

ATTACHMENT B

ZION NUCLEAR GENERATING STATION

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**PROPOSED CHANGE TO
FOR FACILITY OPERATING LICENSES
DPR-39 and DPR-48**

5.5 Programs and Manuals

5.5.7 Steam Generator (SG) Tube Surveillance Program (continued)

"Defect" means an imperfection of such severity that it exceeds the Plugging or Repair Limit, where applicable. A tube containing a defect is defective.

"F* distance" is the length of undegraded tube required to resist pullout. This distance is measured from the bottom of the upper hard roll transition toward the bottom of the tube sheet and has been conservatively determined to be 1.05 inches. The determination of F* Distance is satisfied by the mechanical tool (rolling pin) used to install the joint having an effective length of greater than or equal to 1.05 inches. The F* Distance is applicable only to tubes that are rerolled below the mid-plane of the tubesheet and have no degradation in the rerolled expansion joints. The F* Distance is not applicable to the original factory hard roll.

"F* tube" means a tube with indications below the F* distance greater than or equal to the Plugging or Repair Limit, and no indications within the F* distance.

"Imperfection" means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy current testing indications < 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections.

"Plugging or Repair Limit" means the imperfection depth at or beyond which the tube shall be repaired or removed from service by plugging because it may become unserviceable prior to the next inspection.

"Repaired Tube" means a tube that has undergone a process that re-establishes its serviceability. The sleeving process utilized shall be one of the following:

1. The Combustion Engineering welded sleeve process as described in Report CEN 331-P, Revision 1-P. The following sections of ABB/CE Report CEN 629-P, Revision 00, shall be implemented in conjunction with Report CEN 331-P, Revision 1-P: ABB/CE Report CEN-629-P, Revision 02.

(continued)

5.5 Programs and Manuals

5.5.7 Steam Generator (SG) Tube Surveillance Program (continued)

~~Section 4.5.3 Tube Brushing Cleaning Equipment~~
~~Section 4.5.7 Nondestructive Examination~~
~~Section 5.0 Sleeve Examination Program~~
~~Section 9.3.1 Cleaning Qualification~~

2. The Westinghouse Electric Corporation mechanical sleeve process as described in Report WCAP-11669.
3. The Bechtel-KWU Alliance welded sleeve process as described in Report BKAT-01-P, Revision 1.

"Sleeve Inspection" means an inspection of the sleeved portion of the tube. For a Combustion Engineering welded sleeve, this inspection will include the upper weld which forms the new pressure boundary and the sleeve material below the upper weld. For a Westinghouse Electric Corp. mechanical sleeve, this inspection will include the entire length of sleeve material. For a Bechtel-KWU Alliance welded sleeve, this inspection will include the upper weld which forms the new pressure boundary and the sleeve material below the upper weld.

"Tube Inspection" means an inspection of the steam generator tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg. If a tube does not permit the passage of the eddy current inspection probe the entire length and through the U-bend; this shall be recorded and an adjacent tube shall be inspected.

"Unserviceable" describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified above.

5.5.8 Secondary Water Chemistry Program

This program provides controls for monitoring secondary water chemistry to inhibit SG tube degradation. The program shall include:

(continued)

5.5 Programs and Manuals

5.5.7 Steam Generator (SG) Tube Surveillance Program (continued)

"Defect" means an imperfection of such severity that it exceeds the Plugging or Repair Limit, where applicable. A tube containing a defect is defective.

"F* distance" is the length of undegraded tube required to resist pullout. This distance is measured from the bottom of the upper hard roll transition toward the bottom of the tube sheet and has been conservatively determined to be 1.05 inches. The determination of F* Distance is satisfied by the mechanical tool (rolling pin) used to install the joint having an effective length of greater than or equal to 1.05 inches. The F* Distance is applicable only to tubes that are rerolled below the mid-plane of the tubesheet and have no degradation in the rerolled expansion joints. The F* Distance is not applicable to the original factory hard roll.

"F* tube" means a tube with indications below the F* distance greater than or equal to the Plugging or Repair Limit, and no indications within the F* distance.

"Imperfection" means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy current testing indications < 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections.

"Plugging or Repair Limit" means the imperfection depth at or beyond which the tube shall be repaired or removed from service by plugging because it may become unserviceable prior to the next inspection.

"Repaired Tube" means a tube that has undergone a process that re-establishes its serviceability. The sleeving process utilized shall be one of the following:

1. The Combustion Engineering welded sleeve process as described in ABB/CE Report CEN-629-P, Revision 02.

(continued)

5.5 Programs and Manuals

5.5.7 Steam Generator (SG) Tube Surveillance Program (continued)

2. The Westinghouse Electric Corporation mechanical sleeve process as described in Report WCAP-11669.
3. The Bechtel-KWU Alliance welded sleeve process as described in Report BKAT-01-P, Revision 1.

"Sleeve Inspection" means an inspection of the sleeved portion of the tube. For a Combustion Engineering welded sleeve, this inspection will include the upper weld which forms the new pressure boundary and the sleeve material below the upper weld. For a Westinghouse Electric Corp. mechanical sleeve, this inspection will include the entire length of sleeve material. For a Bechtel-KWU Alliance welded sleeve, this inspection will include the upper weld which forms the new pressure boundary and the sleeve material below the upper weld.

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5.5.8 Secondary Water Chemistry Program

This program provides controls for monitoring secondary water chemistry to inhibit SG tube degradation. The program shall include:

(continued)

ATTACHMENT C

ZION NUCLEAR GENERATING STATION

EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATIONS

PROPOSED CHANGE TO FACILITY OPERATING LICENSES DPR-39 and DPR-48

A. INTRODUCTION

Commonwealth Edison proposes to amend Zion Improved Technical Specification Section 5.5.7, "Steam Generator (SG) Tube Surveillance Program."

The existing specification allows for the installation of Combustion Engineering (CE) sleeves in steam generator tubes as described in Topical Report CEN-331-P, Revision 1-P, in conjunction with sections 4.5.3, 4.5.7, 5.0, and 9.3.1 of ABB/CE Report CEN 629-P Revision 00.

Commonwealth Edison is proposing to change the specification to reference, in its entirety, ABB/CE Report CEN-629-P, Revision 02, as defining the process for installing Combustion Engineering sleeves.

The proposed amendment will fulfill a previous Commonwealth Edison commitment to implement the latest Combustion Engineering Topical Report on sleeving in its entirety, will provide documentation of the compatibility of tube sleeves with an increase in the steam generator tube plugging limit, and will authorize three additional types of CE sleeve installations. Two of these sleeve types have been previously approved by the NRC for other plants with slightly different diameter tubes, and one variation of the third type has been approved by the NRC for the same model steam generator as is installed at Zion.

Commonwealth Edison Company has evaluated this proposed amendment and determined that it involves no significant hazards considerations. According to Title 10, Code of Federal Regulations, Part 50, Section 92, Paragraph c (10 CFR 50.92 (c)), a proposed amendment to an operating license involves no significant hazards considerations if 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.

B. 10 CFR 50.92 ANALYSIS

1. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The previously evaluated accident of concern in evaluating a potential increase in probability is a Steam Generator Tube Rupture (SGTR). However the probability of an SGTR would not be increased by the proposed change, because the level of confidence in the structural and leakage integrity of the types of sleeves authorized by the proposed amendment is at least as high as that of the previously authorized CE sleeve. The sleeves authorized by the proposed amendment were designed and analyzed in accordance with the same criteria as the previously authorized CE sleeve, and have been subjected to similar testing and analyses. Also the Inservice inspection requirements for the sleeved tubes remain unchanged.

The types of sleeves authorized by the proposed amendment were designed and analyzed in accordance with the criteria of draft Regulatory Guide (RG) 1.121 and Section III of the ASME Code. Fatigue and stress analyses of the sleeved tube assemblies have produced acceptable results for all the authorized types of sleeves as documented in ABB/CE Licensing Report CEN-629-P, Revision 02, and Addendum 1, "Repair of Westinghouse Series 44 and 51 Steam Generator Tubes Using Leak Tight Sleeves."

Mechanical testing has shown that the structural strength of the sleeves under normal, faulted, and upset conditions is within the acceptable limits specified in draft RG 1.121. Leakage rate testing for the sleeves has demonstrated that all the authorized types of sleeves are leak tight for primary to secondary leakage during any plant condition. Additionally, the consequences of any leakage that did occur through the sleeved region of the tube would be bounded by the existing SGTR analysis included in the Zion Updated Final Safety Analysis Report. Two of the three sleeve types not previously authorized at Zion have been previously approved by the NRC for other plants with slightly different diameter tubes, and one variation of the third type has been approved by the NRC for the same model steam generator as is installed at Zion.

All the types of sleeves authorized by the proposed amendment are designed to allow inservice inspection of the pressure retaining portions of the sleeve and parent tube. Inservice inspection is performed on all sleeves following installation to ensure that each sleeve has been properly installed and is structurally sound. Periodic inspections are required by the Technical Specifications in subsequent refueling outages to monitor sleeve degradation on a sample basis. The eddy current technique used for inspection will be capable of detecting both axial and circumferential flaws.

Installation of all the authorized types of sleeves can be used to repair degraded tubes by returning the condition of the tubes to their original design basis condition for tube integrity and leak tightness during all plant conditions. The tube bundle overall structural and leakage integrity will be increased with the installation of the sleeves reducing the risk

of primary to secondary leakage in the steam generator while maintaining acceptable reactor coolant system flow rates. Therefore, installation of the authorized sleeves will not increase the probability of occurrence of an accident previously evaluated.

The proposed change does not adversely impact the consequences of any previously evaluated design basis accident. The effect of the installation of all the authorized types of sleeves on the performance of the steam generator has been analyzed for heat transfer, flow restriction, and steam generation capacity. The installation of sleeves result in a hydraulic flow restriction that is dependent on the number and types of sleeves installed. However, the reduction in primary system flow rate is a small percentage of the flow rate reduction seen from plugging one tube and is a preferable alternative when considering LOCA core margins based on minimum reactor coolant system flow rates. The sleeving installation will result in a resistance to primary coolant flow through the tube for other evaluated accidents. In summary, installation of sleeves does not substantially affect the primary system flow rate or the heat transfer capability of the steam generators during normal or accident conditions.

Therefore, these proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The only physical change resulting from the proposed amendment will be the use of three new types of steam generator tube sleeves. The only credible accident involving steam generator tubes is an SGTR, which has been previously analyzed. The changes encompassed by the proposed amendment will not induce previously unevaluated accidents or component failures.

Implementation of the types of sleeves authorized by the proposed amendment will not introduce significant or adverse changes to the plant design. Stress and fatigue analyses of all the authorized types of sleeve installations has shown the ASME Code and draft RG 1.121 allowable values are met. Implementation of the authorized sleeving maintains overall tube bundle structural and leakage integrity at a level consistent with that of the originally supplied tubing. Leak and mechanical testing of the sleeves support the conclusions that the sleeve retains both structural and leakage integrity during all operating and accident conditions. Repair of a tube by using any of the sleeve types authorized by the proposed amendment does not provide a mechanism that results in an accident outside of the area affected by the sleeve.

Any hypothetical accident as a result of potential tube or sleeve degradation in the repaired portion of the tube is bounded by the existing SGTR analysis. The types of sleeves authorized by the proposed amendment do not affect any other component or location on the tube outside of the immediate area sleeved.

Installation of the types of sleeves authorized by the proposed amendment do not create any credible new scenarios involving loose parts, since the specified pre-installation, post-installation, and Inservice inspections provide a high degree of confidence that the sleeve tube assemblies will remain intact. The Technical Specifications require that Inservice Inspections be performed following sleeve installation to ensure proper weld fusion has occurred to maintain structural integrity. The post installation inspection also serves as baseline data to be used for comparison during future inspections. Periodic eddy current inspections monitor the pressure retaining portions of the sleeve and parent tube for degradation. Eddy current techniques will be employed that are sensitive to axial and circumferential degradation.

Additionally, Addendum 1 of the CE topical Report analyzes the effect of an increased primary to secondary differential pressure resulting from a tube plugging limit of up to 30%. This analysis demonstrates that, even with this increased differential pressure, the previously installed sleeves, and sleeves installed in the future in accordance with the Topical Report, will continue to meet the requirements of ASME Section III NB and draft RG 1.121.

Therefore, the proposed changes do not create the possibility of a new or different type of accident from any accident previously evaluated.

3. The proposed change does not involve a significant reduction in a margin of safety.

The proposed amendment will not reduce the margin of safety in that compliance with draft RG 1.121 and ASME Section III NB will be maintained. The repair of degraded steam generator tubes using the sleeves authorized by the proposed amendment has been shown by analysis to restore the integrity of the tube bundle to its original design basis condition. The safety factors used in the design of the types of sleeves authorized by the proposed amendment for the repair of degraded tubes are consistent with the safety factors in the ASME Boiler and Pressure Vessel Code used in steam generator design. The design of the sleeves authorized by the proposed amendment has been verified by testing to preclude leakage during normal and postulated accident conditions. The portions of the sleeve which represents the reactor coolant pressure boundary can be monitored for the initiation and progression of sleeve/tube wall degradation, thus satisfying the requirements of RG 1.83.

The portion of the steam generator tube bridged by the sleeve joints is effectively removed as a pressure boundary, and the sleeve then forms the new pressure boundary. The structural integrity of the tube is thus maintained by the sleeve and sleeve-to-tube joint. In this manner, a steam generator sleeve thus removes potential leak source from the reactor coolant system pressure boundary, eliminating the potential of a primary-to-secondary leak. Keeping the tube in service with the use of a sleeve instead of plugging the tube and removing it from service increases the heat transfer efficiency of the steam generator.

Therefore, the proposed changes do not involve a significant reduction in the margin of safety.

Based on the preceding analysis it is concluded that operation of Zion Units 1 and 2, in accordance with the proposed amendment, does not increase the probability of an accident previously evaluated, does not create the possibility of a new or different kind of accident from any accident previously evaluated, nor does it reduce any margins of plant safety. Therefore, this proposed amendment does not involve a significant hazards consideration as defined in 10 CFR 50.92.

ATTACHMENT D
ZION NUCLEAR GENERATING STATION
EVALUATION OF ENVIRONMENTAL ASSESSMENT
PROPOSED CHANGE
TO FACILITY OPERATING LICENSES
DPR-39 and DPR-48

Commonwealth Edison Company (ComEd) has evaluated this proposed amendment against the criteria for and identification of licensing and regulatory actions requiring environmental assessment in accordance with Title 10, Code of Federal Regulations, Part 51, Section 21 (10 CFR 51.21). ComEd has determined that this proposed amendment meets the criteria for a categorical exclusion as provided under 10 CFR 51.22 (c)(9). This determination is based upon the following:

The proposed licensing action involves the issuance of an amendment to a license for a reactor pursuant to 10 CFR 50 which changes a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or which changes an inspection or a surveillance requirement. This proposed license amendment request allows for the installation of CE steam generator tube sleeving under a newly revised and enhanced generic Topical Report and Addendum 1 to that report;

1. The proposed license amendment request involves no significant hazards consideration as demonstrated in Attachment C;
2. There is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite; and
3. There is no significant increase in individual or cumulative occupational radiation exposure.

Therefore, pursuant to 10 CFR 51.22(b), neither an environmental impact statement nor an environmental assessment is necessary for this proposed license amendment request.