TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

August 10, 1983

BLRD-50-438/83-26
BLRD-50-439/83-21

U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2 - QUALIFICATION OF PROTECTIVE COATINGS - BLRD-50-438/83-26, BLRD-50-439/83-21 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector Linda Watson on March 25, 1983 in accordance with 10 CFR 50.55(e) as NCR BLN ASB 8301. This was followed by our first interim report dated April 22, 1983. Enclosed is our final report. TVA does not now consider the subject nonconforming condition adverse to the safe operation of the plant. Therefore, we will amend our records to delete the subject nonconformance as a 10 CFR 50.55(e) item.

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, Manager
Nuclear Licensing

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

Records Center
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, Georgia 30339

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ENCLOSURE
BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2
QUALIFICATION OF PROTECTIVE COATINGS
NCR BLN ASB 8301
BLRD-50-438/83-26, BLRD-50-439/83-21
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

TVA-supplied protective coatings are used inside the Bellefonte (BLN) containment on the containment steel liner, interior concrete, steel structures, and miscellaneous steel and equipment. The coatings were originally specified to be able to withstand the environmental conditions associated with the design basis accident (DBA) loss-of-coolant accident (LOCA) to ensure that the coatings would not blister or peel off the walls and then clog the reactor building emergency sump filters. Therefore, the coatings were tested (qualified) to 300°F (which bounds the peak LOCA temperature) to verify that they would meet the specified temperature requirements. After the coatings were purchased and applied to a large number of the surfaces, it was determined that main steam line breaks (MSLBs) could result in containment temperatures greater than 400°F for a 300 second period. These temperatures are considerably higher than the coating's qualification temperature.

Safety Implications

TVA has evaluated the safety implications of the high MLSB temperature effects on the coatings and has determined that no safety concerns exist and that 10 CFR 50.55(e) does not apply to this item. This conclusion is based on the following:

1. The temperature response of the major steel and concrete heat sinks was provided as part of the CONTEMPT-LT MSLB analysis of the BLN containment. The coatings and their associated physical properties were included in the model of the heat sinks. The analysis showed the peak heat sink surface temperatures (i.e., paint) were less than 200°F. Thus, it is concluded that the coatings on the major heat sinks will not reach temperatures in excess of 300°F to which they are qualified and would, therefore, remain on the walls and structures.

2. Mass and energy releases from the double-ended MSLBs last only about 60 seconds and releases from small single-ended breaks (which do not produce extremely high peak temperatures) last approximately 30 minutes. The reactor building spray (RBS) which would be used to cool the containment in these events would draw coolant from the borated water storage tank (BWST) which contains sufficient water to supply the sprays for over 90 minutes. Also, containment calculations have shown that by 10 minutes after a break occurs, spray water in the sump will be hotter than the containment atmosphere. This precludes using the RBS in the recirculation mode. Therefore, any peeled or blistered coatings which had fallen into the sump would not interfere with containment cooling.

3. With regard to long-term core cooling, the decay heat removal (DHR) system would be used to bring the reactor to cold shutdown during a MSLB. Because there is no break in the reactor coolant system (RCS) long-term RCS water inventory control is accomplished by normal makeup methods rather than through DHR recirculation of the sump water. Thus, any coating flakes or debris in the sump would not interfere with reactor cooling.

4. In the event that an operator placed the RBS in the recirculation mode upon depletion of the BWST and some of the coatings (for any reason) had peeled off and clogged the sump filter screens, the worst result would be the failure of the spray pumps. This will not prevent further RCS cooldown since the RBS is not required after BWST depletion.