

NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
 WESTERN MASSACHUSETTS ELECTRIC COMPANY
 NEW YORK WATER POWER & COMPANY
 NORTHEAST UTILITIES SERVICE COMPANY
 NORTHEAST NUCLEAR ENERGY COMPANY

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February 4, 1991

Docket No. 50-336

B13725

Re: CEA Inspection

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

Gentlemen:

Millstone Nuclear Power Station, Unit No. 2
Control Element Assembly Action Program

In a letter dated October 24, 1990, (1) Northeast Nuclear Energy Company (NNECO) provided the NRC Staff with information on the results of the control element assembly (CEA) inspection program. The information at that time consisted of the CEAs that were inspected during the most recent refueling outage. The inspection of the remaining CEAs that were not previously inspected has been completed. The purpose of this letter is to provide the results of the inspection of the remaining CEAs and to update our action plan based on the most recent inspection results.

The CEA inspection program has now been completed. Of the 73 original CEAs, 72 have been inspected since their final discharge. The remaining original CEA was not inspected due to interference problems between the grapple used for the inspection and the spent fuel pool rack location the CEA was stored in.

The CEAs inspected either during the recently completed refueling outage (Cycle 10) or shortly after start-up from that outage are as follows:

- o The 16 "old design" CEAs reinserted for Cycle 11. The exposure of nine of these CEAs was approximately 1454 effective full power days (EFPDs) when they were inspected. The remaining 7 had exposures of approximately 1076 EFPDs.
- o The 13 original issue CEAs which were discharged at the end of Cycle 10. The total exposure on these CEAs is approximately 3681 EFPDs.

(1) E. J. Mrocza letter to U.S. Nuclear Regulatory Commission, "Control Element Assembly Action Program," dated October 24, 1990.

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- o The 21 CEAs discharged at the end of Cycle 8. The total exposure on these CEAs is approximately 2949 EFPDs.
- o Thirteen of the 14 CEAs discharged at the end of Cycle 9. The total exposure on these CEAs is approximately 3262 EFPDs.

In addition, there have been an additional 25 CEAs that were discharged at the end of Cycles 6 and 7 that were previously inspected. The exposures on these were 2227 EFPDs for the 9 CEAs that were discharged at the end of Cycle 6 and 2605 EFPDs for the 16 CEAs that were discharged at the end of Cycle 7.

There have been no cracks found in any of these CEAs. The measured strains are all well below the previous limit of 1.2 percent.

It is clear that the CEAs at Millstone Unit No. 2 are less susceptible to cracking than are CEAs at other similar plants. The probable reason for the absence of cracks is because the CEAs have been kept in their fully withdrawn positions throughout their lifetimes. Other similar plants move the CEAs to several positions at or near fully withdrawn. The neutron flux gradient is very high near the top of the core. The same time of exposure could result in a significantly lower neutron exposure if the CEAs are maintained in a full-out position. Therefore, it is possible that CEAs at Millstone Unit No. 2 may be less sensitive to cracking than other plants because their neutron exposure may be significantly lower for a given number of EFPDs.

It is also expected that the "old design" CEAs reinserted for Cycle 11 are less susceptible to cracking than are the original issue CEAs. This is because they have long (2 5/8") end caps on all five fingers. The original CEAs had a much shorter (5/8") end cap on the center finger. It is the shorter end cap that was in use at the other plants where the cracking was observed. The result of the longer end cap is that the bottom B₄C pellet is approximately 2" further away from the core. The high neutron flux gradient near the top of the core will result in a significantly lower neutron flux in the cladding near the bottom B₄C pellet. This lower neutron flux should result in a longer lifetime for the replacement CEAs.

The recent inspection program at Millstone Unit No. 2 has resulted in a large amount of data for CEAs with exposures exceeding 2900 EFPDs. Based on this data, we concluded that there is no basis for assuming that cracking is a significant problem at Millstone Unit No. 2 until relatively high exposures (well in excess of 2900 EFPDs) are reached. The plant is currently in the early part of Cycle 11. The lead "old design" CEAs will not approach a 2900 EFPD exposure until at least Cycle 14. It is therefore concluded that operation with the current "old design" reinsert CEAs through at least the end of Cycle 13 is acceptable and no further inspections are planned until replacement.

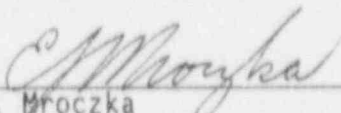
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Note also that Millstone Unit No. 2 is participating in the ABB-CE Owners' Group work to identify the cause of the cracking which has been observed at similar plants. We will monitor the progress of this task to assure that our conclusions regarding the expected lifetime of the CEAs are confirmed.

Please contact us if you have any questions.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY



E. J. Mroczka
Senior Vice President

cc: T. T. Martin, Region I Administrator
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and 3