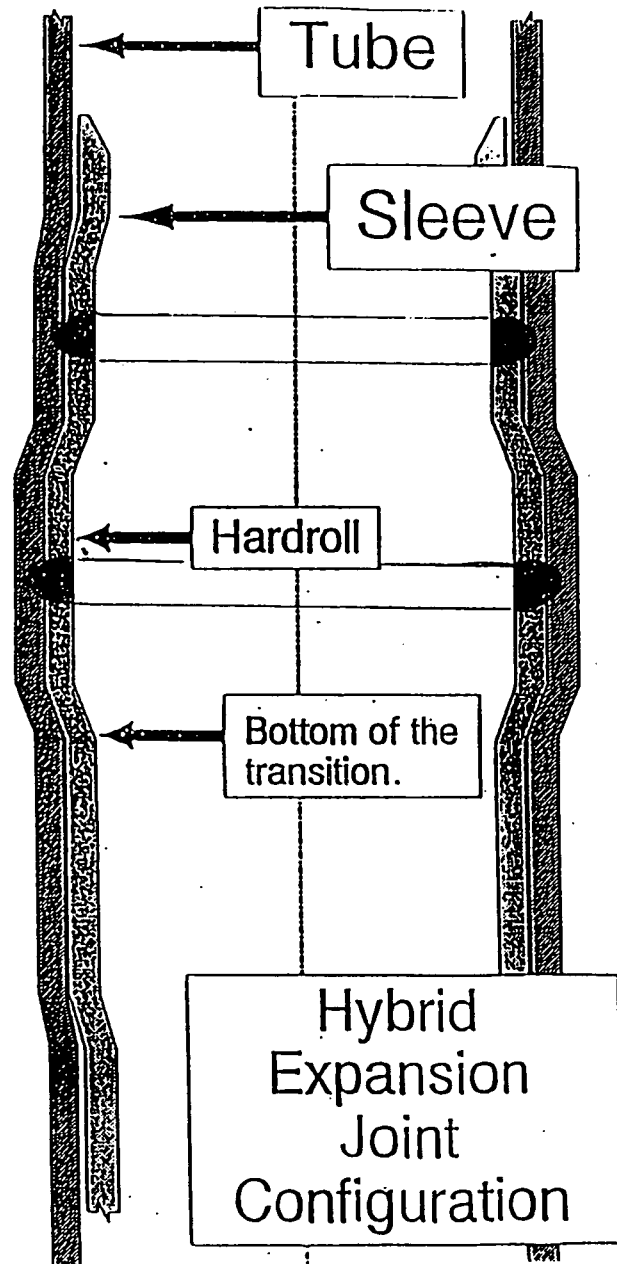
- 3) The proposed license amendment does not involve a significant reduction in the margin of safety.

The laser weld repair of the HEJ sleeved tubes has been shown to restore integrity of the tube bundle consistent with its original design basis conditions; i.e., tube/sleeve operational and faulted load stresses and cumulative fatigue usage factors are bounded by the ASME Code requirements and the tubes are leak tight under all plant conditions. Based on the results of the structural and leakage testing performed on LWR joints pulled from the KNPP SGs, and supporting analytical evaluations, application of laser-welded repair will not result in a significant reduction in the margin of safety.

ENVIRONMENTAL CONSIDERATIONS

This proposed amendment request involves a change to the inspection requirements with respect to the installation or use of a facility component located within the restricted area. WPSC has determined that the proposed amendment request involves no significant hazards consideration and no significant change in the types of effluent that may be released offsite 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 equipment. 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.

FIGURE 1



ATTACHMENT 3

Letter from C. R. Steinhardt (WPSC)

To

Document Control Desk (NRC)

Dated

April 22, 1997

Proposed Amendment 144b

WCAP-14685, Revision 2
WCAP-14686, Revision 2
WCAP-14685, Addendum 1
Affidavit Request