PAUL SCHERRER INSTITUT

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Document Title

PANDA Transient Tests

M7 Integral System Test Apparent Test Results

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		Approval / Date				
Rev.	Prepared / Revised by	P-PM	G-PM	G-SQR	Issue Date	Remarks
0	C. Aubert	J. Perez 16-IV-96	J. Torbeck 16 April 96	G. Wingate 16 April 96	17 April 96	G-PM & G-SQR approvals on file (P-ERM-38, p.2)

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PAUL SCHERRER INSTITUT	Registrierung TM-42-96-09 ALPHA-607-0
Titel: **PANDA Transient Tests M7 Integral System Test Apparent Test Results**	Ersetzt ---
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Summary:

This Apparent Test Results (ATR) report is compiled in accordance with the requirements specified in the Test Plan (TP) 25A5764R3 (GE document) section 10. The report covers the results for the PANDA Transient Test M7. The ATR summarizes the apparent results and includes: test number, test objective, test date and time, data recording period, data analysis period, name of data file and ORACLE data tables, list of failed or unavailable instruments considered to be required for the test, list of required instruments with zero or reference check points not in tolerance or in over-range or under-range during test, deviations from test procedure and problems which occured during test. Statements are made whether or not the test objective has been reached and the data were recorded correctly. A table of actual initial conditions based on average and standard deviation over one minute time period just before the test start for all parameters with a specified acceptance criterion in section 9.2 of TP is provided as well as time history plots over test duration for all top priority measurements.

Verteiler

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42	G. Yadigaroglu	1		GE San Jose CA	1
	G. Varadi	1		J.E. Torbeck	
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PANDA INTEGRAL SYSTEM TEST
APPARENT TEST RESULTS

TEST M7

Contents:

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1. TEST OBJECTIVES:

The objectives of the PANDA integral system tests are to provide additional data to: a) confirm the capability of TRACG to predict SBWR containment system performance, including potential systems interaction effects *(Integral System Tests)* and b) demonstrate start-up and long-term operation of a passive containment cooling system *(Concept Demonstration)*.

The specific objective of test M7, which was initiated with Drywells and PCC units filled with air, is to provide data to determine the PCC condenser start-up characteristics when blanketed with noncondensable gas.

2. REFERENCE DOCUMENTS:

Test Plan:	GE document 25A5764R3
Test Procedure:	ALPHA-521-0

3. TEST DATE/TIME:

Test Start:	14-NOV-95 / 19:10:30
Test Stop:	15-NOV-95 / 00:20:43
Test Duration:	05:10:13
Test Period:	0 to 18613 sec

4. DATA RECORDING PERIOD:

Start:	14-NOV-95 / 18:57:10
Stop:	15-NOV-95 / 00:20:43
Data Recording Period:	-800 to 18613 sec

5. FILE NAMES:

Raw Data:	panda_M7.dat
DAS-Configuration / Channel List:	kbt99999999.o12

6. ORACLE DATA TABLES:

PANDA_M7_MT_LINE
PANDA_M7_MT_POOL
PANDA_M7_MT_REF
PANDA_M7_MT_VESSEL
PANDA_M7_M_OTHER
PANDA_M7_M_TIME
PANDA_M7_KBT
INFO_TESTS

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7. RPV POWER CURVE:

Power analysis period: 20 to 18613 sec

Mean value
Maximum negative deviation:
Maximum positive deviation:
Standard deviation:

Power curve tolerance: ±25.0 [kW]

Definition of RPV power deviation (ΔPower) and standard deviation (σ):

$$\Delta Power = Power_{th} - \sum_{j=1}^{6} MW.RP.j$$

$$\sigma = \sqrt{\frac{1}{n}\sum_{k=1}^{n}\left(Power_{th}^{k} - \sum_{j=1}^{6} MW.RP.j^{k}\right)^{2}}$$

$Power_{th}$: theoretical power

$\sum_{j=1}^{6} MW.RP.j$: measured power

n: # of measurements throughout the test

8. TEST INSTRUMENTATION

LIST OF FAILED OR UNAVAILABLE REQUIRED INSTRUMENTS:

Air partial pressure in DW1	MPG.D1.3	Back-up instrument: MPG.D1.2
Air partial pressure in DW2	MPG.D2.3	Back-up instrument: MPG.D2.2

LIST OF REQUIRED INSTRUMENTS WITH ZERO NOT IN TOLERANCE OR OVER-RANGE OR UNDER-RANGE DURING TEST:

None

9. DEVIATIONS FROM TEST PROCEDURE:

None

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10. LIST OF DEVIATIONS FROM REQUESTED INITIAL CONDITIONS:

11. TEST PROCESSING

PROBLEMS:

None

HAS THE TEST OBJECTIVE BEEN REACHED:

Yes

HAVE THE DATA BEEN CORRECTLY RECORDED:

Yes

12. REQUESTED INITIAL CONDITIONS

DATA ANALYSIS PERIOD FOR INITIAL CONDITIONS:

Data analysis period: -120 to -60 sec

Initial conditions are calculated over one minute just before connection of Drywells to RPV (phase n°113.9 of Test Procedure)

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TABLE OF INITIAL CONDITIONS

VARIABLE	PROCESSID	UNIT	Average Value	Standard Deviation	Requested Value	Tolerance
ENVIRONMENT PARAMETERS						
Atmospheric pressure	MP.EN	bar				
Temperature of saturation for atmospheric pressure (T_{sat_EN})		C				
RPV PARAMETERS						
Total pressure	MP.RP.1	bar				
Fluid temperatures:						
Spatial average	T_{F_mean}(RP)	C				
Local	MTF.RP.1	C				
	MTF.RP.2	C				
	MTF.RP.3	C				
	MTF.RP.4	C				
	MTF.RP.5	C				
Water level	ML.RP.1	m				
DRYWELL PARAMETERS						
*Total pressure	MP.D1	bar				
Air partial pressure	MPG.D1.1	bar				
	MPG.D1.2	bar				
	MPG.D2.1	bar				
	MPG.D2.2	bar				
Gas temperatures:						
Spatial average	T_{G_mean}(D1)	C				
Local	MTG.D1.1	C				
	MTG.D1.2	C				
	MTG.D1.3	C				
	MTG.D1.4	C				
	MTG.D1.5	C				
	MTG.D1.6	C				

* The Drywell total pressures are not independent variables, they are given by temperatures and air partial pressures. The corresponding tolerance is calculated from temperature and air partial pressure tolerances.

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TABLE OF INITIAL CONDITIONS (Cont'd)

VARIABLE	PROCESSID	UNIT	Average Value	Standard Deviation	Requested Value	Tolerance
DRYWELL PARAMETERS (Cont'd)						
Spatial average	$T_{G\_mean}(D2)$	C				
Local	MTG.D2.1	C				
	MTG.D2.2	C				
	MTG.D2.3	C				
	MTG.D2.4	C				
	MTG.D2.5	C				
	MTG.D2.6	C				
Water level	ML.D1	m				
	ML.D2	m				
SUPPRESSION CHAMBER PARAMETER						
Total pressure	MP.S1	bar				
**Air partial pressure	MPG.S1	bar				
	MPG.S2	bar				
Water temperatures:						
Spatial average	$T_{W\_mean}(S1)$	C				
Local	MTL.S1.1	C				
	MTL.S1.2	C				
	MTL.S1.3	C				
	MTL.S1.4	C				
	MTL.S1.5	C				
	MTL.S1.6	C				
Spatial average	$T_{W\_mean}(S2)$	C				
Local	MTL.S2.1	C				
	MTL.S2.2	C				
	MTL.S2.3	C				
	MTL.S2.4	C				
	MTL.S2.5	C				
	MTL.S2.6	C				

**The Suppression Chamber air partial pressures are not independant variables, they are given by temperatures and total pressures. The corresponding tolerance is calculated from temperature and total pressure tolerances.

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TABLE OF INITIAL CONDITIONS (Cont'd)

VARIABLE	PROCESSID	UNIT	Average Value	Standard Deviation	Requested Value	Tolerance
SUPPRESSION CHAMBER PARAMETERS (Cont'd)						
Gas temperatures:						
Spatial average	$T_{G\_mean}(S1)$	C				
Local	MTG.S1.1	C				
	MTG.S1.2	C				
	MTG.S1.3	C				
	MTG.S1.4	C				
	MTG.S1.5	C				
	MTG.S1.6	C				
Spatial average	$T_{G\_mean}(S2)$	C				
Local	MTG.S2.1	C				
	MTG.S2.2	C				
	MTG.S2.3	C				
	MTG.S2.4	C				
	MTG.S2.5	C				
	MTG.S2.6	C				
Water level	ML.S1	m				
	ML.S2	m				
GDCS PARAMETERS						
Total pressure	MP.GD	bar				
Fluid temperatures:						
Spatial average	$T_{F\_mean}(GD)$	C				
Local	MTF.GD.1	C				
	MTF.GD.2	C				
	MTF.GD.3	C				
	MTF.GD.4	C				
	MTF.GD.5	C				
	MTF.GD.6	C				
	MTF.GD.7	C				
Water level	ML.GD	m				

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TABLE OF INITIAL CONDITIONS (Cont'd)

VARIABLE	PROCESSID	UNIT	Average Value	Standard Deviation	Requested Value	Tolerance
PCC1 POOL PARAMETERS						
Water temperatures:						
Spatial average	$T_{w\_mean}(U1)$	C				
Local	MTL.U1.1	C				
	MTL.U1.2	C				
	MTL.U1.3	C				
	MTL.U1.4	C				
	MTL.U1.5	C				
	MTL.U1.6	C				
	MTL.U1.7	C				
Water level	ML.U1	m				
PCC2 POOL PARAMETERS						
Water temperatures:						
Spatial average	$T_{w\_mean}(U2)$	C				
Local	MTL.U2.1	C				
	MTL.U2.2	C				
	MTL.U2.3	C				
	MTL.U2.4	C				
	MTL.U2.5	C				
	MTL.U2.6	C				
	MTL.U2.7	C				
Water level	ML.U2	m				
PCC3 POOL PARAMETERS						
Water temperatures:						
Spatial average	$T_{w\_mean}(U3)$	C				
Local	MTL.U3.1	C				
	MTL.U3.2	C				
	MTL.U3.3	C				

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TABLE OF INITIAL CONDITIONS (Cont'd)

VARIABLE	PROCESSID	UNIT	Average Value	Standard Deviation	Requested Value	Tolerance
PCC3 POOL PARAMETERS (Cont'd)						
Water temperatures:						
Local						
	MTL.U3.4	C				
	MTL.U3.5	C				
	MTL.U3.6	C				
	MTL.U3.7	C				
	MTL.U3.8	C				
	MTL.U3.9	C				
	MTL.U3.10	C				
	MTL.U3.11	C				
	MTL.U3.12	C				
	MTL.U3.13	C				
	MTL.U3.14	C				
	MTL.U3.15	C				
	MTL.U3.16	C				
	MTL.U3.17	C				
	MTL.U3.18	C				
	MTL.U3.19	C				
Water level	ML.U3	m				

13. GRAPHS:

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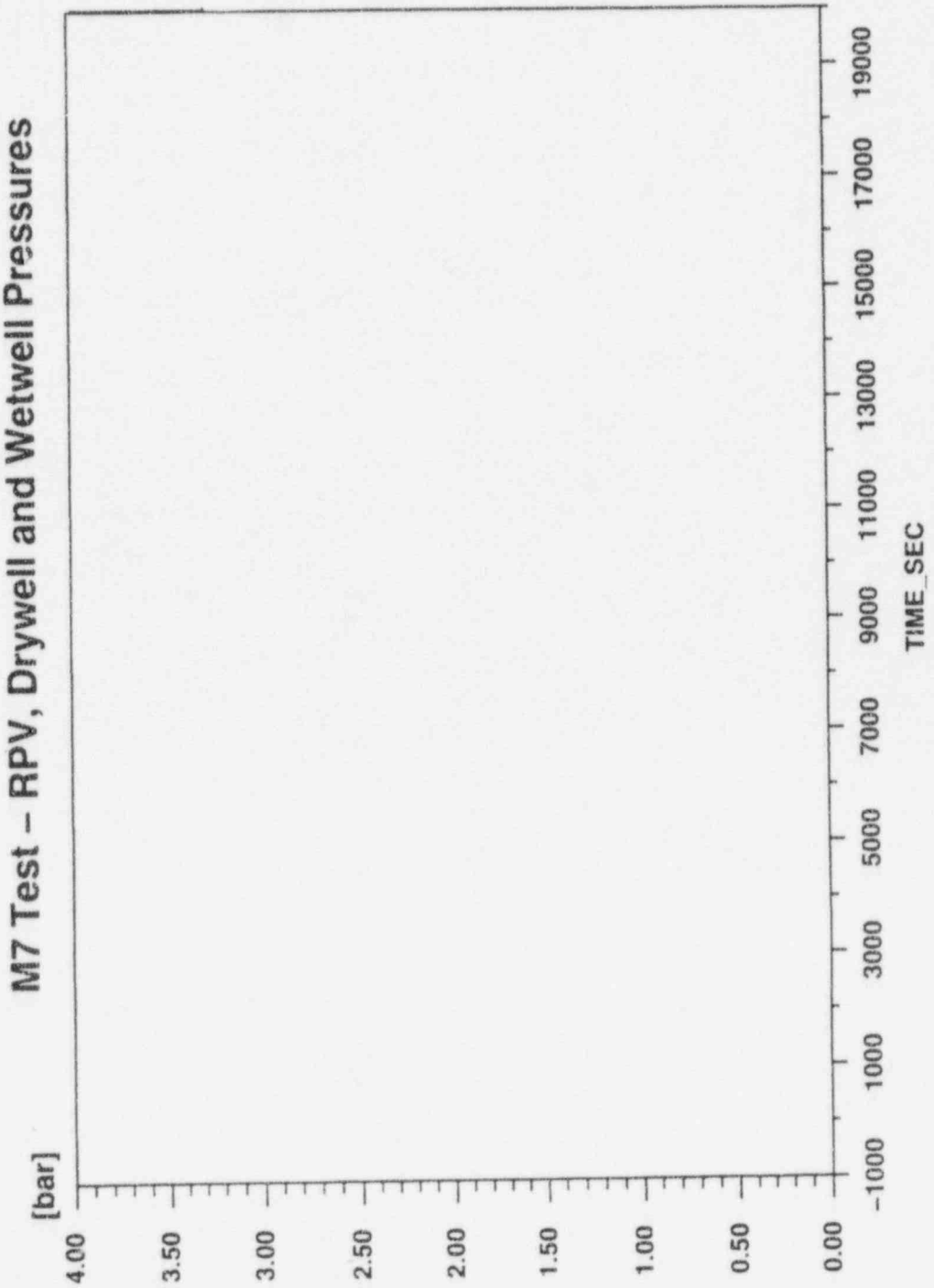

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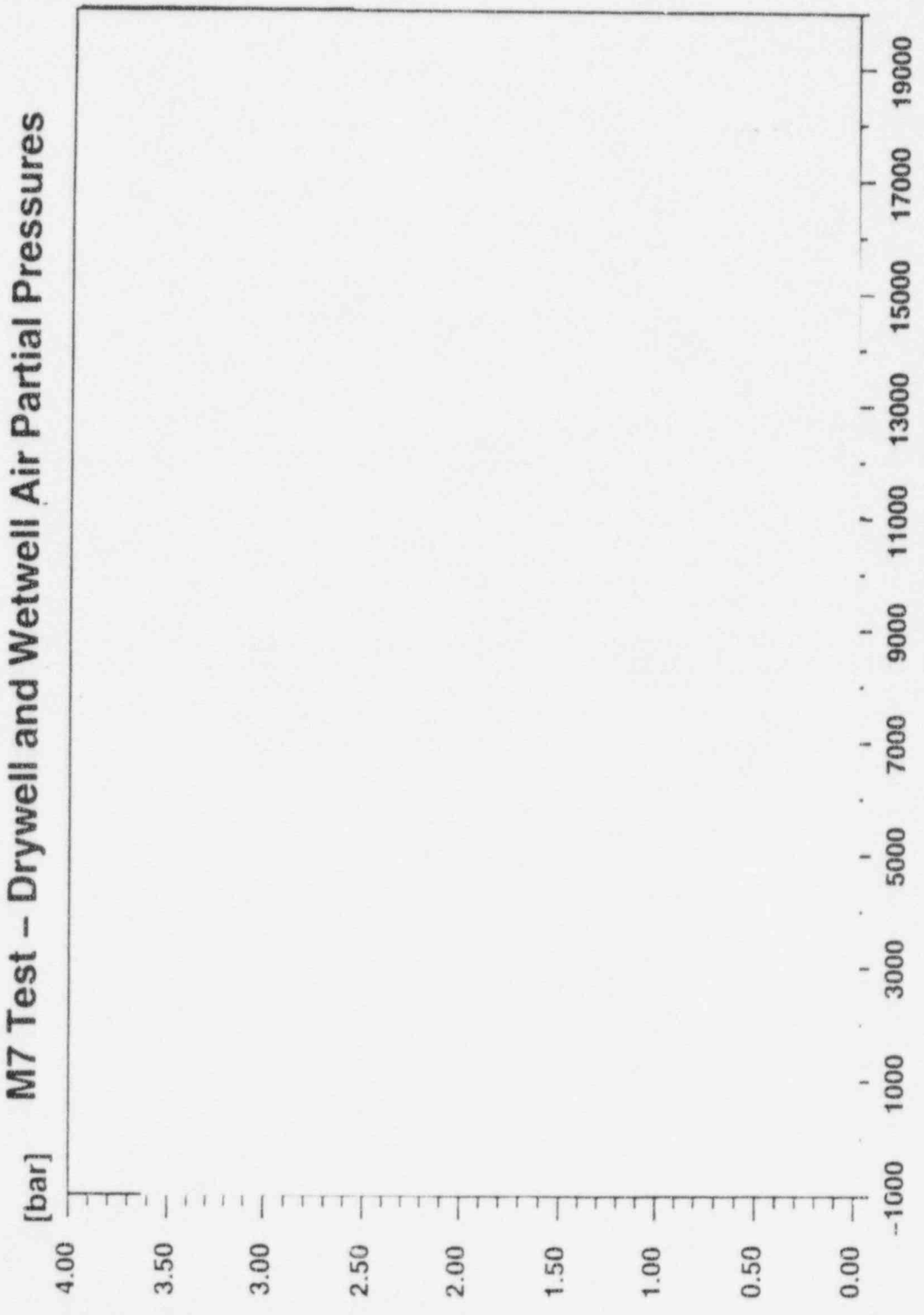

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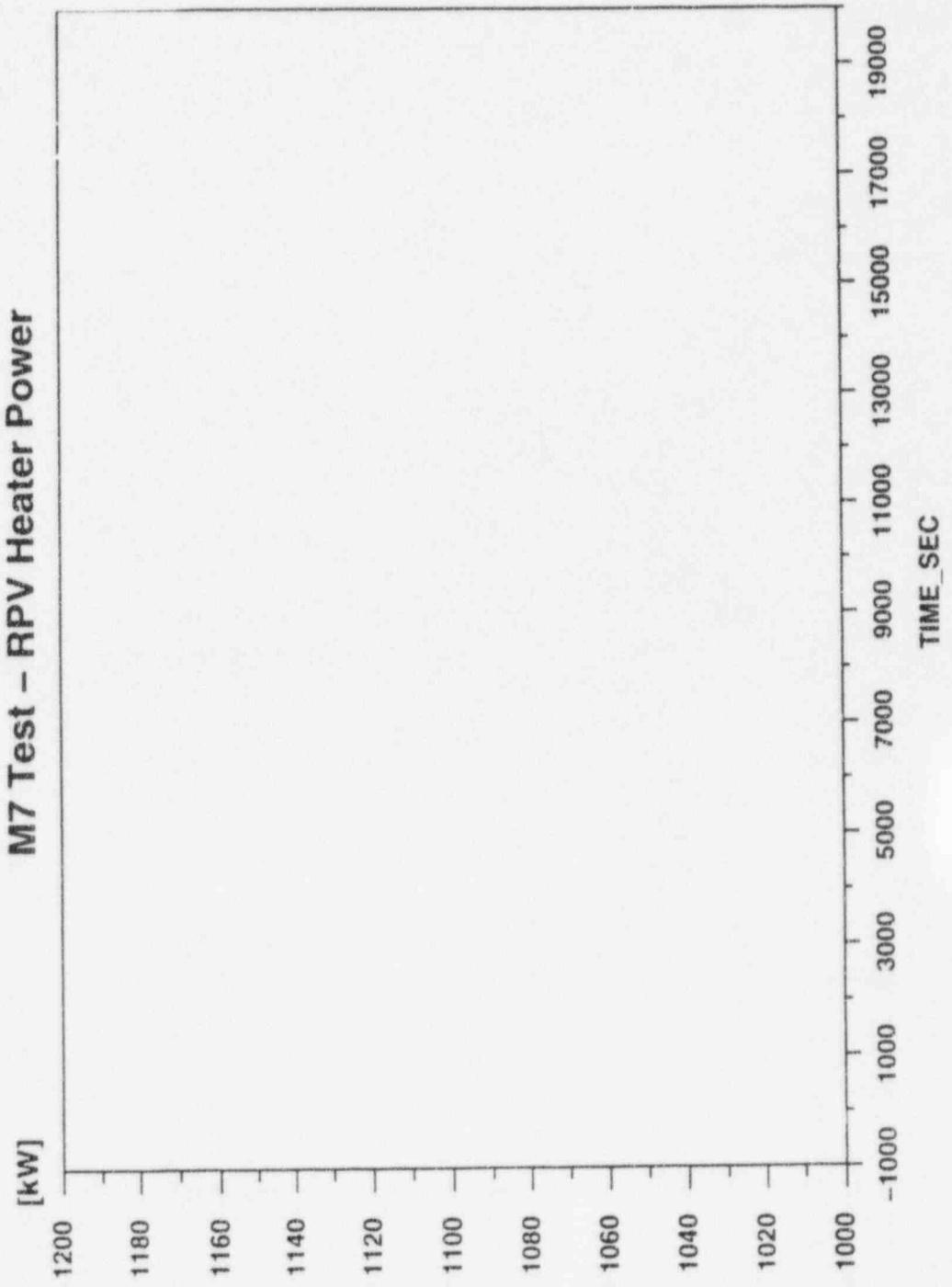

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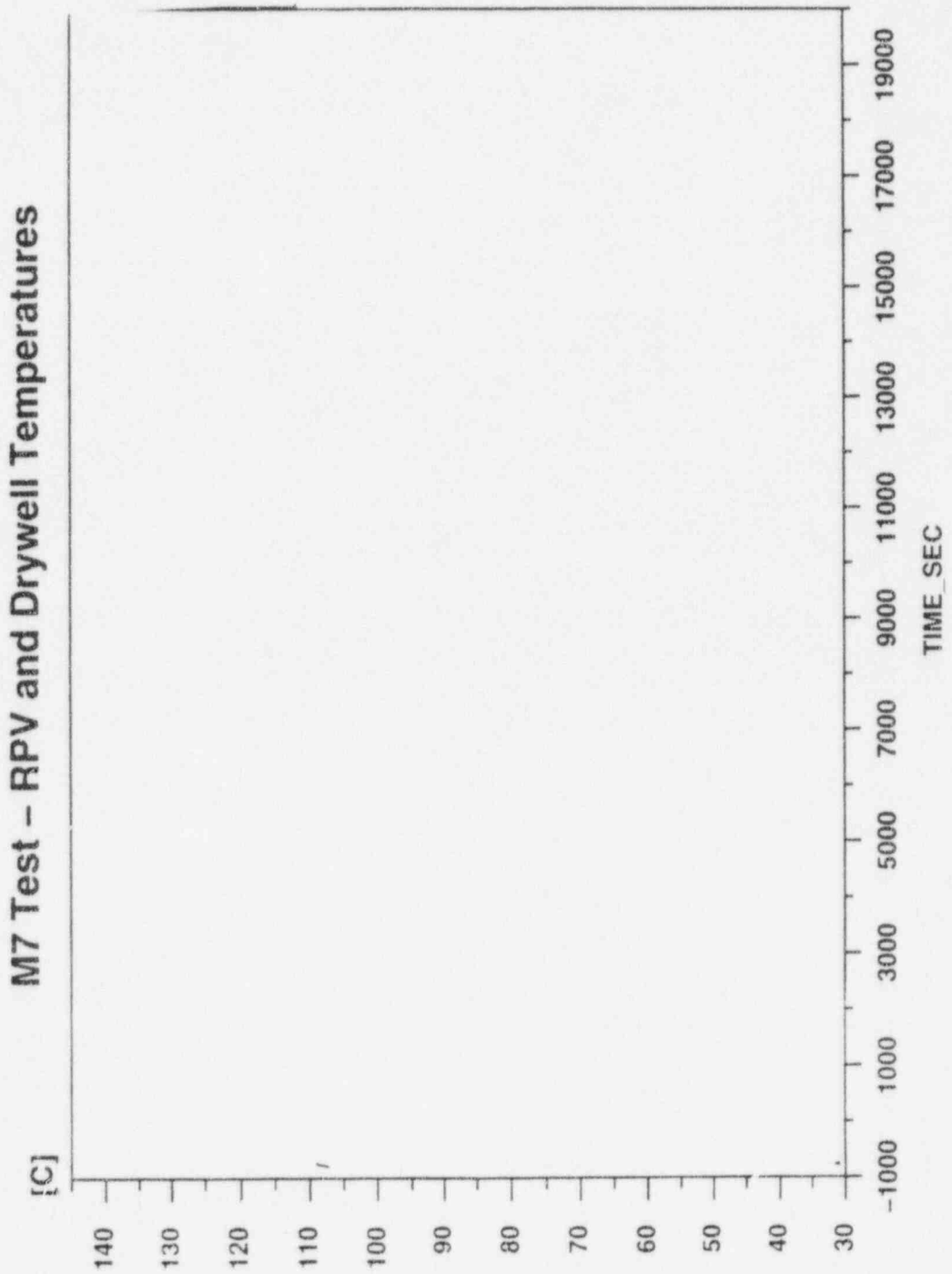

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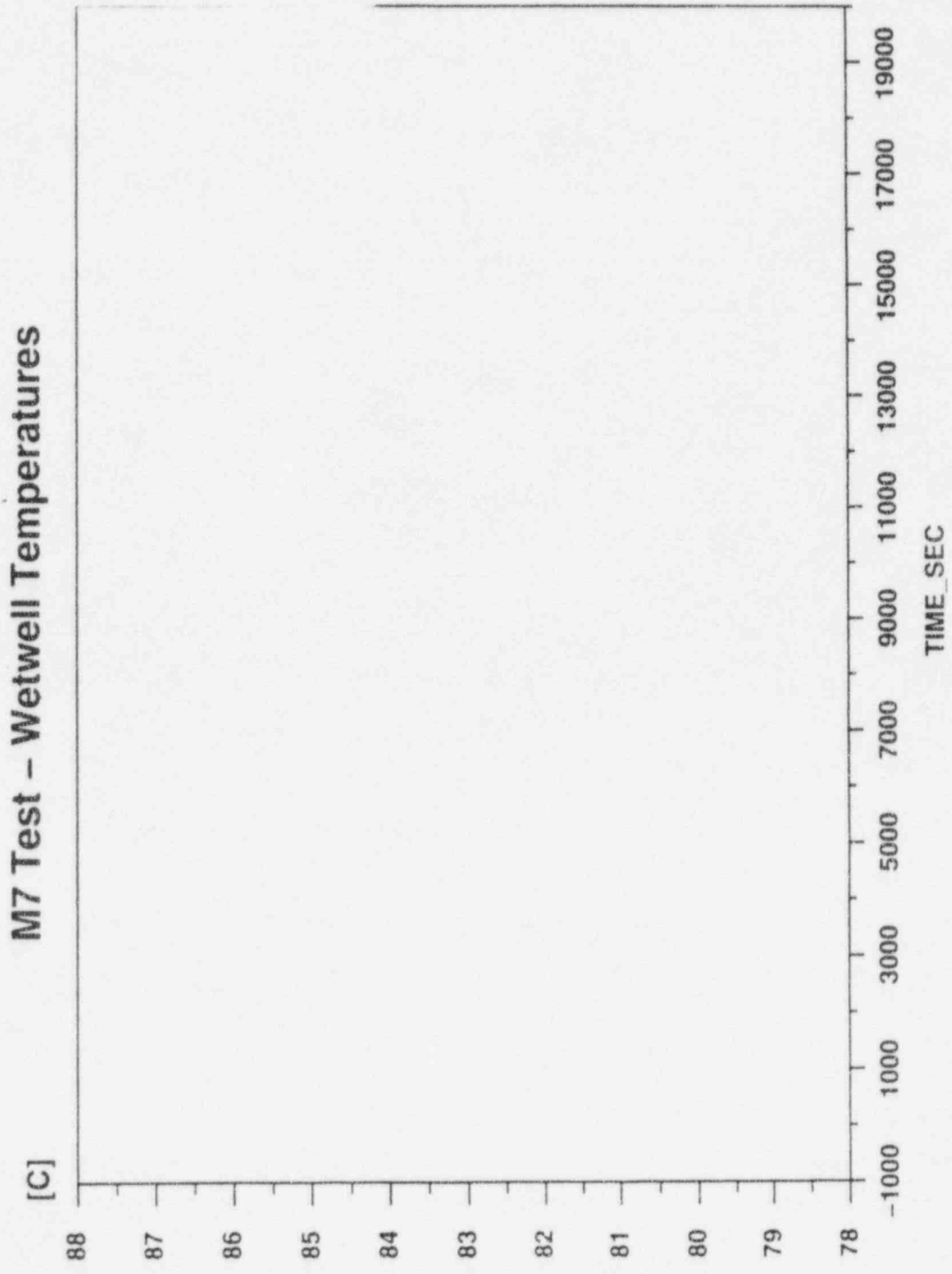

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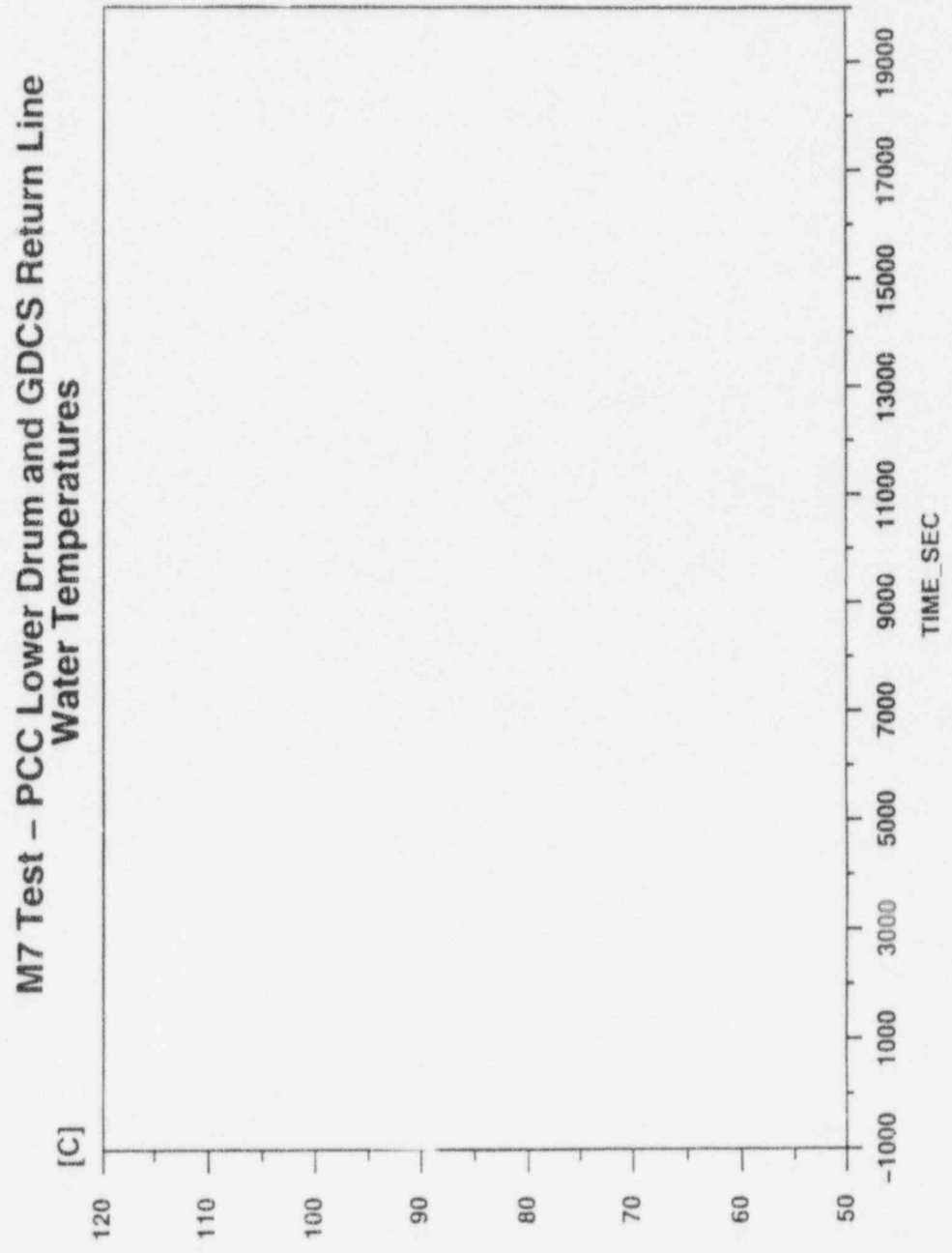

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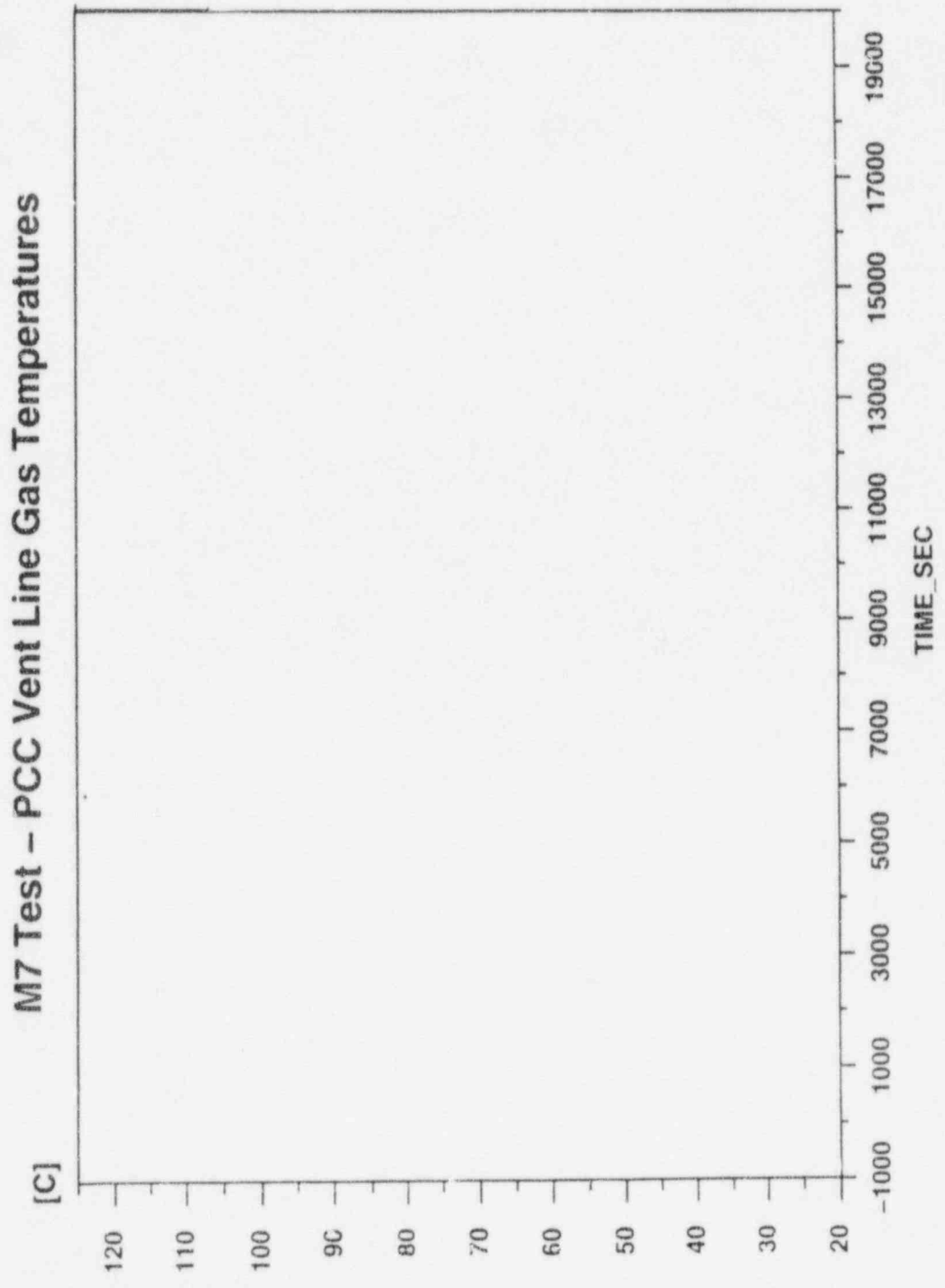

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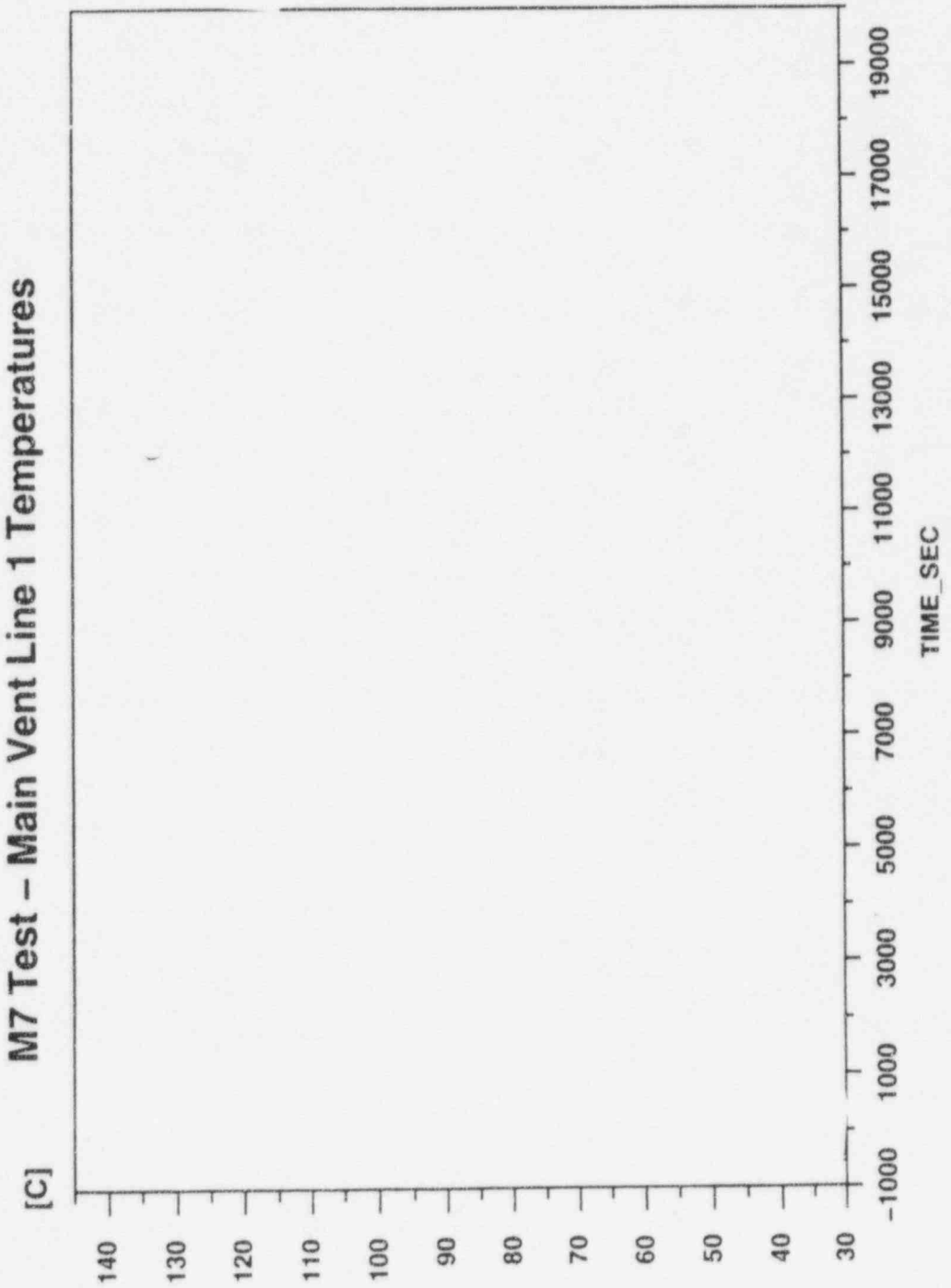

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