Station Support Department

10CFR50.90

PECO ENERGY

PECO Energy Company
Nuclear Group Headquarters
965 Chesterbrook Boulevard
Wayne, PA 19087-5691

July 20, 1994

Docket Nos. 50-277
50-278
License Nos. DPR-44
DPR-56

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Peach Bottom Atomic Power Station, Units 2 and 3
Response to Request for Additional Information
Regarding Power Rerate Program (RAI-6)

Dear Sir:

Attached is our response to your request for additional information (RAI) discussed in our telephone conversation on July 7, 1994 regarding our planned implementation of the Power Rerate Program at Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3. The Power Rerate Program was the subject of Technical Specifications Change Request (TSCR) No. 93-12 which was forwarded to you by letter dated June 23, 1993.

If you have any questions, please contact us.

Very truly yours,

G. A. Hunger, Jr.

G. A. Hunger, Jr.
Director-Licensing

Attachment

cc: T. T. Martin, Administrator, Region I, USNRC
W. L. Schmidt, USNRC Senior Resident Inspector, PBAPS
R. R. Janati, Commonwealth of Pennsylvania

A001

COMMONWEALTH OF PENNSYLVANIA :

: ss.

COUNTY OF CHESTER :

W. H. Smith, III, being first duly sworn, deposes and says:

That he is Vice President of PECO Energy Company; the Applicant herein; that he has read the enclosed response to the request for additional information concerning Technical Specifications Change Request (Number 93-12) for Peach Bottom Facility Operating Licenses DPR-44 and DPR-56, and knows the contents thereof; and that the statements and matters set forth therein are true and correct to the best of his knowledge, information and belief.

William H. Smith III
Vice President

Subscribed and sworn to
before me this 20th day
of July 1994.

Erica A. Santon
Notary Public

Notarial Seal
Erica A. Santon, Notary Public
Tredyffrin Twp., Chester County
My Commission Expires July 10, 1995

Docket Nos. 50-277
50-278
License Nos. DPR-44
DPR-56

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION (RAI-6)
PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3

Question 1:

"Provide the containment analyses or a list of key input parameters that are different from the original analyses, a brief discussion as to why they are different, and a pressure/temperature graph for the final results."

Response:

The major differences between the original Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3 Updated Final Safety Analysis Report (UFSAR) containment analyses and the new power rerate containment analyses are in the code models and methodologies used to analyze the LOCA event. The new containment analysis methodology breaks the analysis up into short-term and long-term analyses. The short-term analysis is performed using a detailed vessel and containment model to determine the containment response during the first 30 seconds of the event (used for peak drywell pressure and containment loads). The original containment analysis model and input assumptions have been refined for determining the long-term containment response (peak pool temperature and suppression chamber pressure). For example, the heat addition due to the heated water in the feedwater train is now included in the long-term analysis.

The changes to key input parameters form the original to the new analyses are the following: the initial drywell temperature was increased from 135°F to 145°F, and; the initial suppression pool temperature was increased from 90°F to 95°F to obtain temperature margin. The RHR heat removal capacity was reduced by approximately 5.7% (from 70,000,000 Btu/hr to 66,003,830 Btu/hr) to reflect corrected design calculations performed by the heat exchanger manufacturer. All other key input parameters for the power rerate analyses were essentially the same as those for the original analyses.

The pressure/temperature graphs are shown in the PBAPS, Units 2 and 3 UFSAR markups for Figures 14.6.10, 14.6.11, and 14.6.12 (attached).

Question 2:

"For the NPSH of the ECCS pumps, how does the increase in pool temperature affect NPSH and is credit taken for wetwell pressure?"

Response:

The increased suppression pool temperature results in a reduction of the Net Positive Suction Head (NPSH) available to the Emergency Core Cooling System (ECCS) pumps during the long-term cooling operation due to the increase in the suppression pool water vapor pressure. However, there is an increase in the suppression chamber airspace pressure during a loss-of-coolant event. The increase in suppression chamber airspace pressure increases the NPSH available to the ECCS pumps and offsets the effect of the increased suppression pool temperature. The NPSH calculations for power rerate were performed assuming the peak suppression pool temperature. These calculations took credit for the suppression chamber pressurization during the event. The minimum suppression chamber pressure during the event was used in the NPSH calculations. This minimum pressure occurs just after the drywell-to-torus vacuum breakers open, which is well before the suppression pool temperature peaks. The combination of conditions assumed (minimum airspace pressure and maximum pool temperature) results in a conservative calculation of the available NPSH. The NPSH margin for the RHR pumps was reduced from 8.8 feet for the current conditions to 8.1 feet for power rerate. The NPSH margin for the core spray pumps was reduced from 9.9 feet for the current conditions to 9.2 feet for power rerate.

Question 3

"Provide more information on the RPV model as discussed on page 4-3 of the General Electric Report (NEDC-32183P)."

Response:

A detailed description of the LAMB code vessel model used in the power rerate containment analyses is contained in "General Electric Model for LOCA Analysis In Accordance With 10CFR50 Appendix K", NEDE-20566-P-A, dated September, 1986. This model is used primarily for determining the short-term core thermal-hydraulic response and reactor internal pressure differences following a large break LOCA. With regards to containment analyses, the LAMB Code provides a more realistic calculation of the break flow from the vessel. It models the effects of the recirculation loop pumps, piping and jet pumps on the break flow. The code contains detailed models for determining the steam flashing and bubble rise in the liquid and determines a two phase liquid level in the downcomer. The break flow conditions (subcooled or saturated liquid, two phase, or steam) are then based on the actual water level and thermal-hydraulic conditions in the recirculation loop and downcomer.

The original model conservatively assumes saturated liquid flow from the break until the water level in the vessel uncovers the break. Any steam generated by flashing in the downcomer (due to the vessel depressurization) is assumed to be swept immediately to the steam dome, thus increasing the duration of liquid flow out the

break. Conservative corrections are applied to account for subcooled break flow conditions. Two-phase flow out the break is assumed only after the liquid level in the vessel falls below the break elevation. In addition, there is no modeling of the recirculation loop pumps or piping effects. These assumptions result in an overprediction of the break flow and an exaggerated sensitivity to subcooled conditions in the downcomer.

Question 4:

"What is the wetwell design temperature?"

Response:

The suppression chamber structural design temperature is 281°F. This value was not included in Table 4-1 of the General Electric licensing report (NEDC-32183P, "Power Rerate Safety Analysis Report For Peach Bottom 2 & 3", dated May, 1993) because this limit is not applicable to the peak pool temperature. A comparison between the peak pool temperature and the structural design temperature limit would be misleading and would imply more margin in the peak pool temperature than actually exists. The peak pool temperature limit is indirectly determined by the available ECCS pump NPSH which is a function of the peak pool temperature.

Question 5:

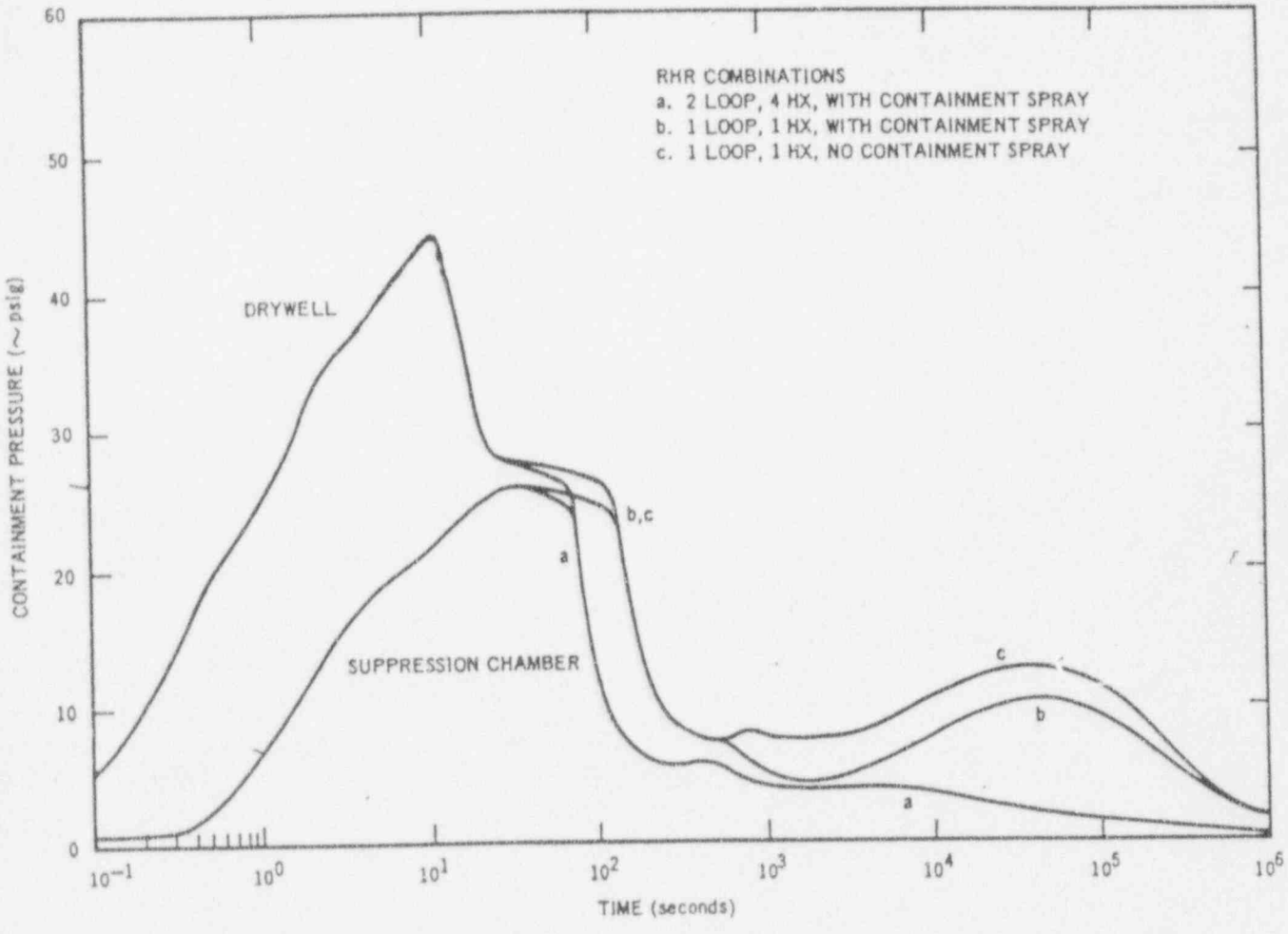
"On Page 4-5 (Section 4.1.2.2), show that there is sufficient conservatism in the original containment dynamic loads definition to accommodate the increased SRV loads."

Response:

The load definitions used in the original Safety Relief Valve (SRV) loads structural evaluation are documented in Bechtel reports "Peach Bottom Atomic Power Station Units 2 and 3 Mark I Long-term Plant Unique Analysis," dated December 15, 1985, and Addendum No. 1 to this report. The SRV load definitions were based on conservative analyses and data from tests conducted at PBAPS. A conservative load definition was determined based on these analyses and applied to the load analysis for each SRV. For the power rerate analyses, the increase in SRV loads that results from the higher SRV setpoints was determined. This increase was then compared to the original margin available for the limiting SRV. The limiting SRV originally had about 11% margin to the load definition before power rerate and about 8% after power rerate.

ATTACHMENT

Pressure/Temperature Graphs



Note: Historical information - not accurate for current plant conditions. (See Figure 14.6.10A & B)

PHILADELPHIA ELECTRIC COMPANY
PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 AND 3
UPDATED FINAL SAFETY ANALYSIS REPORT

LOCA -- PRIMARY CONTAINMENT PRESSURE RESPONSE

FIGURE 14.6.10 REV. 6 01/88

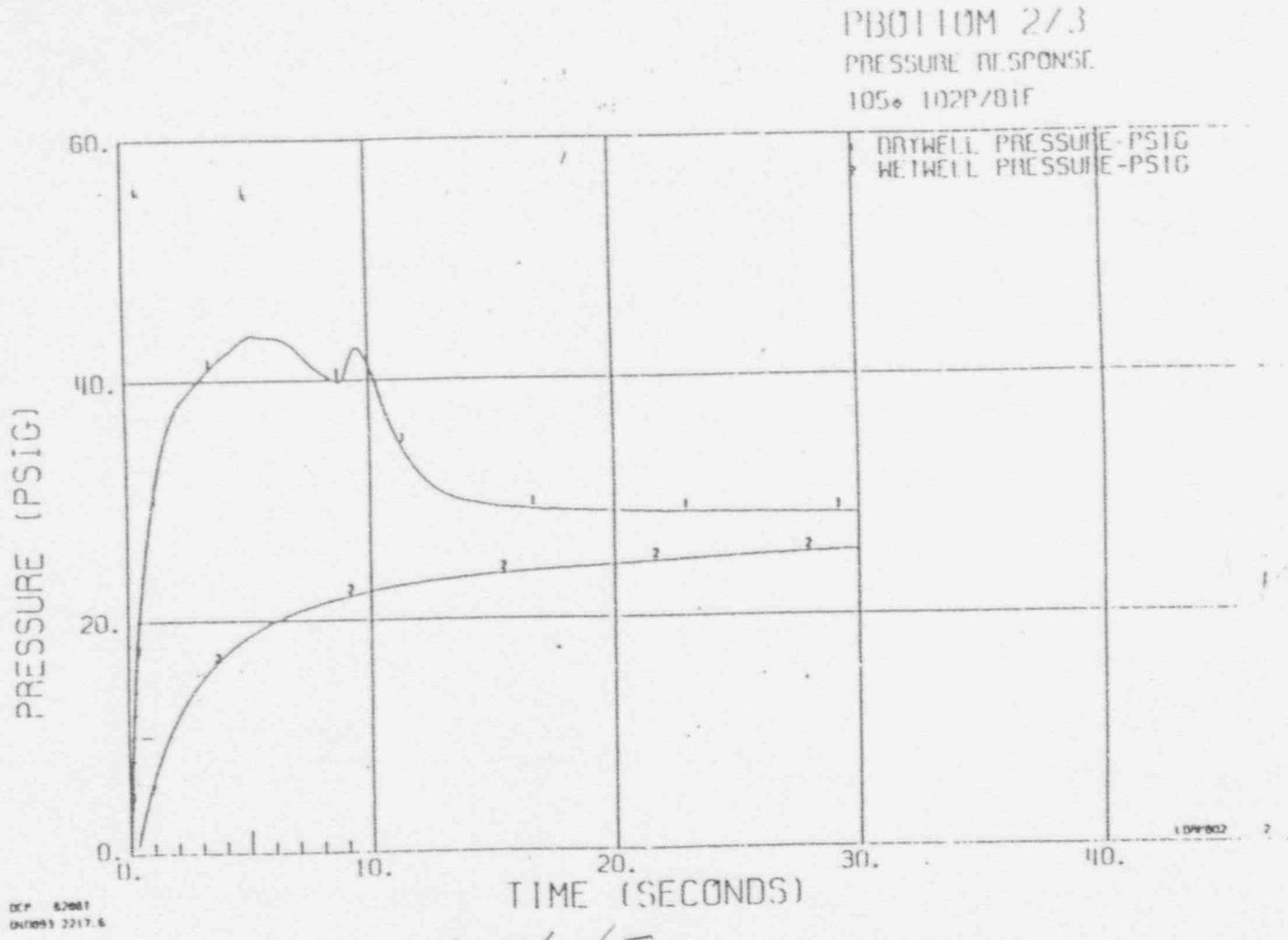


Figure 14.6.10A Short Term 3527 MWt

~~Figure 3~~. Pressure Response as a Function of Time at ~~102% Power~~ and 81% Core Flow (LAMB Blowdown)

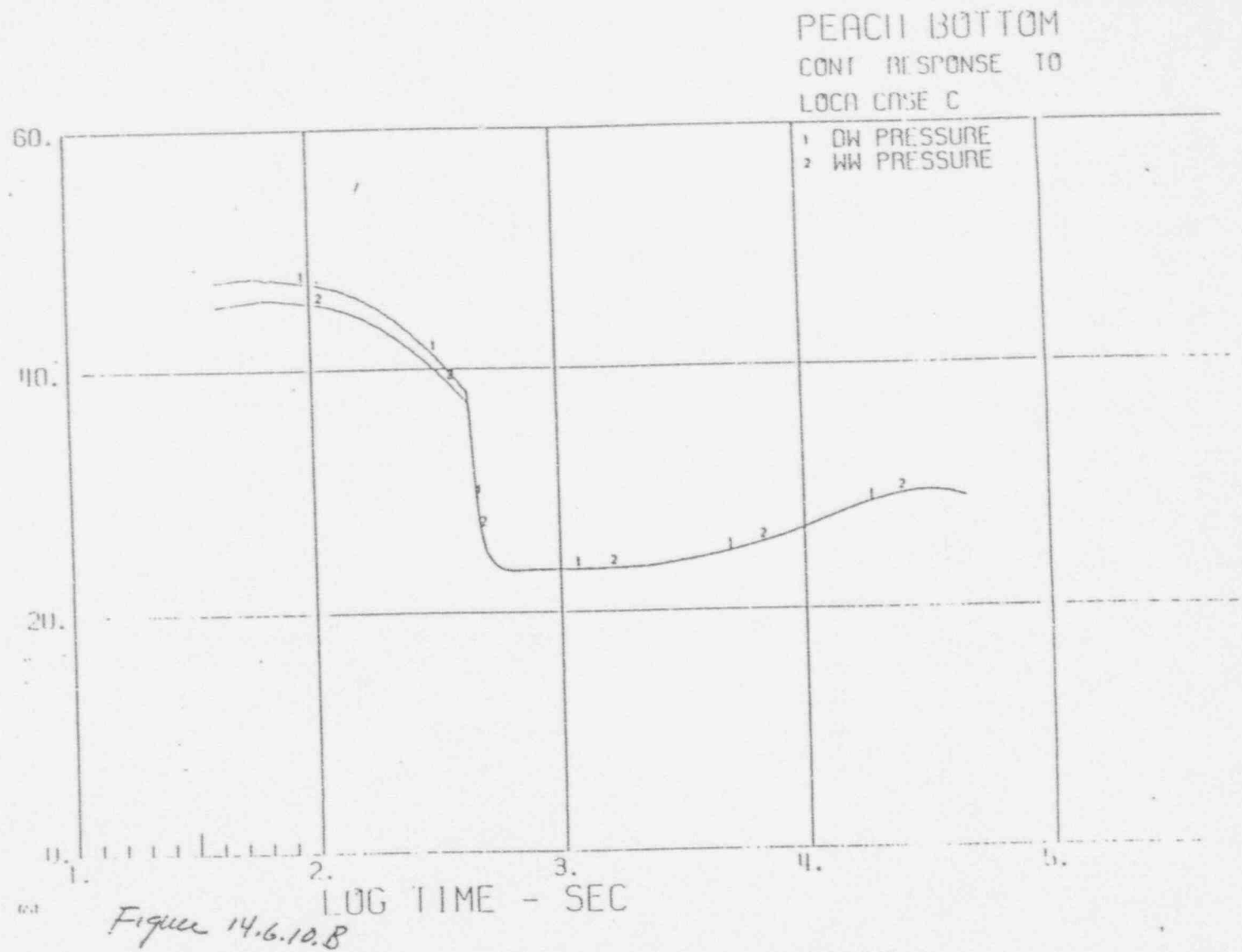
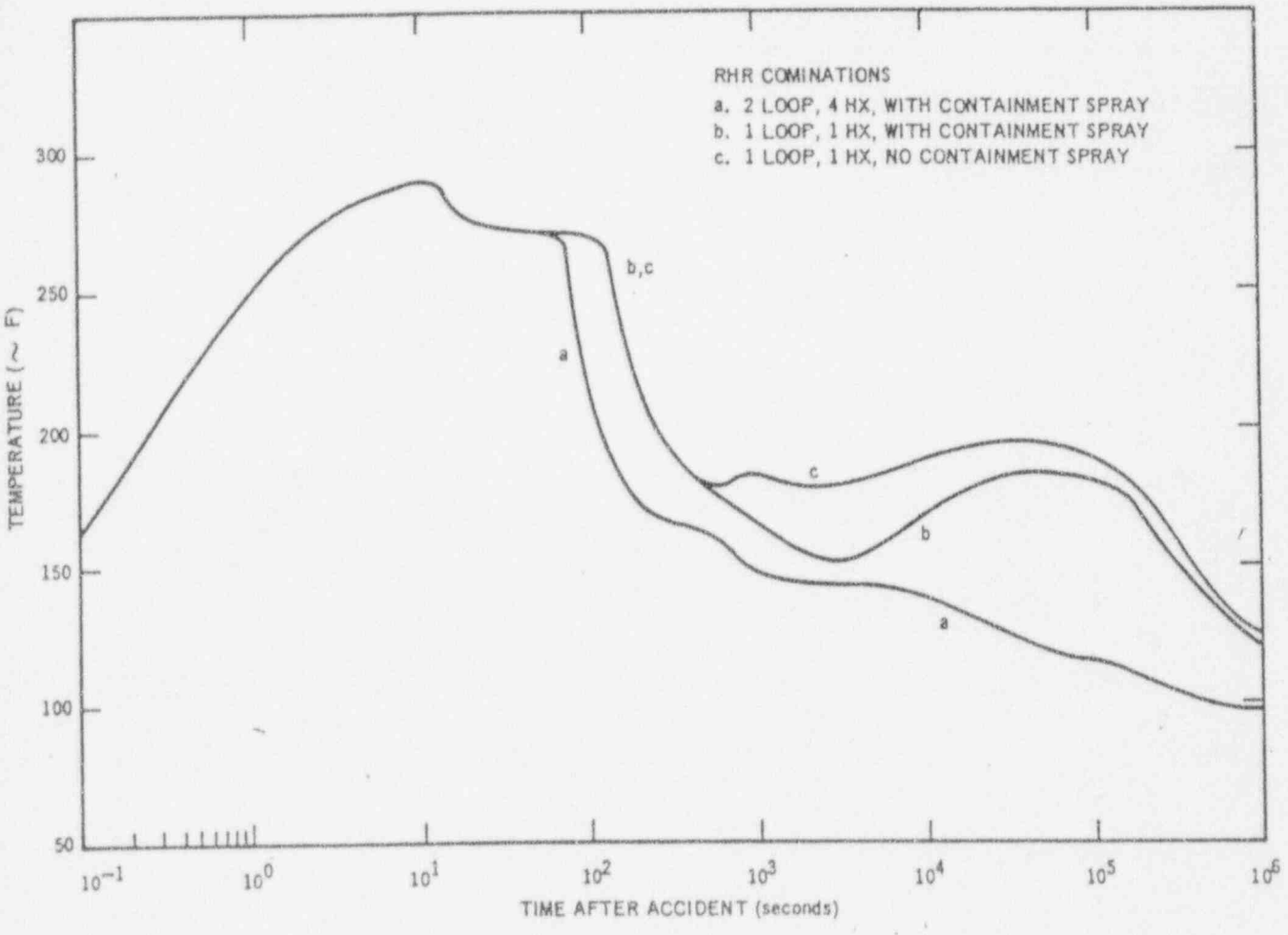


Figure 14.6.10.8

Figure 14.6.10.8

Figure 19. Long Term Containment Pressure Response - Normal ECCS Flows
Peach Bottom 2/3 Power Rerate



Note: Historical - not accurate for current plant conditions (See Figure 14.6.11A&B)

PHILADELPHIA ELECTRIC COMPANY
PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 AND 3
UPDATED FINAL SAFETY ANALYSIS REPORT

LOCA – DRYWELL
TEMPERATURE RESPONSE

FIGURE 14.6.11

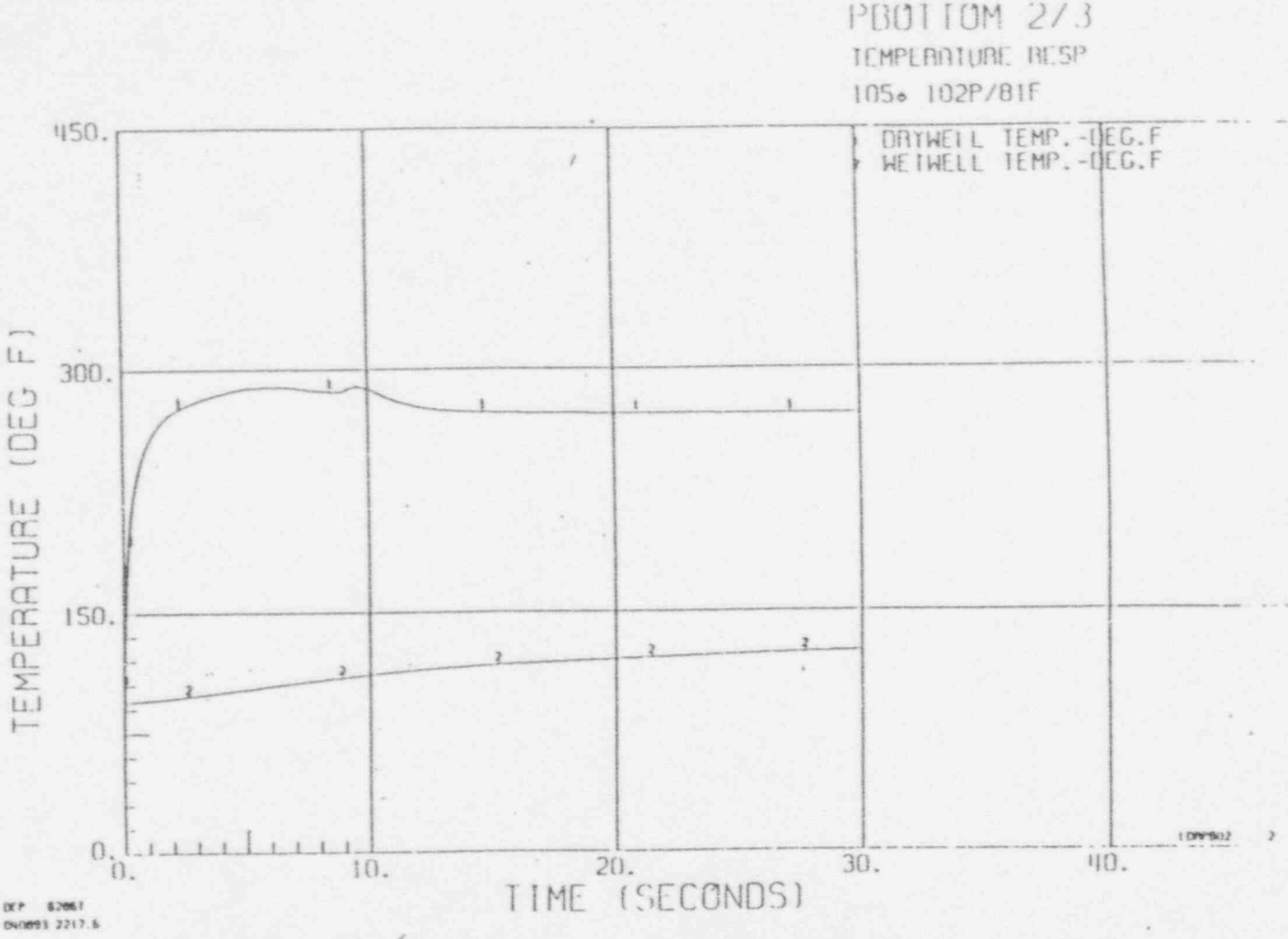


Figure 14.6.11A Short Term 3527 MW t

~~Figure 4~~: Temperature Response as a Function of Time at ~~102% Power~~ and 81% Core Flow ~~(LAMB Blowdown)~~

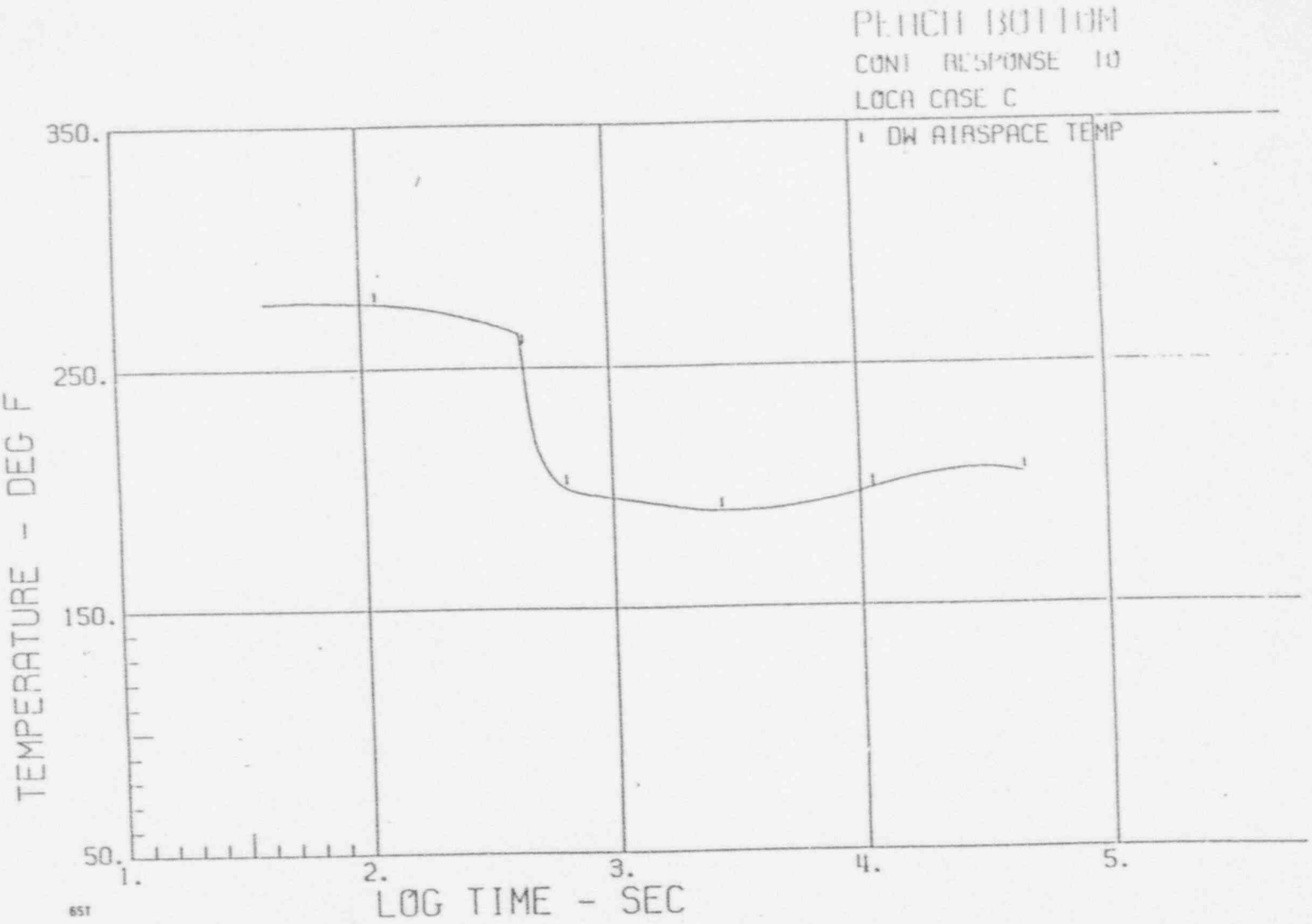
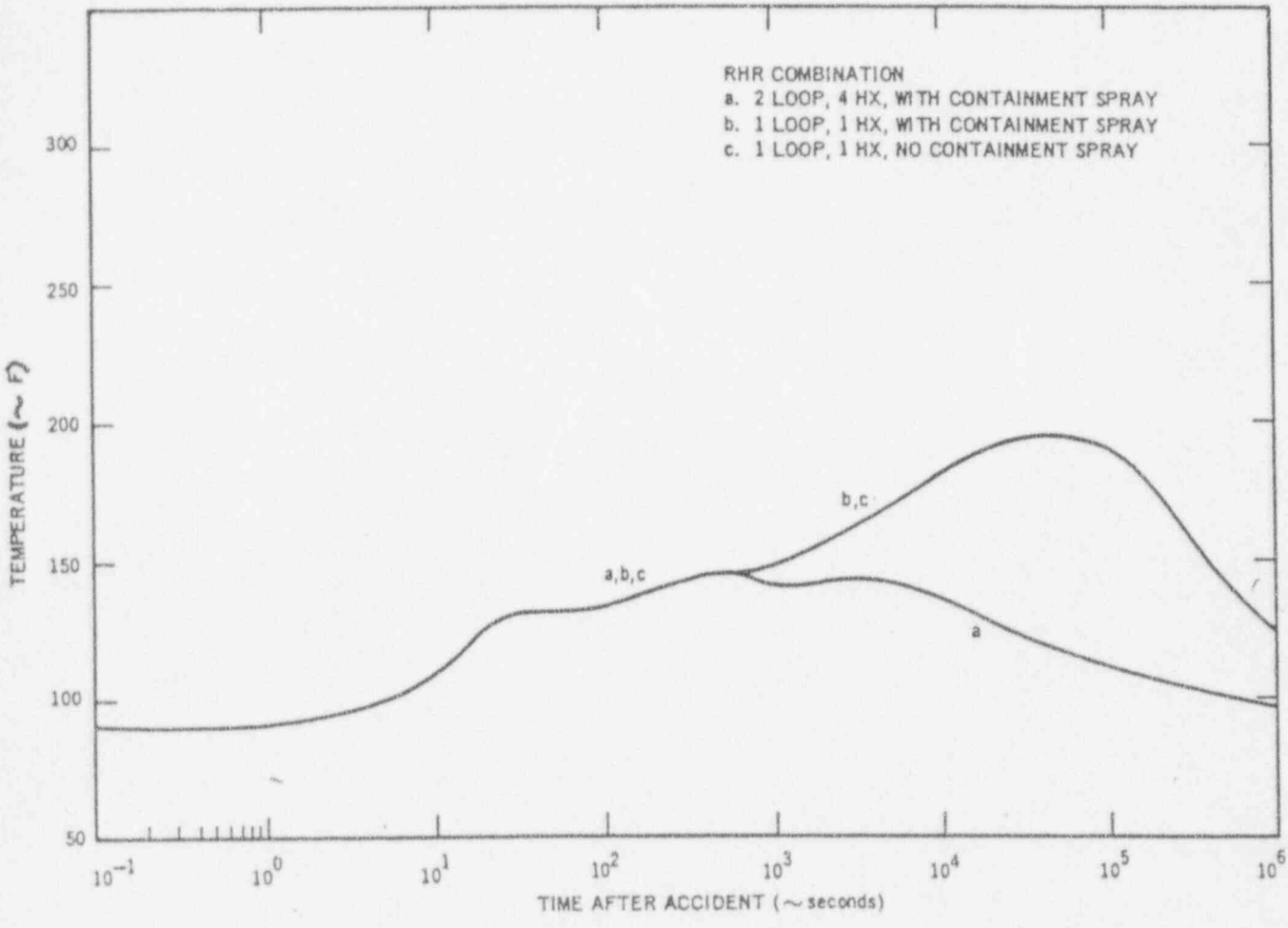


Figure 14.6.11B

Figure 14.6.11B ~~Figure 21~~. Long Term Drywell Airspace Temperature Response - Normal ECCS Flows
Peach Bottom 2/3 Power Rerate



Note: Historical information, not accurate for current plant conditions (See Figure 14.6.12A)

PHILADELPHIA ELECTRIC COMPANY
PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 AND 3
UPDATED FINAL SAFETY ANALYSIS REPORT

LOCA – SUPPRESSION POOL TEMPERATURE RESPONSE

FIGURE 14.6.12

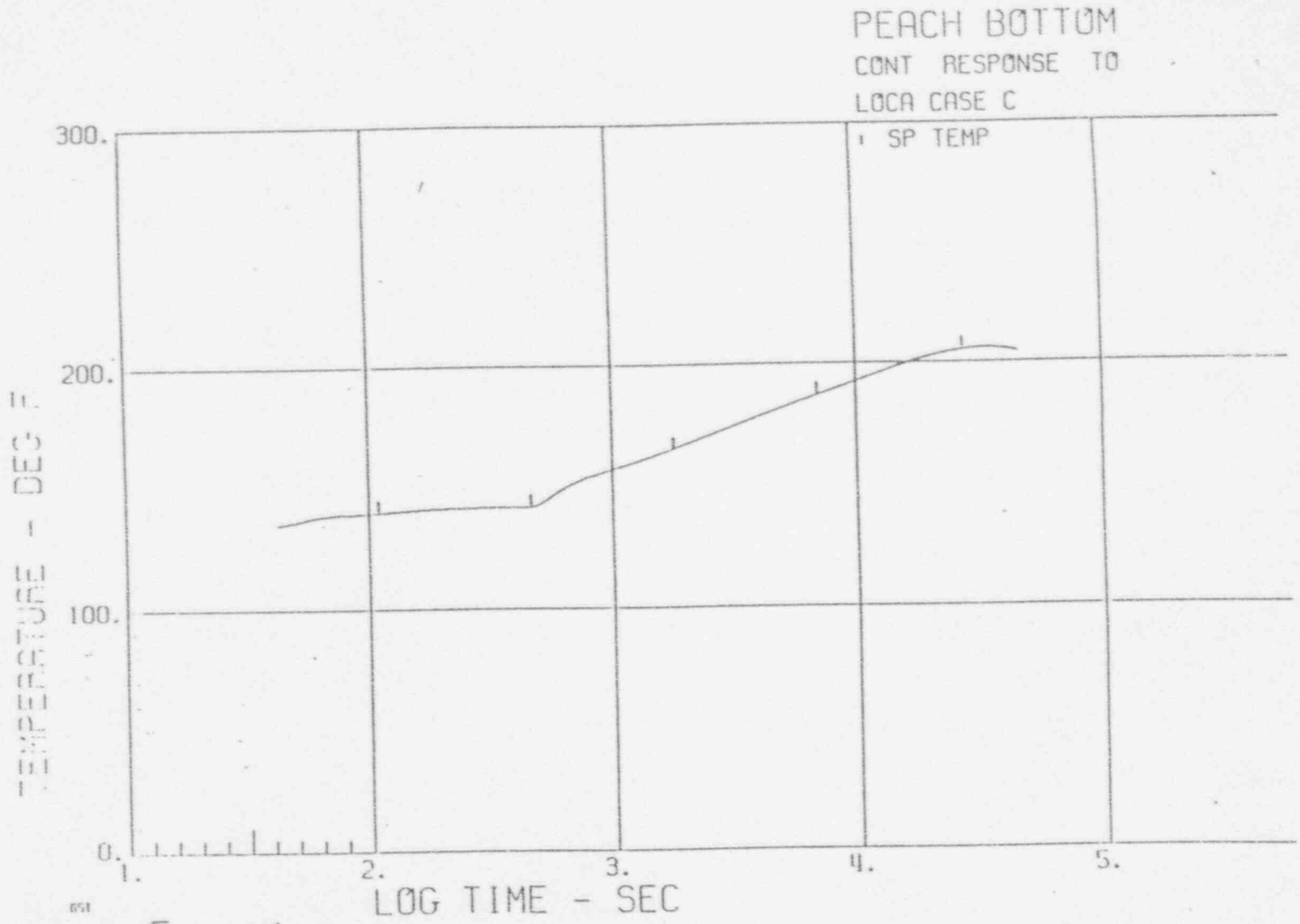


Figure 14.6.12A

~~Figure 20~~. Long Term Suppression Pool Temperature Response - Normal ECCS Flows
Peach Bottom 2/3 Power Rerate