



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D. C. 20555-0001

SAFETY EVALUATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

CONFORMANCE TO REGULATORY GUIDE 1.97

CONNECTICUT YANKEE ATOMIC POWER COMPANY

HADDAM NECK PLANT

DOCKET NO. 50-213

1.0 INTRODUCTION

In response to a March 12, 1989 letter from the Connecticut Yankee Atomic Power Company (the licensee), on April 13, 1992, the NRC issued a Safety Evaluation regarding the licensee's conformance to Regulatory Guide (RG) 1.97, Revision 2 for the Haddam Neck Plant. The staff requested that the licensee provide justification for deviations from the guide for 12 variables.

In submittals dated July 6, 1992, December 20, 1993, and March 14, 1994, the licensee documented deviations from the guidance of RG 1.97 for 10 of the 12 variables. The licensee also documented that the two remaining variables meet the guidance of RG 1.97.

2.0 EVALUATION

The NRC staff reviewed the licensee's July 6, 1992, December 20, 1993, and March 14, 1994, submittals which identified deviations and exceptions with regard to: (1) high pressure safety injection (HPSI) flow, (2) steam generator safety relief valve (SRV) position or main steam flow, (3) releases from steam generator SRVs or atmospheric dump valves, (4) steam generator pressure, (5) chemical and volume control system (CVCS) makeup flow-in, (6) low pressure safety injection (LPSI) flow, (7) containment atmosphere temperature, (8) quench tank temperature, (9) auxiliary feedwater flow, and (10) heat removal by the containment heat removal system.

1. RG 1.97 recommends Category 2 HPSI flow instrumentation with a range of 0 to 110% design flow to monitor the operation of the safety injection systems.

The licensee has provided HPSI pump motor current instrumentation with a range of 0 to 300 amps. This instrumentation is located in a mild environment, and therefore, meets the Category 2 criteria. We find this instrumentation acceptable.

2. RG 1.97 recommends Category 2 steam generator SRV position or main steam flow instrumentation to monitor the operation of the steam generators. The licensee has not provided this instrumentation because operators can determine whether the SRVs are open by monitoring reactor coolant system

(RCS) pressure, pressurizer level, steam generator pressure, steam generator level, auxiliary feedwater flow, and containment pressure. Furthermore, procedures direct the operators to identify either a stuck open SRV or a main steamline break. Therefore, the use of RCS pressure, pressurizer level, steam generator pressure, steam generator level, auxiliary feedwater flow, and containment pressure instrumentation are acceptable as an alternative to steam generator SRV position or main steam flow.

3. RG 1.97 recommends Category 2 instrumentation to monitor releases from steam generator SRVs or atmospheric dump valves. The licensee has provided portable, in lieu of permanently installed, instrumentation and has determined that releases from the SRVs can be quantified and assessed utilizing the portable instrumentation in conjunction with steam generator pressure. The NRC staff finds the use of portable instrumentation to monitor releases from the steam generator SRVs acceptable.
4. The licensee has determined that steam generator pressure monitoring is required for performing manual actions for which no automatic actions are provided, and therefore, this instrumentation was classified Type A. This instrumentation includes four transmitters (one per steam generator) located outside containment, in a mild environment, for accidents inside containment and four transmitters located inside containment for accidents outside containment. The transmitters located inside containment are not qualified to the containment environment but the licensee has committed to replace them with environmentally qualified transmitters.

The licensee has also committed to provide transmitters with an upper range limit of 1200 psig. The lowest steam generator SRV setpoint is 985 psig and the upper range limit of 1200 psig exceeds the lowest setpoint by 20%. The NRC staff finds the licensee's commitment acceptable.

5. RG 1.97 recommends Category 2 CVCS makeup flow-in instrumentation with a range of 0 to 110% design flow.

The licensee has provided instrumentation with a range of 0 to 200 gpm and has indicated that the normal design flow for CVCS makeup flow-in is 60 gpm. Therefore, the NRC staff finds the existing range of 0 to 200 gpm acceptable.
6. RG 1.97 recommends Category 2 LPSI flow instrumentation with a range of 0 to 110% design flow.

The licensee has provided LPSI pump motor current instrumentation with a range of 0 to 300 amps. This instrumentation is located in a mild environment, and therefore, meets the Category 2 criteria. The NRC staff finds this instrumentation acceptable.

7. RG 1.97 recommends Category 2 containment atmosphere temperature monitoring instrumentation to monitor the performance of containment cooling systems.

The licensee has provided Category 3 containment atmosphere temperature instrumentation with a range of 0 to 150°F and has determined that the key instrumentation for monitoring containment cooling system performance is containment pressure, which is Category 1. Containment atmosphere temperature is not relied upon by operators for post-accident decisions. The NRC staff finds the Category 3 containment atmospheric temperature monitoring instrumentation acceptable.

8. RG 1.97 recommends Category 3 quench tank temperature monitoring instrumentation with a range of 50 to 750°F.

The licensee has provided Category 3 quench tank temperature instrumentation with a range of 0 to 300°F and a high temperature alarm which annunciates in the control room at 125°F. The licensee stated that the provided range relates to the tank's rupture disk that limits the temperature of the tank contents to saturated steam conditions. The upper range limit of 300°F is greater than the saturated steam temperature corresponding to the rupture disk relief pressure of 100 psig. Therefore, the temperature instrumentation will remain on scale. The NRC staff finds the existing quench tank temperature instrumentation acceptable.

9. The licensee had previously classified auxiliary feedwater flow monitoring instrumentation as Type A. However, since credit for operator action based on indications of auxiliary feedwater flow is no longer taken, this instrumentation has been reclassified as Type D, Category 2.

The licensee has provided adequate justification for reclassification of this instrumentation, and the NRC staff finds it acceptable.

10. RG 1.97 recommends plant specific Category 2 instrumentation for monitoring heat removal by the containment heat removal system. The licensee determined that containment pressure is the key variable for this function, with other indications used as backup instrumentation. The containment pressure instrumentation is Category 1. The instrumentation used for backup includes Category 3 containment air recirculation (CAR) fan breaker status, CAR fan motor current, and low cooler water flow alarm. The NRC staff finds the use of Category 1 containment pressure instrumentation backed up by Category 3 CAR fan breaker status, CAR fan motor current, and low cooler water flow alarm instrumentation acceptable for monitoring heat removal by the containment heat removal system.

3.0 CONCLUSION

Based on the NRC staff's review of the licensee's submittals, the staff concludes that the licensee has provided adequate justification for deviations from and exceptions to RG 1.97, Revision 2, for the instrumentation that monitors (1) HPSI flow, (2) steam generator SRV position or main steam flow, (3) releases from steam generator SRVs or atmospheric dump valves, (4) steam generator pressure, (5) CVCS makeup flow-in, (6) LPSI flow, (7) containment atmosphere temperature, (8) quench tank temperature, (9) auxiliary feedwater flow, and (10) heat removal by the containment heat removal system. Therefore, the NRC staff finds this instrumentation acceptable.

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