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SUBJECT: Responds to NRC request to provide info re potential utilization of phased-array technique to inspect inside radius section os SG primary nozzles,per 921221 telcon. Requests relief from volumetric exam of radius.

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January 11, 1993

10 CFR 50.55a(g)(5)(iii)

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

Ladies/Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Inservice Inspection Plan Relief Request

References:
1) Letter from D.C. Hintz (WPSC) to Document Control Desk (NRC) dated March 20, 1987

2) Letter from John N. Hannon (US NRC) to C.R. Steinhardt (WPSC) dated April 25, 1989

3) Letter from C.A. Schrock (WPSC) to Document Control Desk (NRC) dated September 17, 1992

4) J.C. Grigsby, M. Dalichow, E.R. Fischer, and W. Rathgeb, Phased-Array Techniques and Manipulators: An Advanced Modular Approach for Inspection of Boiling Water Reactor Pressure Vessels, Materials Evaluation, pp. 605-611 (May 1992.)

This letter is in response to a verbal request from the Nuclear Regulatory Commission (NRC) to provide information regarding the potential utilization of the phased-array technique described

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in reference 4 to inspect the Kewaunee Nuclear Power Plant (KNPP) inside radius section of the steam generator primary nozzles. During this December 21, 1992, telephone call, Mr. Allen Hansen of the NRC requested that the following information be provided regarding Wisconsin Public Service Corporation's (WPSC) relief request:

1) Duration of relief request,

2) Current schedule for Steam Generator Replacement, and

3) Practicality of phased-array technique to satisfy ASME code inspection requirements.

Regarding the effective dates of the relief request, WPSC requests relief be granted for the duration of the current inspection interval which expires on June 16, 1994.

A firm date for steam generator replacement has not been decided at this time. However, our preliminary data shows that 1997-1999 is an optimum time to replace steam generators at KNPP.

The phased-array technology discussed in reference 4 has primarily been used to inspect nozzles at Boiling Water Reactors (BWR). KNPP is a pressurized water reactor (PWR). The following differences between a BWR nozzle and PWR steam generator primary nozzle greatly affect the ability to conduct a successful ultrasonic examination:

1. A PWR operates at about 2235 psig, more than twice the typical BWR operating pressure. Therefore, the wall thickness of a PWR nozzle is greater than that of a BWR resulting in a longer ultrasonic examination metal path.

2. A BWR nozzle is typically fabricated from a forging whereas the KNPP steam generator primary nozzles are fabricated from a casting. The metallurgical structure of a casting is much coarser than that of a forging. When a cast material is subject to an ultrasonic examination the coarse grain causes the sound beam to scatter and reflect, resulting in less penetration into the material.

The cumulative affect of these variables (i.e., a longer metal path, reduced penetration, and complex geometry) obstructs our ability to conduct an ASME code examination even with the benefits of the phased-array technique.

Due to the problems identified herein and in reference 3, a volumetric examination is impractical for KNPP at this time. It is our position that the proposed alternative method of examination, a remote visual examination of the accessible portions of the inner radius using a robotic type eamera and VT-2 inspections during the class 1 system pressure test, will ensure integrity of the pressure boundary.

If you have any additional questions regarding our request for relief, please contact a member of my staff.

Sincerely,

C. A. Schrock

C. A. Schrock
Manager-Nuclear Engineering

CAT/cjt

cc - US NRC - Region III
Mr. Patrick Castleman, US NRC

LIC\NRC\INSPPLAN.WP