

# Maine Yankee

RELIABLE ELECTRICITY FOR MAINE SINCE 1972

EDISON DRIVE • AUGUSTA, MAINE 04330 • (207) 628-3521

March 23, 1992

MN-92-26

SEN-92-81

UNITED STATES NUCLEAR REGULATORY COMMISSION

Attention: Document Control Desk

Washington, DC 20555

References: (a) License No. DPR-36 (Docket No. 50-309)  
(b) Letter, MYAPCo to USNRC, MN-91-122, dated December 12, 1990  
(c) Letters, MYAPCo to USNRC, MN-91-122 and MN-91-182, dated August 23, 1991, and December 31, 1991

Subject: Submittal of CE-NPSU-692-P: "Cracked CEA Failure Analysis and Evaluation of Highly Irradiated CEA Materials"

Gentlemen:

As per Reference (b), Maine Yankee is hereby submitting, for your information, the final report evaluating the hot cell examinations of the failed CEAs identified during the Cycle 11/12 refueling outage. This report is provided as Attachment B.

The failure analysis, as described in Reference (b), indicates that the cause of the CEA cracking is an intergranular irradiation-assisted stress corrosion mechanism. In this type of phenomena, impurity atoms segregate to the grain boundaries under neutron irradiation and are believed to contribute to intergranular cracking upon reaching a critical concentration. The driving force for the crack initiation and propagation is postulated to be either the stress associated with the swelling of the boron carbide pellet against the inside of the cladding at the irradiated zone during power operations, or the stress resulting from a differential shrinkage rate of the CEA cladding and boron carbide pellet during cooldowns. In either case, a brittle fracture of the CEA cladding was not observed.

The work resulting in the preparation of this report and the report itself are proprietary to Combustion Engineering, Inc. Accordingly, Combustion Engineering and Maine Yankee both request that the staff treat the enclosed report as proprietary.

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# Maine Yankee

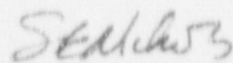
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Attachment A contains an affidavit pursuant to the provisions of 10 CFR 2.790 in conformance with the identification of proprietary information. Please note that a non-proprietary version of the above subject report LC-NPSD-692-P does not exist.

If there are any questions or comments concerning this report, please contact me.

Very truly yours,



S. E. Nichols, Manager  
Licensing & Engineering Support Department

RPJ/jag

## Attachments

c: Mr. Thomas T. Martin (w/o Attachment B)  
Mr. Charles S. Marschall (w/o Attachment B)  
Mr. E. H. Trottier (w/o Attachment B)  
Mr. Patrick J. Hostie (w/o Attachment B)  
Mr. Phillip W. Richardson, Jr. (CEOG) (w/o Attachment B)

ATTACHMENT A

Affidavit Pursuant to 10 CFR 2.790



AFFIDAVIT PURSUANT

TO 10 CFR 2.790

Combustion Engineering, Inc.    )  
State of Connecticut            )  
County of Hartford              )       SS.: Windsor

I, S. A. Toelle, depose and say that I am the Manager, Nuclear Licensing, of Combustion Engineering, Inc., duly authorized to make this affidavit, and have reviewed or caused to have reviewed the information which is identified as proprietary and referenced in the paragraph immediately below. I am submitting this affidavit in conformance with the provisions of 10 CFR 2.790 of the Commission's regulations for withholding this information.

The information for which proprietary treatment is sought is contained in the following document:

CE NPSD-692-P, "Cracked CEA Failure Analysis and Evaluation of Highly Irradiated CEA Materials," December 1991.

This document has been appropriately designated as proprietary.

I have personal knowledge of the criteria and procedures utilized by Combustion Engineering in designating information as a trade secret, privileged or as confidential commercial or financial information.

Pursuant to the provisions of paragraph (b) (4) of Section 2.790 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure, included in

the above referenced document, should be withheld.

1. The information sought to be withheld from public disclosure, which is owned and has been held in confidence by Combustion Engineering, concerns the irradiated properties of control rod materials.
2. The information consists of test data or other similar data concerning a process, method or component, the application of which results in substantial competitive advantage to Combustion Engineering.
3. The information is of a type customarily held in confidence by Combustion Engineering and not customarily disclosed to the public. Combustion Engineering has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The details of the aforementioned system were provided to the Nuclear Regulatory Commission via letter DP-537 from F. M. Stern to Frank Schroeder dated December 2, 1974. This system was applied in determining that the subject document herein is proprietary.
4. The information is being transmitted to the Commission in confidence under the provisions of 10 CFR 2.790 with the

understanding that it is to be received in confidence by the Commission.

5. The information, to the best of my knowledge and belief, is not available in public sources, and any disclosure to third parties has been made pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.
6. Public disclosure of the information is likely to cause substantial harm to the competitive position of Combustion Engineering because:
  - a. A similar product is manufactured and sold by major pressurized water reactor competitors of Combustion Engineering.
  - b. Development of this information by C-E required thousands of manhours and hundreds of thousands of dollars. To the best of my knowledge and belief, a competitor would have to undergo similar expense in generating equivalent information.
  - c. In order to acquire such information, a competitor would also require considerable time and inconvenience performing a failure analysis of cracked CEA cladding.
  - d. The information required significant effort and expense to obtain the licensing approvals necessary for application of the information. Avoidance of this expense would decrease



a competitor's cost in applying the information and marketing the product to which the information is applicable.

- e. The information consists of analyses of the irradiated properties of control rod materials, the application of which provides a competitive economic advantage. The availability of such information to competitors would enable them to modify their product to better compete with Combustion Engineering, take marketing or other actions to improve their product's position or impair the position of Combustion Engineering's product, and avoid developing similar data and analyses in support of their processes, methods or apparatus.
- f. In pricing Combustion Engineering's products and services, significant research, development, engineering, analytical, manufacturing, licensing, quality assurance and other costs and expenses must be included. The ability of Combustion Engineering's competitors to utilize such information without similar expenditure of resources may enable them to sell at prices reflecting significantly lower costs.
- g. Use of the information by competitors in the international marketplace would increase their ability to market nuclear steam supply systems by reducing the costs associated with their technology development. In addition, disclosure would have an adverse economic impact on Combustion Engineering's potential for obtaining or maintaining

foreign licensees.

Further the deponent sayeth not.

S. A. Toelle

S. A. Toelle  
Manager  
Nuclear Licensing

Sworn to before me  
this 14th day of February, 1992

Laurie J. White

Notary Public

My commission expires: 3/31/94



ATTACHMENT 3

Report CE-NPSD-692-P (copy no. 25)

"Cracked CEA Failure Analysis and Evaluation  
of Highly Irradiated CEA Materials"