

NORTHEAST UTILITIES



THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

General Offices • Selden Street, Berlin, Connecticut

P.O. BOX 270
HARTFORD, CONNECTICUT 06141-0270
(203) 665-5000

March 23, 1987

Docket No. 50-213

B12463

Re: 10 CFR 50.34

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Reference: (1) F. M. Akstulewicz letter to J. F. Opeka, "Cycle 14 Reload Technical Specifications," dated April 17, 1986.

Gentlemen:

Haddam Neck Plant
Fuel Misloading Event Analysis

In response to Reference (1), the Connecticut Yankee Atomic Power Company (CYAPCO) has conducted a fuel misloading event evaluation for the Haddam Neck Plant.

A fuel misloading event is considered to be the result of an error in fuel placement in the reactor core such that, on reactor startup, one (or more) locations have reactivity characteristics different from that assumed in the cycle design loading pattern. To evaluate this event, a spectrum of cycle reload evolutions was evaluated for errors in design, fabrication and transfer procedures.

The spectrum of fuel assembly loading errors were classified by type. The following three types of errors, which result in an as-loaded assembly different from that assumed in the core design loading pattern, were evaluated against the current Haddam Neck reload process: errors in (a) initial reactivity (enrichment, cladding, burnable poison, etc.), (b) assembly exposure, and (c) assembly orientation.

The design basis for prevention of initial reactivity loading errors is that fabrication practices will be strictly controlled so as to clearly prevent incorrect identification of fuel enrichment, uranium, cladding or burnable poison loading of a given assembly. The existing Haddam Neck fuel design, fabrication, and reload process was reviewed against this basis. The Haddam Neck reload fuel is a single enrichment batch, with uniform uranium loading, and does not employ burnable poison pins. The Haddam Neck fuel, fuel assemblies, and fabrication equipment are physically separated from other fuel orders. These fabrication practices assure that a misloading event due to errors in initial fuel assembly enrichment will not occur.

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The design basis for prevention of assembly exposure misloading errors is that fuel transfer procedures are evaluated and shown to sufficiently control selection of the proper new or exposed fuel assembly, and subsequent placement of that fuel assembly in the assigned location such that compliance with the cycle design loading pattern is assured. The existing Haddam Neck reload process was reviewed against this design basis. The fuel transfer procedure for the reload sequence is developed by an engineering group independent of the Haddam Neck staff, then reviewed for compliance with the cycle design loading pattern by the Haddam Neck staff. Movement of fuel assemblies during the reload sequence is controlled by procedure and equipment configurations. If a given fuel assembly is placed in an incorrect location, the subsequent movement of the assembly assigned to that location is prevented. The fuel transfer procedure discussed above insures that the location of the assembly is accurately known, and that its relocation is correct. The physical configuration of the fuel transfer equipment and storage locations, and the fact that there will be no remaining empty core locations at the completion of the reload evolution, constrain fuel movement so that multiple procedural errors would be necessary to result in a misloading event.

The design basis for prevention of fuel assembly orientation misloading events is that fuel transfer procedures and fuel handling equipment are evaluated and shown to sufficiently control rotation and orientation of fuel assemblies such that compliance with the cycle design loading pattern is assured. The existing Haddam Neck operating procedures do not rotate fuel assemblies as a planned evolution. The geographical orientation of a fuel assembly normally remains unchanged throughout its residence at Haddam Neck. Rotation of fuel assemblies in containment is restricted by a mechanical stop, and would be a violation of procedures.

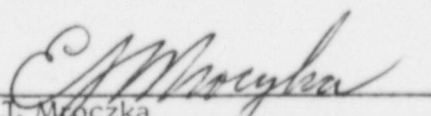
As a separate and independent means to assure that a fuel assembly misload event will not occur, CYAPCO Quality Control conducts an extensive as-loaded verification. The verification is conducted visually, and uses video recordings to allow separate checks. The as-loaded verification (placement and orientation) is conducted without access to the cycle design loading pattern until the review is complete.

It is thus concluded that procedural controls and system equipment configurations will prevent assembly loading errors which would result in a misloaded fuel assembly. Review of the as-loaded configuration provides an independent verification that no errors have been committed. Therefore, further analysis of the consequences of a misloaded assembly are not required.

If you have any questions or comments, please let us know.

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY


E. J. Moczka
Senior Vice President

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cc: Dr. T.E. Murley, Region I Administrator
F. M. Akstulewicz, NRC Project Manager, Haddam Neck Plant
P. D. Swetland, Resident Inspector, Haddam Neck Plant