UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO BOSTON EDISON'S RELIEF REQUEST PERTAINING TO

GENERIC LETTER 88-01 IGSCC INSPECTION

PILGRIM NUCLEAR POWER STATION

1.0 INTRODUCTION

During a shutdown of the Pilgrim plant in September 1996, the licensee (Boston Edison Company, BECo) discovered that the radiation dose rates in the drywell were significantly higher than anticipated. The elevated radiation level presents a radiological exposure hardship to the performance of the scheduled non-destructive examinations (NDE) during the upcoming refueling outage (RFO #11). By letter dated December 12, 1996, the licensee submitted to the staff a request seeking a reduction of the scope of inspection from ASME, Section XI inspections and Generic Letter (GL) 88-01 intergranular stress corrosion cracking (IGSCC) inspections, which are scheduled to be performed in the upcoming refueling outage (RFO #11) at the Pilgrim plant. In a letter dated January 20, 1997, the licensee provided supplemental information and also informed the staff that a chemical decontamination of the recirculation system piping will be performed during RFO #11 for the purpose of reducing the radiation exposure to the inspection and craft personnel. The licensee's decision to implement decontamination process at this late date will impact the scheduled inspection activities. The licensee stated that it is not practical to complete the full scope of ISI inspection as originally scheduled because the outage window available for inspection is shortened by the implementation of decontamination. The licensee also requested to move the N1A safe-end weld from relief request #3 (IGSCC inspection) to relief request #1 (ISI Section XI inspection), because N1A safe-end weld is a Category A weld and does not require inspection relief per GL 88-01 at this time. For Category A welds, the required IGSCC inspection frequency is 25% of welds every 10 years.

The licensee's relief request consists of (1) relief from volumetric examination of three (N1A, N2A and N2B) full penetration nozzle to vessel welds and its inner radii, and a safe-end weld (N1A), (2) relief from surface and/or volumetric examination of 12 piping welds and 2 integral attachment welds and (3) relief from IGSCC inspection of two safe-end welds. The licensee proposed to inspect the above welds in RFO #12 instead of the upcoming RFO #11 scheduled which will begin in February 1997. In this safety evaluation, the staff discusses only the relief request pertaining to the IGSCC inspection of two recirculation safe-end welds (N2A and N2B) per GL 88-01. The two ASME relief requests have been withdrawn by letter dated February 5, 1997.

ENCLOSURE

2.0 DISCUSSION

The licensee requested a one-time relief from the IGSCC inspection of two safe-end welds (N2A and N2B nozzle to safe-end welds) in the recirculation piping system. Originally, six (6) Category D safe-end welds in the recirculation piping system including the N2A and N2B safe-end welds were scheduled to be inspected during the upcoming refueling outage (RFO #11). Because of the high radiation level found in the drywell and the need to reduce the radiation exposure to the inspection and craft personnel, the licensee proposed to defer a portion of the scheduled inspections including the two safe-end welds (N2A and N2B) until the next refueling outage (RFO #12), so that the chemical decontamination as well as the revised scope of inspection can be performed within the scheduled outage time. The staff finds that the licensee's revised outage (RFO #11) planning is consistent with the principle of achieving the goal of ALARA.

The N2A and N2B safe-end welds are IGSCC Category D welds. In accordance with GL 88-01, Category D welds are required to be inspected every two fuel cycles. N2A nd N2B safe-end welds were last inspected during the RFO #9 and are required to be reinspected during the RFO #11. There are 11 Category D safe-ends welds in the recirculation piping system. Of which 6 welds had been inspected twice and 5 welds only once during the last three refueling outages. No relevant indications were found in any of the Category D safe-end welds. Therefore, the staff finds that the licensee's deferral of the inspection of N2A and N2B safe-end welds for one fuel cycle to be acceptable, because extensive IGSCC in the recirculation system piping during the next fuel cycle is not expected. The inspection results of three other safe-end welds which are scheduled to be inspected in RFO #11 would also provide verification of the low likelihood of cracking in the N2A and N2B welds.

Hydrogen water chemistry (HWC) has been implemented at Pilgrim plant since 1989. Effective HWC (equal or less than -230mv) will provide resistance in stainless steel against the initiation and propagation of IGSCC. The licensee reported that the effective HWC achieved in the recirculation piping during cycles 9, 10 and 11 was 56%, 75% and 85%, respectively. Per GL 88-01, inspection credit up to a factor of two can be given, when effective HWC is demonstrated. In order to qualify the inspection credit, the staff requires that at least 90% availability of effective HWC is achieved in an operating cycle. Since the required availability of effective HWC was not achieved in the last three operating cycles, the Pilgrim plant is not given at this time the full inspection credit due to the implementation of HWC. However, the staff believes that the HWC implemented at Pilgrim, even less than the 90% availability, provided some benefit in reducing the susceptibility and development of IGSCC in stainless steel components in the recirculation piping system.

By considering the favorable inspection experience in Category D safe-end welds and the continued implementation of HWC at Pilgrim plant, the staff has determined that the licensee's request for a one-time relief to defer the inspection of two Category D safe-end welds (N2A and N2B) until RFO #12 is acceptable. The staff's conclusion is based on the low likelihood of developing extensive IGSCC in these two welds during the next fuel cycle.

CONCLUSION

Based on the staff review as discussed above, the staff concludes that the licensee's one-time request to defer the inspection of N2A and N2B safe-end welds (Category D) per GL 88-01 until RFO #12 is acceptable because the likelihood of developing extensive IGSCC in these two welds during the next fuel cycle is low.

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Date: February 10, 1997