INTERIM REPORT

Accession No. _____

Contract Program or Project Title: PWR Blowdown/ECC

Subject of this Document: Program Progress

Type of Document: Monthly Letter

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Date of Document: April 1980

Responsible NRC Individual and NRC Office or Division: W. D. Beckner

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Prepared for
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

INTERIM REPORT

GENERAL ELECTRIC

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Mail Code 583

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May 12, 1980

TO: Edward L. Halman, Director
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SUBJECT: BWR Blowdown/ECC Program
Contract No. NRC-04-76-215
Informal Monthly Progress Report for April 1980

Gentlemen:

The following summarizes the subject matter covered in the attached report:

A PMG meeting has been held in San Jose; highlights are presented. The test facility is being restored to large break configuration and prepared for a series of separate effects, boiloff tests. Highlights of the large break, reference test and of the second small break test are reported.

Distribution of this report is being made in accordance with the "Monthly Distribution List" provided with W.D. Beckner's letter of September 6, 1979.

Very truly yours,

G.W. Burnette

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/fs: attachment

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Prepared for:

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NRC FIN. NO. B3014

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BY

General Electric Company

UNDER

Contract No. NRC-04-76-215

# BWR BD/ECC PROGRAM

# FIFTY - FOURTH MONTHLY REPORT

# APRIL 1980

## SUMMARY

A PMG meeting has been held in San Jose; highlights are presented. The test facility is being restored to large break configuration and prepared for a series of separate effects, boiloff tests. Highlights of the large break, reference test and of the second small break test are reported.

## TASK AA - PROGRAM PLANNING AND ADMINISTRATION

A PMG meeting was held in San Jose on April 14 and 15, 1980. In addition to adminstrative matters, a number of technical items were reviewed including small break test results, large break test results and planning for the separate effects, boiloff tests. Advantages and disadvantages of various facility options which might be used under a contemplated program modification were also reviewed.

A number of significant agreements were reached by the PMG including: (1) agreement to review facility options with respective managements with feedback provided to GE by May 9, 1980 concerning interest and next actions on a multibundle facility, (2) agreement to delete the Non-Jet Pump and Alternate Power Shape Tests in favor of higher priority tests, (3) agreement on the balance of large break tests in the current test phase as: (a) peak power, average ECC and (b) average power, average ECC*, and (4) agreement on a series of separate effects, boiloff tests to be completed.

A decision on program direction is needed very soon by the program sponsors to assure continuity of the program effort.

## TASK CC - TEST FACILITY PREPARATION

Changeover of the facility from small break to large break configuration was started, and setup for the boiloff tests was also started. Periodic recalibration of instruments was completed, the safety valves were retested, and other needed facility maintenance was performed. Installation of the modified drag discs and turbine meters is projected to start about mid-May and the boiloff tests should be well underway by the end of May.

## TASK FF - TESTING

No tests were executed during the reporting period.

*These tests will be executed with the improved, direct measurements of break flow.

## TASK GG - ANALYSIS

The status of analysis effort on TLTA test data was reviewed in the April 14-15 PMG meeting. Highlights of what was presented together with information in reply to one action item are included below.

## SCHEDULE OF DATA REPORTS

The issue dates for the three large break and two small break test results are given below. The status of data verification for each test was reviewed with the PMG, and the priority of issuing the data reports was set by the PMG.

| TEST NO | BREAK SIZE | SPRAY RATE | ECC TEMP | DATA REPORT DATE |
|---|---|---|---|---|
| 6422/R2 | DBA | Average | Nominal | Mid-May |
| 6431/R1 | small | | | End May |
| 6432/R3 | small | | | End May |
| 6423/R3 | DBA | Low | High | End May |
| 6421/R2 | DBA | None | Nominal | Early June |

## HIGHLIGHTS OF THE LARGE BREAK REFERENCE TEST

The main points discussed on the reference test (6422/R3, average power, average ECC rate) were:

1. Realistic bundle power simulation in TLTA 5A contributes to lower PCT (maximum PCT less than 700°F) (see Figure 1).

2. Improved simulation of the bypass flow path coupled with CCFL at the side entry orifice (SEO) allows the bundle to reflood with two-phase mixture prior to refilling the lower plenum (see Figure 2).

3. CCFL breaks down at the upper tie plate after the bypass region refills (see Figure 3). This further contributes to reflooding the bundle (see Figure 2).

4. The lower plenum partially refills. At the end of the test (∿ 400 sec.) the lower plenum level (Fig. 2) is just above the jet pump exit and the ECC fluid that drains through the bundle is discharged out the jet pumps.

## HIGHLIGHTS OF SMALL BREAK TEST 2

1. The test was conducted successfully to meet the test specification.

2. The system pressure response is shown in Figure 4.

3. The mixture levels observed in various regions are shown in Figure 5. The results indicate the bundle was covered with two-phase mixture for the entire transient, while a two-phase mixture level was seen in the lower plenum and bypass after the ADS initiation at 286 seconds. The fast system depressurization due to the activation of ADS resulted in flashing and high vapor generation which led

to the occurence of the counter current flow limiting (CCFL) at the side entry orifice (SEO). This CCFL phenomena at SEO prevents the bundle mass inventory from draining into the lower plenum and hence maintains a low void fraction mixture with nucleate boiling throughout the fuel bundle during the entire transient.

4. No heat-up occurred throughout the bundle for the entire transient. (Figures 6 and 7).

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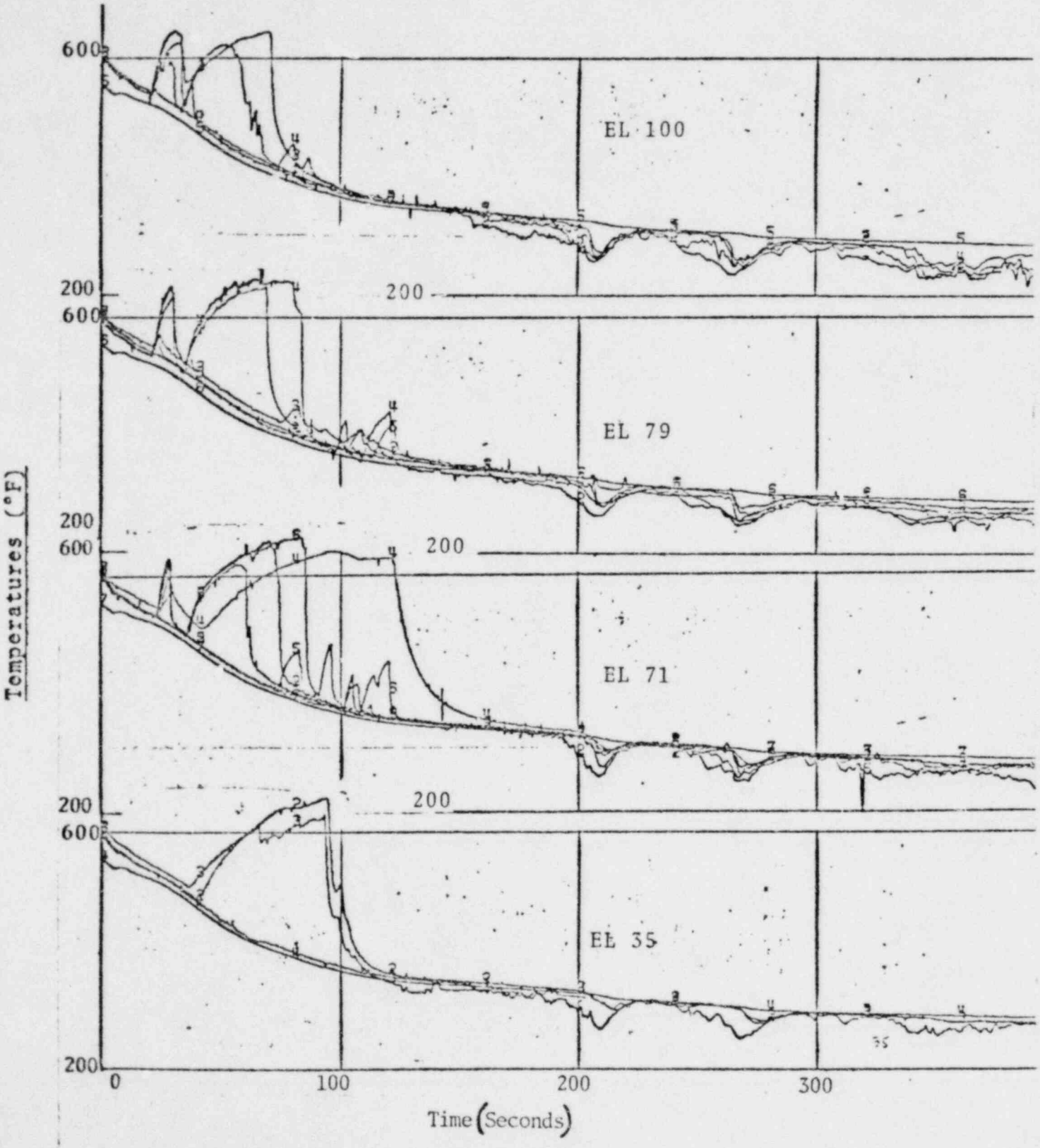



Figure 1, Bundle Temperature response at selected elevations of ILTA reference test (6422 Run 3, average power, average ECC rate)

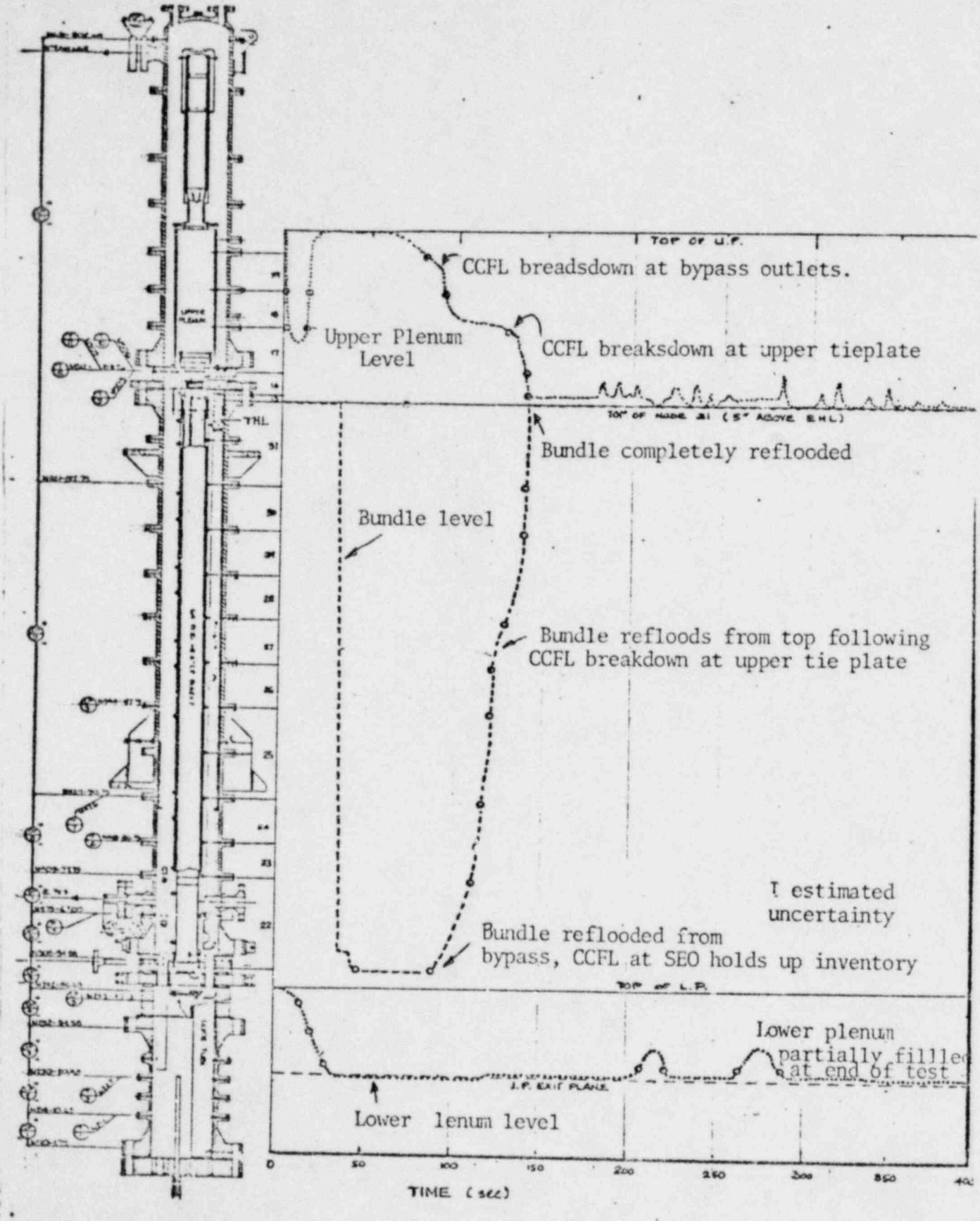



Figure 2. Mixture levels along the bundle path: TLTA 5A Reference Test (6422 Run 3 average power average ECC rate)

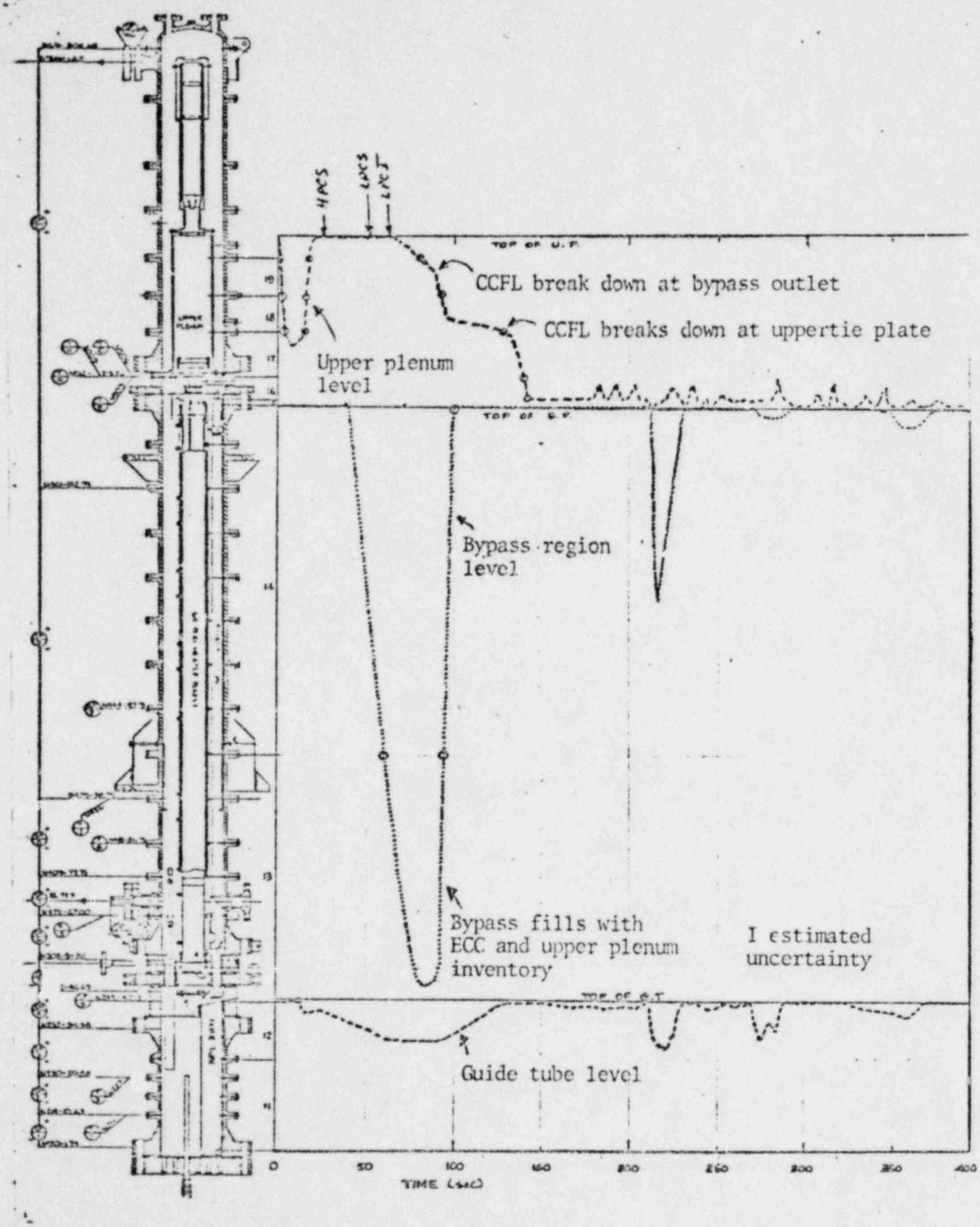



Figure 3. Mixture levels along the bypass path: TLTA 5A Reference test (6422 Run 3 Average power, average ECC rate)

FIGURE 4. SYSTEM PRESSURE

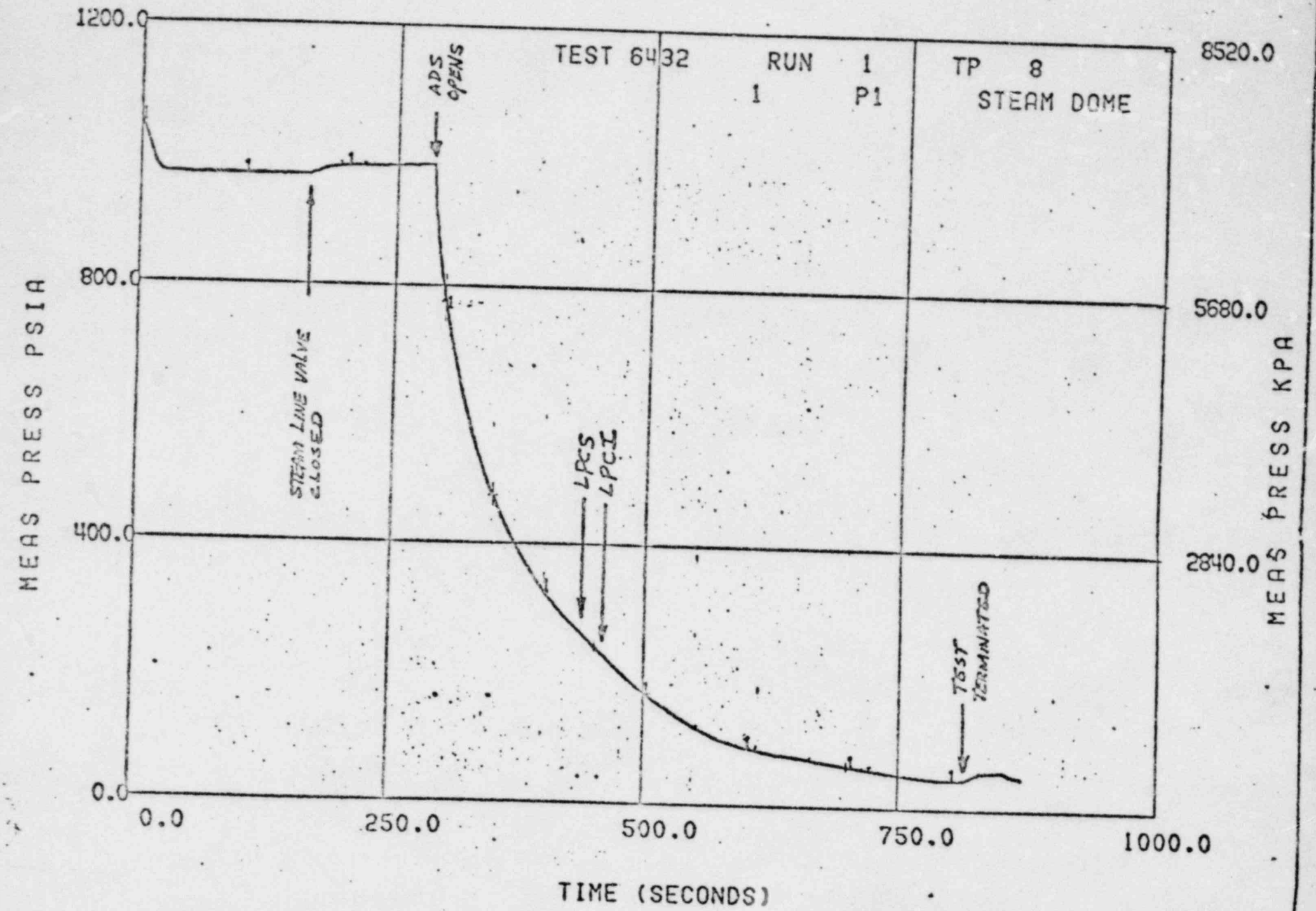
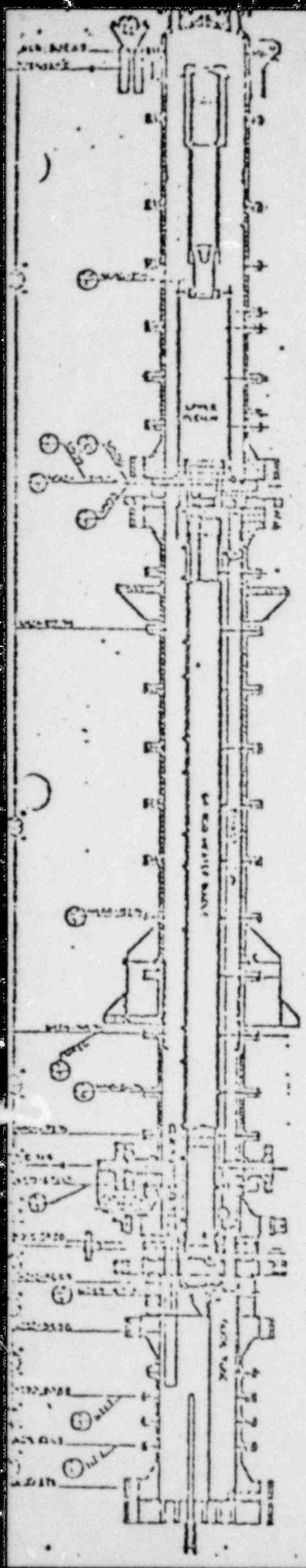


FIGURE 5 MIXTURE LEVEL (6432 /R1)



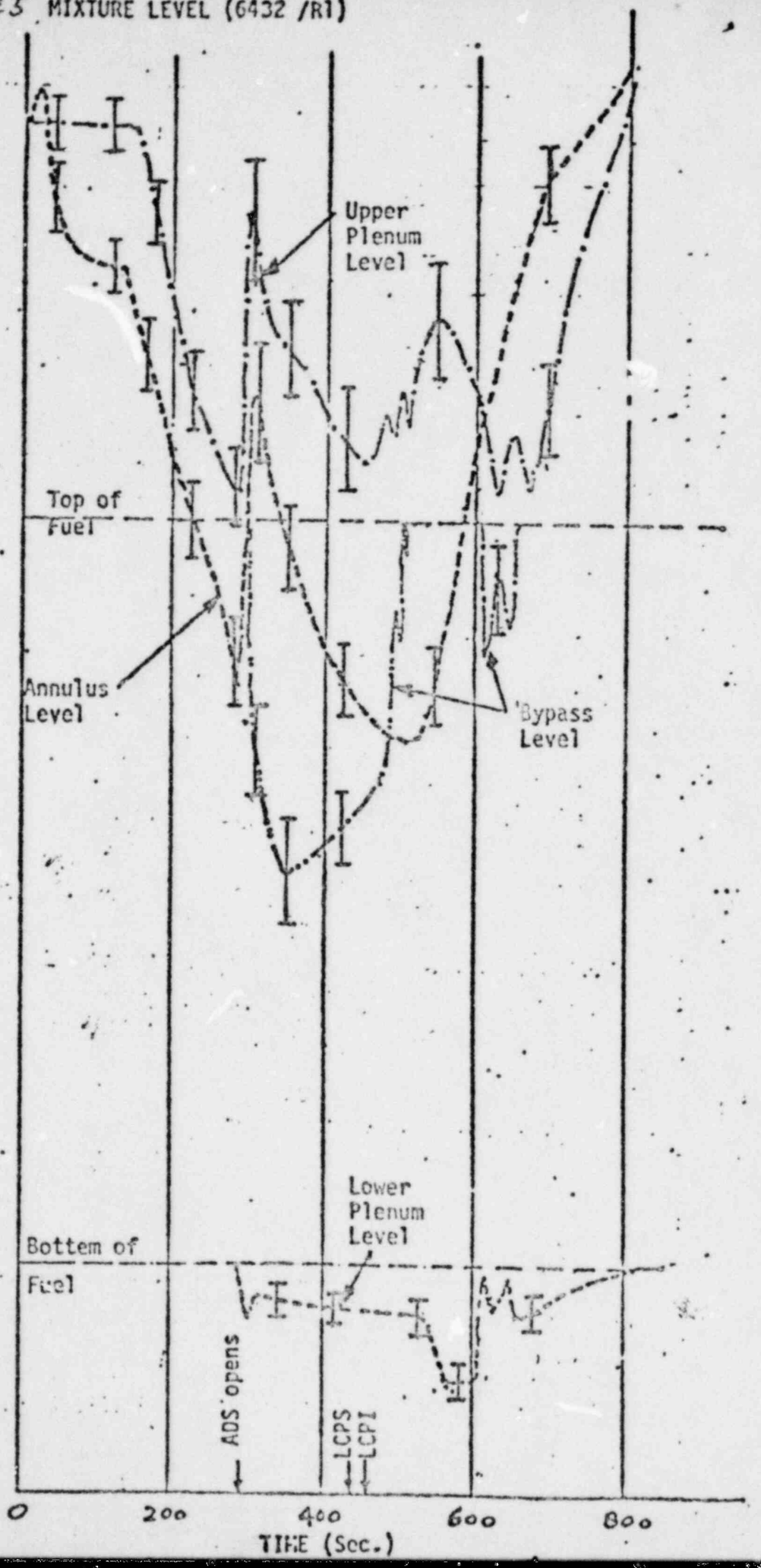


FIGURE 6 ROD CLADDING TEMPERATURE

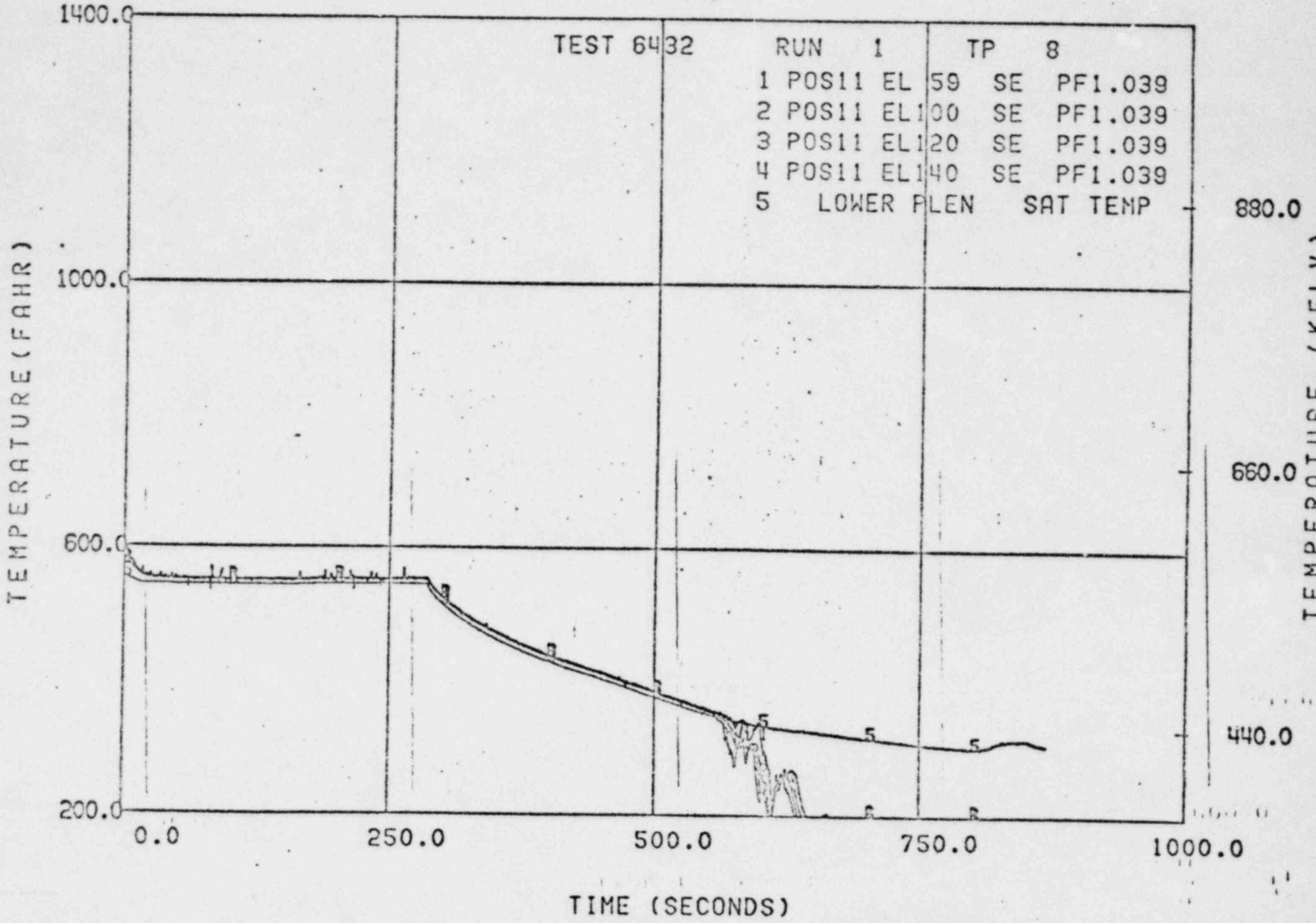


FIGURE 7 ROD CLADDING TEMPERATURE