

TO: W. D. LANNING

PRELIMINARY TEST RESULTS

SEMISCALE PRESSURIZER RELIEF VALVE VENTING FROM
THREE MILE ISLAND TYPE CONDITIONS

*9
83
Venting*

March 31, 1979

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13-056

A. SUMMARY

On March 30, 1979, NRC management personnel requested EG&G Idaho personnel to help evaluate alternative courses of action for securing the Three-Mile Island Plant (TMI). We conducted our evaluation. Among several recommendations, we proposed conducting a venting test of the primary relief valve (PRV) in Semiscale from present TMI conditions to check the accuracy of calculations we performed on the response of TMI to such a venting condition.

We conducted the proposed test from 6:55 a.m. to 9:47 a.m. on March 31, 1979. Two-hundred forty channels of data were recorded. The test was successful. We believe the test results may be of use to NRC in evaluating the probable TMI plant response if venting from present conditions is attempted.

The remainder of this report is divided into three sections. Section B presents a comparison of TMI and Semiscale significant parameters as best we know them. Section C provides the sequence of experimental events and significant phenomena correlated with the time at which they occurred. Section D presents the calculated TMI plant response during venting from the PRV from the initial conditions provided by NRC. Section E presents our conclusions from pressurizer relief valve tests in Semiscale.

B. COMPARISON OF SEMISCALE AND THREE MILE ISLAND (TMI)

SIGNIFICANT PARAMETERS

1. VOLUME RATIOS ($\frac{\text{Vol component}}{\text{Vol vessel}}$)

	<u>B&W</u>	<u>Semiscale</u>	<u>SS/BW</u>
Pressurizer	0.374	0.454	1.21
Cold Leg (one side) versus broken loop	0.118	0.255	2.16
Hot leg (one side) versus broken loop	0.122	0.144	1.18
Total Loop (both sides)	0.974	1.596	1.639

2. ELEVATIONS (from ζ Nozzle HL)

	<u>B&W</u>	<u>Semiscale</u>
Top of upper plenum	14 ft - 6 in.	13 ft - 2-1/2 in.
Top of core	4 5 ft - 0 in.	-5 ft - 0 in.
Surge line connection to HL	6 ft - 2-1/2 in.	4 ft - 0 in. ←
Surge line vertical drop (not from nozzle ζ)	12 ft - 8 in.	11 ft - 0 in.
Piping vertical height (total) (including pump suction)	68 ft - 0 in.	51.3 ft (BL) 21.3 ft (IL)
ζ Nozzle to top of tube (or pipe)	46 ft - 0 in.	41 ft (BL) 11 ft (IL)
Surge line below top of core	3 ft - 3-1/2 in.	2 ft - 0 in.

3. SIGNIFICANT DIFFERENCES

	<u>BSW</u>	<u>Semiscale</u>
Cold Leg	2 cold legs / side	1 cold leg / side (1 side scaled for 3/4 flow)
Hot Leg	1 per side	1 per side
Upper Plenum	Vent Valves	No Vent Valves
Hot Leg / Cold Leg Elevation Difference	None	8-1/2 in. (Hot Higher)
SG Elevations (difference)	None	IL @ 11 ft - 0 in. BL @ 41 ft - 0 in.