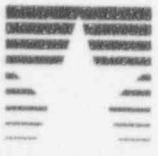


TU ELECTRIC

Log # TXX-96501
File # 10010
10CFR50.46

November 1, 1996

C. Lance Terry
Group Vice President

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446
LARGE BREAK LOCA ANALYSIS,
SUPPLEMENTAL INFORMATION

REF: Letter logged TXX-96497, Dated October 25, 1996, from C.L. Terry to the NRC

Gentlemen:

Per your request, attached is plant specific information from the TOODEE2 hot rod heatup calculations regarding the calculated peak clad temperature.

Please contact Dr. W. G. Choe at (214) 812-4371 or Mr. J. D. Seawright at (817) 897-0140 if you have any questions in this regard.

Sincerely,

C. L. Terry

By: D R Woodlan
D. R. Woodlan
Docket Licensing Manager

070094
9611080043 961101
PDR ADOCK 05000445
P PDR

JDS/grp
Attachment

c - Mr. L. J. Callan, Region IV
Mr. T. J. Polich, NRR
Mr. J. I. Tapia, Region IV
Resident Inspector, CPSES

1/1

D029

Case	LB16J (Unit 1)	LB16Z (Unit 1)	LB23W (Unit 2)	LB23X (Unit 2)
F_Q	2.42	2.40	2.42	2.40
Axial Shape Peak	7.75'	7.75'	7.75'	7.75'
K_z	0.978125	0.978125	0.978125	0.978125
Total Peaking (F_Q x K_z)	2.3670	2.3475	2.3670	2.3475
Initial Clad Temp. at PCT node	1237.8 °F	1231.1 °F	1244.4 °F	1238.2 °F
Initial LHGR (for peak node, at start of REFLOOD)	~0.63 kw/ft	~0.63 kw/ft	~0.63 kw/ft	~0.63 kw/ft
Initial Subcooling	135.9 °F	135.9 °F	135.9 °F	135.9 °F
PCT	2055.0 °F	2112.1 °F	2047.8 °F	2036.0 °F
Time of PCT	66.7 sec	79.7 sec	67.3 sec	75.3 sec
Reflood (BOCREC) time	38.0 sec	38.0 sec	38.0 sec	38.0 sec
Time of PCT after BOCREC	28.7 sec	41.7 sec	29.3 sec	37.3 sec
Temporary Assessment for Reflood Heat Transfer Coefficient?	No	Yes	No	Yes

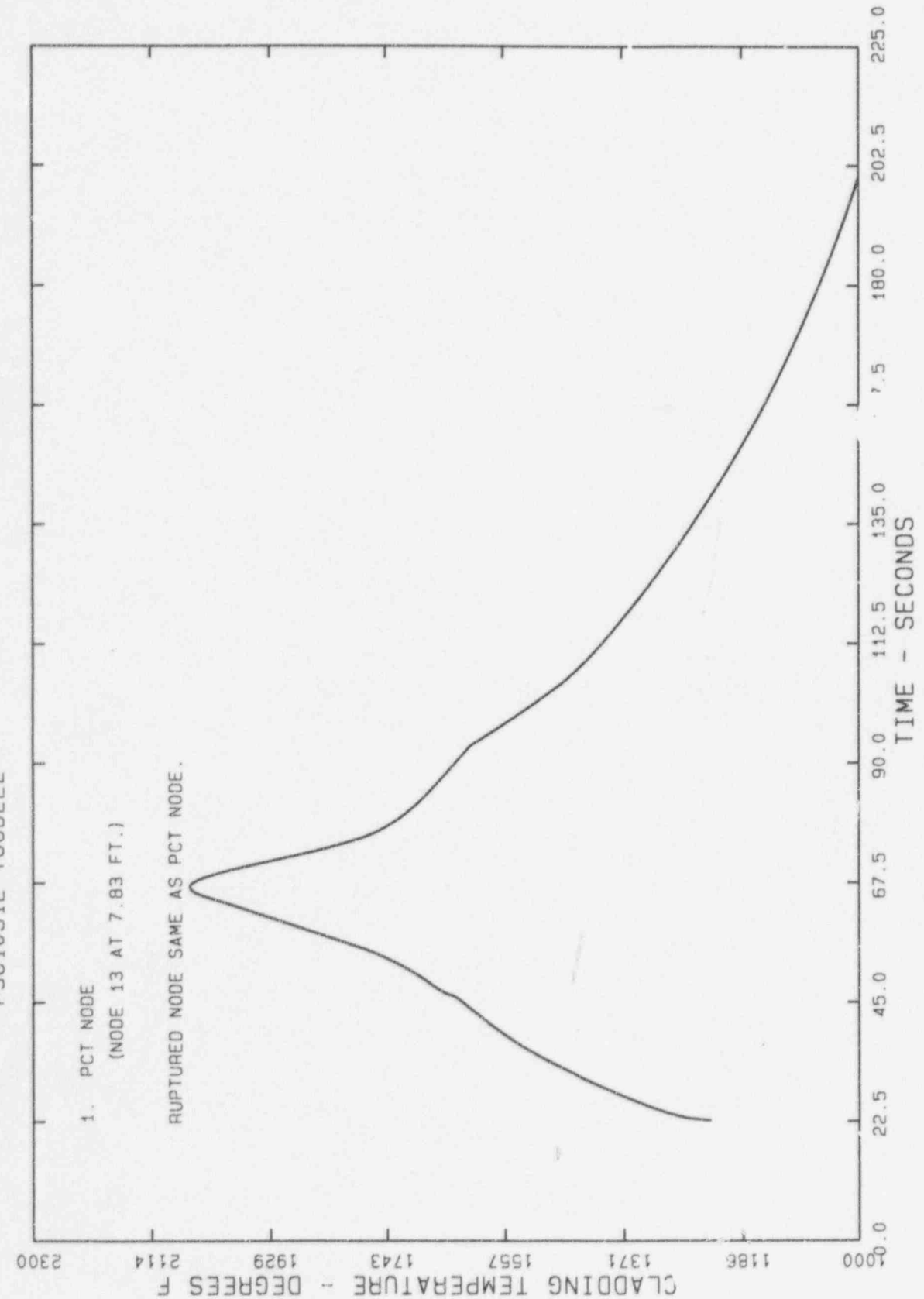
Convective Heat Transfer Coefficient Plots: Note that the heat transfer coefficient plotted pertains only to convection. Up until approximately 50.0 seconds, the heat transfer mode is radiation.

Reflood Rate Plots: The reflood rate levels off at approximately 50.0 seconds due to the competing effects of the slight depressurization (increases flooding rate) and decrease in ECCS flow (decreases flooding rate) due to the runout of the accumulators.

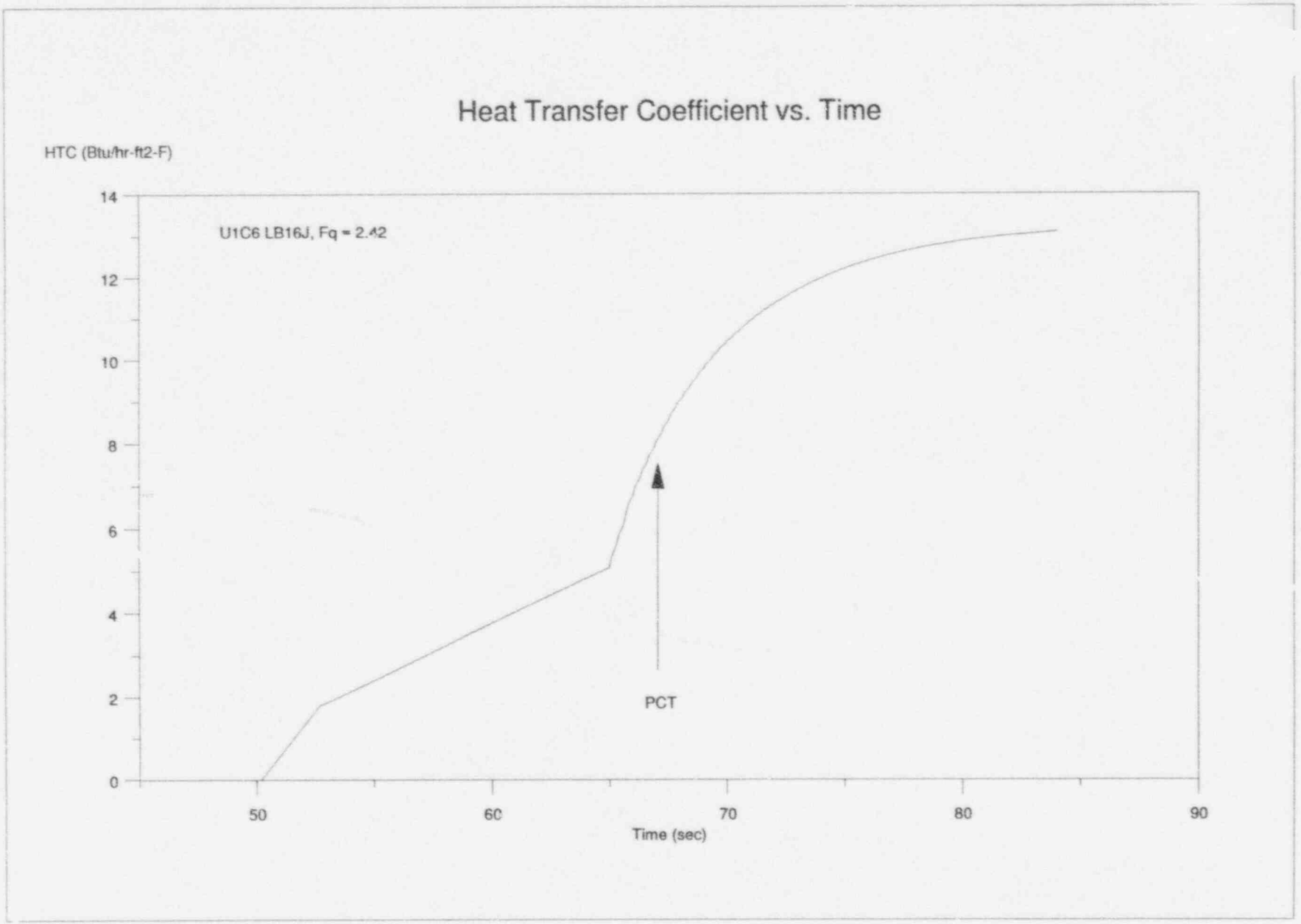
Quench Level Plots: The blip seen in all of the Quench level versus time plots at approximately 50.0 seconds is due to the runout of the accumulators. The emptying of the accumulators causes a slight depressurization in the reactor vessel, which induces an increase in the quench front up the core. This increase in quench level causes greater steam production, which repressurizes the primary system, and quench level is seen to return to the original trend.

Note that in TOODEE2, a constant core inlet subcooled margin is assumed. The initial inlet subcooled margin is retained throughout the calculation, and T_{inlet} is "backed out" of the saturated temperature and assumed subcooled margin. This is conservative, as the T_{inlet} calculated assuming a constant subcooled margin is higher than is actually the case (subcooled margin increases during the course of the LOCA due to the cooler ECCS flow entering the lower plenum).

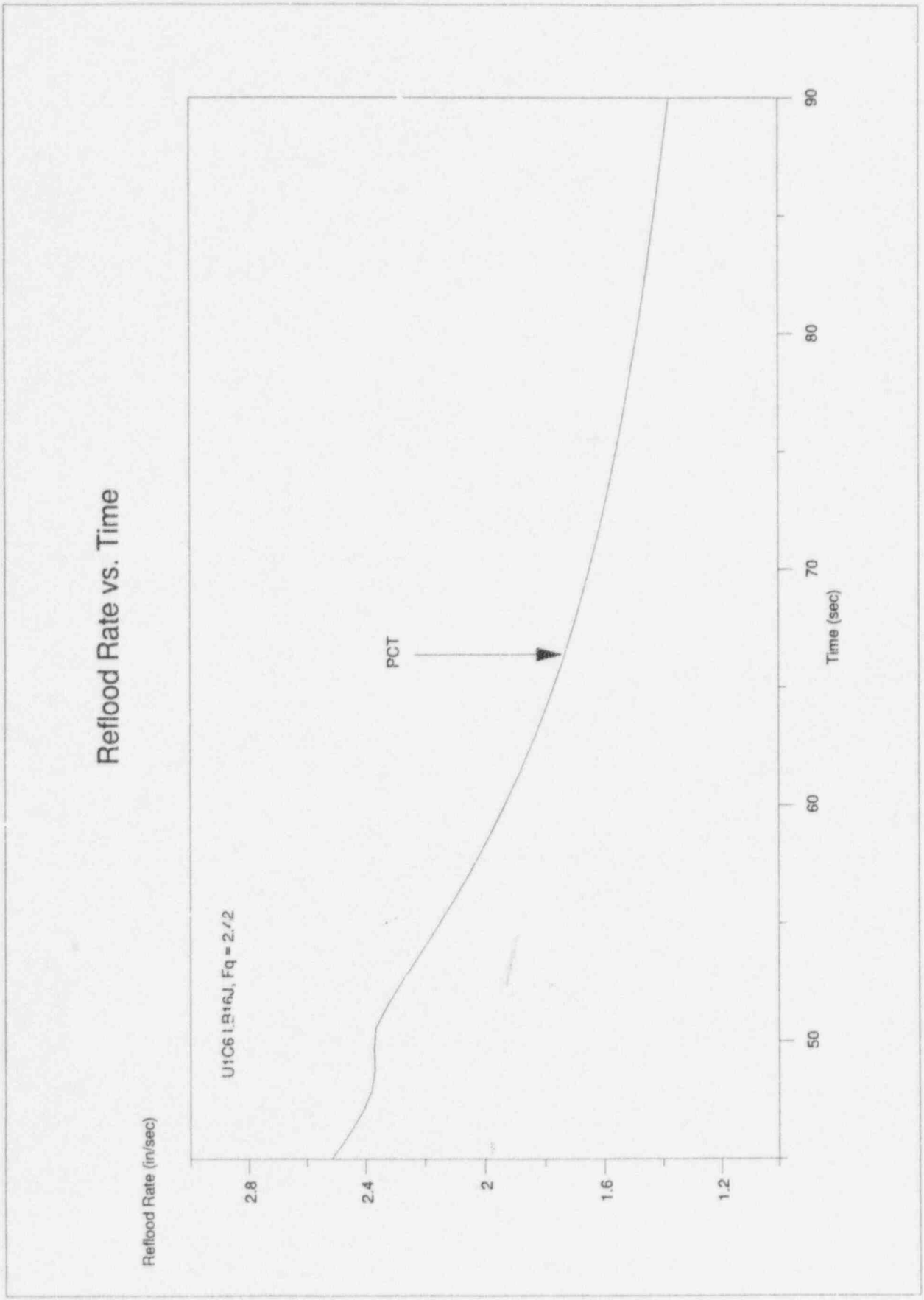
Note that the reflood rate plotted for cases LB16ZTD2 and LB23XTD2 (pages 10 and 22) are the actual reflood rates. However, in the TOODEE2 run, the reflood rate was manually adjusted to 1.77001 in/sec for all reflood rates between 1.0 and 1.77 in/sec in order to decrease the reflood heat transfer coefficient.


P3G10S1E T00DEE2
1. PCT NODE
(NODE 13 AT 7.83 FT.)
RUPTURED NODE SAME AS PCT NODE.
CLADDING TEMPERATURE - DEGREES F
2300
2114
1929
1743
1557
1371
1186
1000
0.0
22.5
45.0
67.5
90.0
112.5
135.0
180.0
202.5
225.0
TIME - SECONDS

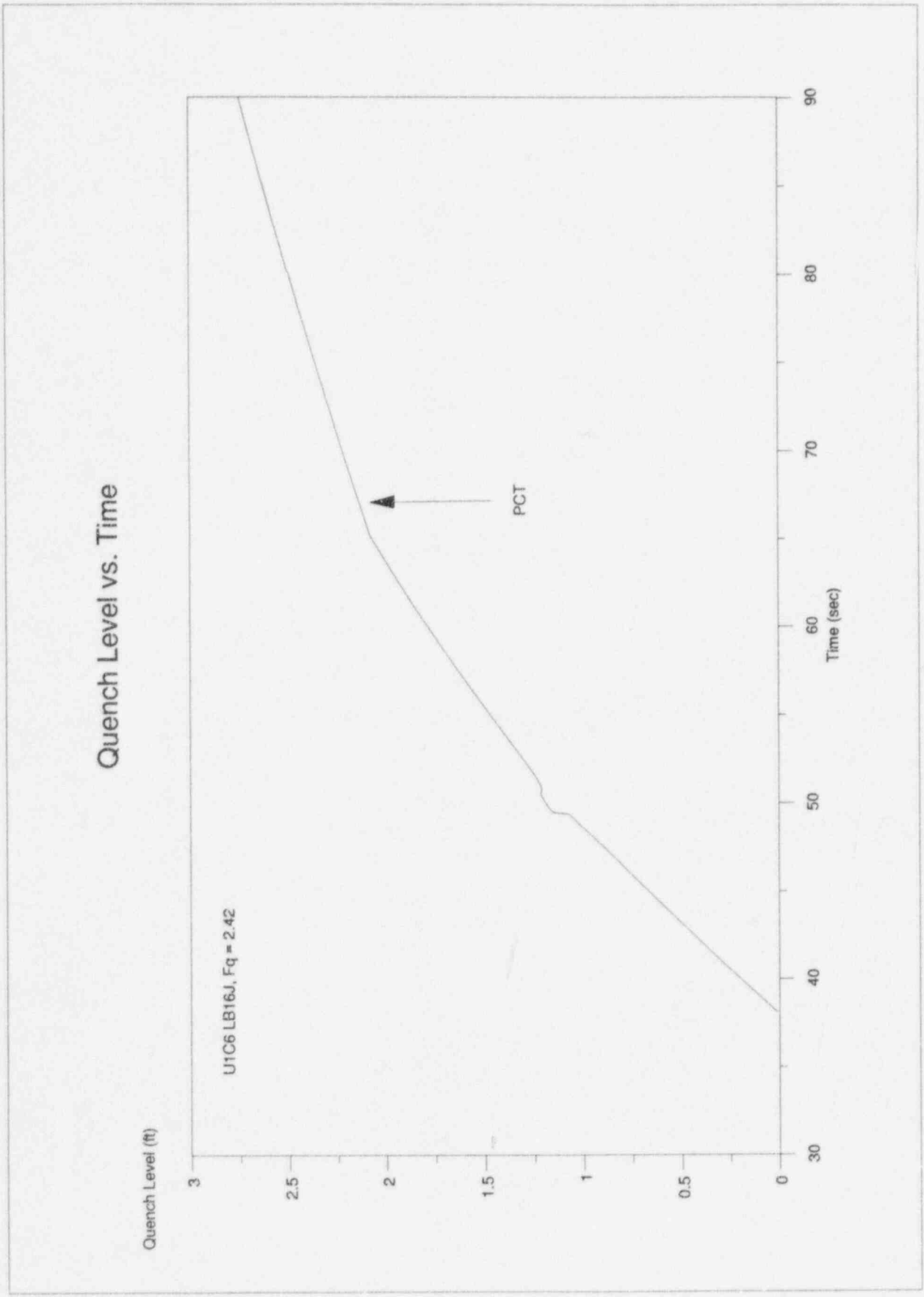
U1C6 LB16J


Heat Transfer Coefficient vs. Time
HTC (Btu/hr-ft2-F)
U1C6 LB16J, Fq = 2.42
PCT
Time (sec)
0
2
4
6
8
10
12
14
50
60
70
80
90

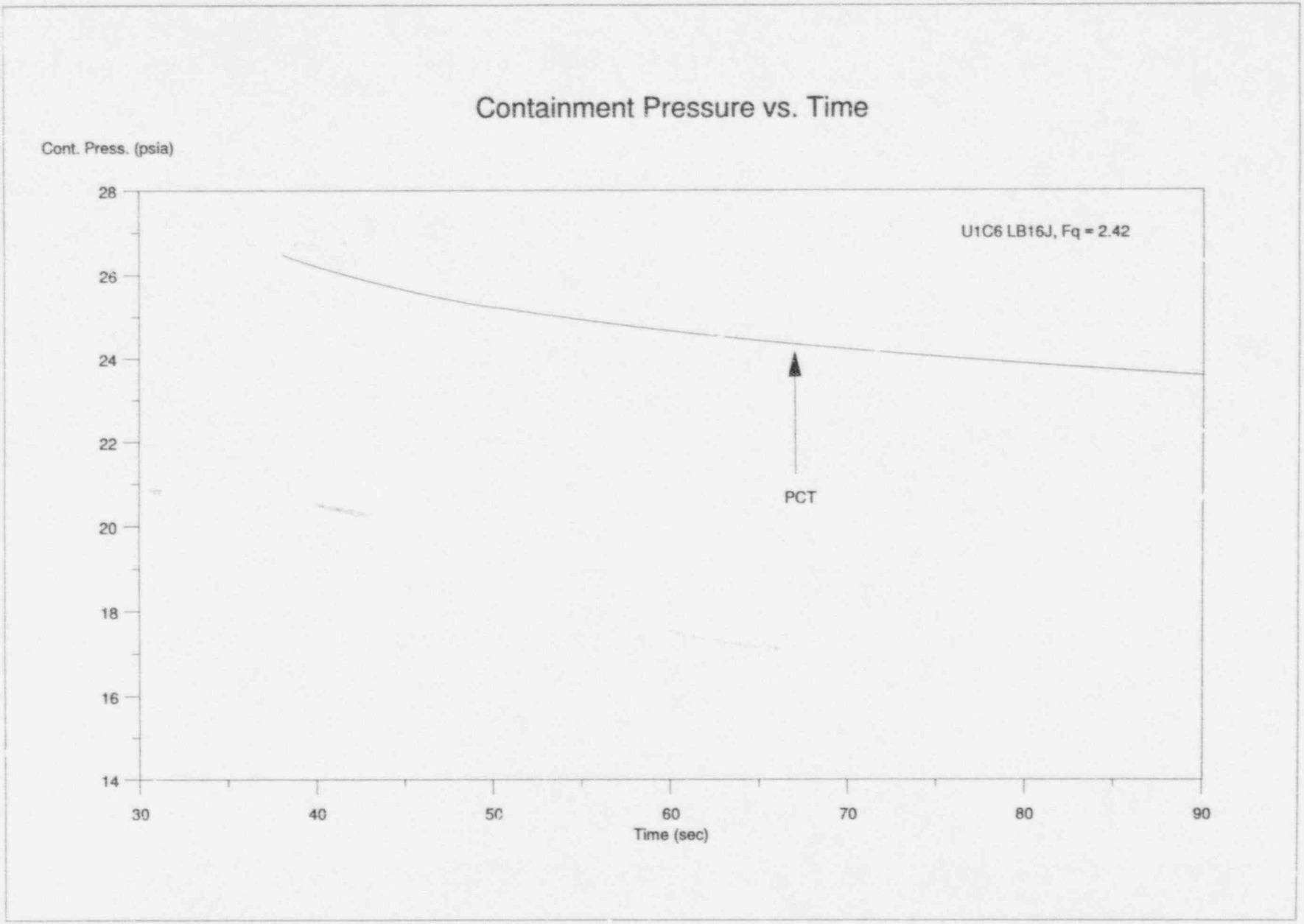
U1C6 LB16J


Reflood Rate vs. Time
U1C6LB16J, Fq = 2.12
PCT
Reflood Rate (in/sec)
2.8
2.4
2
1.6
1.2
50
60
70
80
90
Time (sec)

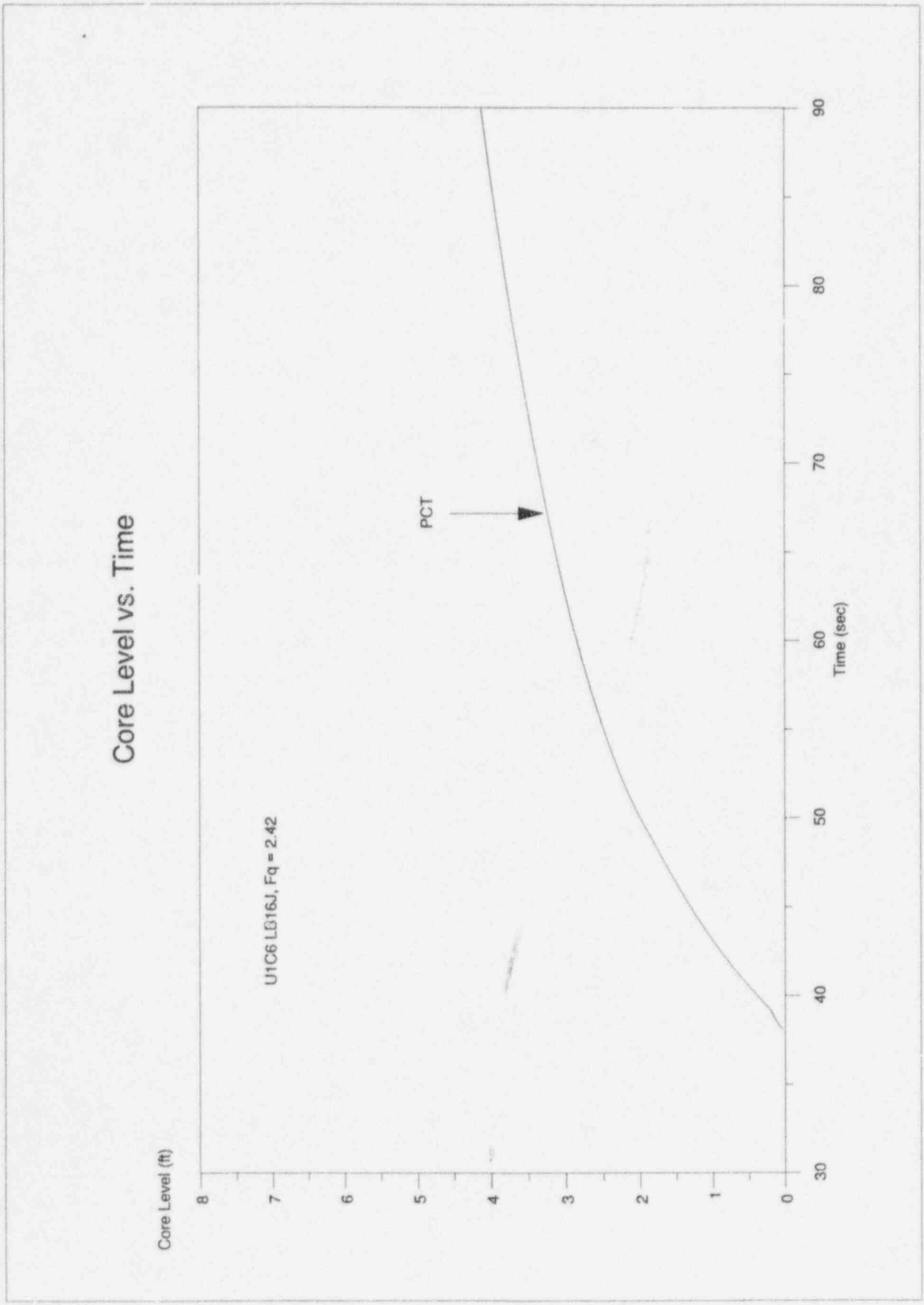
U1C6 LB16J

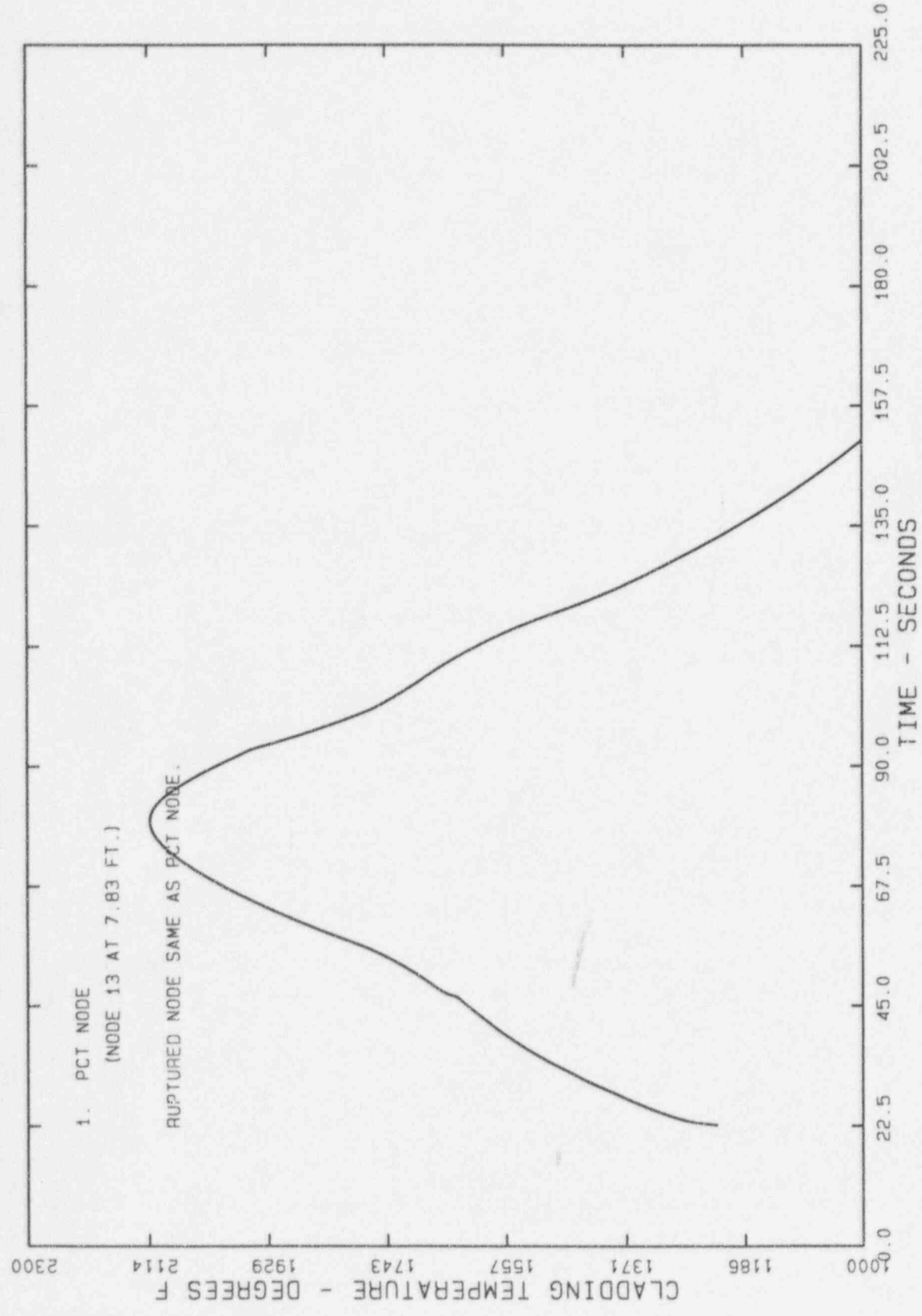

Quench Level vs. Time
U1C6 LB16J, Fq = 2.42
PCT
Quench Level (ft)
Time (sec)
0
0.5
1
1.5
2
2.5
3
30
40
50
60
70
80
90

U1C6 LB16J

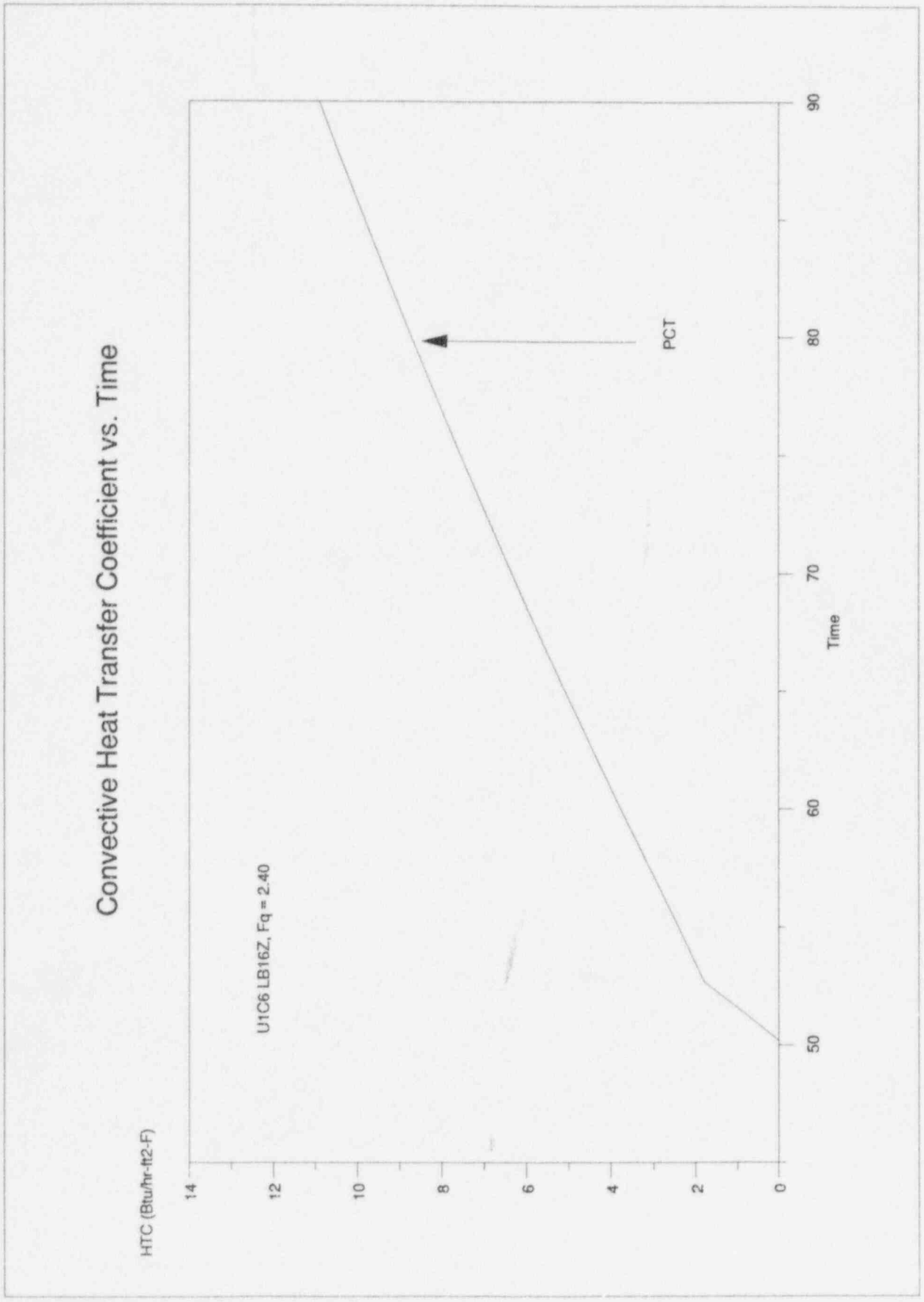

Containment Pressure vs. Time
Cont. Press. (psia)
28
26
24
22
20
18
16
14
U1C6 LB16J, Fq = 2.42
PCT
30
40
50
60
70
80
90
Time (sec)

U1C6 LB16J

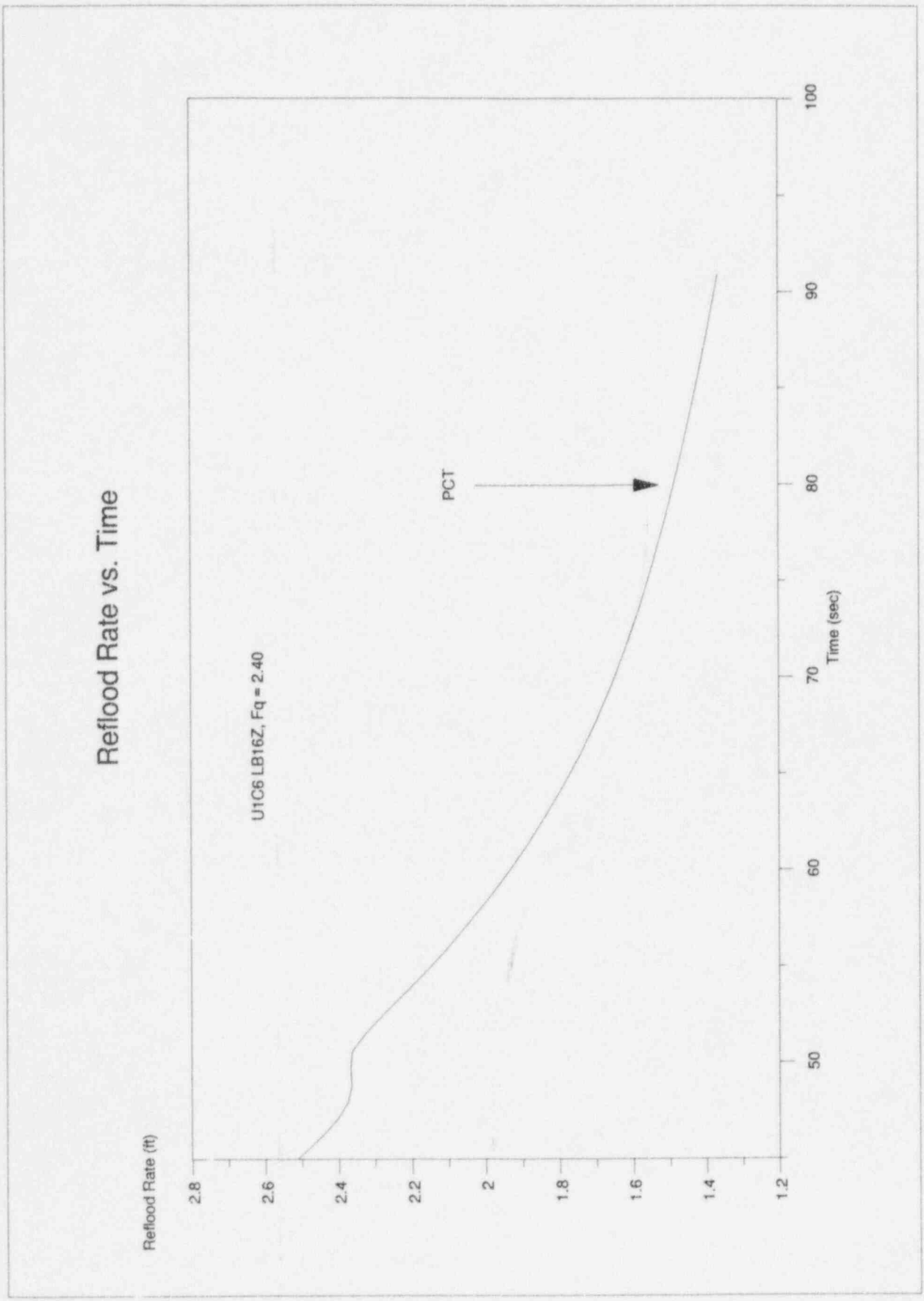

Core Level vs. Time
U1C6 LB16J, Fq = 2.42
PCT
Core Level (ft)
Time (sec)
0
1
2
3
4
5
6
7
8
30
40
50
60
70
80
90


P3G10S1E T00DEE2
1. PCT NODE
(NODE 13 AT 7.83 FT.)
RUPTURED NODE SAME AS PCT NODE.
CLADDING TEMPERATURE - DEGREES F
2300
2114
1929
1743
1557
1371
1186
1000
0.0
22.5
45.0
67.5
90.0
112.5
135.0
157.5
180.0
202.5
225.0
TIME - SECONDS

U1C6 LB16ZTD2.OUT



U1C6 LB16Z TD2.OUT



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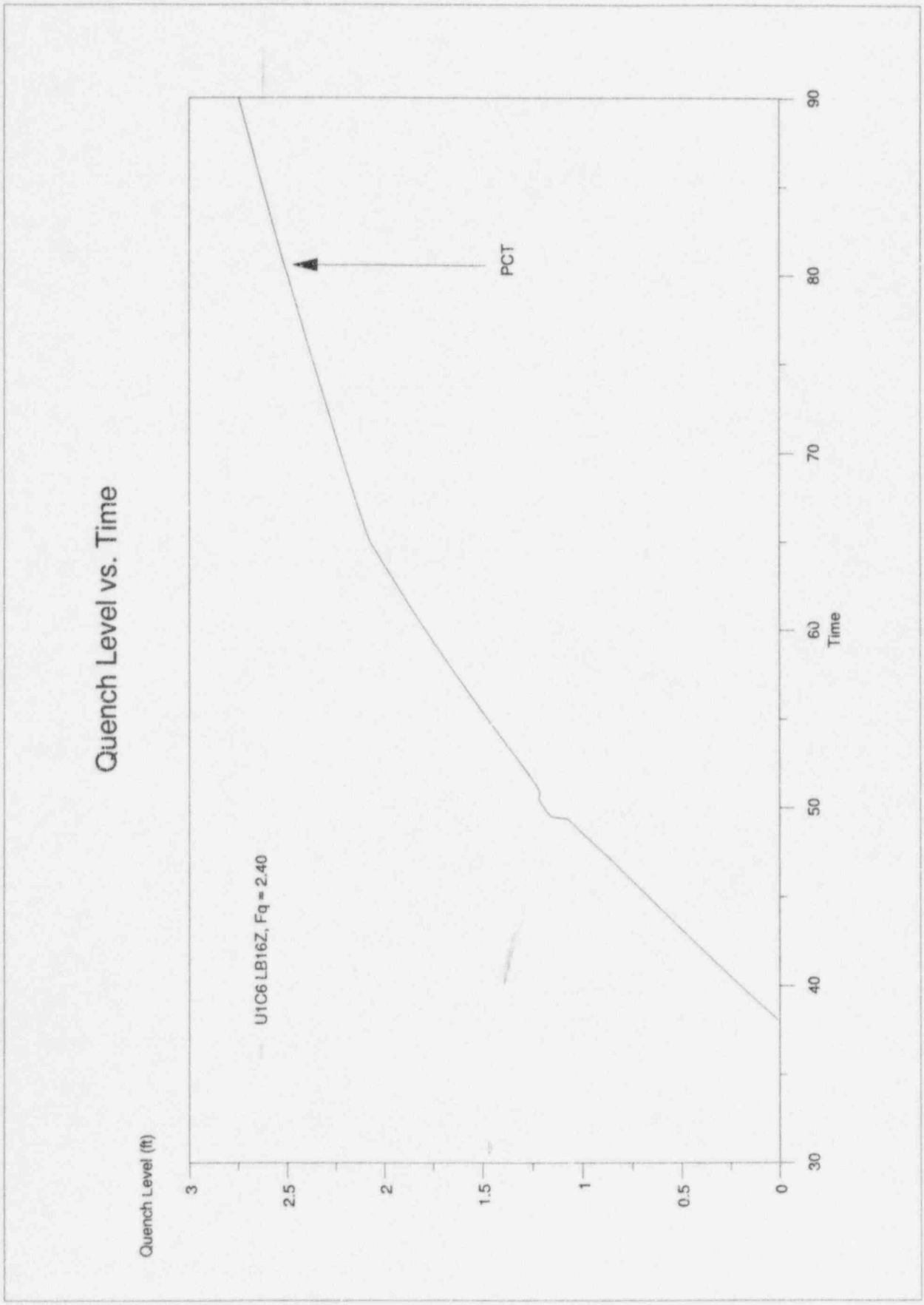
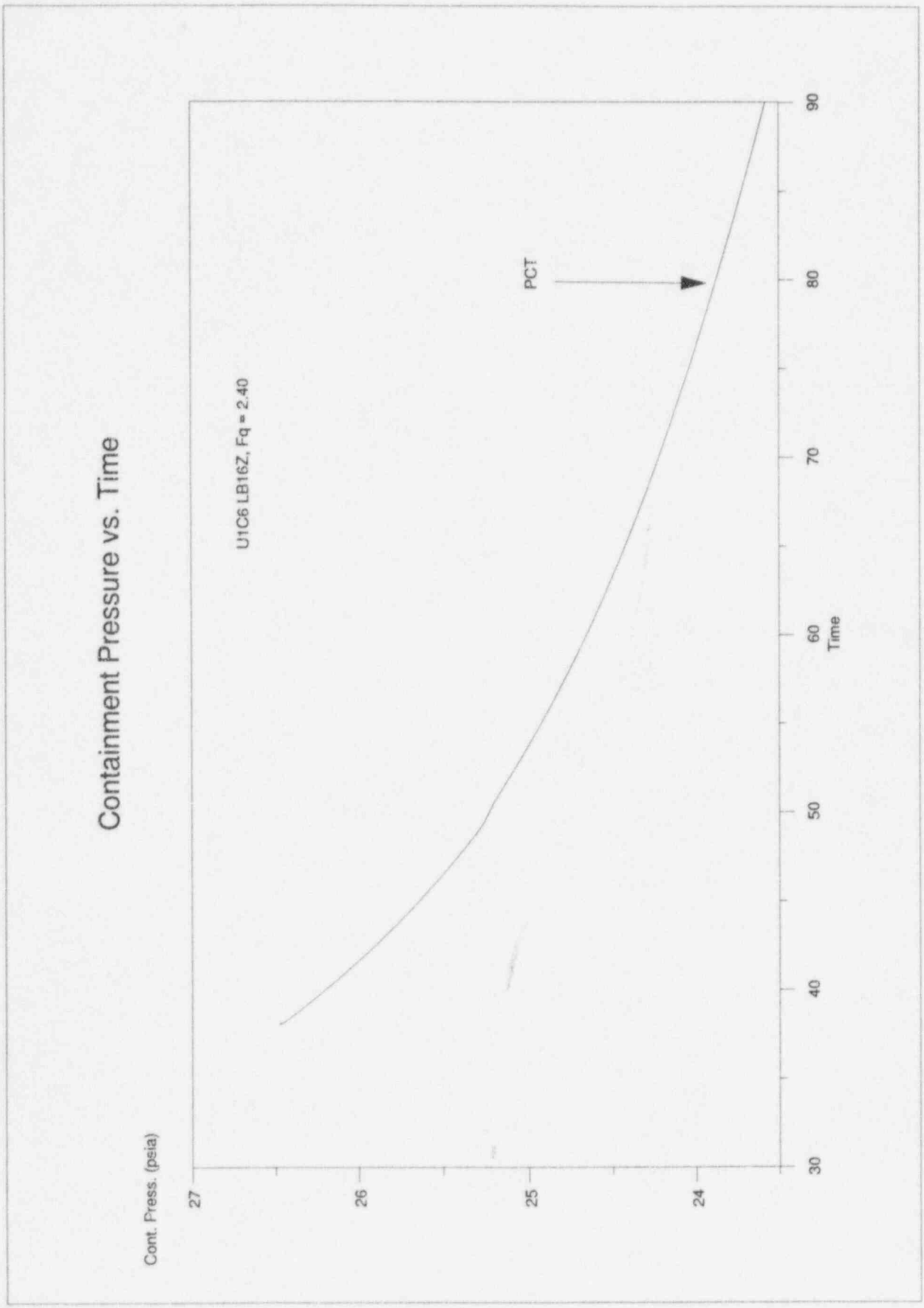
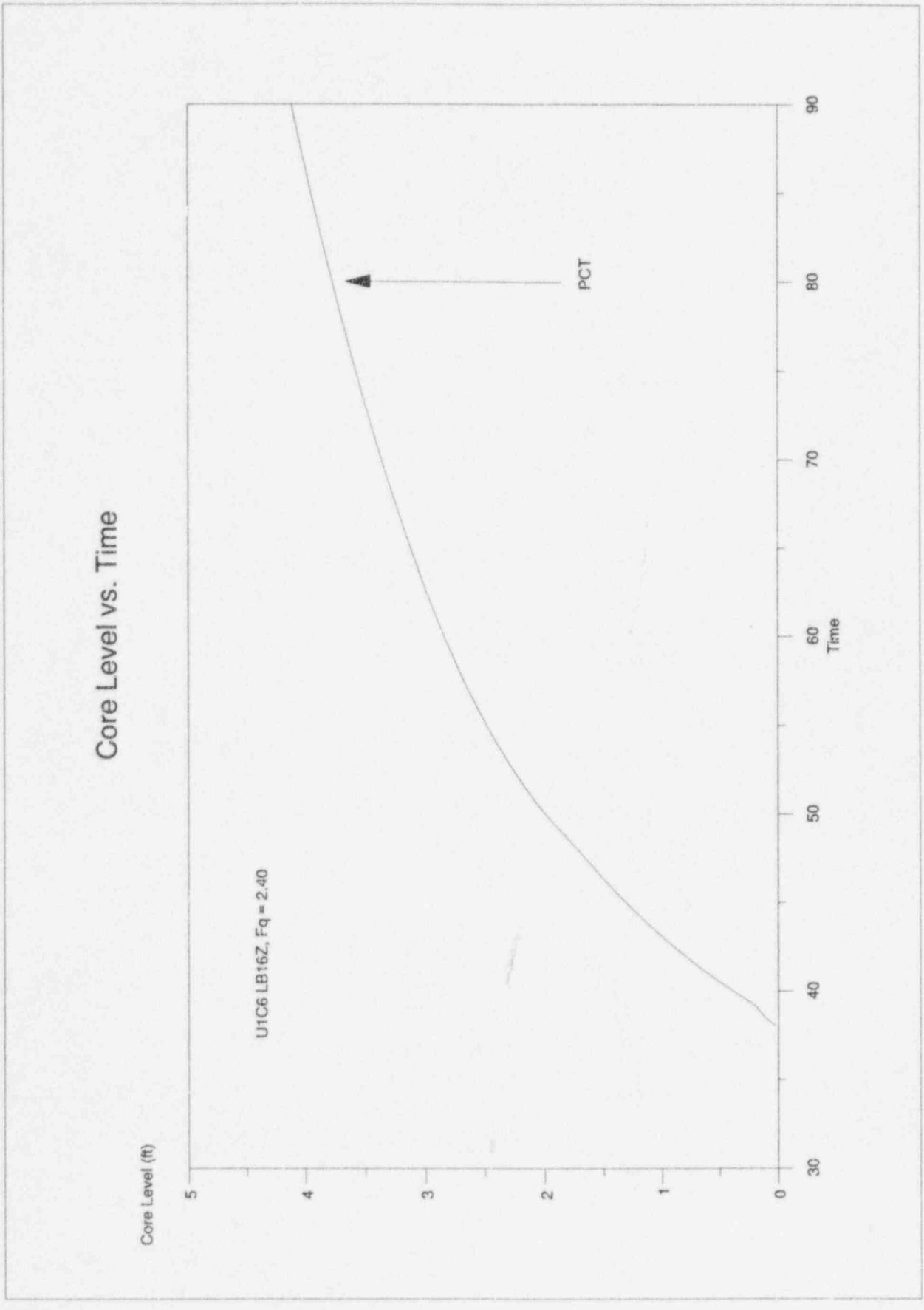


U1C6 LB16ZTD2.OUT

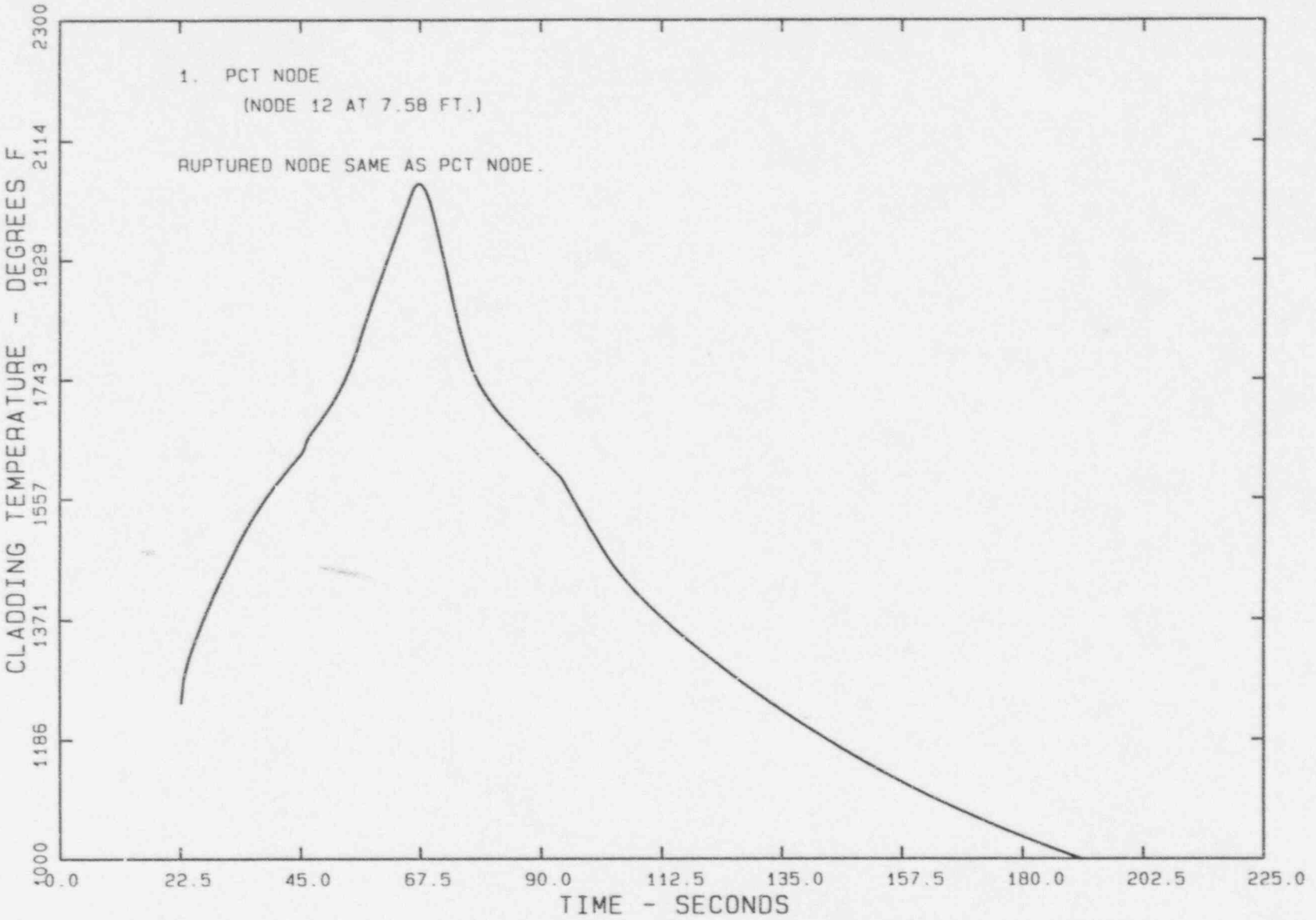


U1C6 LB16ZTD2.OUT

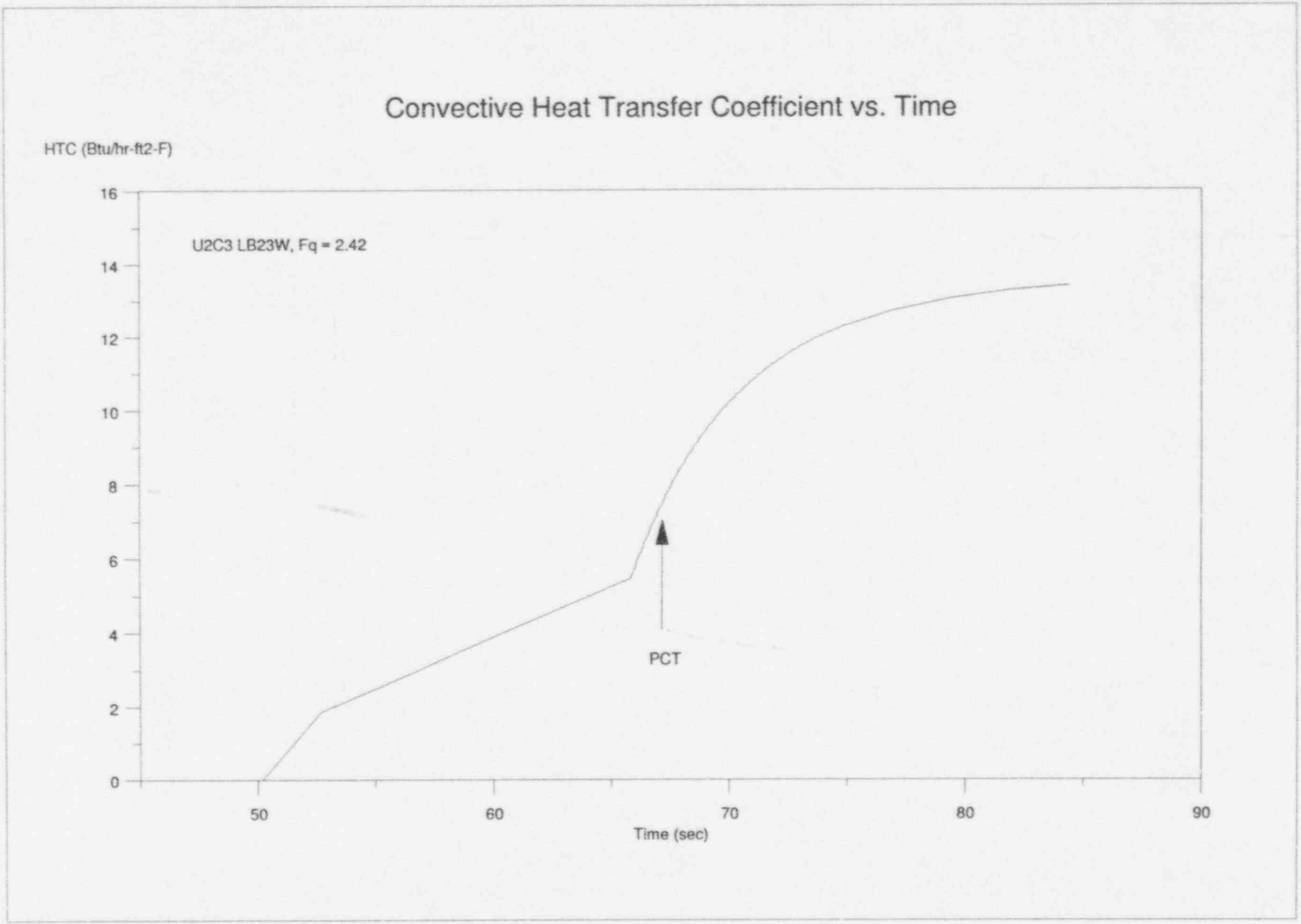


U2C3 LB23W.LOG

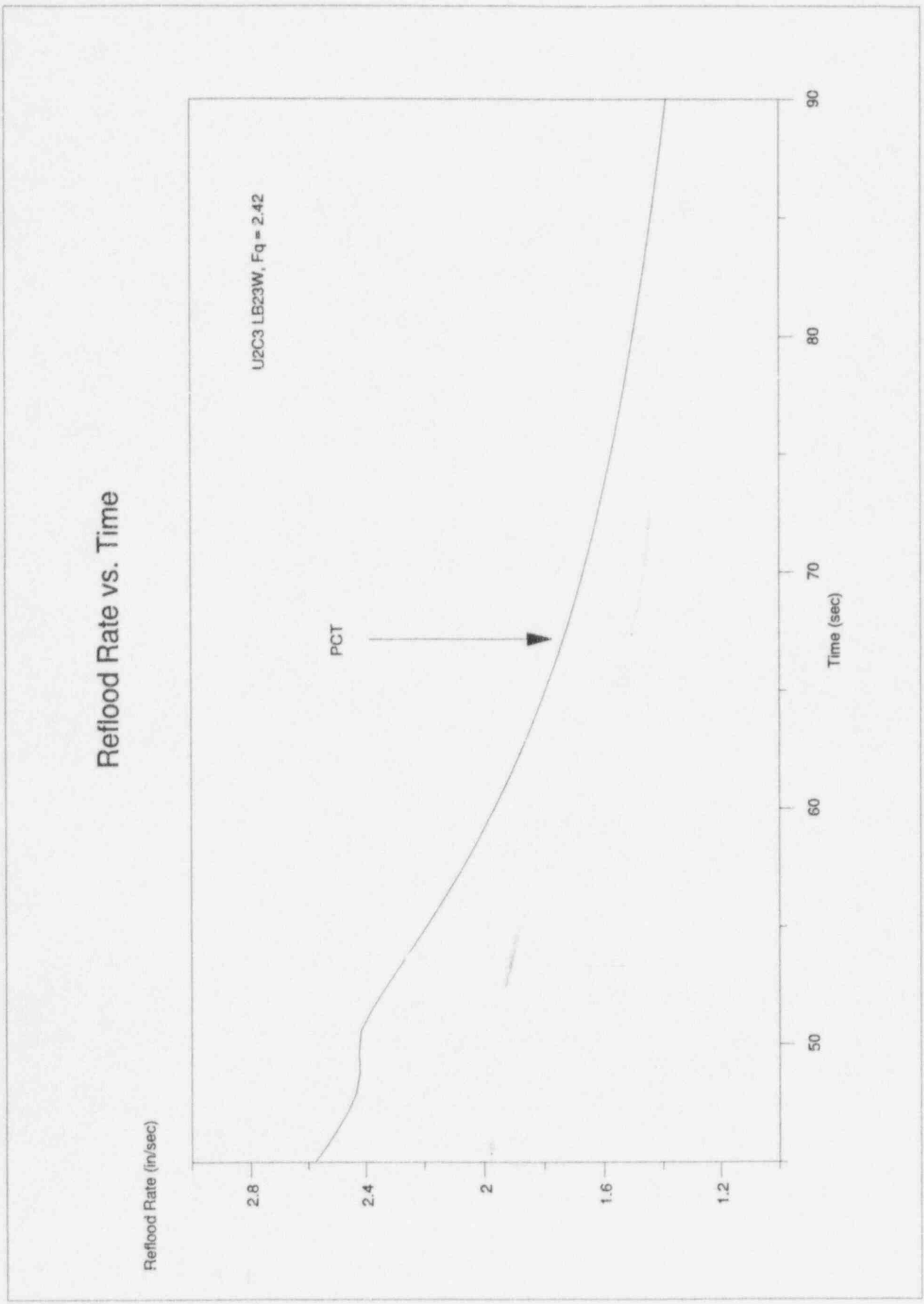
P3G10S1E T00DEE2



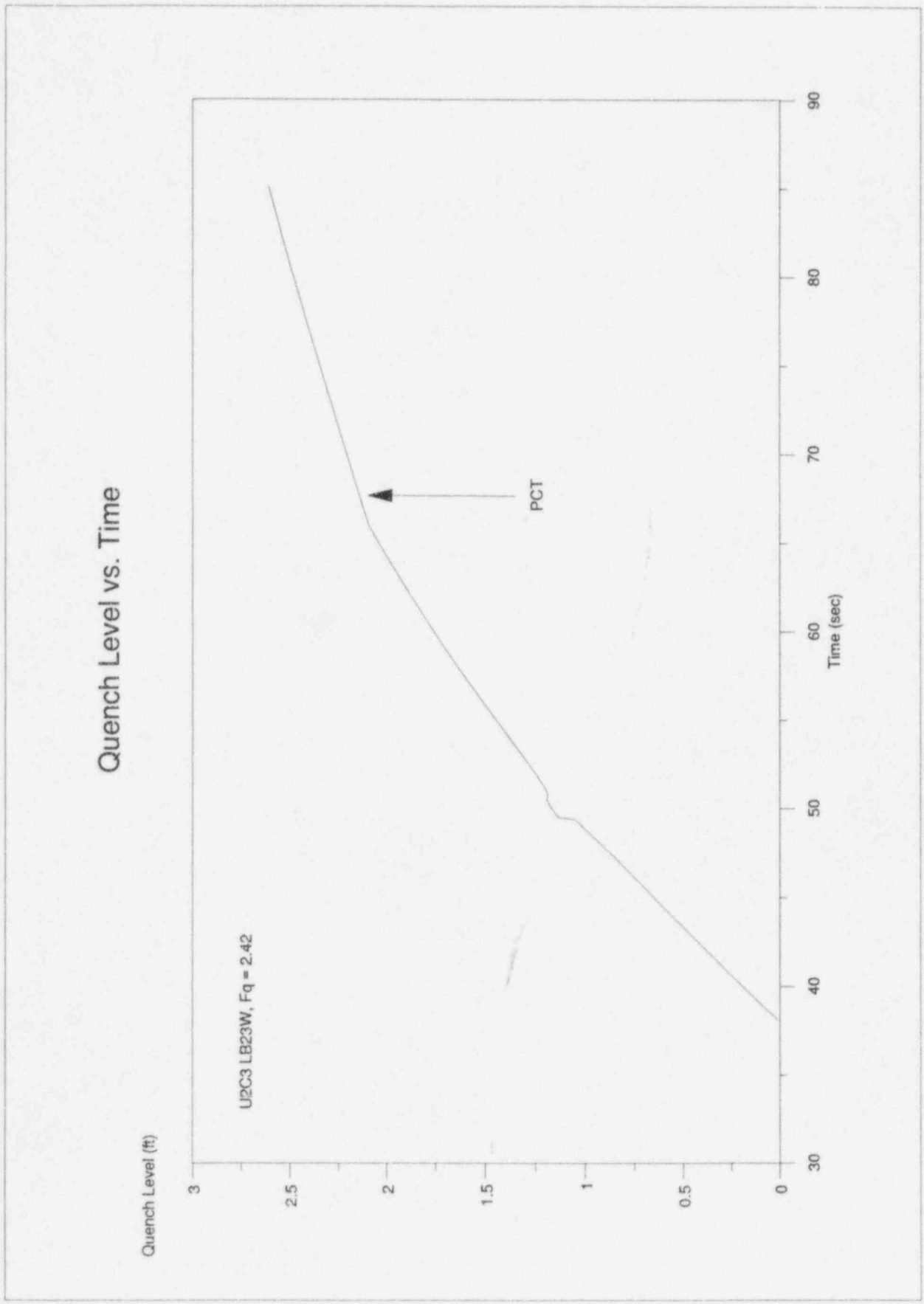
U2C3 LB23W


Convective Heat Transfer Coefficient vs. Time
HTC (Btu/hr-ft2-F)
U2C3 LB23W, Fq = 2.42
PCT
16
14
12
10
8
6
4
2
0
50
60
70
80
90
Time (sec)

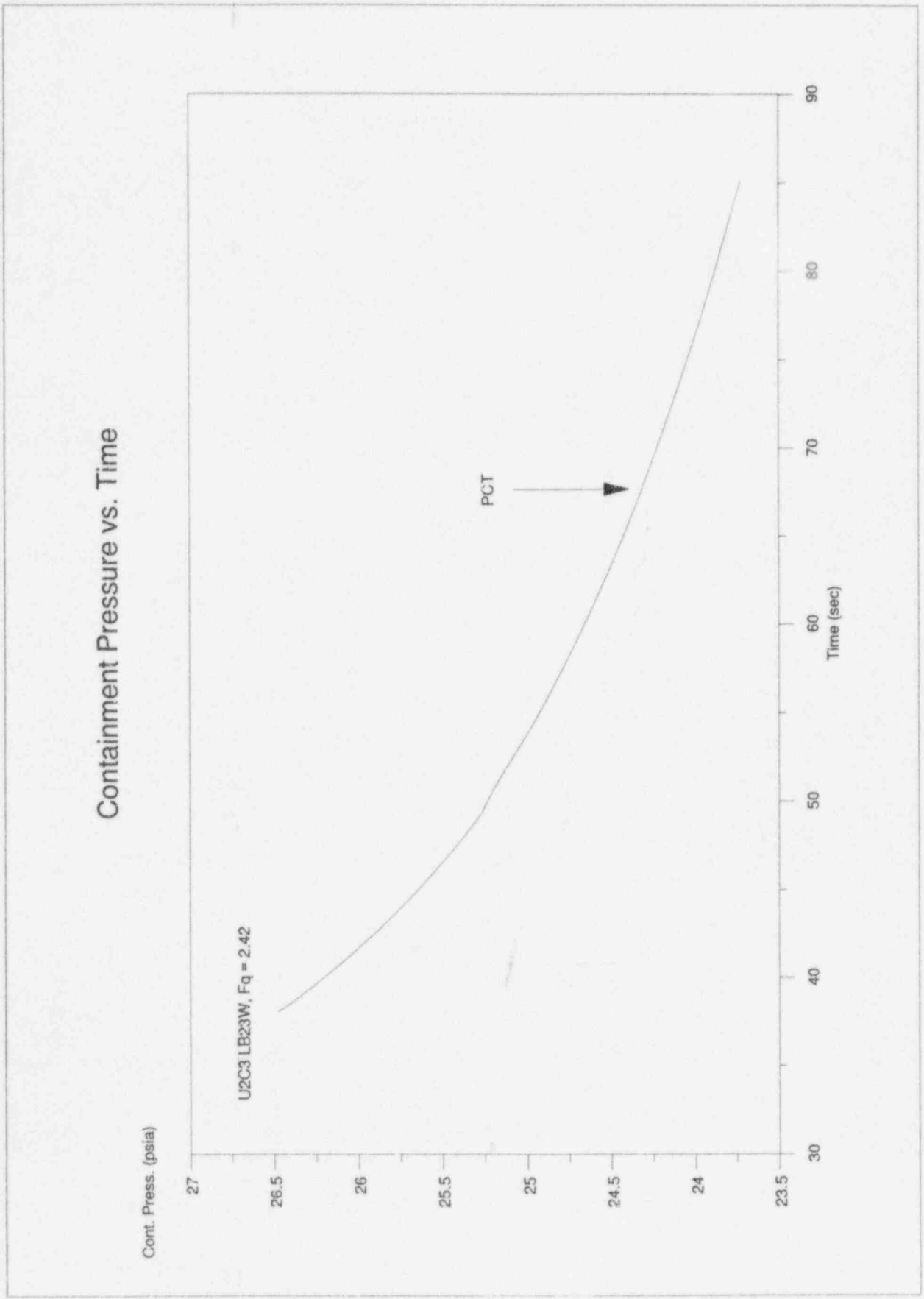
U2C3 LB23W


Reflood Rate vs. Time
U2C3 LB23W, Fq = 2.42
PCT
Reflood Rate (in/sec)
2.8
2.4
2
1.6
1.2
50
60
70
80
90
Time (sec)

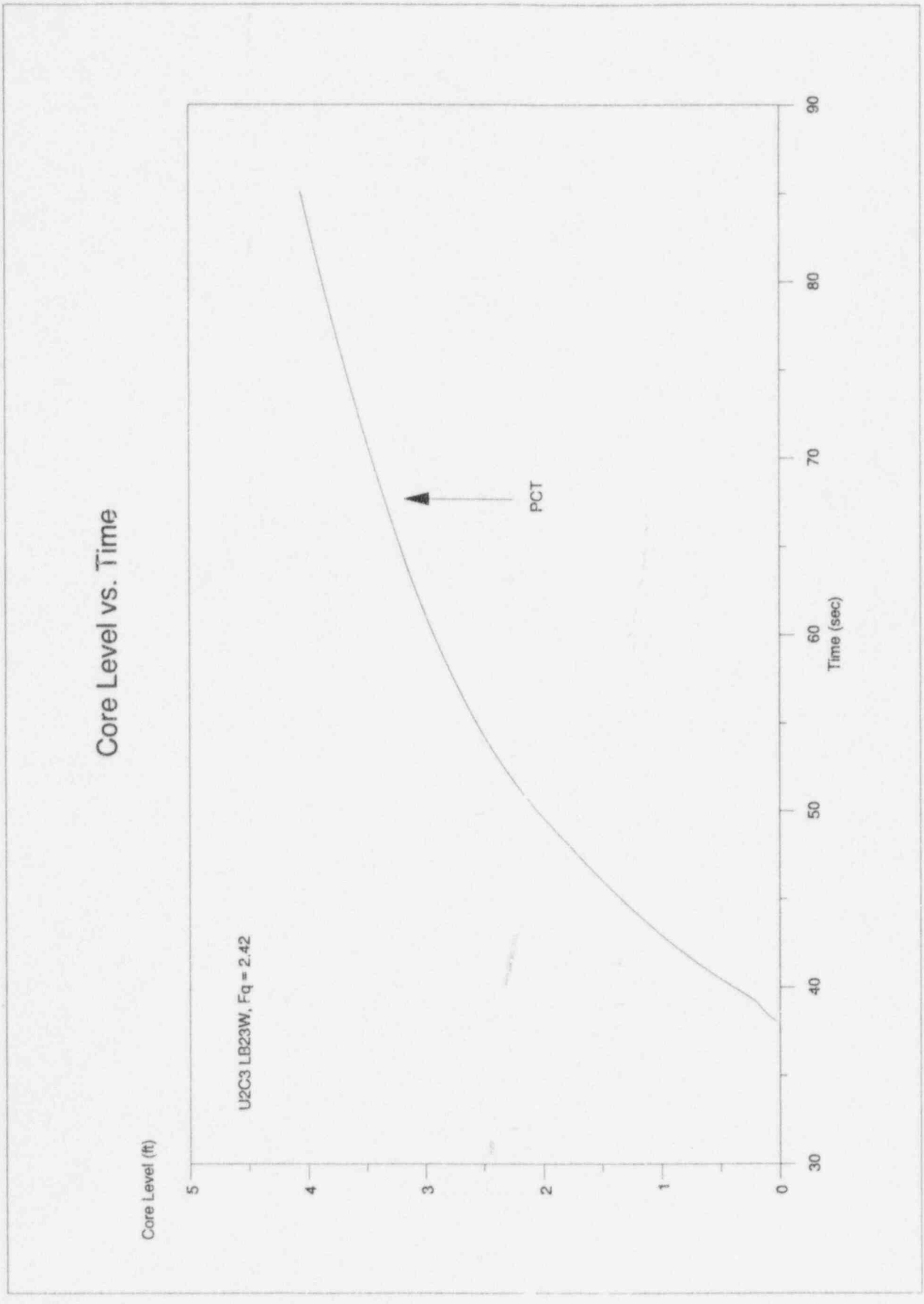
U2C3 LB23W


Quench Level vs. Time
Quench Level (ft)
U2C3 LB23W, Fq = 2.42
PCT
Time (sec)
0
0.5
1
1.5
2
2.5
3
30
40
50
60
70
80
90

U2C3 LB23W

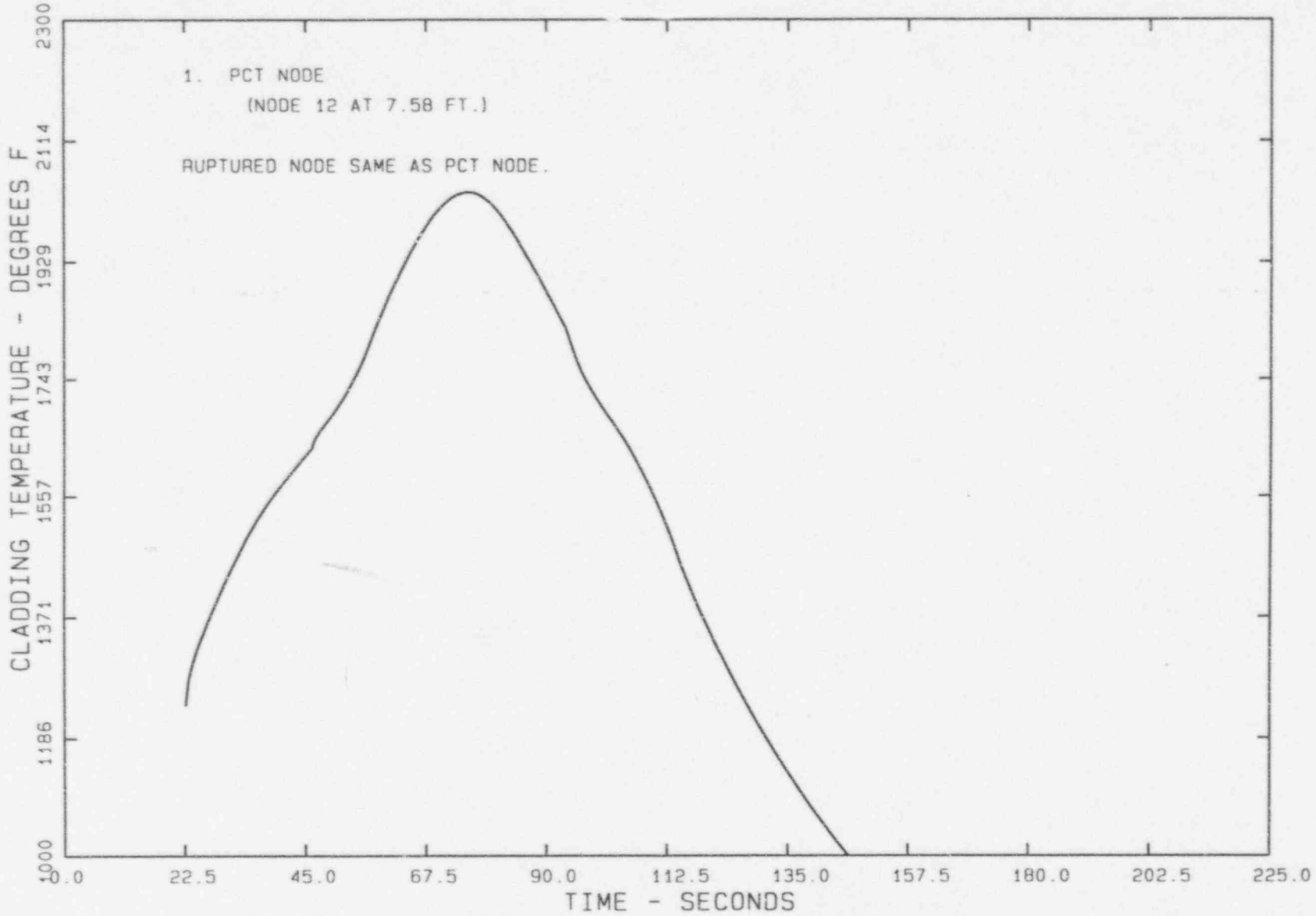

Containment Pressure vs. Time
Cont. Press. (psia)
27
26.5
26
25.5
25
24.5
24
23.5
30
40
50
60
70
80
90
Time (sec)
U2C3 LB23W, Fq = 2.42
PCT

U2C3 LB23W


Core Level vs. Time
U2C3 LB23W, Fq = 2.42
PCT
Core Level (ft)
Time (sec)
0
1
2
3
4
5
30
40
50
60
70
80
90

U2C3 LB23XTD2.OUT

P3G10S1E TOODEE2



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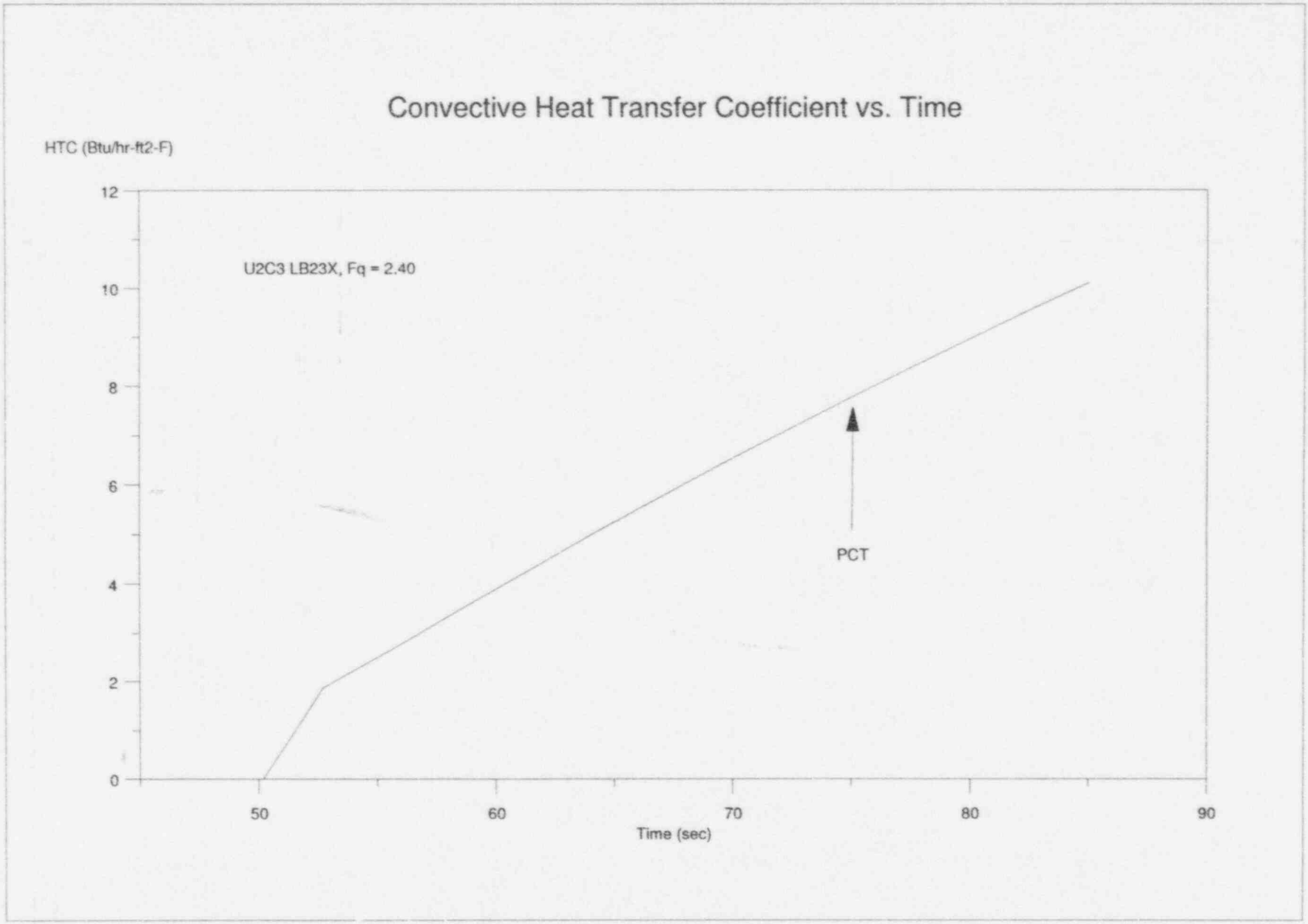

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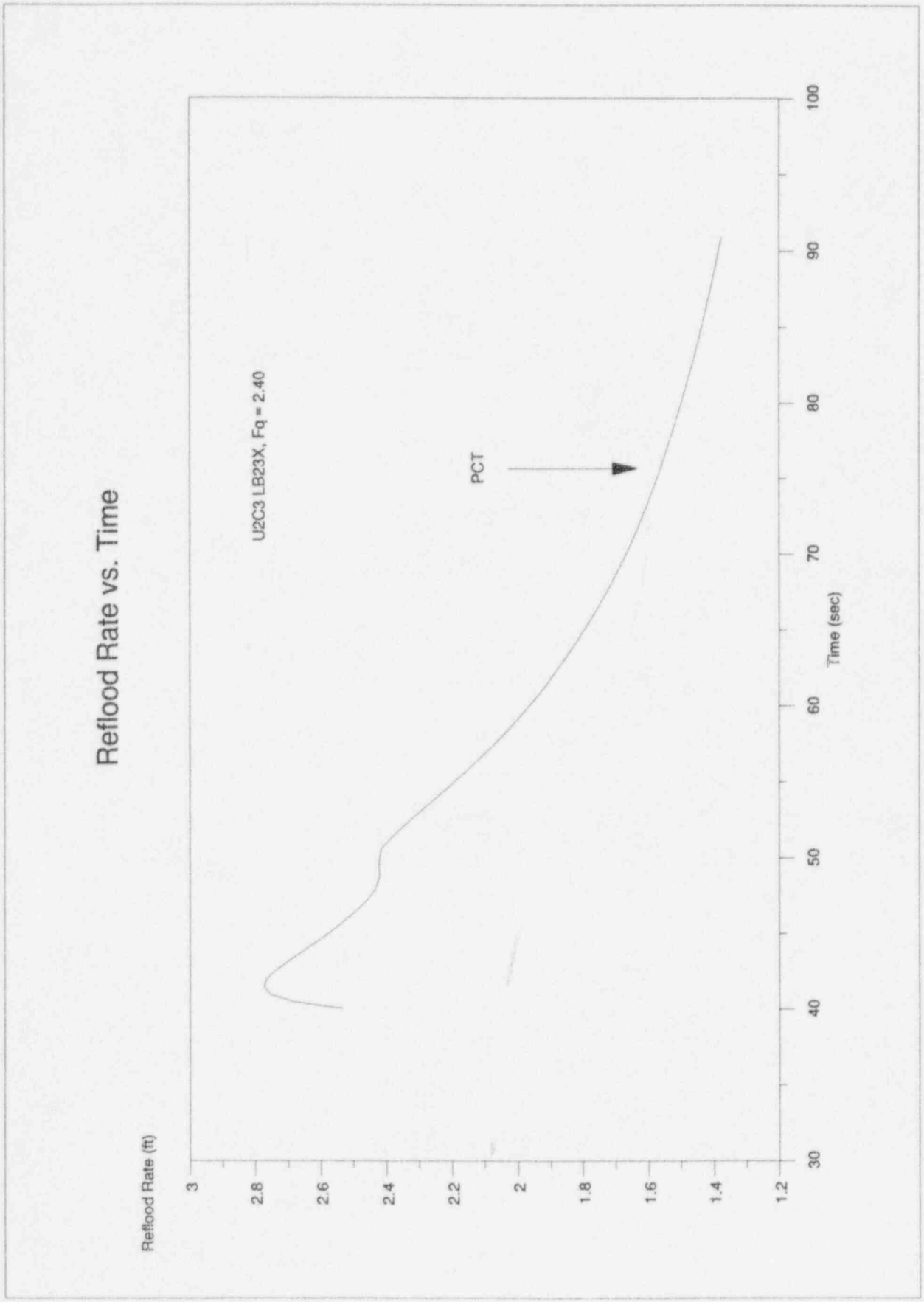

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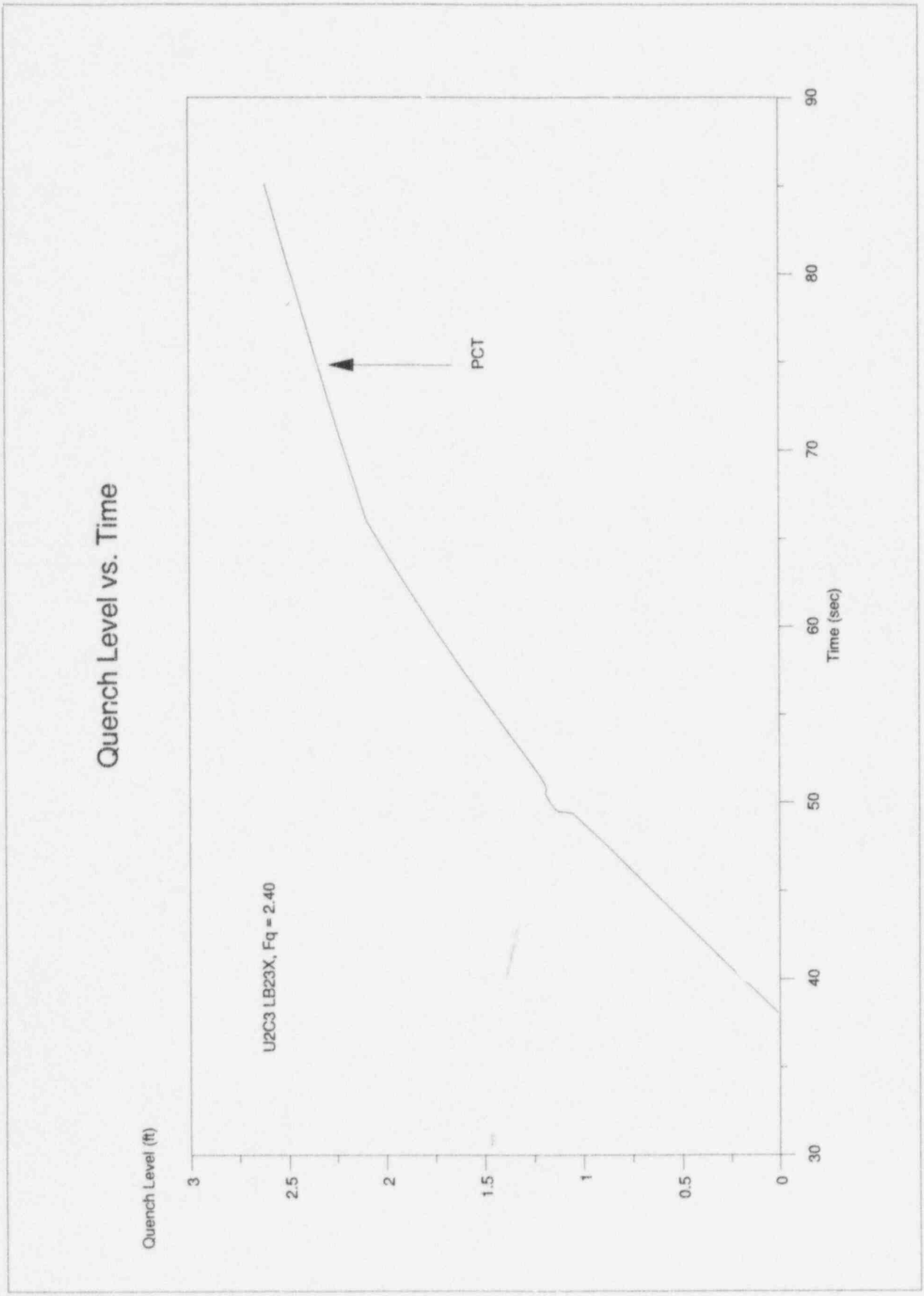

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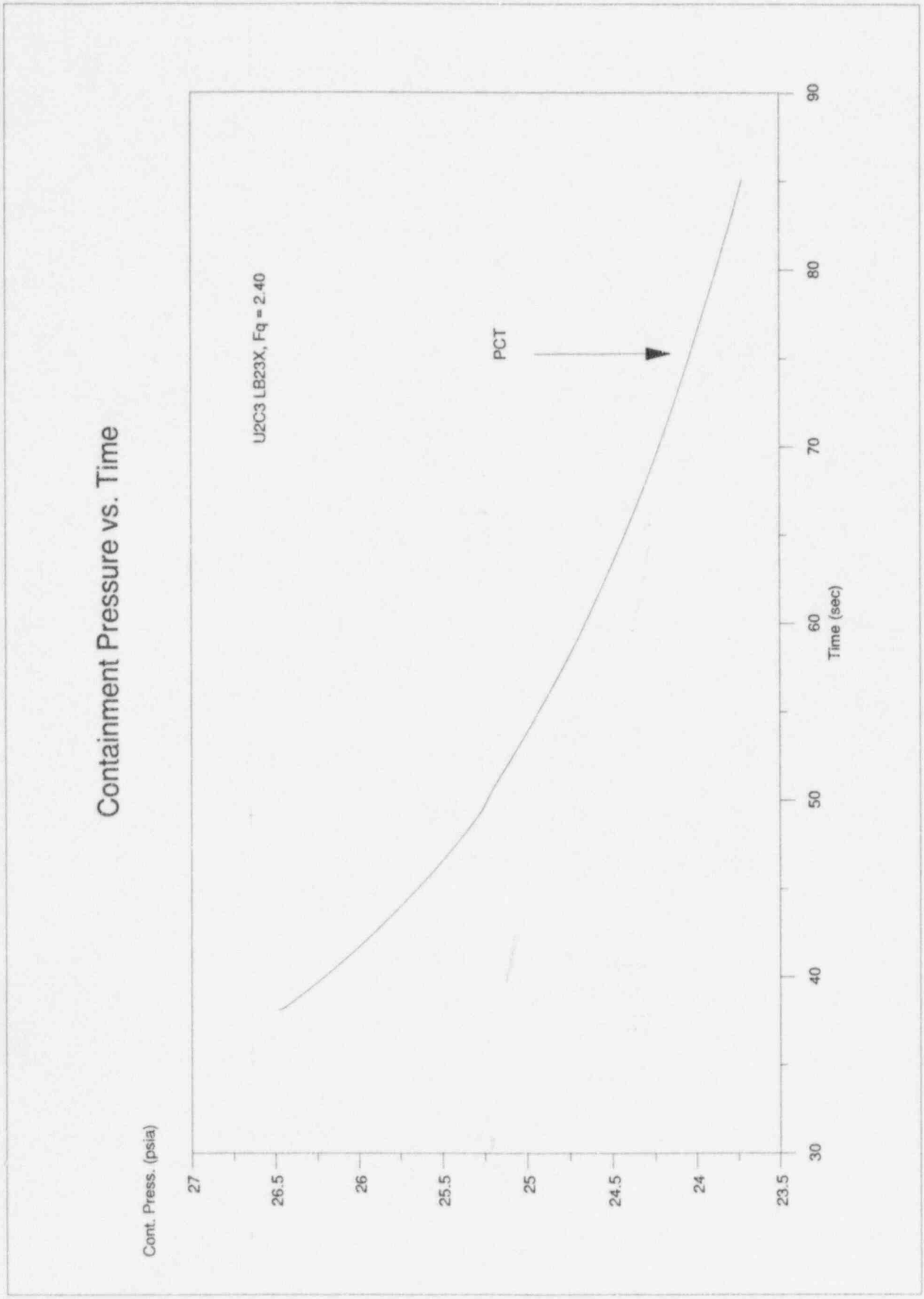

U2C3 LB23XTD2.OUT