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Baltimore Gas and Electric Company
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BGE

November 30, 1995

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
License Amendment Request: Sleeving Option for Steam Generator Tube Repair

Pursuant to 10 CFR 50.90, the Baltimore Gas and Electric Company (BGE) hereby requests an Amendment to Operating License Nos. DPR-53 & DPR-59 to allow the installation of tube sleeves as an alternative to plugging to repair defective steam generator tubes.

Currently, the Calvert Cliffs Technical Specifications only allow defective tubes to be plugged and removed from service. The installation of steam generator tube plugs removes the heat transfer surface of the plugged tubes from service, and leads to a reduction in the primary coolant flow available for core cooling. The proposed amendment will revise the appropriate Technical Specifications and their Bases to permit tube sleeving repair techniques developed by Westinghouse Electric Corporation and ABB Combustion Engineering, Inc. (ABB-CE) to be used at Calvert Cliffs. Sleeving is a steam generator tube repair method where a length of tubing (sleeve), having an outer diameter slightly smaller than the inside of the steam generator tube, is installed spanning the degraded region of the parent tube. Installation of steam generator sleeves does not greatly affect the heat transfer capability or the primary coolant flow rate through the tube being sleeved; therefore, a large number of sleeves can be installed without significantly affecting the operation of the Reactor Coolant System. The sleeve spans the degraded section of the tube and maintains the structural integrity of the steam generator tube under normal and accident conditions.

The detailed safety analysis for the proposed sleeving repair techniques is provided in Attachment (A-1). Baltimore Gas and Electric Company has evaluated the proposed revision to the Calvert Cliffs Technical Specifications and has determined that it does not involve a significant hazards consideration as defined in 10 CFR 50.92 (refer to Attachment A-2 for a complete discussion). Attachments (A-3) and (A-4) provide the Technical Specifications marked-up pages for Units 1 and 2, respectively. The detailed report on the specific qualifications of the Westinghouse and ABB-CE sleeves for Calvert Cliffs application are documented in Attachments (B-2)-(B-5) and (C-2)-(C-3), respectively. As Attachments (B-2), (B-4), and (C-2) contain information proprietary to Westinghouse and ABB-CE, they are accompanied by affidavits

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(Attachments B1 and C1) signed by Westinghouse and ABB-CE, the owners of the information. The affidavits set forth the basis on which the information may be withheld from public disclosure by the Commission, and addresses with specificity the considerations listed in 10 CFR 2.790(b)(4). Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse and ABB-CE be withheld from public disclosure.

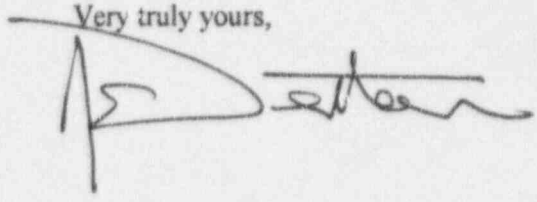
In addition, BGE has determined that operation with the proposed amendment would not result in any significant change in the types, or significant increases in the amounts, of any effluents that may be released offsite, nor would it result in any significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed amendment is eligible for categorical exclusion as set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment is needed in connection with the approval of the proposed amendment.

These proposed changes to the Technical Specifications and our determination of no significant hazards have been reviewed by our Plant Operations Safety Review Committee and Offsite Safety Review Committee, and they have concluded that implementation of these changes will not result in an undue risk to the health and safety of the public.

Baltimore Gas and Electric Company wishes to have sleeving as an option to repair defective steam generator tubes during the upcoming Unit 1 refueling outage, scheduled to begin on March 15, 1996. Therefore, BGE requests that the NRC review and approve the proposed amendment on or before March 15, 1996. It is important to note that both the Westinghouse and the ABB-CE sleeving techniques have been previously approved for use at power plants similar to Calvert Cliffs, such as the Maine Yankee Nuclear Power Plant.

Should you have questions regarding this matter, we would be pleased to discuss them with you.

Very truly yours,



STATE OF MARYLAND :
: **TO WIT:**
COUNTY OF CALVERT :

I hereby certify that on the 30th day of November, 1995, before me, the subscriber, a Notary Public of the State of Maryland in and for Calvert County, personally appeared Robert E. Denton, being duly sworn, and states that he is Vice President of the Baltimore Gas and Electric Company, a corporation of the State of Maryland; that he provides the foregoing response for the purposes therein set forth; that the statements made are true and correct to the best of his knowledge, information, and belief; and that he was authorized to provide the response on behalf of said Corporation.

WITNESS my Hand and Notarial Seal:

Donna L. McCready
Notary Public

My Commission Expires:

January 1, 1998
Date

RED/GT/dlm

Attachments:
- (A-1) Summary Description and Safety Analysis
- (A-2) Determination of No Significant Hazards
- (A-3) Unit 1 Marked-Up Technical Specification Pages
- (A-4) Unit 2 Marked-Up Technical Specification Pages
- (B-1) Westinghouse Authorization Letter, CAW-95-899, Accompanying Affidavit, Proprietary Information Notice, and Copyright Notice
- (B-2) Proprietary Westinghouse Report WCAP-13698, Revision 2; "Laser Welded Sleeves for 3/4 Inch Diameter Tube Feedring-Type and Westinghouse Preheater Steam Generators, Generic Sleeving Report," April 1995
- (B-3) Non-Proprietary Westinghouse Report WCAP-13699, Revision 2; "Laser Welded Sleeves for 3/4 Inch Diameter Tube Feedring-Type and Westinghouse Preheater Steam Generators, Generic Sleeving Report," April 1995
- (B-4) Proprietary Westinghouse Report WCAP-14469; "Specific Application of Laser Welded Sleeving for the Calvert Cliffs Power Plant Steam Generators," November 1995
- (B-5) Non-Proprietary Westinghouse Report WCAP-14470; "Specific Application of Laser Welded Sleeving for the Calvert Cliffs Power Plant Steam Generators," November 1995
- (C-1) ABB Combustion Engineering Proprietary Affidavit for Attachment C-2, Pursuant to 10 CFR 2.790
- (C-2) Proprietary ABB Combustion Engineering Report CEN-626-P, Revision 00; "Baltimore Gas and Electric Calvert Cliffs Station Units 1 and 2 Steam Generator Tube Repair Using Leak Tight Sleeves," September 1995
- (C-3) Non-Proprietary ABB Combustion Engineering Report CEN-626-NP, Revision 00; "Baltimore Gas and Electric Calvert Cliffs Station Units 1 and 2 Steam Generator Tube Repair Using Leak Tight Sleeves," September 1995

cc: D. G. McDonald, Jr., NRC

(Without Attachments)
D. A. Brune, Esquire
J. E. Silberg, Esquire
L. B. Marsh, NRC
T. T. Martin, NRC
Resident Inspector, NRC
R. I. McLean, DNR
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ATTACHMENT (A-1)

SUMMARY DESCRIPTION AND SAFETY ANALYSIS

Baltimore Gas & Electric Company
Docket Nos. 50-317 and 50-318
November 30, 1995

ATTACHMENT A-1

SUMMARY DESCRIPTION AND SAFETY ANALYSIS

A. BACKGROUND

Pressurized water reactor (PWR) steam generators (SGs) have experienced tube degradation related to corrosion phenomena, such as wastage, pitting, intergranular attack, stress corrosion cracking and crevice corrosion, along with other phenomena such as denting and vibration wear. Tubes that experience excessive degradation reduce the integrity of the primary-to-secondary pressure boundary. Eddy current examination is used to measure the extent of tube degradation. When the reduction in tube wall thickness reaches a calculated value commonly known as the plugging criteria, the tube is considered defective and a corrective action is taken.

Currently, the corrective action taken at many PWRs, including Calvert Cliffs, is to remove the degraded tube from service by installing plugs at both ends of the tube. The installation of SG tube plugs removes the heat transfer surface of the plugged tube from service, and leads to a reduction in the primary coolant flow available for core cooling. Sleeving is a SG tube repair method where a length of tubing (sleeve) having an outer diameter slightly smaller than the inside of the SG tube is installed inside the parent tube spanning the degraded region. Installation of SG sleeves does not greatly affect the heat transfer capability or the primary coolant flow rate through the tube being sleeved; therefore, a large number of sleeves can be installed without significantly affecting the operation of the Reactor Coolant System. The sleeve spans the degraded section of the tube and maintains the structural integrity of the SG tube under normal and accident conditions, and limits or prevents primary-to-secondary leakage through the sleeved section of the tube should the degradation deteriorate into a through-wall crack.

B. DESCRIPTION OF AMENDMENT REQUEST

The proposed amendment would revise the Technical Specifications Surveillance Requirements for the Calvert Cliffs Nuclear Power Plant SG tubing (Technical Specifications Section 4.4.5 and associated Bases). This revision would allow the use of Westinghouse and ABB Combustion Engineering (ABB-CE) sleeves to repair defective SG tubes. The marked-up Technical Specification pages in Attachments A-3 and A-4 (for Units 1 and 2, respectively) provide the details of the proposed changes. The wording used in the Technical Specification markup is similar to the wording used by previous applicants, such as Arizona Public Service Company which submitted an application for its Palo Verde Nuclear Generating Station on April 18, 1995.

[NOTE: In previous Safety Evaluation Reports on sleeving repair, the Commission has required reduction of SG leakage limit from 500 gpd per SG, to 150 gpd per SG. Since Baltimore Gas and Electric Company has already implemented a change to Technical Specification 3.4.6.2 adopting a 100 gpd per SG leakage limit (NRC Safety Evaluation Report, dated July 13, 1992), the implementation of sleeving repair at Calvert Cliffs will not affect this Specification.]

C. SAFETY ANALYSIS

The principal accident associated with this proposed change is the steam generator tube rupture (SGTR) accident. The consequences associated with an SGTR event are discussed in Calvert Cliffs Updated Final Safety Analysis Report Section 14.15, "Steam Generator Tube Rupture

Event." The SGTR event is a penetration of the barrier between the Reactor Coolant System and the Main Steam System. The integrity of this barrier is significant from the standpoint of radiological safety in that a leaking SG tube allows the transfer of reactor coolant into the Main Steam System. Radioactivity contained in the reactor coolant mixes with water in the shell side of the affected SG. This radioactivity is transported by steam to the turbine and then to the condenser, or directly to the condenser via the turbine bypass valves, or directly to the atmosphere via the atmospheric dump valves. Noncondensible radioactive gases in the condenser are removed by the condenser priming and air removal system and discharged to the plant vent. Use of the tube sleeving process will allow the repair of degraded SG tubes such that the function and integrity of the tube is maintained; therefore, the SGTR accident is not affected by sleeving.

The hypothetical consequences of failure of the sleeved tube would be bounded by the current SGTR analysis described above. 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 analysis (depending on the break location), and therefore, would result in lower total primary fluid mass release to the secondary system. Combinations of tubesheet sleeves and tube support plate sleeves would reduce the primary fluid flow through the sleeved tube assembly due to the series of diameter reductions the fluid would have to pass on its way to the break area. The overall effect would be reduced SGTR release rates.

The proposed Technical Specification change to allow the installation of Westinghouse and ABB-CE sleeves does not adversely impact any other previously evaluated design basis accident. The material selected for both types of sleeves is thermally treated Alloy 690 due to its enhanced corrosion resistance properties. The structural analyses of the sleeves demonstrate that their design meets all applicable ASME Boiler and Pressure Vessel Code criteria for the SG pressure, temperature, and flow design conditions, and establishes the minimum reactor coolant pressure boundary wall thickness requirements. As summarized below and described in detail in Attachments B2-B5 and C2-C3, the results of the analyses and testing, as well as plant operating experience, demonstrate that both type of sleeves are acceptable means of maintaining tube integrity. Sleeved tube plugging limit criteria are established using the guidance of Regulatory Guide 1.121. Furthermore, per Regulatory Guide 1.83 recommendations, the sleeved tube can be monitored through periodic inspections with present eddy current techniques. These measures ensure that installation of sleeves spanning degraded areas of the tube will restore the tube to a condition consistent with its original design basis.

Westinghouse Laser Welded Sleeves

Three types of laser welded sleeves are evaluated in WCAP-13698, Revision 2 (Attachment B-2); tube support plate sleeves, tubesheet sleeves, and elevated tubesheet sleeves. These sleeve types are illustrated in Figures 2-1, 2-2, and 2-3 in Attachment (B-2).

The tube support plate sleeve is attached to the degraded tube by producing an autogenous weld between the original tube and sleeve. Tube support plate sleeve welds are produced in the free span sections of the tube. The free span welds provide the structural joint between the tube and sleeve and also provide positive (leak tight) leakage integrity.

The tubesheet sleeve is secured and supported structurally at the upper section by a free span autogenous weld performed identically to the tube support plate sleeve welds, while the tubesheet sleeve lower weld joint is a standard (previously licensed) hybrid expansion joint (HEJ) with a laser-produced seal weld. The HEJ alone provides structural integrity and a high degree of leak-tightness. The tubesheet sleeve lower joint seal weld is used for leakage prevention, and is an optional step (although test data indicates the HEJ is leak tight at plant conditions). No structural benefit is assumed by the tubesheet sleeve lower joint seal weld.

The elevated tubesheet sleeve is installed using the same processes as the standard tubesheet sleeve. The elevated tubesheet sleeve, however, is shorter in length than the standard tubesheet sleeve. The elevated tubesheet sleeve permits a greater number of tubes to be sleeved due to its shorter length, and lesser potential for obstruction by the channelhead bowl.

The Westinghouse laser welded sleeve is designed to Section III, Subsection NB-3300, of the 1989 Edition of the ASME Code. Fatigue and stress analyses of the sleeved tube assemblies have been completed in accordance with the requirements of Section III, Subsection NB-3200 of the 1989 Edition of the ASME Code. The results of the primary stress intensity evaluation, primary plus secondary stress intensity range evaluation, and fatigue evaluation indicate that the ASME Code allowables are not exceeded. Since the sleeve design meets all applicable subsections of Section III of the ASME Code, it meets the design requirements of the original tubing. Regulatory Guide 1.121, "Bases for Plugging Degraded PWR Steam Generator Tubes," is used to develop the plugging criteria for the sleeve, in the event of sleeve wall degradation. Potentially degraded sleeves are shown (by analysis) to retain burst strength in excess of three times the normal operating pressure differential at 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.

The sleeve and weld structural analysis utilized a generic set of design and transient loading inputs which are intended to bound all plants with Westinghouse Model D, E, and Combustion Engineering feedring-type SGs. The temperature and pressure variances used in the generic transients are conservative.

Eddy current and ultrasonic inspection of the sleeve is performed prior to operation. The eddy current inspection establishes baseline data on sleeve and tube. The ultrasonic inspection of the free span weld joints is used to verify that the minimum acceptable fusion zone width at the sleeve/tube interface is achieved. This minimum weld fusion zone width has been shown by analysis to satisfy the requirements of the ASME Code with regard to acceptable stress levels during operating and accident conditions. In addition, a fatigue analysis was performed for the sleeve-tube assembly with the critical location being the free span laser weld. The loading cycles that were applied to the sleeve-tube assembly analysis were those for a 40-year plant life cycle. Therefore, the fatigue analysis is conservative for an operating plant. The results of the fatigue analysis indicate acceptable usage factors for the entire range of permitted weld width.

Westinghouse Report WCAP-14469 (Attachment B-4) provides a comparison of the generic operating and transient conditions, and the current set of operating and transient conditions applicable to Calvert Cliffs. This comparison shows that the generic analysis considers a larger number of transients, and in general, more transient cycles than are applicable to Calvert Cliffs; and as such, the stress and fatigue results of WCAP-13698, Revision 2 (Attachment B-2) are

enveloping. For the transient conditions found not to be bounded by the generic analysis, the overall cumulative fatigue usage increased by less than 0.01, and the overall weld fatigue usage was found to remain well below 0.05.

Thermally-treated Alloy 600 and Alloy 690 sleeved tube assemblies have performed well historically with regard to corrosion. There are no reported instances of sleeve degradation for the greater than 35,000 HEJ sleeves, or approximately 12,000 laser welded sleeves that Westinghouse has installed in United States and European plants. Accelerated corrosion test results show the free span laser welded joint (with post-weld heat treatment) is capable of exhibiting a resistance to corrosion of greater than 10 times that of the original tube roll transition at the tubesheet. Accelerated corrosion tests also show that non-heat treated laser welded free span joints exhibit resistance to stress corrosion cracking equal to or greater than the original tube roll transition at the tubesheet. These factors suggest postulated sleeve degradation, even in a non-heat treated condition, would occur at a relatively slow rate, and be able to be detected by routine eddy current inspection without influencing applicable safety margins.

Mechanical testing of laser weld and HEJ joints indicates that the axial load bearing capability of these joints individually exceeds the most limiting pressure end cap loading established by Regulatory Guide 1.121. Both the lower laser welded joint (HEJ + seal weld) and free span laser weld joints separately have strength characteristics exceeding the structural requirements for the sleeve. Therefore, it can be postulated that a loss of structural integrity in one of the sleeve joints will not result in a loss of structural integrity for the sleeve. The sleeve structural integrity requirements include safety factors inherent to the requirements of the ASME Code. Installation of tube support plate sleeves and/or tubesheet sleeves restores the integrity of the primary pressure boundary to a condition consistent with that of the originally supplied tubing; that is, stresses are bounded by the ASME Code and the tube is leak tight.

ABB Combustion Engineering Leak Tight Sleeves

ABB Combustion Engineering provides two major types of leak tight sleeves for SG tube repair. Combustion Engineering Report CEN-626-P (Attachment C-2) describes in detail the design and testing of these sleeves for Calvert Cliffs' applicability. The sleeve material is thermally-treated Alloy 690. The first type of sleeve spans the parent SG tube at the top of the tube sheet. This sleeve is welded to the tube near the upper end of the sleeve and is hard rolled into the tube within the SG tube sheet. A shorter sleeve of the same design is used to span defective areas of a SG tube which exists just above the tube sheet. The second type of sleeve spans degraded areas of the SG tube at a tube support plate, or in a free span section of tube. This leak tight sleeve is welded to the SG tube near each end of the sleeve. The SG tube with the installed welded and/or hard rolled sleeve meets the structural requirements of tubes which are not degraded.

The sleeve dimensions, materials and joints were designed to the applicable ASME Boiler and Pressure Vessel Code. An extensive analysis and test program was undertaken to prove the adequacy of both the welded and welded-hard rolled sleeve. This program determined the effect of normal operating and postulated accident conditions on the sleeve-tube assembly, as well as the adequacy of the assembly to perform its intended function. The proposed sleeving provides for a substitution in kind for a portion of a SG tube.

Installation of ABB-CE leak tight sleeves has no significant effect on the configuration of the plant, and does not affect the way in which the plant is operated. Design criteria were established prior to performing the analysis and test program which, if met, would prove that both sleeve types are acceptable repair techniques. These criteria conformed to the stress limits and margins of safety of Section III of the ASME Boiler and Pressure Vessel Code. The safety factors of 3 for normal operating conditions and 1.5 for accident conditions were applied. Based upon the results of the analytical and test programs described in Attachment (C-2), the two sleeve types fulfill their intended function as leak tight structural members, and meet or exceed all the established design criteria.

Evaluation of the sleeved tubes indicates no detrimental effects on the sleeve-tube assembly resulting from reactor system flow, coolant chemistries, or thermal and pressure conditions. Structural analyses of the sleeve-tube assembly, using the demonstrated margins of safety, have established its integrity under normal and accident conditions. The structural analyses performed are applicable to shorter sleeves installed at the top of the tubesheet and the tube support plate sleeves which may be installed at the Calvert Cliffs Units 1 or 2. The detailed analyses for the different sleeve types and lengths are included in Section 8 of Attachment (C-2).

Welding development has been performed on clean tubing, dirty tubing which has been taken from pot boiler tests, and contaminated tubing taken from a SG. ABB Combustion Engineering installed their first welded sleeves in a demonstration program at Ringhals Unit 2 in May 1984. ABB-CE's sleeving history is shown in Table 2-1 of Attachment (C-2). Since 1985, no sleeve which has been accepted based on NDE has been removed from service due to degradation.

Mechanical tests using ASME code stress allowables were performed on mockup SG tubes containing sleeves to provide qualified test data describing the basic properties of the completed assemblies. These tests determined axial load, collapse, burst and thermal cycling capability. A minimum of three tests of each type were performed. The demonstrated load capacity of the assemblies provided an adequate safety factor for normal operating and postulated accident conditions. The load capability of the upper and lower sleeve joints is sufficient to withstand thermally-induced stresses in the weld resulting from the temperature differential between the sleeve and the tube, and pressure-induced stresses resulting from normal operating and postulated accident conditions. The burst and collapse pressures of the sleeve provide a large safety factor over limiting pressure differential. Mechanical testing revealed that the installed sleeve will withstand the cyclical loading resulting from power changes in the plant and other transients.

The effects of sleeve installation on SG heat removal capability and system flow rate are discussed in Attachment (C-2). Heat removal capability and system flow rate were considered for installation of one to three sleeves in a SG tube. After sleeves are installed, an ultrasonic and eddy current examination is performed. The ultrasonic examination is used to confirm fusion of sleeve to the tube after welding. The eddy current examination serves as baseline to determine if there is sleeve degradation in later operating years. The SG tube will be plugged if the sleeve installation is not successful, or if there is unacceptable degradation of a sleeve or sleeved SG tube. Standard SG tube plugs may be used to remove a sleeved tube from service.

Conclusion

Both Westinghouse and ABB-CE sleeves meet or exceed all applicable ASME code requirements. Based on the Regulatory Guide 1.121 guidelines for tube degradation limits, appropriate sleeved tube repair criteria have been established. Eddy current techniques are available to perform necessary sleeve and tube inspections for defect detection, and to verify proper installation of the sleeve. Available techniques are capable of providing adequate defect sensitivity in the required areas of the tube and sleeve pressure boundary. Proprietary methods described in the Westinghouse and ABB-CE reports with supporting qualification data demonstrate the inspectability of the sleeve and underlying tube. In addition, we are committing to use only qualified processes for periodic inservice inspection and will evaluate improved inspection techniques as they are developed and qualified for use.

ATTACHMENT (A-2)

DETERMINATION OF NO SIGNIFICANT HAZARDS

Baltimore Gas & Electric Company
Docket Nos. 50-317 and 50-318
November 30, 1995

ATTACHMENT (A-2)

DETERMINATION OF NO SIGNIFICANT HAZARDS

SIGNIFICANT HAZARDS EVALUATION

This evaluation of the hazards consideration involved with the proposed steam generator tube sleeving is focused on the standards set forth in 10 CFR 50.92(c):

> *The Commission may make a final determination, pursuant to the procedures in 50.91, that a proposed amendment to an operating license for a facility licensed under 50.21(b) or 50.22 or for a testing facility involves no significant hazards consideration, if the operation of the facility in accordance with the proposed amendment would not:*
>
> *1. Involve a significant increase in the probability or consequences of an accident previously evaluated; or*
>
> *2. Create the possibility of a new or different kind of accident from any accident previously evaluated; or*
>
> *3. Involve a significant reduction in a margin of safety.*

Baltimore Gas and Electric Company (BGE) believes that the operation of the Calvert Cliffs Nuclear Power Plant (CCNPP), in accordance with the proposed steam generator tube sleeving amendment, will not create the possibility of any new accident, increase the probability or consequences of any previously evaluated accident, nor significantly reduce any margin of safety. Thus, BGE has concluded that this proposed license amendment involves no significant hazards consideration as defined in 10 CFR 50.92(c).

In support of this determination, a discussion of each of the significant safety hazards consideration factors with respect to the proposed license amendment is provided.

(1) The proposed amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated.

The implementation of the proposed steam generator tube sleeving has been reviewed for impact on the current CCNPP licensing basis.

Since the sleeve dimensions, materials, and connecting joints to the existing tube are designed to the applicable American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, the proposed sleeving repair acts as an in-kind substitution for the original steam generator tubing. The applicable design criteria for the sleeves conform to the stress limits and margins of safety of Section III of the ASME Code. Safety factors of 3 for normal operation and 1.5 for accident conditions were applied to the design. Mechanical testing using the ASME Code stress allowables has been performed in support of the design. Based on the results of Westinghouse and ABB-Combustion Engineering analytical and test programs, the sleeves fulfill their intended function as leak tight structural members and meet or exceed all design criteria.

Evaluation of the proposed sleeved tubes indicates no detrimental effects on the sleeve or sleeve-tube assembly from reactor system flow, primary or secondary coolant chemistries, thermal conditions or transients, or pressure conditions or transients as may be experienced at CCNPP. Corrosion testing of sleeve-tube assemblies indicate no evidence of sleeve or tube corrosion considered detrimental under anticipated service conditions.

The installation of the proposed sleeves is controlled via the sleeving vendors' proprietary processes and equipment. The ABB Combustion Engineering process has been in use since 1984, and has been implemented 24 times for the installation of over 4,200 sleeves. The Westinghouse process has been in use since 1988, and approximately 12,000 laser welded sleeves have been installed between 1988 and 1994. The CCNPP steam generator design was reviewed and found to be compatible with both installation processes and equipment.

The implementation of the proposed sleeves has no significant effect on either the configuration of the plant, or the manner in which it is operated. The hypothetical consequences of failure of the sleeved tube is bounded by the current steam generator tube rupture analysis described in Section 14.15 of the Calvert Cliffs Updated Final Safety Analysis Report .

Therefore, BGE has concluded that the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

(2) Would not create the possibility of a new or different kind of accident from any other accident previously evaluated.

As discussed above, the structural integrity, thermal characteristics, and material properties of the proposed sleeves are consistent with the existing plant steam generators. Therefore, the functions of the steam generators will not be significantly affected by the installation of the proposed sleeves. In addition, the proposed sleeves do not interact with any other plant systems. The continued integrity of the installed sleeve is periodically verified by the Technical Specification requirements. The implementation of the proposed sleeves has no significant effect on either the configuration of the plant, or the manner in which it is operated.

Therefore, BGE concludes that this proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

(3) Would not involve a significant reduction in a margin of safety

The repair of degraded steam generator tubes via the use of the proposed sleeves has been confirmed to restore the structural integrity of the faulted tube under normal operating and postulated accident conditions. The design safety factors utilized for the sleeves are consistent with the safety factors in the ASME Boiler and Pressure Vessel Code used in the original steam generator design. The repair limit for the proposed sleeves is consistent with that established for the steam generator tubes. The design of the sleeve to tube joints is verified by testing to preclude significant leakage during normal and postulated accident conditions. Use of the previously identified design criteria and design verification testing assures that the margin to safety with respect to the implementation of the proposed sleeves is not significantly different from the original steam generator tubes.

Therefore, BGE concludes that the proposed change does not involve a significant reduction in a margin of safety.