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Docket No. 50-286

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THRU: D. B. Vassallo, Chief, Pressurized Water Reactors Branch #1, L

SMALL BREAK ANALYSES

Attached are graphs found in the Indian Point 3 FSAR which show the temperature rise of the primary coolant following a loss of offsite power. The average coolant temperature rises to about 615°F which corresponds to a saturation pressure of around 1720 psia. As shown on the graph, this high saturation temperature and pressure persists for many thousands of seconds after losing offsite power.

I am concerned about a small break, in the zero to two inch range, that might occur during the time of this elevated temperature/pressure condition. The charging pumps on IP-3 are not engineered safety features, so that no water injection will occur until the system pressure is low enough to allow the high head pumps to deliver. These safety injection pumps have a shutoff head of 3375 feet or approximately 1500 psi.

This kind of accident may be worse than the same sized break, immediately followed by a loss of offsite power. I reason that the break after loss of offsite power could be worse than the break before loss of offsite power because at any moment during blowdown the primary system pressure would be higher (corresponding to the higher saturation temperature). Higher primary system pressure ultimately means less pumped injection and a worse core temperature transient. In other words, if the break occurred some 2000 seconds after the power went off, would the primary system pressure at the moment the quiet level equals the top of the core be so high that pumped injection rates are insufficient?

Although this event would have to occur during an infrequent loss of offsite power, say once per year, the product of this frequency times the probability of a small break may exceed the probability of a large pipe break.

Should this accident receive further review?

Original signed by
H. Specter

H. Specter, Project Manager
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Enclosure:
Indian Point 3 FSAR Graphs

OFFICE ▶			PWR-1	PWR-1		
SURNAME ▶			HSpecter:cs	DVassallo		
DATE ▶			6/26/73	6/28/73		

TABLE 6.2-5 (Sheet 1 of 2)

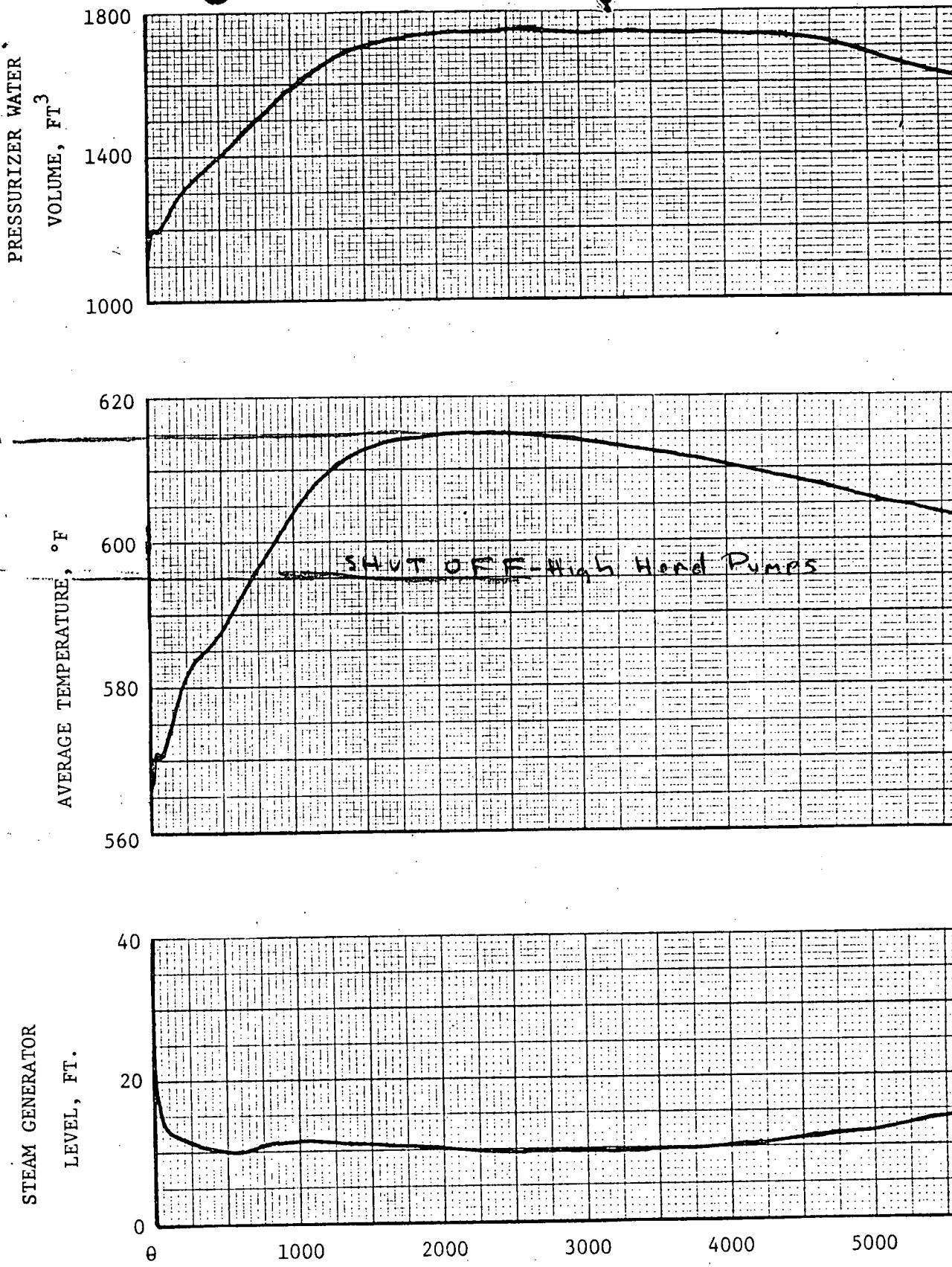
PUMP PARAMETERS

Safety Injection Pump Design Parameters

Number	3
Design pressure, discharge, psig	1700
Design pressure, suction, psig	250
Design temperature, °F	300
Design flow rate, gpm	400
Max. flow rate, gpm	650
Design head, ft	2,325
Shutoff head, ft	3,375 ≈ 1500psi
Material	Austenitic stainless stee
Motor H. P.	400
Type	Horizontal centrifugal

Recirculation Pump Design Parameters

Number of pumps	2
Type	Vertical centrifugal
Design pressure, discharge, psig	250
Design temperature, °F	300
Design flow, gpm	3000
Design head, ft.	332
Material	Austenitic stainless ste
Maximum flow rate, gpm	4000
Shutoff head, ft	477
Motor H. P.	350



TRANSIENT RESPONSE FOLLOWING A LOSS OF NORMAL FEEDWATER WITH ONE 40
AUXILIARY FEEDWAYER PUMP DELIVERY TO TWO STEAM GENERATORS BEGINNING
AT ONE MINUTE

FIGURE 14