

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

March 1, 1983

BLRD-50-438/82-35

BLRD-50-439/82-32

U.S. Nuclear Regulatory Commission

Region II

Attn: Mr. James P. O'Reilly, Regional Administrator

101 Marietta Street, Suite 2900

Atlanta, Georgia 30303

Dear Mr. O'Reilly:

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2 - OPERATIONAL DEFECTS IN HIGH
PRESSURE INJECTION NOZZLES AND THERMAL SLEEVES - BLRD-50-438/82-35,
BLRD-50-439/82-32 - THIRD INTERIM REPORT

The subject deficiency was initially reported to NRC-OIE Inspector
Don Quick on April 29, 1982 in accordance with 10 CFR 50.55(e) as NCR
BLN NEB 8206. This was followed by our interim reports dated June 1 and
July 28, 1982. Enclosed is our third interim report. We expect to
submit our next report by April 18, 1983. We consider 10 CFR Part 21
applicable to this deficiency.

If you have any questions concerning this matter, please get in touch with
R. H. Shell at FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills

L. M. Mills, Manager
Nuclear Licensing

Enclosure

cc: Mr. Richard C. DeYoung, Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Mr. James McFarland (Enclosure)
Senior Project Manager
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P.O. Box 1260
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NRC REGION II
ATLANTA, GEORGIA

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ENCLOSURE

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2
OPERATIONAL DEFECTS IN HIGH-PRESSURE INJECTION NOZZLES AND THERMAL SLEEVES
NCR BLN NEB 8206
BLRD-50-438/82-35, BLRD-50-439/82-32
10 CFR 50.55(e)
THIRD INTERIM REPORT

Description of Deficiency

Recent inspections at several B&W operating plants revealed defects in the makeup/HPI nozzles and their thermal sleeves and in the makeup piping upstream of these nozzles. The nozzles are located on each reactor coolant cold leg between the reactor coolant pump and reactor vessel. The nozzles and sleeves are supplied by B&W under the Nuclear Steam Supply System (NSSS) contract. The defects include:

- . through-wall circumferential crack at the welded joint between the nozzle safe end and the first check valve upstream of the safe end
- . loose thermal sleeves
- . missing or worn thermal sleeve retaining buttons

The loose thermal sleeves and missing or worn retaining buttons remove the mechanical restraints which were designed to avoid exposing the nozzle and pipe to a thermal shock condition by preventing sleeve movement in the upstream direction.

Although the degraded components at the affected plants were the same, the resulting damage was not identical. Accordingly, B&W is investigating this concern to determine its cause and to determine if it has generic implications for other B&W plants, including Bellefonte. The Bellefonte nozzle configuration is similar to that at the affected plants except that it is a one-piece construction while the nozzles for the affected plants have a welded safe end. B&W has notified TVA of no similar potential deficiencies in the past for other Bellefonte NSSS nozzles. There are no implications for other TVA plants.

Interim Progress

B&W has determined that there is no safety concern unless there is a cracked or loose thermal sleeve. With respect to nozzles that have not been degraded, failures are assumed only at the weld between the RC pipe and the nozzle forging and between the nozzle forging and the connecting HPI pipe. Emergency core cooling system analyses have shown that ruptures in these locations can be mitigated within the criteria to 10 CFR 50.46. Failures are not assumed within the nozzle forging itself because the forgings are heavily reinforced. Thus failures within the forging are considered to be a sufficiently low probability as to not require evaluation.

This design basis (i.e., no failure within the forgings) assumes that the thermal sleeves within the nozzle remain in place as designed and that there is no loosening or cracking of the sleeve that would allow hot primary coolant, cool makeup, or HPI fluid to flow between the thermal sleeve and the nozzle body. Thermal sleeve problems and subsequent nozzle failures will be prevented at Bellefonte by establishing sleeve tightness.

The Bellefonte HPI nozzle thermal sleeve will be hard rolled into the 2-1/2-inch end of the nozzles and contact rolled at the 28-inch end. The contact roll will be done such that the collar on the sleeve is in line contact with the nozzle inner wall. This second roll will stabilize the sleeve with respect to flow induced vibration. Four small holes will be drilled through the collar from the 28-inch pipe side to allow the venting of fluids from between the rolled areas.

B&W has documented the field work required to implement this fix in a field change package (FCP). The fix requires access to the inside of the RC piping. Access to this area is available only through the reactor vessel when the internals have been removed. The internals are to be removed and the field work to implement the fix is scheduled to begin by March 4, 1983. The work is scheduled to be completed by May 3, 1983.

TVA will submit a final report on this deficiency upon review, and concurrence with B&W's FCP.