

TECHNICAL DATA REPORT

PROJECT:

DEPARTMENT/SECTION Systems Eng/Control & Safety Analysis

Three Mile Island Unit 2

RELEASE DATE 8-1-79 REVISION DATE

DOCUMENT TITLE:

Accident Transient Modeling Analysis

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DISTRIBUTION	ABSTRACT:
T. G. Broughton	<p>This report provides the Preliminary Analysis of the first 225 minutes of the 3-28-79 TMI-2 accident. The report concludes:</p> <ol style="list-style-type: none"> The delay (8 minutes) in initiating emergency feedwater flow to the steam generators had no effect on the severity of the accident. The failure of the pressurizer electromagnetic relief valve to shut caused a loss of coolant which eventually prevented core cooling and resulted in core damage. Severe core damage did not occur until after the reactor coolant pumps were stopped (at 101 minutes). <p>This draft was issued to document the status of the analysis to date.</p>
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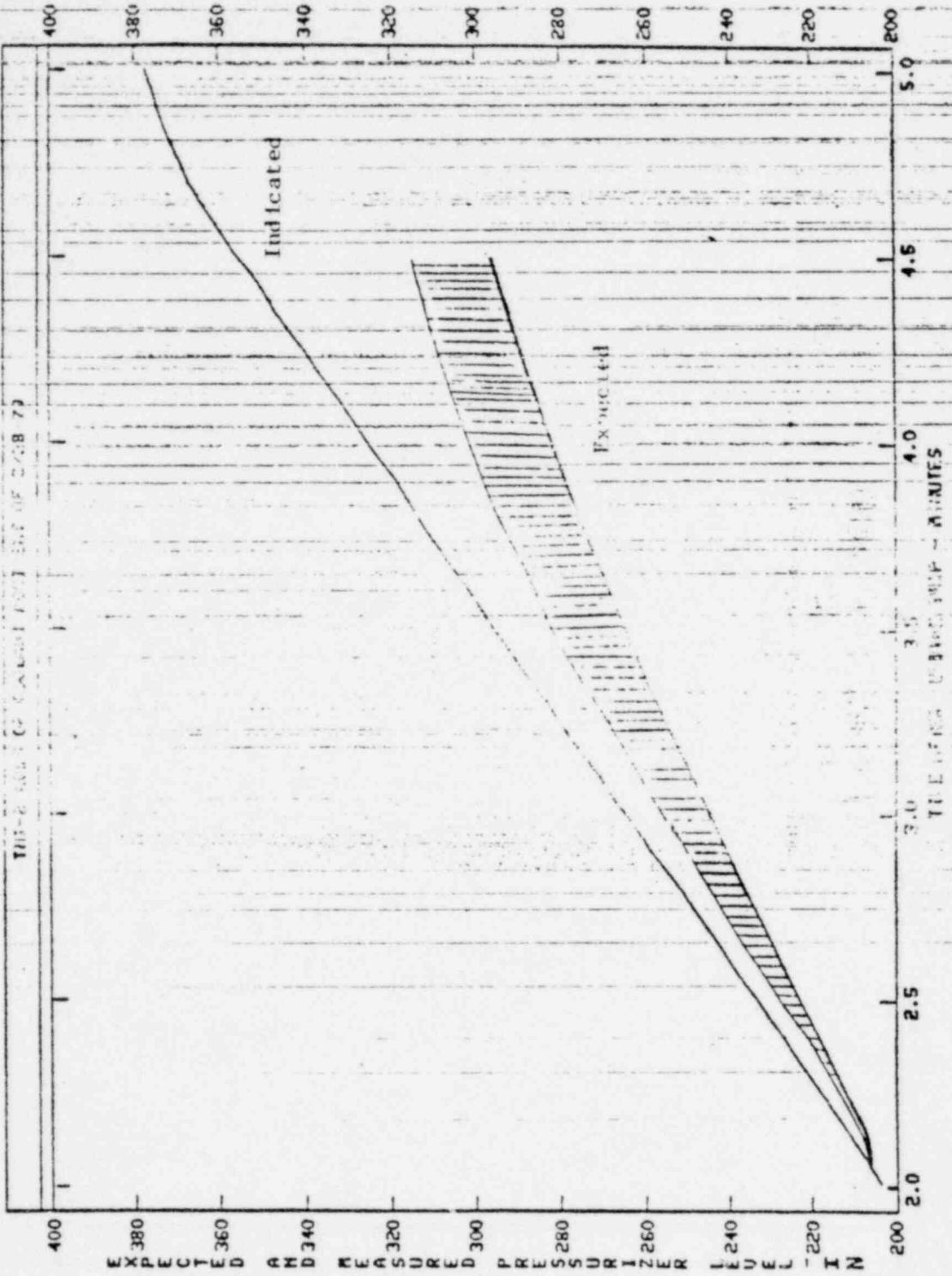
During the period 2 to 4½ minutes, pressurizer level could be expected to increase as a result of securing letdown, using two makeup pumps and maintaining a nearly constant primary temperature. Figure 9 compares the indicated pressurizer level during this period with the expected level based on a total average makeup rate of 720 gpm and an average relief valve flow of about 150 gpm. (See Appendix B for determination of net makeup rates). Under these assumptions, the expected level is between 298 and 316 inches at 4½ minutes. For the entire change in indicated level (150") to be due to makeup, the average makeup rate during this period would have had to have been 1425 gpm. As primary pressure decreased below 1600 psig at 2 minutes, it is likely that voiding in the reactor vessel upper head occurred and liquid was displaced into the pressurizer causing the actual level to increase. The difference between indicated (363 in) and estimated (290 in) level results from a void volume of about 230 ft³.

In a similar manner, voiding in the primary loops contributed to the increased pressurizer level during the period 6 to 8 minutes. (A further increase in indicated level over actual level is possible due to flashing in the level indicator reference leg, but this effect was probably minimal.)

In response to an increasing pressurizer level, operator action was taken to reduce makeup by stopping makeup pump 1C and reducing the flow of makeup pump 1A (at 4½ minutes) and reinitiating letdown (at about 7 minutes).

FIGURE 6

EXPECTED PRESSURE LEVEL IN THE ABSENCE OF VOIDS



POOR ORIGINAL