



CONNECTICUT YANKEE ATOMIC POWER COMPANY

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April 15, 1981

Docket No. 50-213
A01348



Director of Nuclear Reactor Regulation
Attn: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
U. S. Nuclear Regulatory Commission
Washington, DC 20555

- References: (1) W. G. Council letter to D. M. Crutchfield dated July 9, 1980.
(2) D. M. Crutchfield letter to W. G. Council dated September 25, 1980.
(3) W. G. Council letter to D. M. Crutchfield dated February 25, 1981.

Gentlemen:

Haddam Neck Plant
Low Pressure Turbine Disc Integrity

In Reference (1), Connecticut Yankee Atomic Power Company (CYAPCO) informed the NRC Staff of the results of the inspection of the low pressure turbine discs at the Haddam Neck Plant and of the intention to perform a reinspection of the discs during the 1981 refueling outage. The Staff docketed agreement with this plan in Reference (2), which was documented in confirmation of previous telephone discussions. By Reference (3), CYAPCO docketed revised data generated by Westinghouse regarding the low pressure turbine discs at the Haddam Neck Plant. Reference (3) also reiterated CYAPCO's plan to conduct a reinspection during the 1981 refueling outage, currently scheduled to commence in October, 1981.

In recent telephone communications, the NRC Staff has requested supplemental information regarding CYAPCO's evaluation of the revised Westinghouse data, and the basis for CYAPCO's conclusion that continued operation until the 1981 refueling outage is safe and justified. Accordingly, the following information is provided.

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The input data employed in the technical evaluation is the most recent as supplied by Westinghouse and transmitted by Reference (3). The operating time basis is a total of 10,585 hours from the May, 1980 inspection to the October, 1981 refueling outage. The disc which is limiting is the number two-generator end of low pressure turbine number two with a flaw depth of 0.438 inches (the maximum NDE flaw reported by Westinghouse is 0.378 inches, plus 0.06 inches measurement uncertainty) and a crack growth rate of 2.94×10^{-5} inches/hour. Westinghouse reports a fracture toughness of 198 ksi $\sqrt{\text{in}}$ and a critical crack size of 1.71 inches.

Given the initial conditions identified above, and utilizing the Westinghouse analytical methodology, the predicted crack depth at the October refueling outage is 0.75 inches. A comparison of the predicted crack to the critical crack size of 1.71 inches shows that the predicted flaw will not exceed 44% of the critical flaw size with continued operation until October, 1981. This margin is ample to technically substantiate continued safe operation.

CYAPCO's assessment of the generic Westinghouse methodology on the plant-specific parameters at the Haddam Neck Plant confirm that crack growth rate predictions and determinations of the critical crack size are inherently conservative as demonstrated by the following considerations:

- (1) Use of plant specific data yields a crack growth rate prediction which is approximately 18% lower than that utilized in the above evaluation.
- (2) The critical crack size was determined from the Westinghouse K-solution. Comparison of this approach to Paris and Tada's or Raju and Newman's K-solutions for surface cracks indicates that the Westinghouse solution for stress intensity factors is conservative by approximately 15%.
- (3) The bore stress utilized in this evaluation is the maximum tensile stress associated with plant startup, which is the condition at which the potential for brittle fracture is considered to be the greatest. Power operation, which is the mode CYAPCO anticipates maintaining until the October outage, results in a tensile bore stress lower than that assumed in the evaluation.

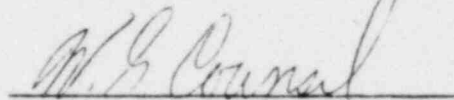
Based upon the above synopsis of CYAPCO's evaluation, it is concluded that continued, safe, full-power operation until the 1981 refueling outage has been justified. In light of the contents of Reference (2) and the above conclusion, the absence of subsequent correspondence from the Staff to the contrary will result in continued operation until the outage.

It is also noted that a mid-cycle outage would have significant adverse economic impact to CYAPCO and its customers without commensurate benefits in plant safety. A mid-cycle outage to perform a reinspection has been estimated to take approximately three calendar weeks. The replacement power costs for this interval exceed \$13,000,000 (thirteen million dollars).

CYAPCO will be providing additional correspondence on this subject subsequent to performing the inspections during the 1981 outage.

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY

A handwritten signature in cursive script, appearing to read "W. G. Council", is written over a horizontal line.

W. G. Council
Senior Vice President