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Northern States Power Company Minneapolis, Minnesota 55401 L. O. Mayer, PE	10-17-73	10-19-73	X			

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Mr. Skovholt	No Orig			X	X

CLASS	UNCLASS	PROP INFO	INPUT	NO CYS REC'D	DOCKET NO:
	XX			49	50-263

DESCRIPTION:
Ltr our 9-5-73 ltr....concerning inverted Control Rod Poison Tubes.....

ENCLOSURES:

ACKNOWLEDGED

Do Not Remove

PLANT NAME: Monticello

FOR ACTION/INFORMATION 10-23-73 AB

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Regulatory File

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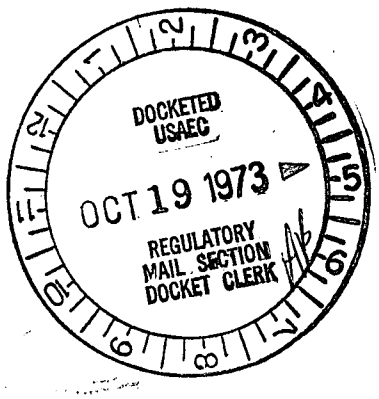

October 17, 1973

Mr. D J Skovholt
Assistant Director for
Operating Reactors
Office of Regulation
U S Atomic Energy Commission
Washington, D C 20545

Dear Mr. Skovholt:

MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50-263 License No. DPR-22

Response to September 5, 1973 Letter
Concerning Inverted Control Rod Poison Tubes

Your September 5, 1973 letter requested that we submit information concerning possible inverted control rod poison tubes. Our response to each of the six areas questioned is as follows.

1. Analyses of possible length and location of poison voids which could be caused by boron carbide redistribution.

   Response

   The Monticello control blades are similar in design and construction to the Millstone blades discussed extensively in a July 23, 1973 report entitled, "Millstone Nuclear Power Station Unit 1, Reactor Control Blade Evaluation." Information regarding the mechanism and limitation of boron carbide redistribution is equally applicable to Monticello. Additional information is provided in the General Electric response, dated October 8, 1973, to ten AEC questions on the subject of inverted poison tubes. The Monticello complement of control blades in the reactor consists of 26 blades fabricated in Wilmington from January 25, 1969 to March 26, 1969 and 95 blades fabricated in San Jose.

   Mechanical accelerations from scram, mechanical vibration during operation and thermal cycling are functions which could contribute

to poison redistribution, if indeed one assumes Monticello rod blades are vulnerable to that phenomena. The Monticello reactor has shown no evidence of boron carbide redistribution in these rods after 34 months of operation which includes 38 reactor scrams and 23 thermal cycles from cold shutdown to operating temperatures. We have done extensive tests of shutdown margins on all rods, observing absolutely no indication of encroachment on safety criteria. (See letter from Mr. L J Wachter to Mr. Boyce H Grier, "Response to July 26, 1973 Letter on Shutdown Margin Testing," dated August 6, 1973.) Further, on several occasions we have conducted critical tests at cold shutdown conditions in ways to ascertain any significant conditions of reactivity asymmetry which may potentially develop between core quadrants or pie-shaped equal sections of the core and have observed no asymmetry indicative of significant poison redistribution. These tests were particularly sensitive to the reactivity condition in the top of the core where the boron carbide redistribution is postulated to occur. (See letter from Mr. L O Mayer to Mr. J F O'Leary, "Supplemental Information to Cycle 2 Startup Report," dated August 9, 1973.) While the conditions have existed wherein redistribution might be predicted if inverted tubes exist, there has been no measurable effect on the core as would be anticipated from a significant amount of redistribution.

2. The effect of such redistribution on normal operation, transients, and accidents.

Response

This question is answered by the General Electric report referenced above.

3. Proposed changes to Technical Specifications which will assure that all safety margins stated or implied in your FSAR are maintained.

Response

We concur with the General Electric report in that no changes to the Technical Specifications are required to preserve safety margins for the current cycle or after future reloads. The response to this question in the General Electric report is based on the fact that we have performed shutdown margin tests on all control rods during the present cycle and is premised on the stated replacement criteria of defective control blades for meeting shutdown margin requirements for future cycles. As explained in our response to the following

question, we may choose the option of performing shutdown margin tests in lieu of blade replacements during future outages. In either of these alternatives, we see no need for Technical Specification changes.

4. Surveillance requirements to maintain adequate shutdown reactivity margins and monitor changes in poison distribution.

Response

In response to question 1 we outlined the testing done to date which showed no indication of boron carbide redistribution in the past. We are following the status of the eddy-current testing techniques discussed in the General Electric report. If at the time of our Spring, 1974 refueling outage the technique has been demonstrated to provide conclusive evidence of inverted poison tubes, we intend to eddy-current inspect each control blade in the reactor. We will perform the following surveillance tests at the beginning of each reload cycle until we have conclusive evidence that no inverted poison tubes exist in excess of the .0025 delta k acceptance criteria discussed in the General Electric report:

a. verify a shutdown margin of .0025 delta k on all rods having a calculated reload design shutdown margin less than .013 delta k at the most reactive time in the subsequent cycle.

b. run cold critical quadrant symmetry checks to verify symmetry as a check against any cluster settlement conditions.

5. Your plans and schedules for change out of control rods.

Response

We have no plans to change out control blades at the present time. We have a limited number of spare control blades on site which are available for replacement. We believe that decisions on a replacement program should be based on:

a. the findings of an in-service non-destructive test showing the number of inverted poison tubes relative to the .0025 delta k acceptance criteria,

b. evidence from the shutdown margin tests and symmetry tests that poison redistribution has indeed occurred, and

c. evidence from laboratory tests or from the inspection of exposed control blades that significant poison redistribution can occur.

6. Expected curve of reactivity vs. burnup for the remainder of current operating cycle.

Response

The attached curve shows the shutdown margin with the strongest control rod fully withdrawn for the entire Monticello cycle 2. The present exposure in this cycle is approximately 2000 MWD/T.

Yours very truly,

L. O. Mayer

L O Mayer, PE
Director of Nuclear Support Services

LOM/MHV/br

cc: J G Keppler
G Charnoff
Minnesota Pollution Control Agency
Attn Ken Dzugan

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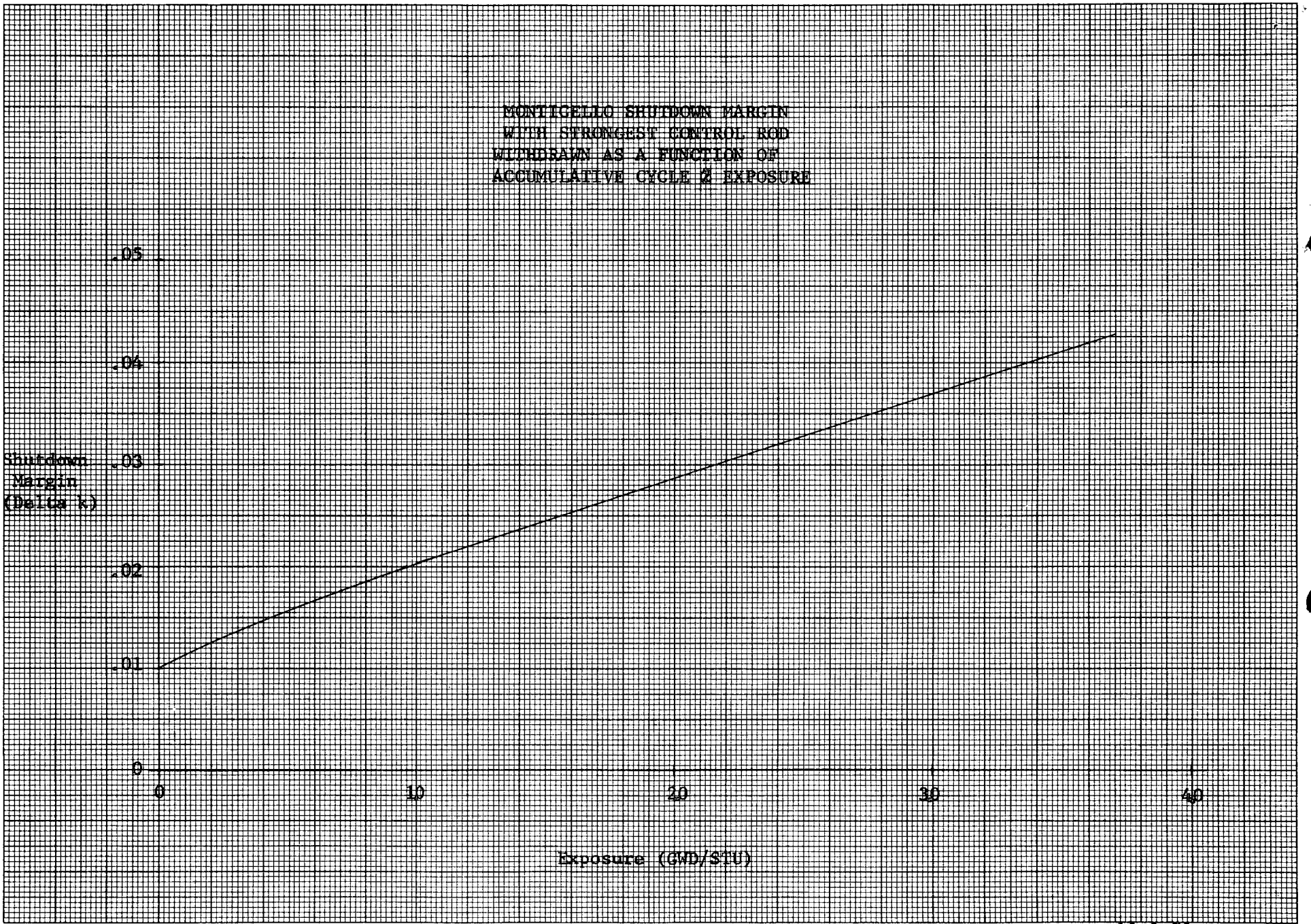

10-9-73