UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION REGARDING THE RESPONSE TO GENERIC LETTER 84-11, STAINLESS STEEL PIPING REINSPECTION

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2 AND 3

DOCKET NOS. 50-259, 50-260 AND 50-296

1.0 INTRODUCTION

By letter dated June 7, 1984, as supplemented February 13, May 3 and 22, 1985, The Tennessee Valley Authority (the licensee or TVA) submitted a response to Generic Letter 84-11 pertaining to the reinspection of stainless steel piping.

2.0 EVALUATION

In its response TVA indicated that, for Browns Ferry Units 1 and 2, all accessible stainless steel piping welds 4 inches in diameter and larger will be ultrasonically examined during the upcoming refueling outages, and for Browns Ferry Unit 3, the ultrasonic examination of the piping welds will be sampled in accordance with Generic Letter 84-11 as all the accessible welds were already inspected under confirmatory order during last outage. As for piping replacement, TVA originally scheduled to replace the IGSCC susceptible piping in Browns Ferry Unit 1 during the upcoming cycle 6 refueling outage; however, this piping replacement is deferred until the cycle 7 refueling outage. Based on the referenced TVA submittals, we conclude that TVA's inspection plans for Browns Ferry Nuclear Plant, Units 1, 2 and 3 in the upcoming refueling outages meet the guidelines in the Generic Letter 84-11.

TVA takes exception to some of the areas related to the inspection plans that were also discussed in the guidelines in Generic Letter 84-11. Our comments to those exceptions are provided below:

(1) Post induction heating stress improvement (IHSI) inspection

TVA plans to perform IHSI on some of the IGSCC susceptible piping welds in the Browns Ferry Nuclear Plant, Units 1, 2 and 3 during the upcoming refueling outages and to inspect 25% of those welds treated with IHSI. The sampled inspection of 25% of the IHSI treated welds is not consistent with the guidelines in Generic Letter 84-11, which recommends 100% of the IHSI treated welds to be inspected. We consider that this inspection deviation is acceptable for the proposed refueling outages if TVA will complete the examination of the remaining IHSI treated welds during the next refueling outage. Furthermore, it is expected that TVA will expand the sampling appropriately if crack indications are reported in any of the IHSI treated welds.

(2) Reactor coolant leakage monitoring

The Technical Specifications in Browns Ferry Units 1, 2 and 3 require the leakage rate to be monitored every 8 hours and the inoperable period of the sump level and flow rate monitoring system cannot be more than 72 hours. This does not meet the guidelines in Generic Letter 84-11, which requires the leakage to be monitored every 4 hours. The sump monitoring system is the only system in BWR plants to provide the leakage information quantitatively. We consider that the compliance with the required operability and monitoring frequencies of the sump monitoring is essential, and is recommended in NUREG-1061, Vol. 1 by the Pipe Crack Task Group of the Piping Review Committee. Therefore, we expect those recommended guidelines for reactor coolant leakage monitoring, or an equivalent with an acceptable basis, be uniformly observed by all operating BWR plants.

(3) Weld overlay design

TVA contends that if the first layer can be demonstrated to be IGSCC resistant then the design of an overlay consisting of only one weld layer should be permitted. We do not agree with TVA's contention in this matter. Although we have given credit for the first overlay layer when its resistance to IGSCC is demonstrated, our justification relies, in part, on the conservatism of the overlay design and the presence of additional weld overlay layers not affected by dilution. We believe that some dilution of the first layer, especially the region adjacent to the base material, will occur, and our main concern is that the extent of the dilution in the first layer is difficult to quantify, as it depends on the specific welding material, base material, and the welding process. Furthermore, the demonstrated IGSCC resistance based on testing performed on the outside surface of the first layer may not fully characterize the properties of the entire layer. Therefore, to provide assurance of adequate margin in IGSCC resistance, we consider that each overlay repair should consist of a minimum of two weld layers unless an appropriate basis is provided.

Based on our review we find that the inspection plans for the upcoming refueling outages are acceptable, however, we request that TVA respond to the enclosed request for additional information prior to restart of the units from the current outages.

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Dated: March 26, 1986

Request for Additional Information

Intergranular Stress Corrosion Cracking

Browns Ferry Nuclear Plant Units 1, 2 and 3

1. Post Induction Heating Stress Improvement (IHSI) Inspection

   Provide assurance that if 100% of the IHSI welds are not inspected the examination of the remaining welds will be completed at the next refueling outage. Of course, the sampling will be expanded if crack indications are reported in the IHSI treated welds.

2. Reactor Coolant Leakage Monitoring

   Provide assurance that the Technical Specifications will be changed to monitor the leakage rate every four hours and to limit the inoperable period of the sump monitoring system to 24 hours or, provide an acceptable basis for any variations from those limits.

3. Weld Overlay Design

   Provide assurance of adequate margin in IGSCC resistance by making each overlay repair consist of a minimum of two layers or, provide an acceptable basis for any variations from the minimum two layers.