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DEC 21 1994

SERIAL: BSEP 94-0520

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-324 / LICENSE NO. DPR-62
NUREG-0619 FEEDWATER NOZZLE AND SAFE END EXAMINATION RESULTS

Gentlemen:

Pursuant to Nuclear Regulatory Commission NUREG-0619, subsection 4.4.3.1(2), the Brunswick Steam Electric Plant (BSEP) hereby submits the enclosed information concerning the non-destructive examination of the feedwater nozzles and safe ends performed during Unit 2 Refueling Outage 10 (B211R1).

Please refer any questions regarding this submittal to Mr. G. Honma at (910) 457-2741.

Very truly yours,

R. P. Lopriore
Manager
Regulatory Affairs Section

SHC/shc

Enclosures

cc: Mr. S. D. Ebner, NRC Region II - Regional Administrator
Mr. P. D. Milano, NRC/NRR Senior Project Manager - Brunswick
Mr. C. A. Patterson, NRC Senior Resident Inspector - Brunswick
The Honorable H. Wells, Chairman - North Carolina Utilities Commission

ENCLOSURE 1

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 2
NRC DOCKET NO. 50-324
OPERATING LICENSE NO. DPR-62
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The following information is provided in accordance with Nuclear Regulatory Commission NUREG-0619, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking," and pertains to the non-destructive examination (NDE) of feedwater sparger, nozzles, and safe ends performed at the Brunswick Steam Electric Plant, Unit 2 during Refueling Outage 10 (B211R1).

I. START-UP/SHUTDOWN CYCLES EXPERIENCED:

Brunswick Unit 2 has experienced 159 start-up/shutdown cycles since initial start-up. This quantity includes one (1) start-up/shutdown cycle since the previous inspection (B210R1).

II. NON-DESTRUCTIVE EXAMINATION RESULTS:

The attached Engineering Evaluation Report (EER) 94-0182 provides a summary of the examination results for the feedwater spargers conducted at the Brunswick Plant, Unit 2 during Refueling Outage 10 (B211R1). Also, no recordable indications or evidence of cracking were noted for the feedwater nozzles and safe ends.

Table 1 of EER 94-0182 summarizes the examination results of the eight circumferential welds connecting the sparger arms to the tees. These circumferential weld cracks are in the same condition as in the previous Unit 2 examination, i.e., all of the cracks are on the flow hole side of the sparger. The cracks extend downward following the heat affected zone of the circumferential weld. There is no appreciable change in crack length or number of cracks since the last inspection.

Table 2 of EER 94-0182 summarizes the examination results of the flow holes in each of the feedwater spargers. The flow holes continue to show slow crack growth. Some new cracking was seen around the flow holes; however, the new cracks are not as long as existing cracks. Due to the size and orientation of the new cracks, these new cracks do not increase the probability of loose pieces in the vessel. Therefore, it is acceptable to operate for an additional cycle with the existing feedwater spargers.

III. NON-DESTRUCTIVE EXAMINATION METHODS:

In June of 1992, CP&L submitted the results from the non-destructive examination of the Unit 2 feedwater spargers, performed during Refueling Outage 9 (B210R1), to the NRC for review. Also, with the results, CP&L requested the NRC staff to concur with a change for continued monitoring of crack growth at future outages using a Liquid Penetrant (LP) technique. CP&L proposed to monitor the crack growth during refueling outage B211R1 by visual examination using a high resolution remote camera. The NRC concurred with the visual inspection in a letter dated June 24, 1993.

All four (4) feedwater spargers were visually examined using a high resolution remote underwater camera. The spargers were examined for gross defects and missing fragments. All of the flow holes were inspected for cracking and the results recorded for each hole. The circumferential welds were inspected to the extent possible with the remote camera. The video tapes of the visual inspections during this outage were compared with the photographs of the LP examinations taken during the previous outage with no significant changes identified.

Manual ultrasonic examinations were performed on the N4A, N4B, N4C, and N4D safe ends and inner blend radii in accordance with NUREG-0619. No recordable indications were identified as a result of these examinations. These results are consistent with previous examinations.

IV. SYSTEM MODIFICATIONS AFFECTING FEEDWATER FLOW AND/OR TEMPERATURE:

During this outage a new digital feedwater control system was installed on Brunswick Unit 2. This system will provide improved stability in feedwater flow control, i.e., fewer flow fluctuations during low power operation.

V. ON-LINE LEAKAGE MONITORING:

No on-line leakage monitoring system for the detection of feedwater leakage past the feedwater thermal sleeves has been installed on the Brunswick Plant, Unit 2.

ENCLOSURE 2

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 2
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ENGINEERING EVALUATION REPORT NO. 94-0182,
"UNIT 2 FEEDWATER SPARGER EVALUATION FOLLOWING
IVVI EXAMINATIONS"