

APPENDIX B

PRELIMINARY CRAFT2 MODEL OF LOFT L3-1 EXPERIMENT

Presented to

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by

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1595 226

7912170030

COMPUTER CODE USED:

CRAFT2, Version 9.3 with LOFT pump dated 4/7/77, Tape #10792.

NODAL ARRANGEMENT:

A nodding diagram of the CRAFT2 computer model is shown in Figure 1 and described in Table 1. The model has 18 nodes and 36 flow paths. Throughout the model, dual flow paths are used to allow for counter-current flow. The secondary side is connected to the containment node to simulate the steam flow to the atmosphere.

BUBBLE RISE MODEL:

The Wilson bubble rise velocity model is used in all of the primary system nodes. A multiplier of 2.38 is used in the core node and 2.0 in the remainder of the vessel node. This approach is consistent with the B&W evaluation model. The secondary side of the SG has a steam separator, hence a large bubble rise velocity is utilized to allow for complete phase separation.

DISCHARGE MODEL:

Leak flow area = 0.002214 ft^2

Leak flow paths = 32 & 33

The Bernoulli-Moody discharge model with $C_D = 0.6$

STEAM GENERATOR:

Steam generator primary side is represented by two nodes and the secondary side with one node. The steam path from the secondary side of the steam generator, path 36, is open at the time of the reactor trip and starts closing at the rate of 5% position per second. An effective steady-state flow area was calculated based on the Moody critical flow model. The effective flow area was changed as a function of secondary side pressure consistent with the given steam flow control valve response characteristics.

PUMP MODEL:

The CRAFT2 pump input was modified to model the actual pump characteristic of that utilized in the experiment.

ECCS MODEL:

The ECCS is comprised of one accumulator (core flood tank), one high pressure injection system, and one low pressure injection system. The injection point is the intact loop cold leg piping. The ECCS actuation and performance characteristics are consistent with the initial conditions for this experiment.

CORE MODEL:

Single node.

Heat generation based on the given decay heat curve.

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Table 1. Node Description

<u>Node No.</u>	<u>Description</u>
1	Downcomer annulus
2	Downcomer
3	Lower plenum
4	Core
5	Upper plenum & upper head
6	Pressurizer
7	Hot leg, intact loop
8	Steam generator, front half of primary side, intact loop
9	Steam generator, back half of primary side, intact loop
10	Steam generator outlet, cold leg piping, intact loop
11	Pump suction, intact loop
12	Pump discharge, intact loop
13	Hot leg plus half simulated SG, broken loop
14	Half simulated ^{SG} plus half pump, broken loop
15	Half pump plus piping, broken loop
16	Leak node
17	Suppression tank
18	Secondary side, intact loop

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OUTSTANDING CONCERNS

The following are areas of concerns and possible model changes. More sensitivity studies will be done before running the final case.

1. Evaluate the Bernoulli-Moody discharge model with C_D of 0.6 against the Wyle test prediction.
2. Evaluate the secondary system pressure response with additional steam control valve modeling studies. Also, evaluating the CRAFT2 small leak steam generator model.
3. Perform sensitivity studies to evaluate the accumulator model, if deemed necessary.

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GENERAL CALCULATIONS

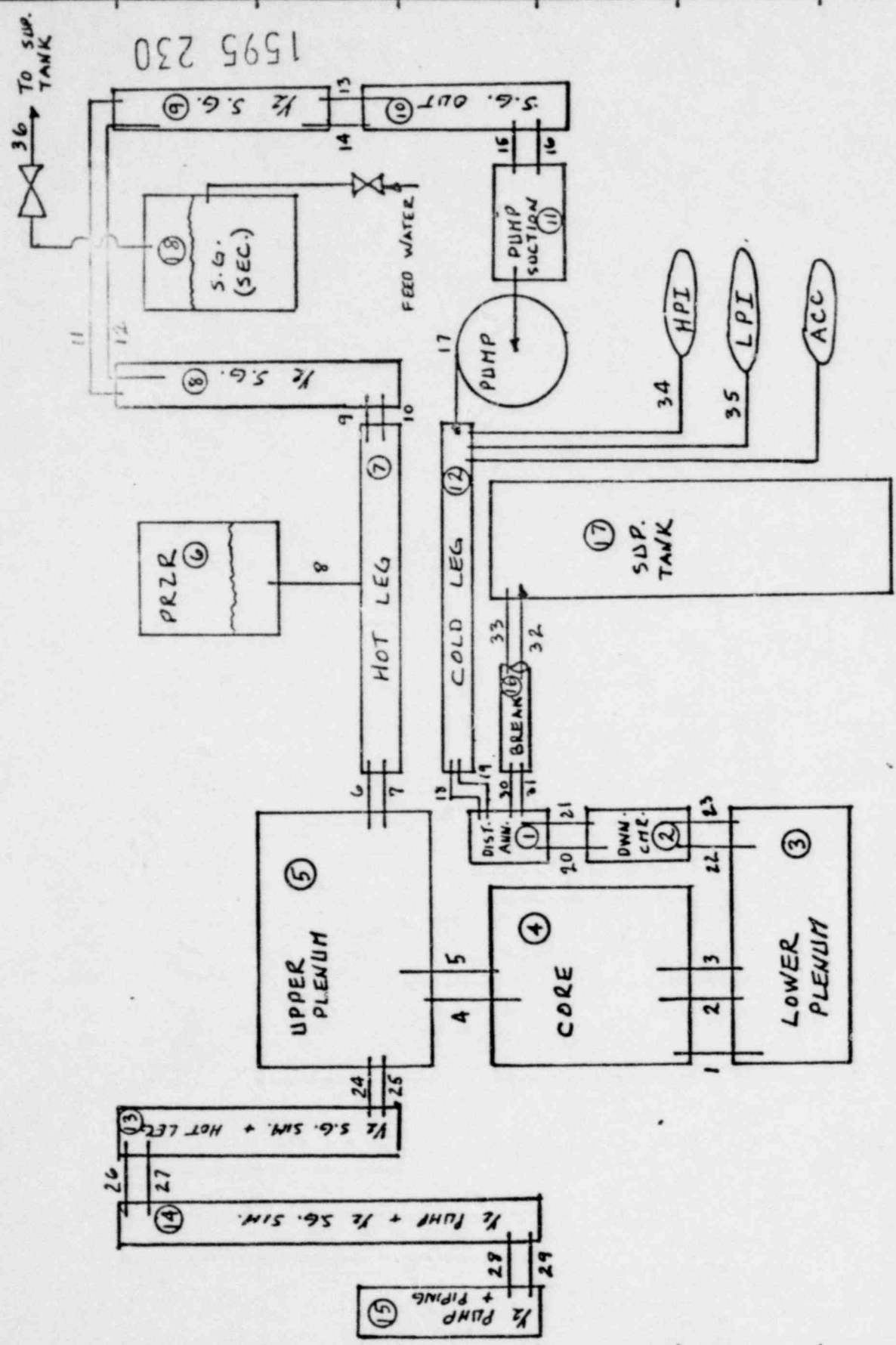


FIG. 1. LOFT L3-1 NODE DIAGRAM.

NODE (16) leak node
Flow paths 32 & 33 are leak flow paths

PROF NO	CONT NO	CUSTOMER
DWG NO	FILE NO	SUBJECT
COMP NO	GROUP NO	DATE

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PRELIMINARY PREDICTION OF L3-1

<u>Time</u>	<u>Event</u>
0.0	Experiment initiated
5.0	HPIS initiation
17.0	Pump decoupled
~24.0	Pressurizer empty
~30.0 (572.96°F)	Peak cladding temperature, °F
32.0	Saturation pressure at upper plenum
60	Auxiliary feedwater starts

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31S1,T7777,STMFZ. SAVANI NK
CHARGE.AH001A19,SAVANI NK,394,P,CRAFT2.
TITLE(LOFT PRETEST PREDICTION OF L3-1,CALC. 32-1106463-00)
DISPOSE(OUTPUT,*FR)
REQUEST,TAPE7,A4,*PF.
REQUEST,TAPE10,*PF.
REQUEST,TAPE77,*PF.
STAGE(TAPE,VSN=10792,PE)
LABEL(TAPE,P,L=PUMPMODEL)
COPYBF(TAPE,CRAFT2)
RETURN(TAPE)
STAGE(RTAPE,PE,POST,VSN=12101)
LABEL(RTAPE,W,L=L31NK,T=999)
STAGE(PTAPE,PE,POST,VSN=07199)
LABEL(PTAPE,W,L=L31NK,T=999)
STAGE(OTAPE,PE,POST,VSN=08748)
LABEL(OTAPE,W,L=L31NK,T=999)
REWIND(CRAFT2)
COPYBF(CRAFT2,TAPE77)
EXIT(C)
CRAFT2(PL=500000)
EXIT(U)
REWIND(TAPE77)
COPYBF(TAPE77,RTAPE,2) (RESTART TAPE)
RETURN(RTAPE)
PURGE(TAPE77)
RETURN(TAPE77)
EXIT(U)
REWIND(TAPE7)
COPYBF(TAPE7,PTAPE) (PLOT TAPE)
RETURN(PTAPE)
PURGE(TAPE7)
RETURN(TAPE7)
EXIT(U)
REWIND(TAPE10)
COPYCF(TAPE10,OUTPUT,100)
REWIND(OUTPUT)
COPYBF(OUTPUT,PAPER,100)
DISPOSE(PAPER,*PR)
REWIND(TAPE10)
COPYBF(TAPE10,OTAPE,100)
RETURN(OTAPE)
PURGE(TAPE10)

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1MOTLOCH L31BASECAS

00FR

LOFT L3-1 BASE CASE

- * LOFT L3-1 BASE CASE
- * BASE CASE
- * TRANSIENT
- * PLOT PACKAGE
- * PUMP HEAD SET TO 332.0 FT.
- * INPUT QA
- * AUXILIARY FEED WATER MODELED USING CARD SERIES 7211
- * 1/3 2/3 STEAM GENERATOR SPLIT
- * CORRECTED BUBBLE RISE INPUT
- * FUEL AVERAGE TEMPERATURE READJUSTED
- * STEAM FLOW CONTROL VALVE MODELED WITH CARD SERIES 4951
- * 40 HOUR OPERATION DECAY HEAT CURVE

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- * ONB TURNED OFF
- * LPI INITIATES AT 144.7 PSIA

90, 4

- * RESTART INFORMATION

POOR ORIGINAL

1001, 22.0, 0.0, 0.0
1004, 5.00, 5.00, 5.00

POOR ORIGINAL

* PLOT INFORMATION

* ID X MIN MAX SCALE Y MIN MAX LENGTH X4 X5

* NODES

1501,	1105,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1502,	1106,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1503,	1107,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1504,	1112,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1505,	1113,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1506,	1116,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1507,	1118,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1508,	1201,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1509,	1202,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1510,	1203,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1511,	1204,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1512,	1205,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1513,	1206,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1514,	1208,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1515,	1209,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1516,	1210,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1517,	1218,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1518,	1308,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1519,	1309,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1520,	1408,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1521,	1409,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1522,	1603,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1523,	1604,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1524,	1605,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1525,	1606,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1526,	1608,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1527,	1609,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1528,	1616,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1529,	1618,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1530,	1801,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	3,	5
1531,	1802,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	11,	12
1532,	1803,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	10,	11
1533,	1804,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	7,	5

* FLOW PATHS

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1534,	2101,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1535,	2102,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1536,	2103,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1537,	2104,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1538,	2105,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1539,	2109,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1540,	2110,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1541,	2117,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1542,	2118,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1543,	2119,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1544,	2124,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1545,	2125,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1546,	2132,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1547,	2133,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1548,	2134,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1549,	2135,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1550,	2401,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1551,	2402,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1552,	2403,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00

1555,	2617,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1556,	2717,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
* CORE PATHS											
1557,	3101,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1558,	3102,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1559,	3201,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1560,	3202,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1561,	3301,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1562,	3302,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1563,	3501,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1564,	3502,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1565,	3601,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1566,	3602,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1567,	3801,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1568,	3802,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00

* STEAM GENERATOR

1569,	4101,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1570,	4301,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1571,	4401,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1572,	4501,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1573,	4701,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00

* FLOOD TANKS

1574,	5101,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1575,	5201,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1576,	5301,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1577,	5801,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00

* MISC

1578,	5401,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1579,	5501,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1580,	5601,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1581,	7104,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1582,	7107,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1583,	7111,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1584,	7112,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1585,	7113,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1586,	7116,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1587,	7201,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1588,	7202,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1589,	7203,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1590,	7204,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1591,	7205,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1592,	7206,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1593,	7208,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1594,	7209,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1595,	7210,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1596,	7211,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1597,	7218,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1598,	2108,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1599,	2432,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00
1600,	1211,	1,	0.0,	0.0,	10.0,	1,	0.0,	0.0,	10.0,	00,	00

* PLOT SELECTION INFORMATION

1601, 1105, 1604, 2132, 5601, 7204, 2717

1595-234

1701, 100

POOR ORIGINAL

* CONTROL VOLUMES

3001,	2.422,	2.477,	20.661,	22.000,	20.611,	2198.77,	538.03,	0.0
3002,	1.451,	12.574,	8.087,	20.561,	8.037,	2193.88,	538.03,	0.0
3003,	6.113,	4.109,	9.694,	7.987,	5.635,	2197.07,	538.03,	0.0
3004,	1.938,	5.583,	15.278,	9.794,	9.744,	2189.42,	582.92,	0.0
3005,	3.284,	10.256,	22.000,	15.378,	15.328,	2178.56,	582.92,	0.0
3006,	6.040,	5.702,	26.298,	26.298,	26.248,	2168.30,	0.0,	3.71
3007,	11.650,	0.932,	22.000,	22.000,	21.534,	2170.70,	582.92,	0.0
3008,	2.482,	10.909,	32.393,	22.000,	21.534,	2159.25,	560.48,	0.0
3009,	2.430,	10.532,	22.498,	32.393,	21.911,	2148.25,	538.03,	0.0
3010,	0.882,	5.021,	18.257,	22.498,	17.791,	2135.46,	538.03,	0.0
3011,	2.327,	4.675,	22.000,	18.257,	17.791,	2134.31,	538.03,	0.0
3012,	16.191,	0.932,	22.0	22.0	21.534,	2199.66,	538.03,	0.0
3013,	1.983,	11.109,	32.041,	22.0	21.534,	2176.24,	538.03,	0.0
3014,	0.773,	15.088,	18.021,	32.041,	17.555,	2176.24,	538.03,	0.0
3015,	0.560,	4.860,	22.0	18.021,	17.563,	2179.60,	538.03,	0.0
3016,	4.120,	2.920,	22.0	22.0	21.534,	2193.33,	538.03,	0.0
3017,	23710.,	15.600,	22.0	11.49,	8.490,	30.00,	0.0,	4.17
3018,	14.630,	18.860,	44.01	34.23	25.62	750.00,	0.0,	10.5

* PRIMARY METAL HEAT TRANSFER COEFFICIENTS

3510, 1.4, .00055

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* PRIMARY METAL TIME STEPS

3511, 0.1, 15.0, .001, 1.+6

POOR ORIGINAL

* PRIMARY METAL PROPERTIES

* VOL	H.T.AREA	THICK	CLAD T	BULK K	CLAD K	RHO CP	T-INC	
3521,	1,	47.18,	0.51,	0.01042,	24.00,	10.99,	53.30,	0.0
3522,	1,	61.09,	0.842,	0.842,	10.99,	10.99,	62.90,	0.0
3523,	1,	21.40,	0.125,	0.125,	10.99,	10.99,	62.90,	0.0
3524,	2,	189.94,	0.399,	0.01042,	24.00,	10.99,	53.30,	0.0
3525,	2,	310.09,	0.842,	0.842,	10.99,	10.99,	62.90,	0.0
3526,	2,	108.63,	0.125,	0.125,	10.99,	10.99,	62.90,	0.0
3527,	3,	24.36,	0.325,	0.01042,	24.00,	10.99,	53.30,	0.0
3528,	3,	28.34,	0.842,	0.842,	10.99,	10.99,	62.90,	0.0
3529,	3,	64.00,	0.0449,	0.0449,	10.99,	10.99,	62.90,	0.0
3530,	4,	35.02,	0.254,	0.254,	10.99,	10.99,	62.90,	0.0
3531,	5,	973.0,	0.010,	0.010,	10.99,	10.99,	62.90,	0.0
3532,	5,	64.10,	0.254,	0.254,	10.99,	10.99,	62.90,	0.0
3533,	7,	50.09,	0.140,	0.140,	10.99,	10.99,	64.11,	0.0
3534,	8,	29.673,	0.267,	0.0208,	24.00,	10.8,	53.30,	0.0
3535,	8,	1449.8,	0.00204,	0.00204,	10.8,	10.8,	55.16,	0.0
3536,	9,	1449.8,	0.00204,	0.00204,	10.8,	10.8,	55.16,	0.0
3537,	9,	29.673,	0.267,	0.0208,	24.0,	10.8,	53.30,	0.0
3538,	18,	3610.0,	0.00204,	0.00204,	10.8,	10.8,	55.16,	0.0
3539,	18,	312.21,	0.0625,	0.0625,	24.0,	24.0,	53.30,	0.0
3540,	18,	268.03,	0.18,	0.18,	24.0,	24.0,	53.30,	0.0
3541,	18,	12.07,	0.479,	0.0208,	24.0,	10.8,	53.30,	0.0
3542,	10,	18.51,	0.135,	0.135,	10.99,	10.99,	64.11,	0.0
3543,	11,	34.66,	0.125,	0.125,	10.99,	10.99,	64.11,	0.0
3544,	12,	49.52,	0.129,	0.129,	10.99,	10.99,	64.11,	0.0
3545,	6,	11.01,	0.0293,	0.0293,	10.99,	10.99,	64.11,	0.0
3546,	6,	65.95,	0.2711,	0.0208,	24.0,	10.99,	53.30,	0.0
3547,	13,	127.82,	0.098,	0.098,	10.99,	10.99,	64.11,	0.0
3548,	14,	88.17,	0.093,	0.093,	10.99,	10.99,	64.11,	0.0
3549,	15,	13.67,	0.046,	0.046,	10.99,	10.99,	64.11,	0.0
3550,	16,	54.96,	0.092,	0.092,	10.99,	10.99,	64.11,	0.0

* WILSON MULTIPLIER TABLE

3890, 2.0, 0.0, 2.0, 1.+6
 3891, 2.0, 0.0, 2.0, 1.+6
 3892, 2.0, 0.0, 2.0, 1.+6
 3893, 2.38, 0.0, 2.38, 1.+6
 3894, 2.0, 0.0, 2.0, 1.+6

POOR ORIGINAL

* BUBBLE RISE VELOCITY

3901, 1,-887.0, 2,-887.0, 3,-887.0, 4,-887.0, 5,-887.0, 6,-888.0
 3902, 7,-888.0, 8,-888.0, 9,-888.0,10,-888.0,11,-888.0,12,-888.0
 3903,13,-888.0,14,-888.0,15,-888.0,16,-888.0,17,-888.0,18,1000.0

* HYDRAULIC DIAMETER FOR WILSON MODEL

3905, 1,0.292, 2,0.167, 3,0.035, 4,0.0402, 5,1.307, 6,2.783, 7,0.932
 3906, 8,0.034, 9,0.034,10,0.932,11,0.9320,12,0.932,13,0.932,14,0.058
 3907,15,0.338,16,0.932,17,1.938,18,4.316

* REGULAR FLOW PATHS

4001, 1, 3, 4,501.39, 6.884,0.828, 0.0 , -1.44-4,0.,0.100,0.0,0.0402
 4002, 1, 3, 4,501.39, 6.884,0.828, 0.0 , -1.44-4,0.,0.100,0.0,0.0402
 4003, 8, 3, 4, 52.78,228.11,0.025, 0.0 , -1.30-2,0.,0.1 , 0.0,0.178
 4004, 8, 4, 5,527.78, 7.062,1.340, 0.0 , -1.02-4,0.,0.1 , 0.0,1.306
 4005, 8, 4, 5,527.78, 7.062,1.340, 0.0 , -1.02-4,0.,0.1 , 0.0,1.306
 4006, 8, 5, 7,527.78,29.10 ,0.361, 0.0 , -6.86-4,0.,0.466,0.0,0.932
 4007, 8, 5, 7,527.78,29.10 ,0.361, 0.0 , -6.86-4,0.,0.466,0.0,0.932
 4008, 5, 6, 7, 0.0 ,1384.2,0.018, 7.6 , -2.28-4,0.,0.1 , 1.0-8,.141,.99
 4009, 8, 7, 8,527.78,37.540,0.451, 0.0 , 7.625-4,0.,0.1 , 0.0,0.0335
 4010, 8, 7, 8,527.78,37.540,0.451, 0.0 , 7.625-4,0.,0.1 , 0.0,0.0335
 4011, 8, 8, 9,527.78, 8.521,0.814, 0.0 , 0.0 ,0.,0.479,0.0,0.0335
 4012, 8, 8, 9,527.78, 8.521,0.814, 0.0 , 0.0 ,0.,0.479,0.0,0.0335
 4013, 8, 9,10,527.78,12.528,0.746, 0.0 , -7.63-4,0.,0.100,0.0,0.0335
 4014, 8, 9,10,527.78,12.528,0.746, 0.0 , -7.63-4,0.,0.1 , 0.0,0.0335
 4015, 8,10,11,527.78,18.922,0.341, 0.0 , 0.0 ,0.,0.466,0.0,0.932
 4016, 8,10,11,527.78,18.922,0.341, 0.0 , 0.0 ,0.,0.466,0.0,0.932
 4017, 2,11,12,1055.6, 8.874,1.075, 0.0 , 0.0 ,0.,0.708,0.0,0.932
 4018, 8,12, 1,527.78,36.546,0.366, 0.0 , 8.699-4,0.,0.466,0.0,0.932
 4019, 8,12, 1,527.78,36.546,0.366, 0.0 , 8.699-4,0.,0.466,0.0,0.932
 4020, 8, 1, 2,527.78,10.241,0.704, 0.0 , 1.295-4,0.,0.1 , 0.0,0.292
 4021, 8, 1, 2,527.78,10.241,0.704, 0.0 , 1.295-4,0.,0.1 , 0.0,0.292
 4022, 8, 2, 3,527.78,10.055,0.890, 0.0 , 1.772-4,0.,0.1 , 0.0,0.167
 4023, 8, 2, 3,527.78,10.055,0.890, 0.0 , 1.772-4,0.,0.1 , 0.0,0.167
 4024, 8,13, 5, 0.0 ,52.568,0.180,1.003,6.856-4,0.,0.466,1.0-8,.479
 4025, 8,13, 5, 0.0 ,52.568,0.180,1.003,6.856-4,0.,0.466,1.0-8,.479
 4026, 8,14,13, 0.0 ,106.75,0.208,12.56,-5.92-4,0.,0.602,1.0-8,.515
 4027, 8,14,13, 0.0 ,106.75,0.208,12.56,-5.92-4,0.,0.602,1.0-8,.515
 4028, 8,15,14, 0.0 ,112.37,0.067, 4.56,0.05290,0.,0.458,1.0-8,.292
 4029, 8,15,14, 0.0 ,112.37,0.067, 4.56,0.05290,0.,0.458,1.0-8,.292
 4030, 8, 1,16, 0.0 , 16.31,0.396, 5.67,-8.70-4,0.,0.466,1.0-8,.710
 4031, 8, 1,16, 0.0 , 16.31,0.396, 5.67,-8.70-4,0.,0.466,1.0-8,.710

* LEAK FLOW PATHS

4232, 7,16,17,0.0,0.0010,0.002214,0.60,-1.0,0.053
 4233, 7,17,16,0.0,0.0010,0.002214,0.60,-1.0,0.053

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* FILL SYSTEM

4434,6,1,12,0,1.0,43.09,0.0

* INTEGRATED FLOW PATH MASS

4601, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
 4602, 21, 22, 23, 24, 26, 28, 30, 31, 32, 33
 4810, 36

* FLOW PATH ELEVATION MODIFICATIONS

	PATH	UP.ELEV	DN.ELEV
4901,	1,	9.584,	9.804
4902,	2,	9.684,	9.904
4903,	3,	9.684,	9.904
4904,	4,	15.168,	15.388
4905,	5,	15.268,	15.488
4906,	6,	22.232,	22.232
4907,	7,	21.768,	21.768
4908,	9,	22.232,	22.232
4909,	10,	21.768,	21.768
4910,	11,	31.964,	31.964
4911,	12,	31.006,	31.006
4912,	13,	22.873,	22.653
4913,	14,	22.973,	22.753
4914,	15,	18.490,	18.490
4915,	16,	18.025,	18.025
4916,	18,	22.232,	22.232
4917,	19,	21.768,	21.768
4918,	20,	20.671,	20.451
4919,	21,	20.771,	20.551
4920,	22,	8.097,	7.877
4921,	23,	8.197,	7.977
4922,	24,	22.232,	22.232
4923,	25,	21.768,	21.768
4924,	26,	32.341,	32.341
4925,	27,	31.740,	31.740
4926,	28,	18.106,	18.106
4927,	29,	17.936,	17.936
4928,	30,	22.232,	22.232
4929,	31,	21.768,	21.768
4930,	8,	26.298,	22.416

* STEAM FLOW CONTROL CONTROL VALVE

4951, 0.038487, 0.0, 0.0, 15.0, 0.0, 1.+6

1595 237

* CORE PARAMETERS

5001, 0.0402, 5.5, 7500., 3000.0, 10., 3, 2.15969+5, 394.96, 1., -9.8-5, 1., 1.,
 + 1., 1., 0.0, 0.0, 0
 5002, 0.0402, 5.5, 7500., 3000.0, 10., 3, 2.15969+5, 394.96, 1., -9.8-5, 1., 1.,
 + 1., 1., 0.0, 0.0, 0

* FUEL PIN, GAP AND CLADDING PROPERTIES

5101, 0.0152, 0.0, 0.0, 1835.0, 0.0003125, -1., -1., 0.00203, 0.0, 0.0, 0.0,
 + 0.0, 0.0, 1, 55.0
 5102, 0.0152, 0.0, 0.0, 1835.0, 0.0003125, -1., -1., 0.00203, 0.0, 0.0, 0.0,
 + 0.0, 0.0, 2, 55.0

* FUEL PIN FUEL DENSITY

5500, 636.92

* UPPER AND LOWER PATHS FOR EACH CHANNEL

5510,1,1,1,2,2,2

* METAL-WATER REACTION CONSTANTS

5901,91.22,140.5,6.5,2.0,1.-5,1500.,45500.0,33.3,0.0

* DNB PARAMETERS

5921, 6.0+9, 1000.0, 1000.0, 2.75, 0.0

* SCRAM PARAMETERS

6001, 3.71, 0.0, 3000.0, 0.0, 0.0, 6, 6

* HEAT GENERATION VS TIME TABLE ... 40 HOUR OPERATION

6011, 1.0,	0.0,	0.059060,	1.0,	0.057404,	1.5
6012, 0.055963,	2.0,	0.051666,	4.0,	0.048779,	6.0
6013, 0.046640,	8.0,	0.044956,	10.0,	0.041893,	15.0
6014, 0.039756,	20.0,	0.034757,	40.0,	0.031888,	60.0
6015, 0.029900,	80.0,	0.028412,	100.0,	0.025868,	150.0
6016, 0.024201,	200.0,	0.020577,	400.0,	0.018552,	600.0
6017, 0.017087,	800.0,	0.015932,	1000.0,	0.013811,	1500.0
6018, 0.012315,	2000.0,	0.008993,	4000.0		

* NORMALIZED HEAT TRANSFER COEFFICIENT VS TIME TABLE

7021,1.,0.0,1.,10000.0

7031,1.,0.0,1.,10000.0

* STEAM GENERATOR HEAT TRANSFER MODEL (OPTION 2)

7100,1,1

* STEAM GENERATOR

7101,9, 18, 15796.3, 31592.6, 40.13, 40.13, 58.5, 0.1

* STEAM GENERATOR LOGIC PARAMETERS

7201,1.+6,1.+6,60.0

* MAIN FEEDWATER COASTDOWN

7211, 0.0, 0.0, 0.0, 59.99, 1.11, 60.0, 1.11, 1500.0

* AUXILIARY FEEDWATER VS PRESSURE TABLE

7231,0.0,0.0,0.0,1.+6

* RELIEF VALVE ACTUATION PRESSURE VS TIME TABLE

1595 238

7251,3000.0,0.0,3000.0,10000.0

* RELIEF VALVE CHARACTERISTICS

POOR ORIGINAL

7271,0.0,0.0,0.0,10000.0

* SAFETY VALVE CHARACTERISTICS

7291,0.0,0.0,0.0,0.0

*
#001,1, 2.42, 2.03, 1.82, 1.61, 1.48, 1.40, 1.35, 1.30, 1.21, 1.11, 1.00
#002,2, 1.00, 0.70, 0.47, 0.33, 0.28, 0.24, 0.13, -0.05, -0.30, -0.60, -1.00
#003,3, -1.00, -0.98, -0.94, -0.88, -0.79, -0.68, -0.51, -0.28, 0.0, 0.40, 1.00
#004,4, 1.00, 0.85, 0.83, 0.85, 0.89, 0.93, 1.21, 1.29, 1.52, 1.92, 2.42
#005,5, 1.98, 1.40, 1.04, 0.80, 0.67, 0.60, 0.63, 0.73, 0.83, 0.91, 1.00
#006,6, 0.33, 0.21, 0.07, -0.26, -0.36, -0.47, -0.70, -0.92, -0.95, -0.98, -1.00
#007,7, -1.00, -0.98, -0.95, -0.92, -0.88, -0.68, -0.47, -0.26, 0.30, 0.63, 1.00
#008,8, 0.33, 0.53, 0.73, 0.93, 1.08, 1.25, 1.39, 1.52, 1.66, 1.81, 1.98

*
* PUMP ELECTRIC TORQUE VS ACTUAL PUMP SPEED

*
#016,350.8,0.0,350.8,3062.5

*
* PUMP SHUTDOWN PARAMETERS

*
#021,0.0, 1.-8, 0.0, 750.0, 0.0, 0.0, 0.0

*
* PUMP PARAMETERS

*
#031,17,332.0,455.59,3530.0,10000.0,0.788,3062.5

*
* PUMP MOTOR CONSTANTS

*
#041,0.003,14.455,152.994,0.0,0.0,972.694,386.971,-1777.01,
* 0.0,0.0,34.0,1.0

*
* FILL SYSTEM ACTUATION PARAMETERS

*
#001,0.0,1910.7,6,7

*
* FILL SYSTEM TIME DELAYS

*
#0011,1.+6,0.0,1.+6
#0012,1.+6,0.0,1.+6

*
* FILL FLOW VS BACK PRESSURE TABLE

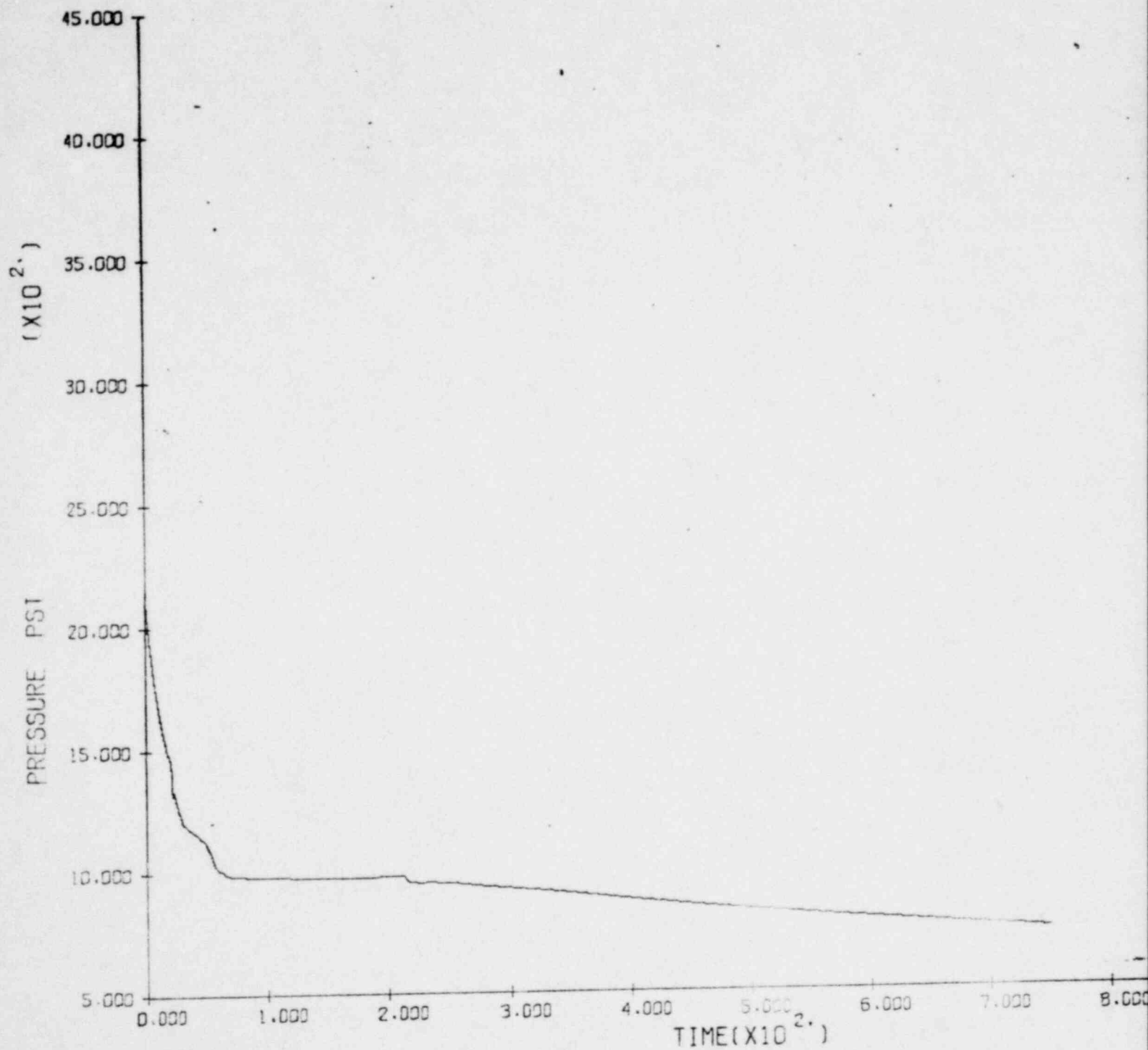
*
#0021,12.0,0.0,12.0,14.7, 5.0,1214.7, 5.0,3000.0
#0026,110.5,0.0,110.5,14.7,68.0,144.7,0.0,145.0,0.0,3000.0

*
* FLOOD TANKS

*
#0000,12,62.23,4741.93,59.62,42.8,615.0,2.5,125.1,13.06,560.6
#0001,24,174,22.0,22.0,13.57,527.4,24.8,0.0645,0,0.0

1595 239

POOR ORIGINAL

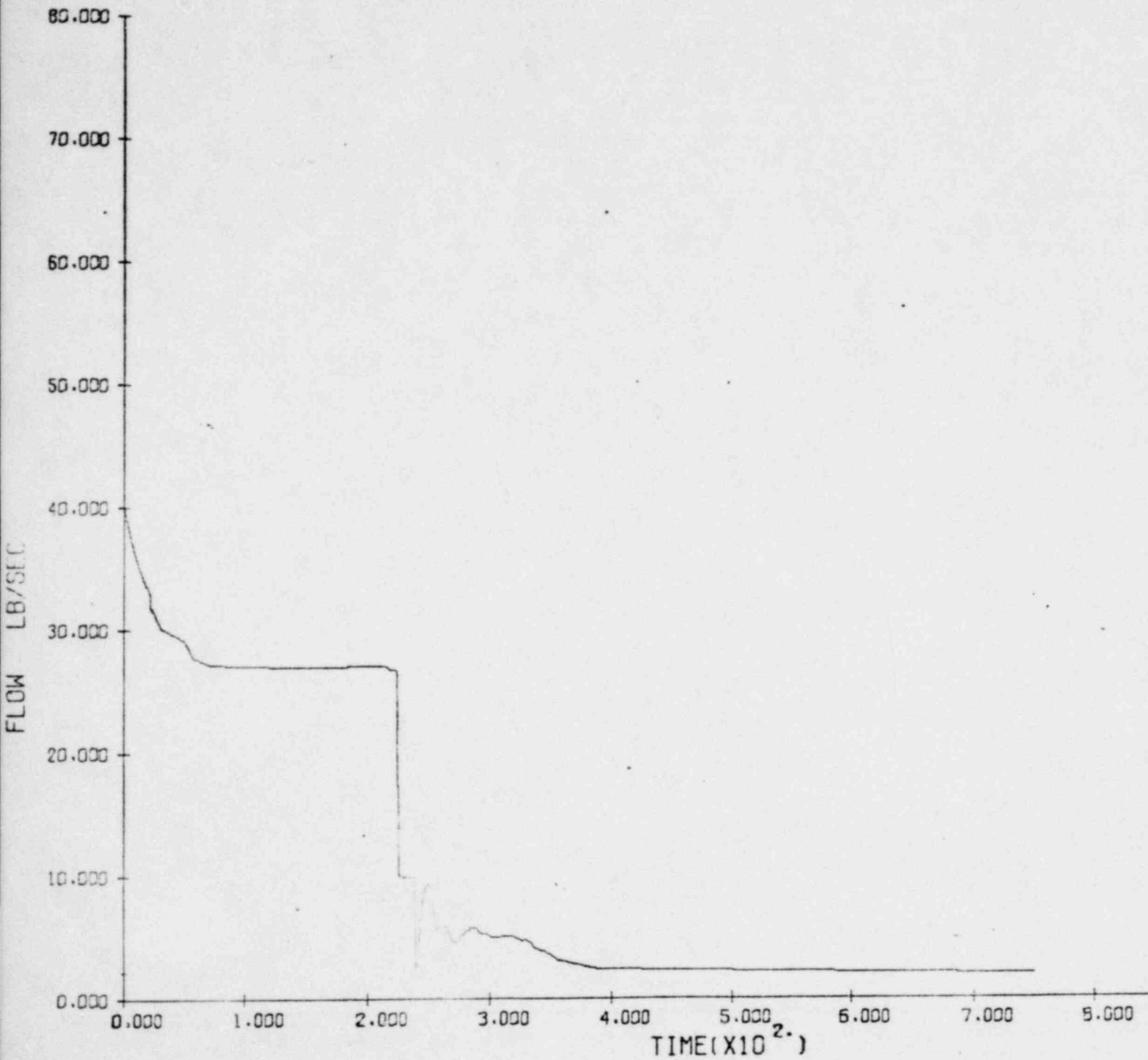


L31S2HK LOFT L3-1 PREDICTION

NODE

5

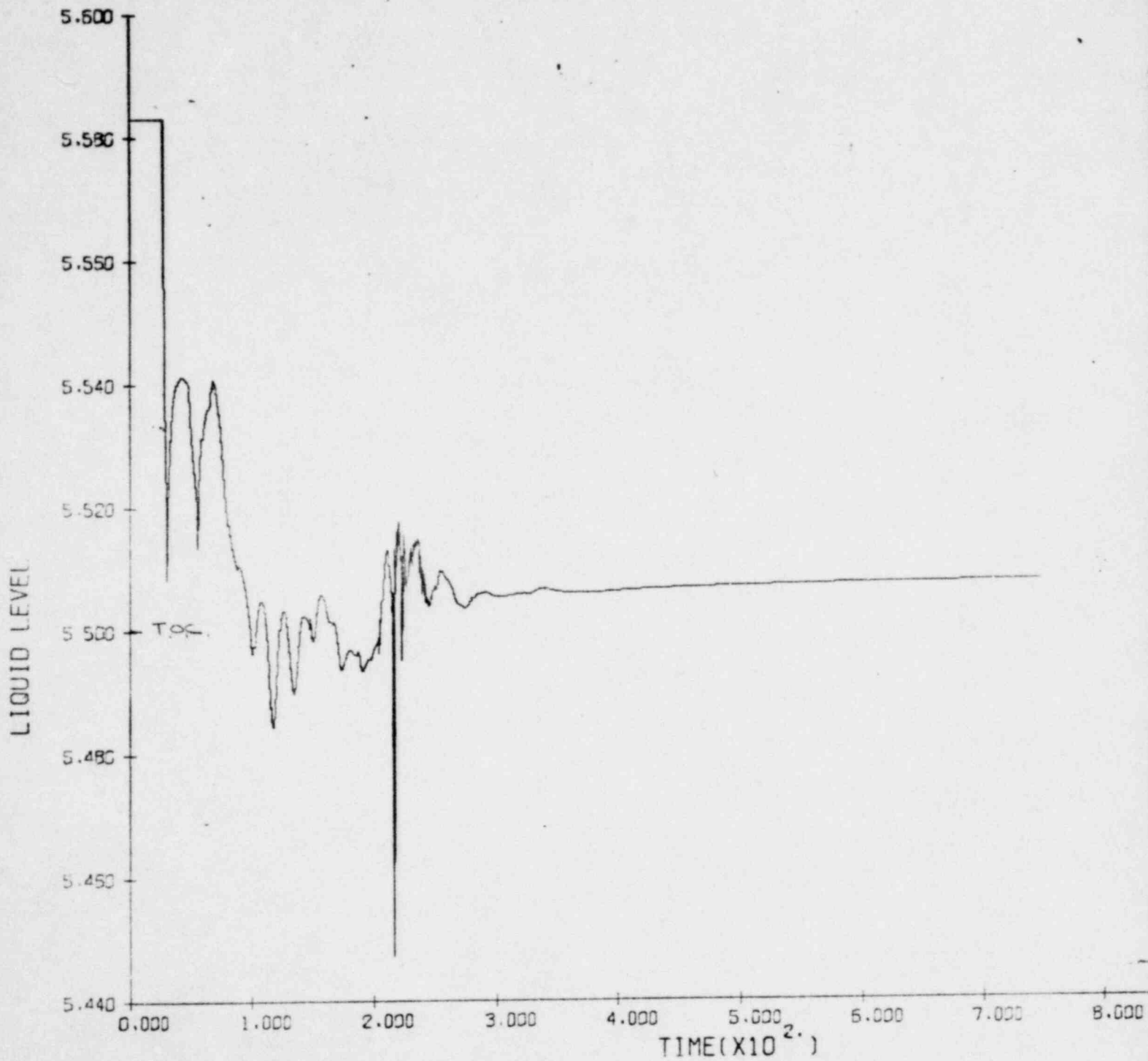
1595 240



S2HK LOFT L3-1 PREDICTION

PATH 32

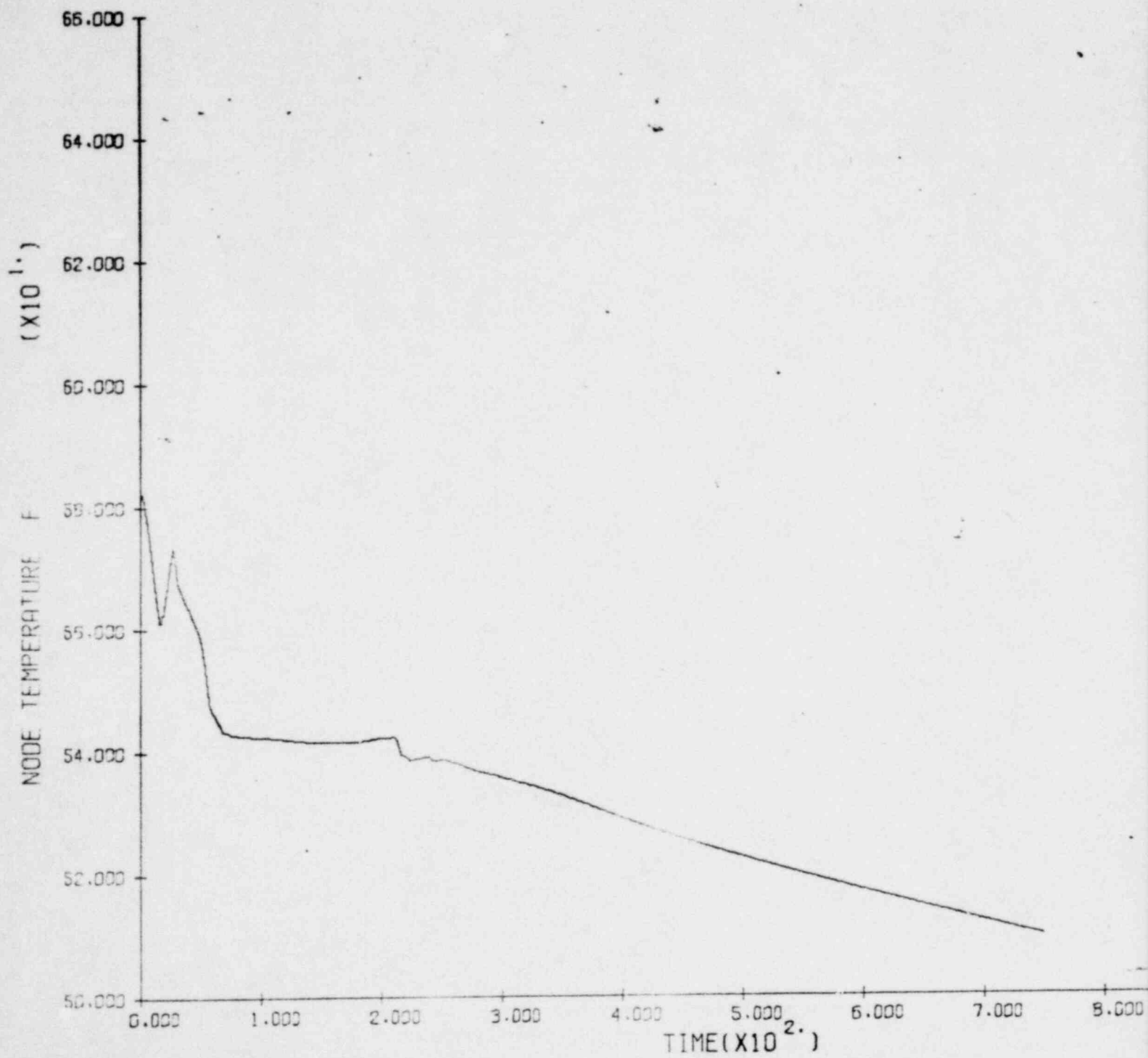
1595 241



31S2HK LOFT L3-1 PREDICTION

NODE

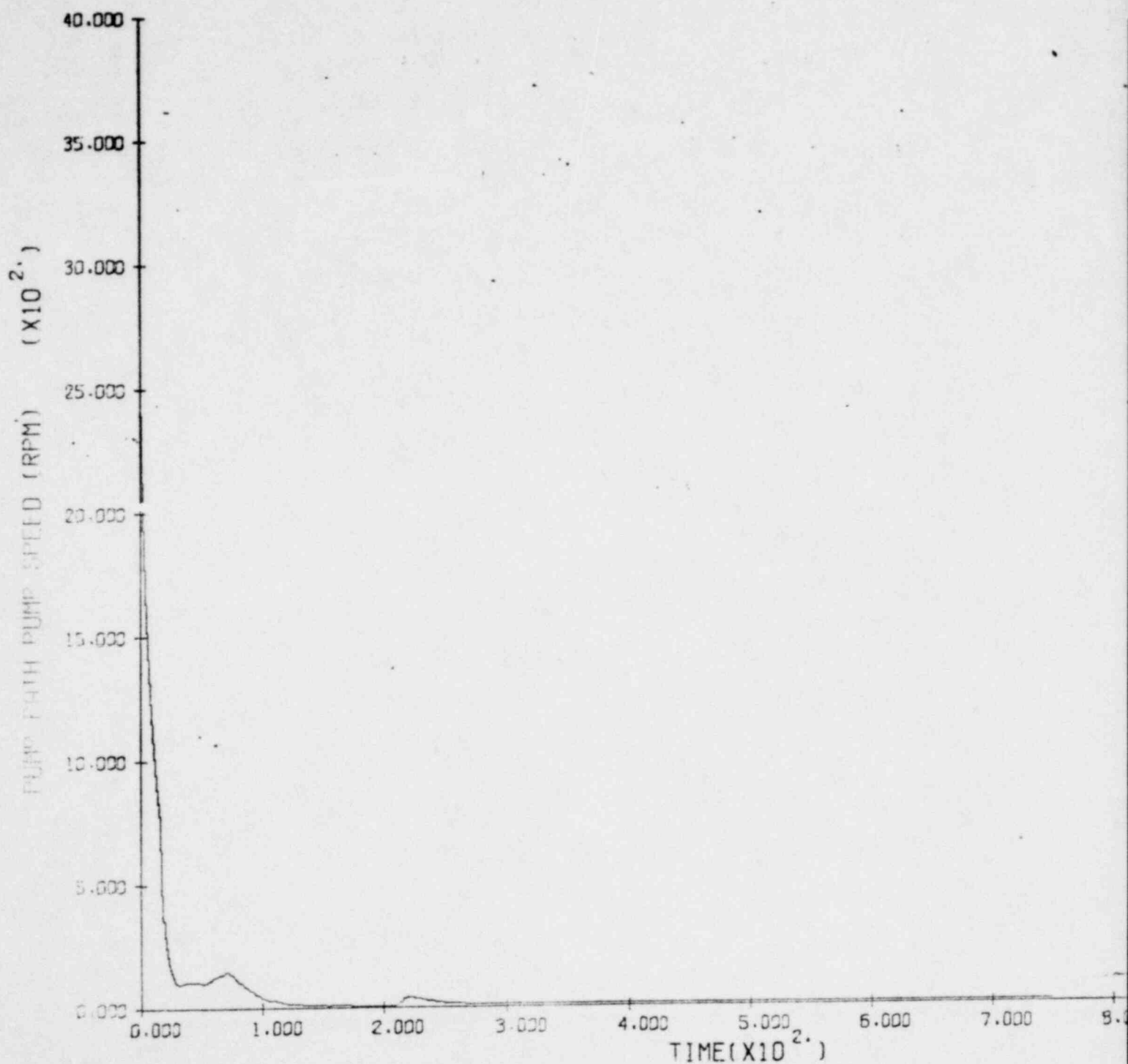
4
1595 242



L31S2HK LOFT L3-1 PREDICTION

NODE 4

1595 243 —

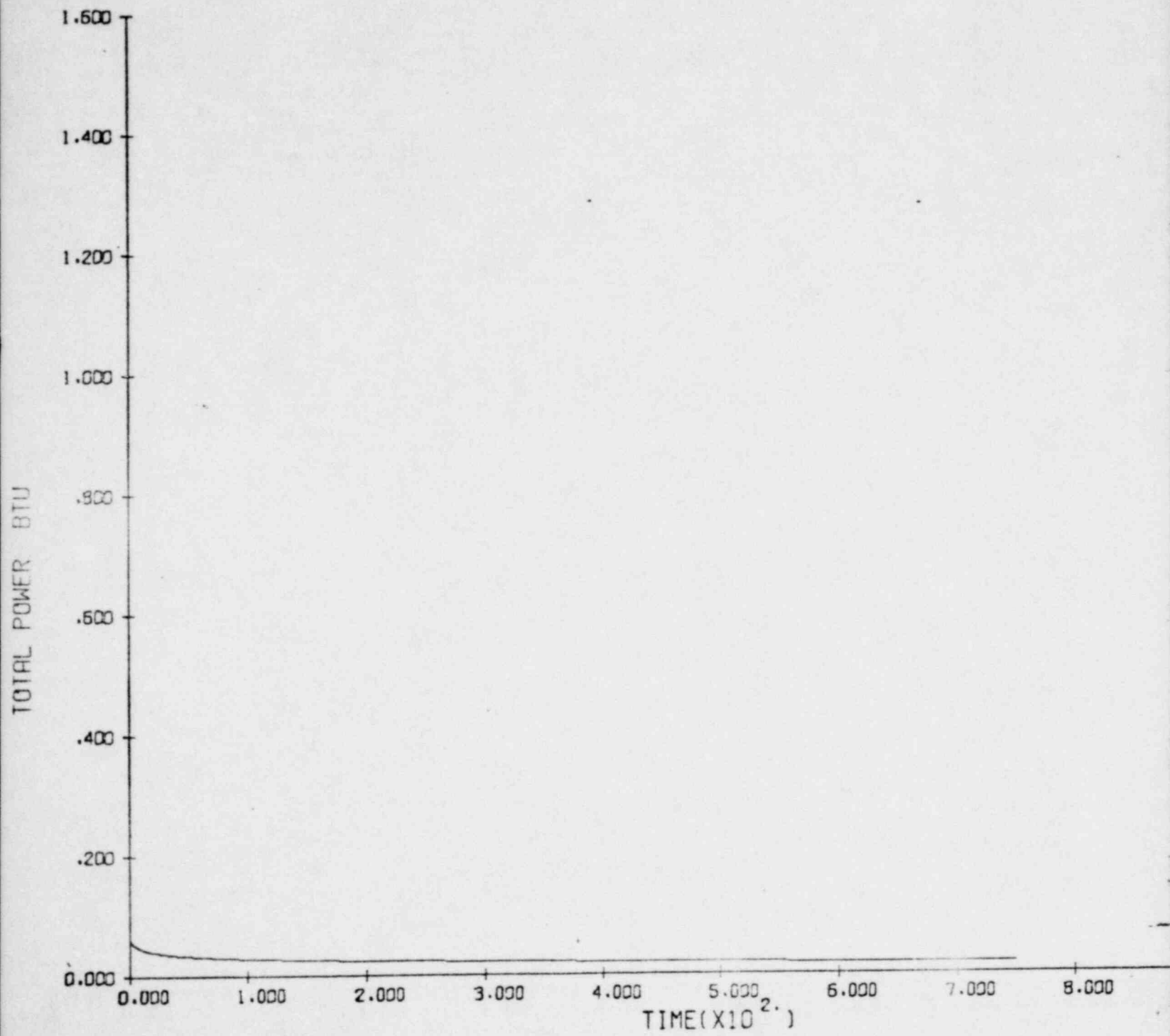


L31S2HK LOFT L3-1 PREDICTION

PATH 17

1595 244

POOR ORIGINAL



S2HK LOFT L3-1 PREDICTION

1595 245