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Calvert Cliffs
Nuclear Power Plant

A Member of the
Constellation Energy Group

February 27, 2001

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
Request for Relief from ASME Code Requirements to Authorize Use of Mechanical Nozzle Seal Assemblies at Calvert Cliffs Nuclear Power Plant as an Alternate Repair Method

REFERENCE: (a) Letter from Mr. C. H. Cruse (CCNPP) to NRC Document Control Desk, dated November 17, 2000, "Use of Mechanical Nozzle Seal Assemblies at Calvert Cliffs Nuclear Power Plant"

Under the provisions of 10 CFR 50.55a(a)(3)(i), Calvert Cliffs Nuclear Power Plant, Inc. (CCNPP) requests Nuclear Regulatory Commission (NRC) Staff authorization to use mechanical nozzle seal assembly (MNSA) devices as an alternate method of repair for the restoration of the structural integrity and leak tightness of Calvert Cliffs Reactor Coolant System (RCS) instrument and sampling nozzle penetrations, should nozzle leaks occur.

In Reference (a), CCNPP submitted a request to obtain approval to utilize the MNSA devices on leaking partial penetration welded nozzles. Subsequent to that submittal, on February 6, 2001, a telephone conversation was held between the NRC Staff and our Staff to discuss the design-by-analysis and design-by-rule provisions of American Society of Mechanical Engineers (ASME) Section III, Articles NB-3200 and NB-3300. It was agreed that an intent inquiry would be submitted for this issue to the ASME Section III Code Committee.

The goal of the code inquiry is to determine the intent of NB-3331(c), "The provisions of (a) and (b) above are not intended to restrict the design to any specified section thicknesses or other design details, provided the basic stress limits are satisfied. If it is shown by analysis that all the stress requirements have been met, the rules of NB-3330 are waived." We believe that an appropriate interpretation of these words is that, if it is shown by analysis that all the stress requirements have been met, the design-by-rule provisions of article NB-3330, which restrict nozzles to welded only joints, are waived. This position

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was reinforced by a Section III requirements inquiry, III-1-98-03 (published in Interpretation Volume 42).

In the meantime, CCNPP is updating Reference (a) to request approval to use MNSA devices, which utilize bolted nozzle connections, on leaking partial penetration nozzles as an alternate repair method to a welded nozzle connection. However, please note, that if the intent inquiry should determine that bolted nozzle connections are acceptable under NB-3331(c), then MNSA devices installed as described in References (a) and (b) would be deemed ASME Code compliant devices. Further, the activities described in this request that go beyond those described in Reference (a) would not be performed, and this code relief would be voided.

The enclosed request for relief proposes alternatives to the standard design for this type of nozzle connection as described in article NB-3300. The proposed alternatives are a generic request, applicable to all RCS instrument and sampling nozzle penetrations at CCNPP. The proposed alternative offers several advantages over replacing nozzles by welding. The MNSA device that can be used to repair these nozzles is faster to install, no welding is required, and it can be installed without draining the affected component. As a result, nuclear safety is enhanced because of the elimination of a fuel offload/reduced inventory requirement, and the occupational exposure to radiation associated with MNSA device installation is lower than that accrued during more traditional repairs. Calvert Cliffs Nuclear Power Plant has determined, as described in Reference (a) and the attached relief request, that the proposed alternative provides an acceptable level of quality and safety.

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

Very truly yours,

CHC/TWG/bjd

Attachment: (1) Generic Relief Request

cc: R. S. Fleishman, Esquire
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ATTACHMENT (1)

GENERIC RELIEF REQUEST

Calvert Cliffs Nuclear Power Plant, Inc.
February 27, 2001

ATTACHMENT (1)

GENERIC RELIEF REQUEST

Component Number(s): All Reactor Coolant System (RCS) instrument and sampling nozzles at Calvert Cliffs Nuclear Power Plant, Inc. (CCNPP).

Function(s): Reactor Coolant System pressure retaining component penetrations for process monitoring and control of the reactor.

Code Requirement: American Society of Mechanical Engineers (ASME) Section XI Code repair requirements (IWA-4000 for 1983 Summer for 1983 Addenda, and the 1998 Edition to which Calvert Cliffs will be updating at the end of the 2001 refueling outage) and, by reference, ASME Code Section III, 1989 Edition, Article NB-3300, Paragraph NB-3337.1, General Requirements: Nozzles shall be attached to the shell or head of the vessel by one of the following methods in NB-3352, "Permissible Types of Welded Joints."

Code Alternative: As an alternative under the provisions of 10 CFR 50.55a(a)(3)(i), the use of a mechanical nozzle seal assembly (MNSA) is proposed as a repair to restore integrity and prevent leakage of nozzle assemblies for up to two cycles of operation.

Basis for Relief: The potential exists for leaks to occur in RCS Alloy 600 instrumentation and sampling nozzles due to primary water stress corrosion cracking. These nozzles are welded to RCS vessel walls with inner diameter J-groove welds. The typical repair of these nozzles utilizes either an internal or external weld repair, or a half nozzle replacement. As an alternative under the provisions of 10 CFR 50.55a(a)(3)(i), the use of a MNSA is proposed as a repair to restore integrity and prevent leakage of nozzle assemblies for up to two cycles of operation.

Mechanical nozzle seal assembly devices provide an acceptable level of quality and safety in lieu of meeting the rules of the ASME code. In order to ensure the MNSA devices provide an acceptable level of quality and safety, CCNPP procured MNSA devices that are designed as fully qualified Code nozzles. The MNSA devices are designed, fabricated, and constructed using ASME Code materials in accordance with the applicable rules of ASME Section III. The MNSA devices are designed to prevent separation of the joint under all service loadings. This design is supported by technical analysis and tests that meet the design criteria specified in ASME Section III. Additionally, MNSA installations are accessible for examination, maintenance, removal, and replacement.

Westinghouse – CE Nuclear Power, LLC design reports and CCNPP engineering service packages were provided as enclosures in Reference (1). This information demonstrates that stresses under all service conditions do not exceed the code allowables as stated in the ASME Section III and that fatigue limits are not exceeded using the conditions in the CCNPP design specification. An evaluation to address

potential corrosion of the nozzle bore holes, corrosion of the pipe outside diameter surface, galvanic corrosion, and stress corrosion cracking of the MNSA fasteners was also provided as enclosures in Reference (1). Based on the evaluation of potential corrosion effects, CCNPP concludes that there are no significant corrosion issues associated with the application of the MNSA devices to vessels or piping at Calvert Cliffs. The data indicates that corrosion of the nozzle hole will be acceptable over the requested two-cycle period of use.

The MNSA device would be used if nozzle leaks are identified. The MNSA device that can be used to repair these nozzles is faster to install, no welding is required, and it can be installed without draining the affected component. As a result, nuclear safety is enhanced because of the elimination of a fuel offload/reduced inventory requirement, and the occupational exposure to radiation associated with MNSA device installation is lower than that accrued during more traditional repairs. Unplanned replacement of these nozzles could significantly increase plant outage duration for no significant safety benefit in comparison to the use of MNSA devices for up to two cycles of operation.

Reference (1) provided proposed inspections for MNSA devices that have been installed preventively on non-leaking nozzles and proposed inspections for MNSA devices installed on leaking nozzles. We believe these inspections provide sufficient assurance of proper installation of the MNSA devices for their intended use and duration. Since this request for alternative is for up to two cycles of operation, prior to exceeding two operating cycles, MNSA devices installed on leaking nozzles will be removed and nozzle replacement activities will be implemented.

In conclusion, CCNPP believes that the proposed alternative provides an acceptable level of quality and safety.

Reference:

(1) Letter from Mr. C. H. Cruse (CCNPP) to NRC Document Control Desk, dated November 17, 2000, "Use of Mechanical Nozzle Seal Assemblies at Calvert Cliffs Nuclear Power Plant"