

# NORTHEAST UTILITIES



THE CONNECTICUT LIGHT AND POWER COMPANY  
WESTERN MASSACHUSETTS ELECTRIC COMPANY  
HOLYOKE WATER POWER COMPANY  
NORTHEAST UTILITIES SERVICE COMPANY  
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January 17, 1994

Docket No. 50-213

B14583

Re: 10CFR50.90

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555

Gentlemen:

Haddam Neck Plant  
Proposed Revision to Technical Specifications  
Failed Fuel Rods

Pursuant to 10CFR50.90, Connecticut Yankee Atomic Power Company (CYAPCO) hereby proposes to amend Facility Operating License DPR-61 by incorporating the changes identified in the attachments into the Technical Specifications of the Haddam Neck Plant.

### Background

On September 2, 1989, CYAPCO shut down the Haddam Neck Plant for the 15th refueling outage. Iodine-131 levels during Cycle 15 operation were in the higher than normal range of .025  $\mu\text{ci/ml}$ , indicative of 9 to 12 leaking fuel rods in the high burnup fuel. In actuality, this initial indication was not representative of fuel cladding conditions. During shutdown at the completion of Cycle 15, coolant activity rose significantly and spiked at 11  $\mu\text{ci/ml}$ , thus indicating the presence of more leaking fuel rods than were originally assumed. CYAPCO's analyses of the fuel via ultrasonic, visual, and eddy current inspection methods revealed 456 leaking fuel rods in 133 fuel assemblies of the Cycle 15 core. These fuel rod defects that occurred during Cycle 15 were a result of debris induced fretting at the bottom of the stainless steel clad fuel rods. The cladding used at the Haddam Neck Plant was unique, in that the industry typically uses a zircaloy clad fuel rod. When similar defects occur in zircaloy clad fuel rods, secondary failures 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, and in turn, facilitates iodine and other soluble fission product transport into the bulk coolant. When this iodine release occurs, Technical Specification 3/4.4.8, "Specific Activity," provides an appropriate limit for the Haddam Neck Plant. However, in the case of Cycle 15, with the stainless steel clad fuel, the secondary defects did not occur, since stainless steel fuel is relatively impervious to secondary hydriding. As a result, the reactor coolant system (RCS) iodine concentrations were not an accurate means

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of evaluating stainless steel fuel debris-induced failures. Therefore, CYAPCO, via our June 25, 1990,<sup>(1)</sup> letter, submitted a proposed license amendment that limited fuel rod defects to 160 fuel rods. CYAPCO, being aware of the fuel cladding defects, was able to predict fuel rod defects based on noble gas concentrations in the primary system. These noble gases would leak out of the defective fuel rods and correlations were developed which would equate the number of fuel rod defects to noble gas concentrations. The NRC Staff approved this approach and proposed license amendment in a letter dated January 4, 1991.<sup>(2)</sup>

CYAPCO has been replacing the stainless steel clad fuel with zircaloy clad fuel over the past two cycles for reasons unrelated to the above-discussed fuel problems. This process will continue until all stainless steel clad fuel assemblies are replaced. As of today, 57 stainless steel clad fuel assemblies remain, of which only five were exposed to the debris encountered in Cycle 15. At the start of Cycle 19, there will be only four stainless steel clad fuel assemblies, none of which were exposed to the debris encountered during Cycle 15. This small number of stainless steel clad fuel assemblies, combined with the improved performance of the fuel over Cycles 16, 17, and 18 result in the ability of CYAPCO to request removal of Technical Specification 3/4.4.12, "Failed Fuel Rods," and use only the limitations imposed by Technical Specification 3/4.4.8, "Specific Activity." This reliance on Technical Specification 3/4.4.8 is consistent with the industry norm and is considered safe.

#### Description of the proposed change

In a letter dated June 25, 1990, CYAPCO submitted a license amendment request proposing a technical specification limit of 160 defective fuel rods (of any type) for Cycle 16 operation at the Haddam Neck Plant. On January 4, 1991, the request was approved by the NRC Staff as License Amendment No. 134.

The purpose of this proposed change is to delete the failed fuel rod technical specification changes approved in Amendment No. 134. The change deletes page 3/4 4-51 and modifies page B3/4 4-13.

The current technical specification is a result of the large number of debris-induced fuel rod defects that occurred during Cycle 15. This specification was intended to apply as long as the fuel, which was exposed to the debris, remained in the core. At the start of Cycle 19, there will be no stainless steel clad fuel assemblies remaining in the core that were exposed to the debris of Cycle 15. Four stainless steel clad fuel assemblies will be in the

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(1) E. J. Mrocza letter to the U.S. Nuclear Regulatory Commission, "Cycle 16 Fuel Recovery Program, Proposed Changes to Technical Specifications," dated June 25, 1990.

(2) A. B. Wang letter to E. J. Mrocza, "Issuance of Amendment (TAC No. 77049)," dated January 4, 1991.

core, but these were not exposed to the debris of Cycle 15. This small number of assemblies, combined with the satisfactory performance of the fuel over Cycles 16, 17, and 18 allows the removal of this requirement.

#### Safety Assessment

The proposed license amendment consists of the removal of a technical specification and bases to limit the amount of defective fuel rods in the core. The 160 defective fuel rod limiting condition for operation (LCO) limit was chosen following a review of all accidents assuming a stainless steel clad fuel core. The most limiting scenario for continued operation with damaged fuel rods was the steam generator tube rupture (SGTR). The LCO would provide reasonable assurance that the radiological consequences of an SGTR accident were within the guidelines provided in Standard Review Plan (SRP) 15.6.3 and the dose reference values specified in 10CFR100.11. This "special" technical specification was necessary due to the Haddam Neck Plant's unique stainless steel fuel cladding and operation with an unknown number of defective fuel rods. The Haddam Neck Plant, over the past two outages (1991 and 1993), has been replacing the stainless steel clad fuel with zircaloy clad fuel, thus negating the need for this "special" technical specification. With the zircaloy clad fuel, any fuel rod defects will result in iodine releases, and the provisions of Technical Specification 3/4.4.8, "Specific Activity," will apply. This will ensure that doses do not exceed 10CFR100.

#### Significant Hazards Consideration

In accordance with 10CFR50.92, CYAPCO has reviewed the attached proposed changes and has concluded that the changes do not involve a significant hazards consideration (SHC). The basis for this conclusion is that the three criteria of 10CFR50.92(c) are not compromised. The proposed changes do not involve an SHC because the changes would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated.

A review of the accidents detailed in the Updated Final Safety Analysis Report, Chapter 15, was undertaken to determine if they were impacted by the proposed change. The review indicated that the previously evaluated accidents were not impacted by the proposed license amendment.

All fuel design and performance criteria are the same for Cycle 18 as in previous cycles. All criteria will continue to be met and no new single-failure mechanisms will be created. This change does not involve any alterations to plant equipment or procedures which would affect any operational modes or accident assumptions. This proposed license amendment does delete a technical specification that is no longer considered necessary. This deletion is prompted by the replacement of stainless steel clad fuel with zircaloy clad fuel. The zircaloy clad fuel, if it experiences damage, will release iodine into the primary system. Any iodine released is covered within the guidelines specified

in the existing Technical Specification 3/4.4.8, "Specific Activity." This specification will ensure that operation does not continue with radiochemistry values that exceed those assumed in our accident assumptions. The existing technical specification of specific activity along with the zircaloy clad fuel will ensure that a significant increase in the probability or consequences of an accident previously evaluated is not present.

2. Create the possibility of a new or different kind of accident from any previously analyzed.

The possibility of an accident or malfunction of a different type than any evaluated previously in the UFSAR is not created. Since there are no changes in the way the plant is operated, the potential for an unanalyzed accident is not created. No new failure modes are introduced.

The presence of defective fuel rods and the resultant iodine release would only affect potential offsite doses. This proposed license amendment does not increase the radiochemistry limits, but does revert the technical specifications back to the standard methodology and limitations that were unable to be used because of the stainless steel clad fuel. These new limitations will continue to ensure that doses remain within the limits prescribed.

3. Involve a significant reduction in a margin of safety.

The proposed changes do not have any adverse impact on the protective boundaries. The margin of safety, as defined in the basis for any technical specification, is not reduced. The proposed changes do not adversely impact any of the safety systems, nor do they increase the number of challenges to the safety systems.

The limit of 160 defective rods was chosen to be consistent with initial conditions assumed for the radiological design basis. The elimination of this specification is acceptable since the basis for the initial condition can be supported by the use of zircaloy clad fuel as opposed to the unique stainless steel clad. If future fuel defects are debris induced, the dose equivalent iodine will be within expected radiochemistry values and the resulting doses will be bounded.

Therefore, there is no reduction in the margin of safety as defined in the basis of any technical specification with the deletion of the defective fuel rod technical specification.

The Commission has provided guidance concerning the application of the standards in 10CFR50.92 by providing certain examples (10CFR 7751, March 6, 1986) of amendments that are considered not-likely to involve an SHC. The changes proposed herein are not enveloped by a specific example. As described above, the proposed changes do not constitute an SHC since the proposed changes will return the plant to the initial conditions assumed for the

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radiological design basis for the Haddam Neck Plant. Therefore, these changes do not involve an increase in the probability of occurrence or consequences of an accident previously analyzed, do not create the possibility of a new or different kind of accident, nor involve a reduction in a margin of safety.

CYAPCO has reviewed the proposed license amendment against the criteria of 10CFR51.22 for environmental considerations. The proposed changes do not involve an SHC, nor increase the types and amounts of effluents that may be released off site, nor significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, CYAPCO concludes that the proposed changes meet the criteria delineated in 10CFR51.22(c)(9) for a categorical exclusion from the requirements for an environmental impact statement.

Attachment 1 presents the marked-up version of the technical specifications. The retype of the proposed changes to the technical specifications, Attachment 2, reflects the proposer's change of the currently issued version of the technical specifications. Pending technical specification changes, or technical specification changes issued subsequent to this submittal, are not reflected in the enclosed retype. The enclosed retype should be checked for continuity with the technical specifications prior to issuance.

Revision bars are provided in the right-hand margin to indicate a revision to the text. No revision bars are utilized when the page is changed solely to accommodate the shifting of text due to additions or deletions.

The Haddam Neck Plant Nuclear Review Board has reviewed and approved this proposed amendment and concurs with the above determination.

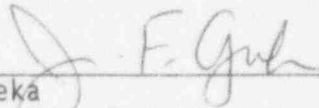
In accordance with 10CFR50.91(b), we are providing the State of Connecticut with a copy of this proposed amendment.

Regarding our proposed schedule for this amendment, we request issuance to support the start of Cycle 19, estimated to occur as early as December 15, 1994. We request the amendment be effective as of the date of issuance, to be implemented within 30 days of issuance.

If you have any questions, please contact us.

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY

  
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J. F. Opeka  
Executive Vice President

cc: See Page 6



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cc: T. T. Martin, Region I Administrator  
A. B. Wang, NRC Project Manager, Haddam Neck Plant  
W. J. Raymond, Senior Resident Inspector, Haddam Neck Plant

Mr. Kevin T.A. McCarthy, Director  
Monitoring and Radiation Division  
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79 Elm Street  
P.O. Box 5066  
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Subscribed and sworn to before me

this 17 day of January 1994

Lorraine J. Damico

Date Commission Expires: 3/31/98