



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 171

TO FACILITY OPERATING LICENSE NO. DPR-61

CONNECTICUT YANKEE ATOMIC POWER COMPANY

HADDAM NECK PLANT

DOCKET NO. 50-213

1.0 INTRODUCTION

By letter dated January 17, 1994, the Connecticut Yankee Atomic Power Company (CYAPCO/ licensee) submitted a request for changes to the Haddam Neck Plant Technical Specifications (TS). The requested changes would remove Technical Specification 3/4.4.12, "Failed Fuel Rods" and its associated Bases Section 3/4.4.12.

2.0 EVALUATION

On September 2, 1989, CYAPCO shut down the Haddam Neck Plant for the 15th refueling outage. Iodine levels during Cycle 15 operation were in the higher than normal range and indicative of 9 to 12 leaking fuel rods. During shutdown at the completion of Cycle 15, coolant activity rose significantly and spiked at 11 uci/ml, indicating significantly more leaking fuel rods than were originally assumed based on activity levels during operation. CYAPCO performed ultrasonic, visual and eddy current inspections and concluded that there were 456 leaking fuel rods in 133 fuel assemblies of the Cycle 15 core. These fuel rod leaks were a result of debris-induced fretting at the bottom of the stainless steel clad fuel rods.

The cladding at the Haddam Neck Plant is stainless steel while the industry typically uses zircaloy clad. If similar defects were to occur in zircaloy clad fuel rods, secondary failures would usually follow at a higher elevation in the rod due to hydriding as a result of the introduction of a steam-water mix. With a defect at this higher elevation, the gases in the rod normally escape, allowing water to enter the rod, which in turn, facilitates iodine and other soluble fission product transport into the bulk coolant. However, in the case of Cycle 15, with the stainless clad fuel, the secondary defects did not occur, since stainless steel clad fuel is relatively impervious to secondary hydriding. As a result, the reactor coolant system (RCS) iodine concentrations did not indicate the stainless steel fuel debris-induced failures. Therefore, by letter dated June 25, 1990, CYAPCO submitted a proposed TS 3/4.4.12, "Failed Fuel Rods," that limited the number of debris-induced failed fuel rods to 160 fuel pins. This limit was based on noble gas concentrations in the RCS rather than iodine. CYAPCO developed a correlation

which would equate the number of defective fuel rods to noble gas concentrations. This approach and amendment were approved by the staff by letter dated January 4, 1991.

CYAPCO has been converting to a zircaloy clad fuel over the past two cycles. This process will continue until all stainless steel clad fuel assemblies are replaced by Cycle 19 scheduled for March 1995. As of today, there are 100 zircaloy assemblies, which were not exposed to the debris and 57 stainless steel clad fuel assemblies, of which only five were exposed to the debris encountered during Cycle 15. The licensee has performed extensive maintenance evolutions during the previous two cycles to remove all of the debris in the RCS. As noted above, TS 3/4.4.12 was specifically approved to limit the debris-induced defects in stainless steel clad fuel. CYAPCO has proposed to now delete TS 3/4.4.12 and its associated BASES Section. Technical Specification 3/4.4.8, "Specific Activity," which has been the limiting TS for the plant has remained valid during this period for typical fuel failures and has been and still is consistent with the industry norm. If the debris-induced defects had been higher in elevation in the steel clad fuel, TS 3/4.4.8, "Specific Activity," would have provided an appropriate limit. In addition, as noted above, if similar defects were to occur in zircaloy clad fuel rods, secondary failures would usually follow at introduction of a steam water mix. With defects at this higher elevation, the gases in the rod normally escape, allowing water to enter the rod, which, in turn, facilitates iodine and other soluble fission product transport into the bulk coolant, and TS 3/4.4.8 would be an acceptable limiting TS. Therefore, deletion of TS 3/4.4.12 does not affect the plant's ability to detect defective fuel rods, nor does it change the 10 CFR 100 dose calculations.

As essentially all the stainless steel fuel assemblies that were exposed to debris have been removed (five remain but will be removed by the new Cycle scheduled to start March 1995) and the debris, which was the cause of the defects, has also been removed, the staff concludes that TS 3/4.4.12 and its associated BASES Section are no longer necessary and the proposed amendment to remove them from the TS is acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Connecticut State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards

consideration, and there has been no public comment on such finding (59 FR 7687). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Date: May 17, 1994