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October 31, 1973

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

Subject: Dresden Units 2 and 3, Quad-Cities Units 1 and 2 -- Inverted Control Rod Tubes -- AEC DKTS 50-237, 50-249, 50-254 and 50-265

Dear Mr. Skovholt:

A partial response to your letter dated September 5, 1973 concerning this subject was submitted in my letter dated October 11, 1973. It was indicated that the response would be completed by October 31, 1973. Attached is the additional information necessary to complete the response.

The numbering of the responses in the attachment corresponds to the numbering of the requested information in your September 5, 1973 letter. The General Electric Company generic report referenced in the attachment was submitted to you by General Electric on October 8, 1973.

One signed original and 39 copies of this letter are submitted.

Very truly yours,

J. S. Abel
Nuclear Licensing Administrator-
Boiling Water Reactors

Att.

cc: 254
265

ATTACHMENT

Response to AEC - Inverted Control Rod Tubes

1) Analyses of possible length and location of poison voids which could be caused by B_4C redistribution

Millstone Special Report of July 23, 1973 summarizes the extent and location of poison voids caused by B_4C redistribution. No additional tests have been completed by General Electric since those reported in MSR, "Reactor Control Blade Evaluation."

2) The effects of such redistribution on normal operations, transients and accidents.

The analysis by the General Electric Company in their generic report for inverted control blades dated October 8, 1973 states that control blades in most operating plants were manufactured prior to June 23, 1970. In the case of the Edison Company, the D-2 reactor falls into this category. Most (93.7% or 166/177) D-3 control blades are also in this group with the 6.3% having a manufacture date prior to March 1971. Quad-Cities Unit 1 has 99.5% of its control blades manufactured in this period prior to June 1970 while Unit 2 has 88.2% (156/177) of its blades manufactured at that time. Of the 21 blades comprising the 11.8%, the manufacturing period was September 1970 for 19 blades and March 1971 for the remaining two blades. From Table 1 of GE's generic report on inverted blades, these later periods had 11% of the absorber tubes and sheaths reversed for September 1970 and 20% inverted tubes with 20% inverted sheaths for March 1971. If we consider this as a

deviation from the generalized 5% reversed tubes and 1% reversed sheaths as used for the GE generic report, one sees that the actual perturbation on the GE analysis for the small number of tubes and sheaths involved has only about a 1% change to their analysis.

Shutdown margin demonstrations have been performed on Dresden 2/3 and Quad-Cities 1/2. These demonstrations have shown that shutdown margin requirements of the technical specification have been satisfied. Further, in all these reactors that margin is expected to increase with exposure. Thus, it may be concluded that the technical specification shutdown margin requirement of 0.25% Δ k can be met with substantial extra margin until the next refueling outage.

Since it has been established that the 95.4% (675/708) of Edison's control blades were manufactured during the period used by General Electric for their generic report and that the remaining 4.6% have a minor effect on the analysis, it will be assumed that the generic report can be used to represent the status of Dresden 2/3 and Quad-Cities 1/2.

Transient responses associated with a possible B_4C redistribution have been analyzed by GE and are contained within the generic report.

Proposed changes to Technical Specifications

As is stated in GE's generic report on inverted control blades, no changes to technical specifications to preserve safety margins for the current cycle or after reloads will be required. This is based on the fact that shutdown margins will be met, pressure margin decreases during transients is negligible, and rod drop accident margin change is small.

EXPECTED CURVES OF REACTIVITY VS BURNUP

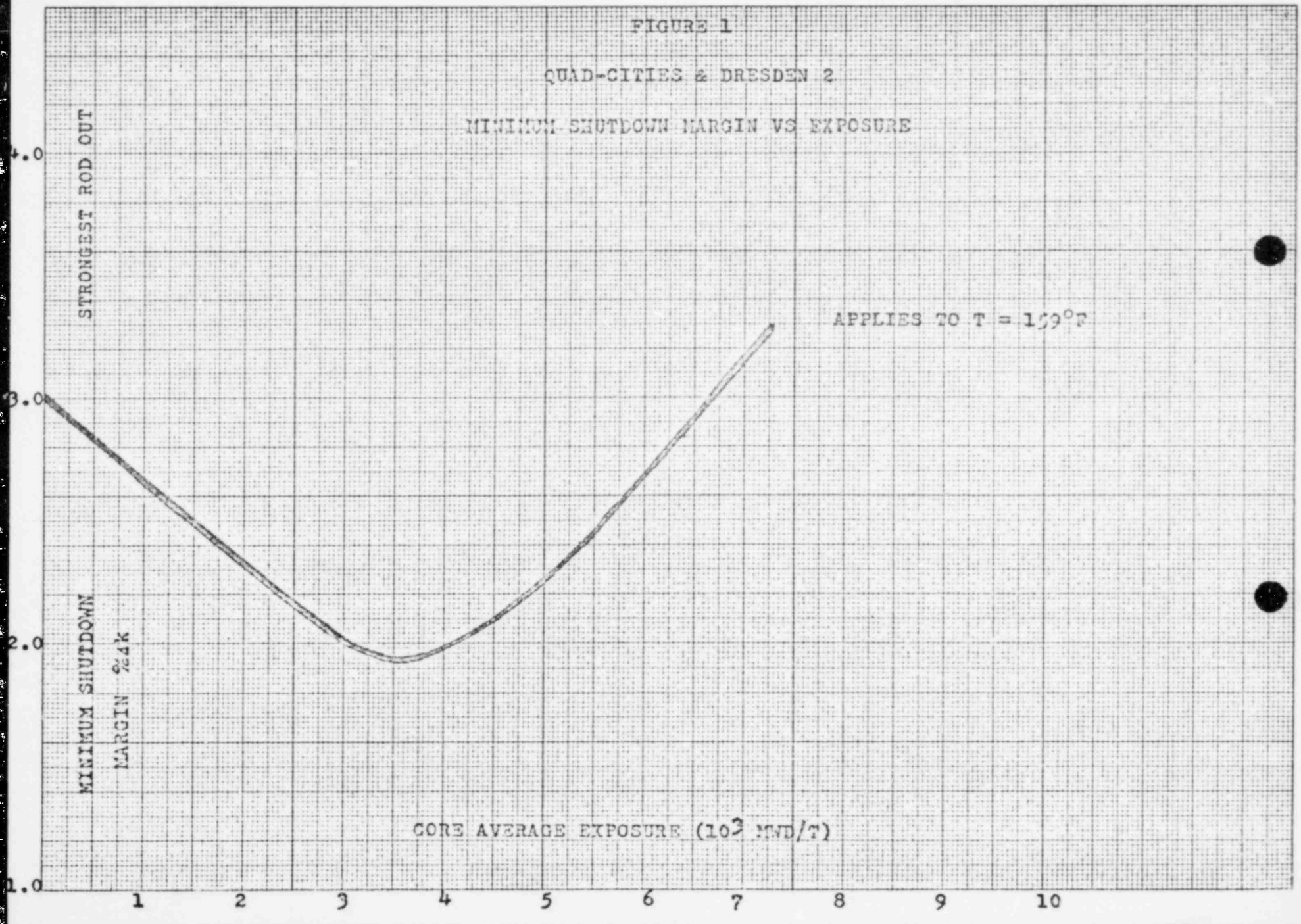
The minimum shutdown margin vs. exposure curves for Dresden 2/3 and Quad-Cities 1/2 are depicted in Figures 1 and 2. Accumulated exposures for the various reactor at the present time are:

Dresden 2	-	6,300 MWD/T
Dresden 3	-	6,800 MWD/T
Quad-Cities 1	-	5,200 MWD/T
Quad-Cities 2	-	4,500 MWD/T

FIGURE 1

QUAD-CITIES & DRESDEN 2

MINIMUM SHUTDOWN MARGIN VS EXPOSURE



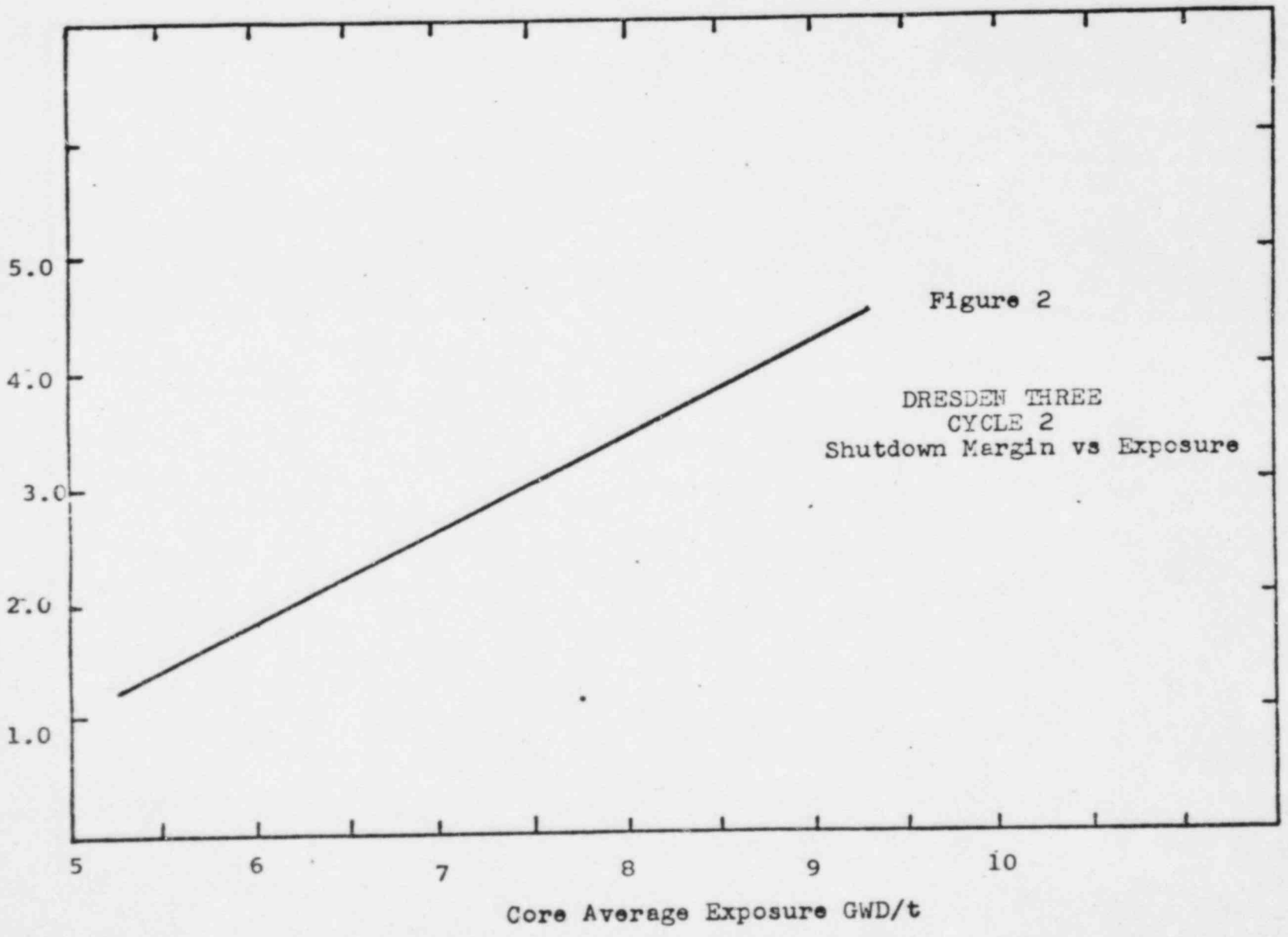


Figure 2

DRESDEN THREE
CYCLE 2
Shutdown Margin vs Exposure