FOSSIL ENERGY

DOE/BC/14260-10 APP (VOL. 1)
(DE92001024)

MEASURING WELLBORE HEAT LOSSES IN ACTIVE STEAM INJECTION WELL

Appendix: Survey & Measurement Data

By
B. V. Traynor

April 1992

Performed Under Contract No. DE-AC22-89BC14260

Kawasaki Thermal Systems, Inc.
Tacoma, Washington
Bakersfield, California

National Petroleum Technology Office
U.S. DEPARTMENT OF ENERGY
Tulsa, Oklahoma

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Prepared for
U.S. Department of Energy
Assistant Secretary for Fossil Energy

Thomas B. Reid, Project Manager
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APPENDIX 1

TASK 1 - SURVEY

APPENDIX 1

INSTRUMENTATION SURVEY CONTACTS

1. AOSTRA
   10th Floor - Energy Resources Building
   640 5th Avenue Southwest
   Calgary, Alberta, Canada T2P OM6

2. BGGH Enterprises
   300 Vista Del Mar
   Redondo Beach, CA 90227

3. Bow Valley Industries, Ltd.
   Box 6610
   Postal Station "D"
   1700, 321 Sixth Avenue S.W.
   Calgary, Alberta, Canada T2P 3R2

4. Canada Petroleum Assoc. Inc.
   Technology Access, Inc.
   500 805 Avenue S.W.
   Calgary, Alberta, Canada T2P 1H7

5. Chevron Research Company
   555 Market Street
   San Francisco, CA 94105

6. Chevron Oilfield Research Company
   P. O. Box 446
   La Habra, CA 90631

7. Dolphin Petroleum Consultants
   174 Tally Ho
   Santa Maria, CA 93454

8. Enertech
   5847 San Philipe, Suite 1000
   Houston, TX 77057

9. Enhanced Insulations, Inc.
   10900 Carnegie Avenue, Suite 450
   Cleveland, OH 44106

10. Mobil Oil Canada Ltd.
    202 5704 44th Street
    Lloydminster, Alberta, Canada T9V 2A1

11. Sandia National Laboratories
    Experimental Aerodynamics Division
    P. O. Box 5800
    Albequerque, NM

12. Sandia National Laboratories
    Geothermal Applications
    P. O. Box 5800
    Albequerque, NM

APPENDIX 1

Instrumentation Survey Contacts (continued)

13. Sandia National Laboratories
    Thermal Test and Analysis Laboratories
    P. O. Box 5800
    Albequerque, NM

14. Shell Canada Resources Ltd.
    400 4th Avenue Southwest
    P. O. Box 100 Station M
    Calgary, Alberta, Canada T2P 2H5

15. Shell Western Production Company
    P. O. Box 11164
    5060 California Avenue
    Bakersfield, CA 93389-1164

16/ Texaco, Inc.
    Box 425
    Bellaire, TX 77401

17. Texaco Exploration and Production Company
    P. O. Box 5197
    Bakersfield, CA 93388

18. University of Alberta
    606 Chemical Mineral Engineering Building
    Edmonton, Alberta, Canada D6G 2G6

19. University of Kansas
    Chemical and Petroleum Engineering
    Lawrence, KS 66045-4006

20. University of Texas at Austin
    Petroleum Engineering Department
    Austin, TX 78712

21. Vertech Systems, Inc.
    18300 West Highway 72
    Golden, CO 80403

APPENDIX 1

WELLBORE HE .T LOSS MODELING REFERENCES

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APPENDIX 1

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APPENDIX 2

TASK 2 - TEST & MEASUREMENT

TEST CASE DATA

TEST CASE A DATA

APPENDIX A: REDUCED DATA FOR CENTRALIZED INSULATED TUBING WITH THERMAL PACKER

FIGURES

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Figure A-2: Layout of Sensors on Instrumented Joint

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Graph A-2: Steam and Water Mass Flow vs. Time

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Graph A-7: Tubing Heat Flux vs. Time

Graph A-8: Tubing Body Heat Flux vs. Time

Graph A-9: Temperature Profiles at 12:00 on 7/12/90

Graph A-10 Heat Flux Profile at 12:00 on 7/12/90

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Graph A-12: Sidestring Log Compared With Fixed Thermocouple Measurements

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Table A-2: Tabulated Heat Flux and Steam Data (4 sheets)

Table A-3: Tabulated Temperature Data (4 Sheets)

Table A-4: Average Surface Temperature of Instrumented Joint on 7/12/90

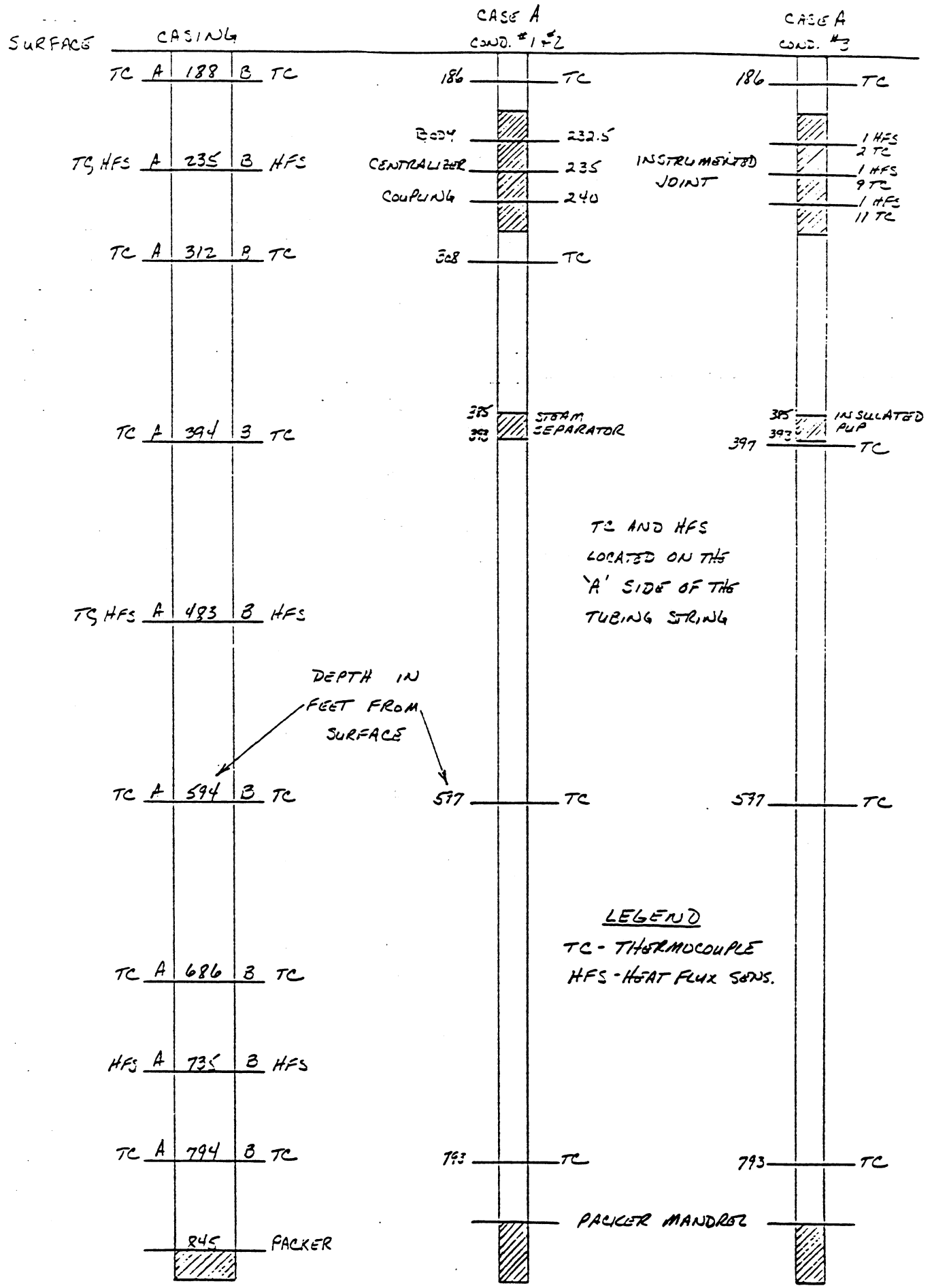


FIGURE A-1: LAYOUT OF TUBULAR AND CASING SENSORS

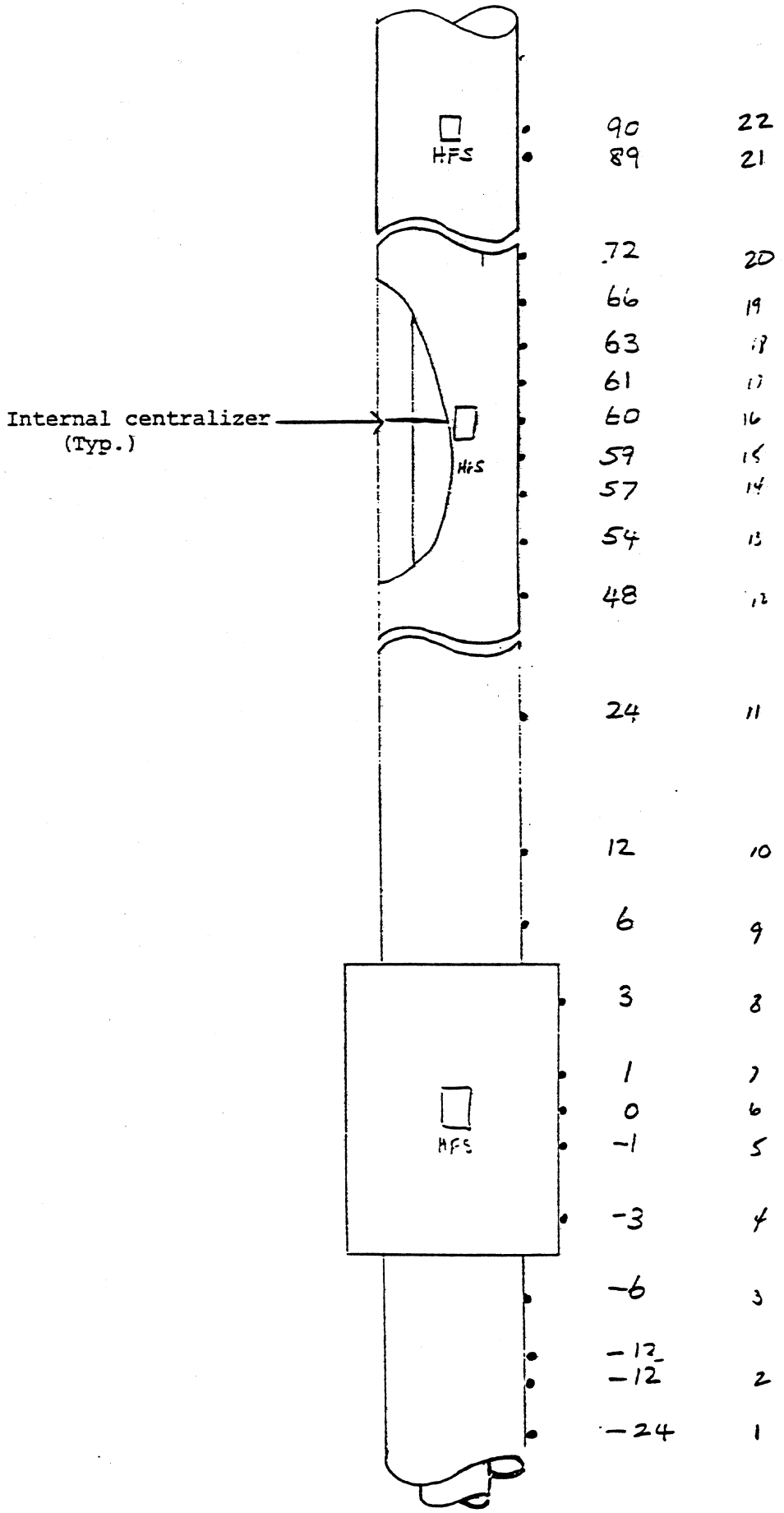


FIGURE A-2: LAYOUT OF SENSORS ON INSTRUMENTED JOINT

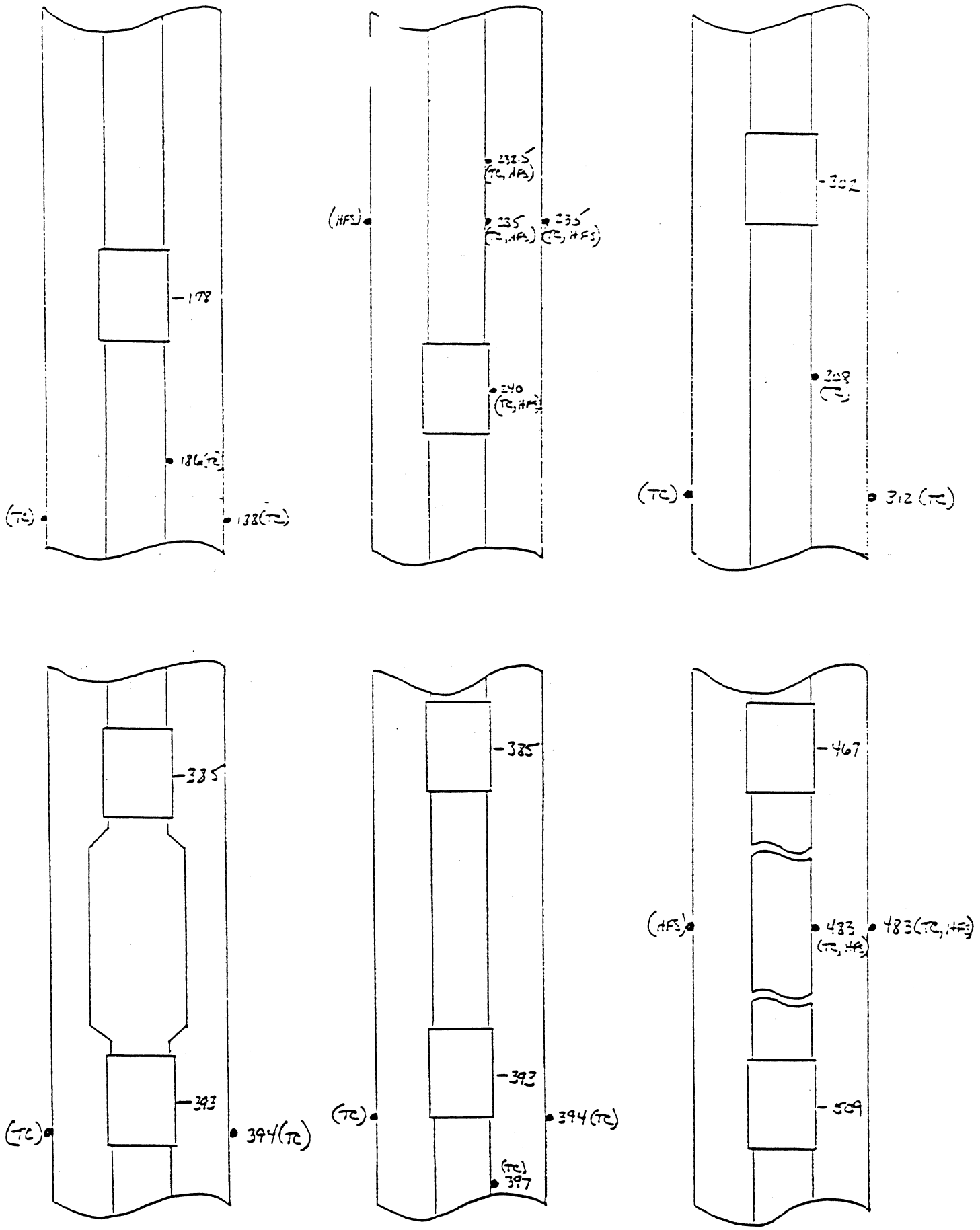


FIGURE A-3: RELATIONSHIP BETWEEN SENSOR LOCATIONS (SHEET 1 OF 3)

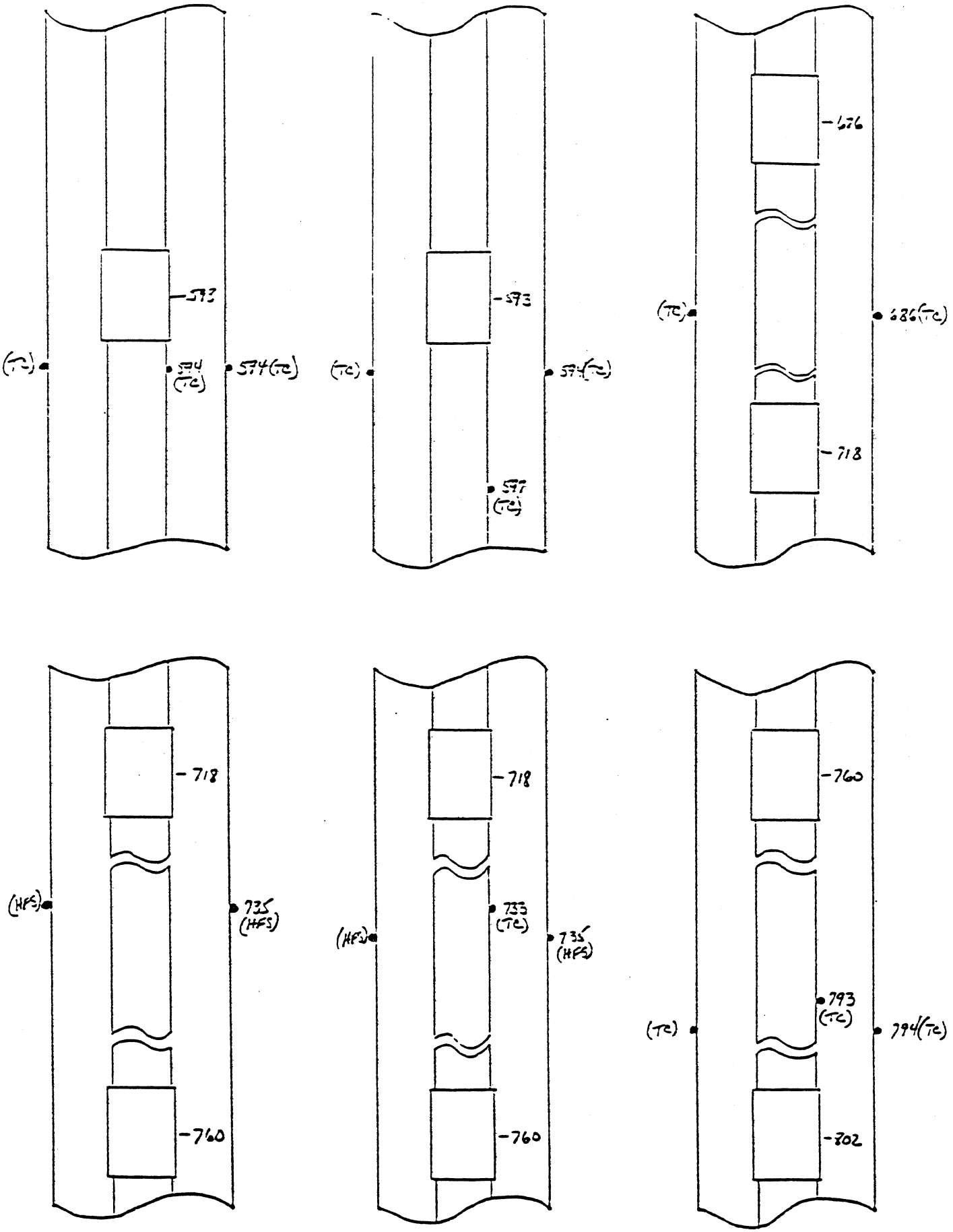


FIGURE A-3: RELATIONSHIP BETWEEN SENSOR LOCATIONS (SHEET 2 OF 3)

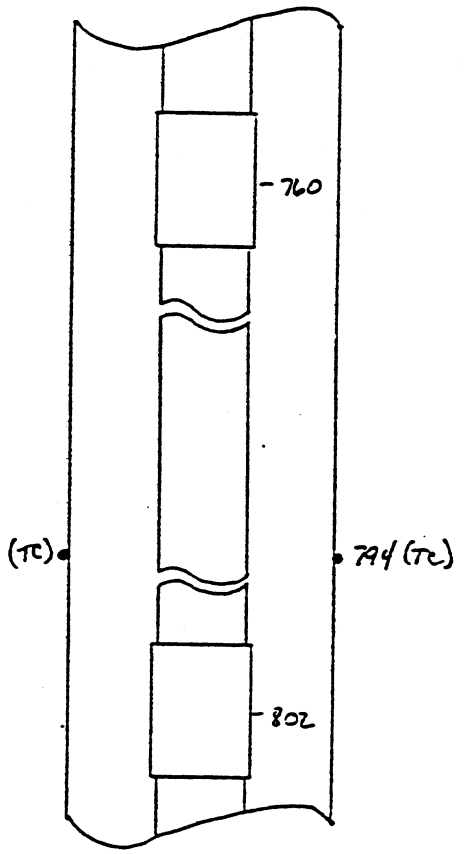
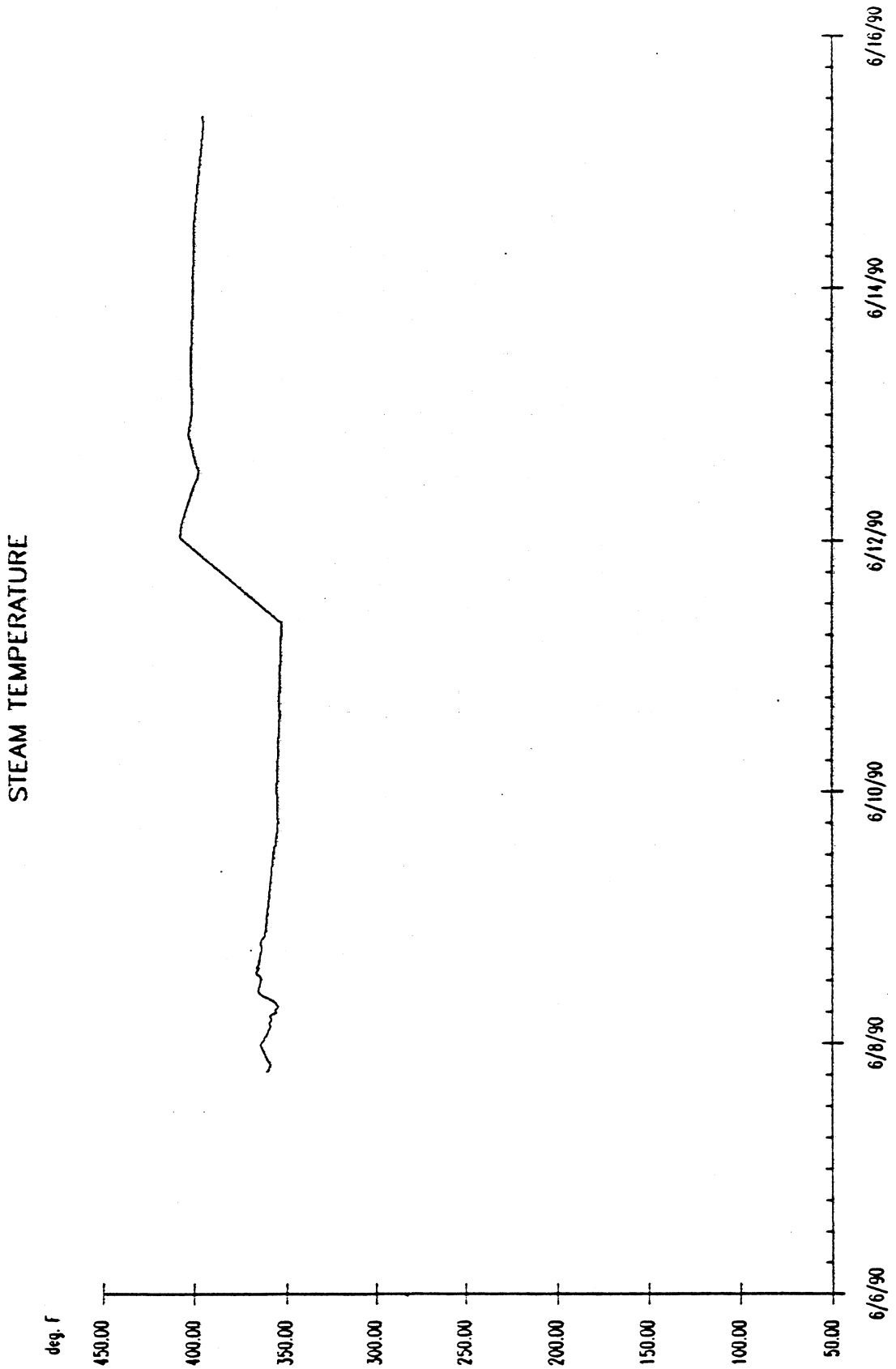
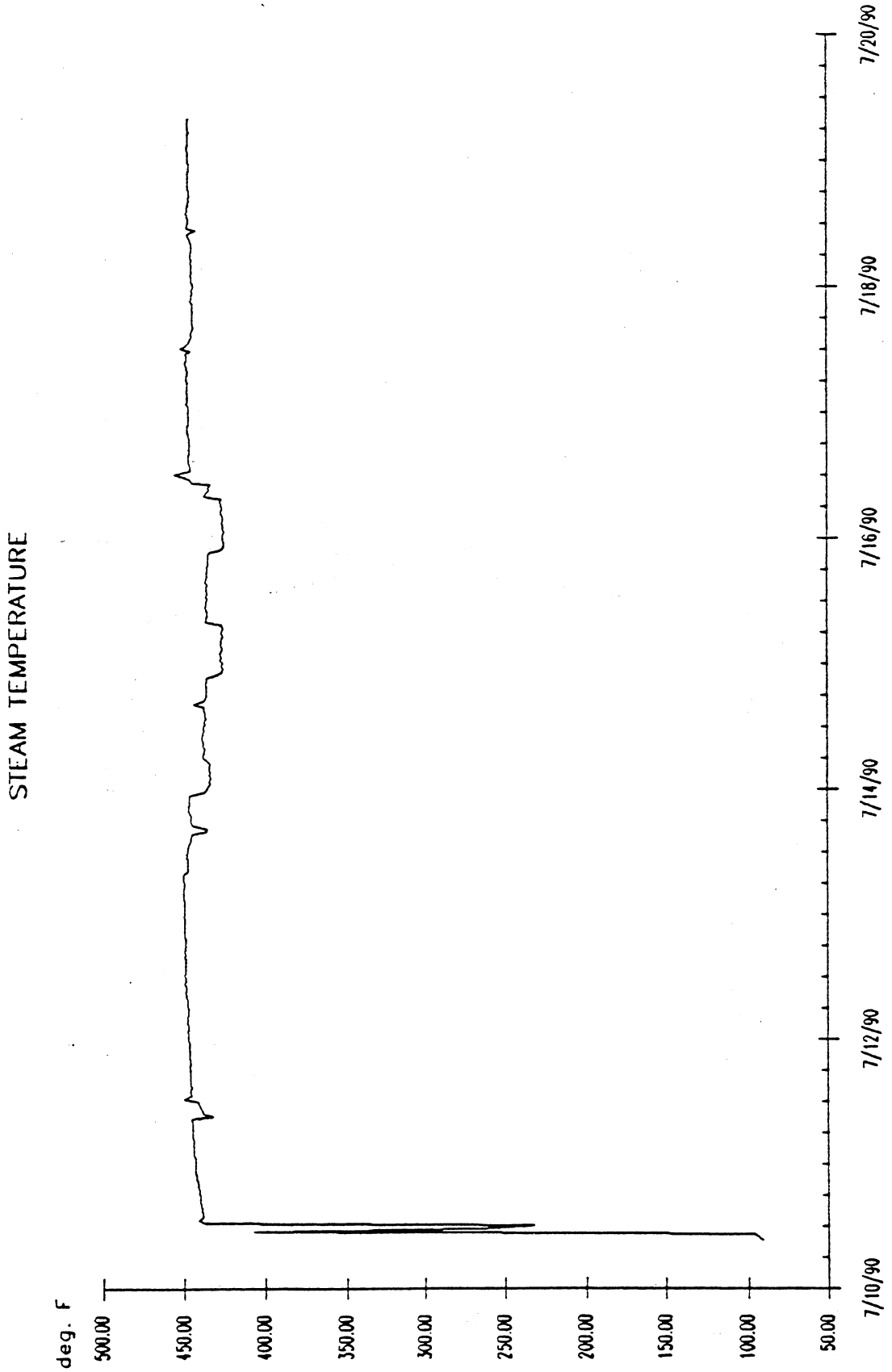


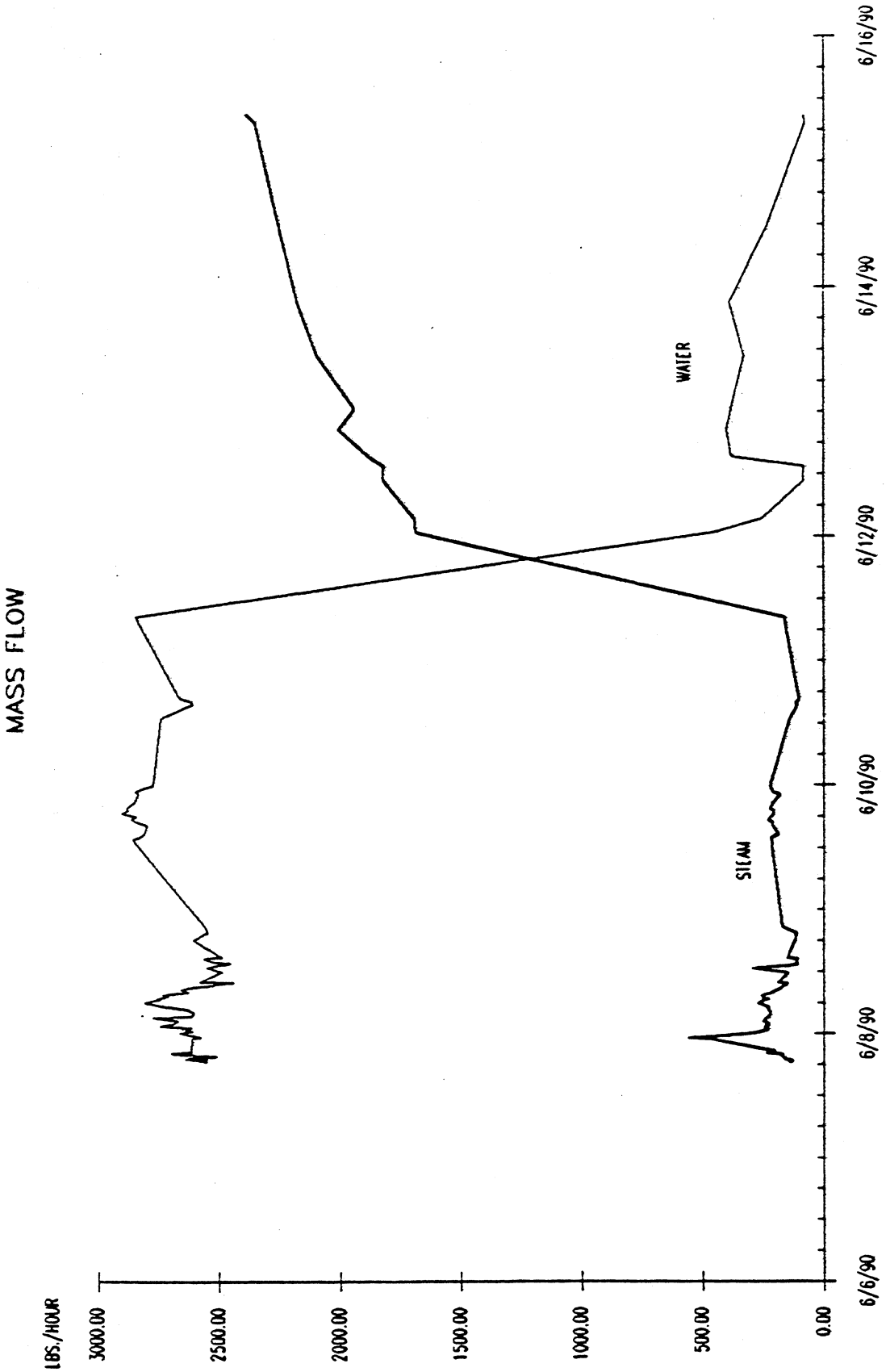
FIGURE A-3: RELATIONSHIP BETWEEN SENSOR LOCATIONS (SHEET 3 OF 3)



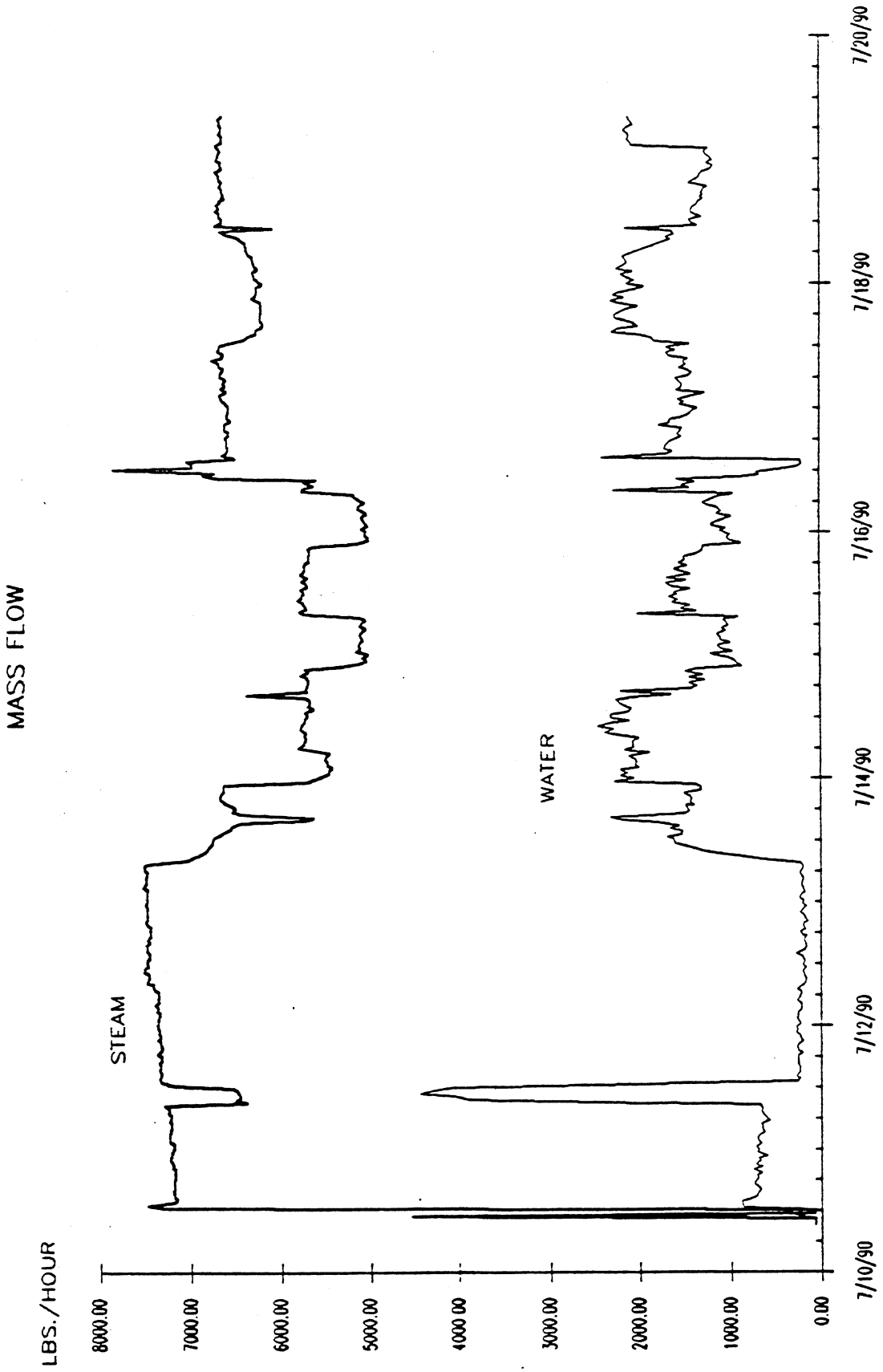
GRAPH A-1: STEAM TEMPERATURE VS. TIME (Sheet 1 of 2)



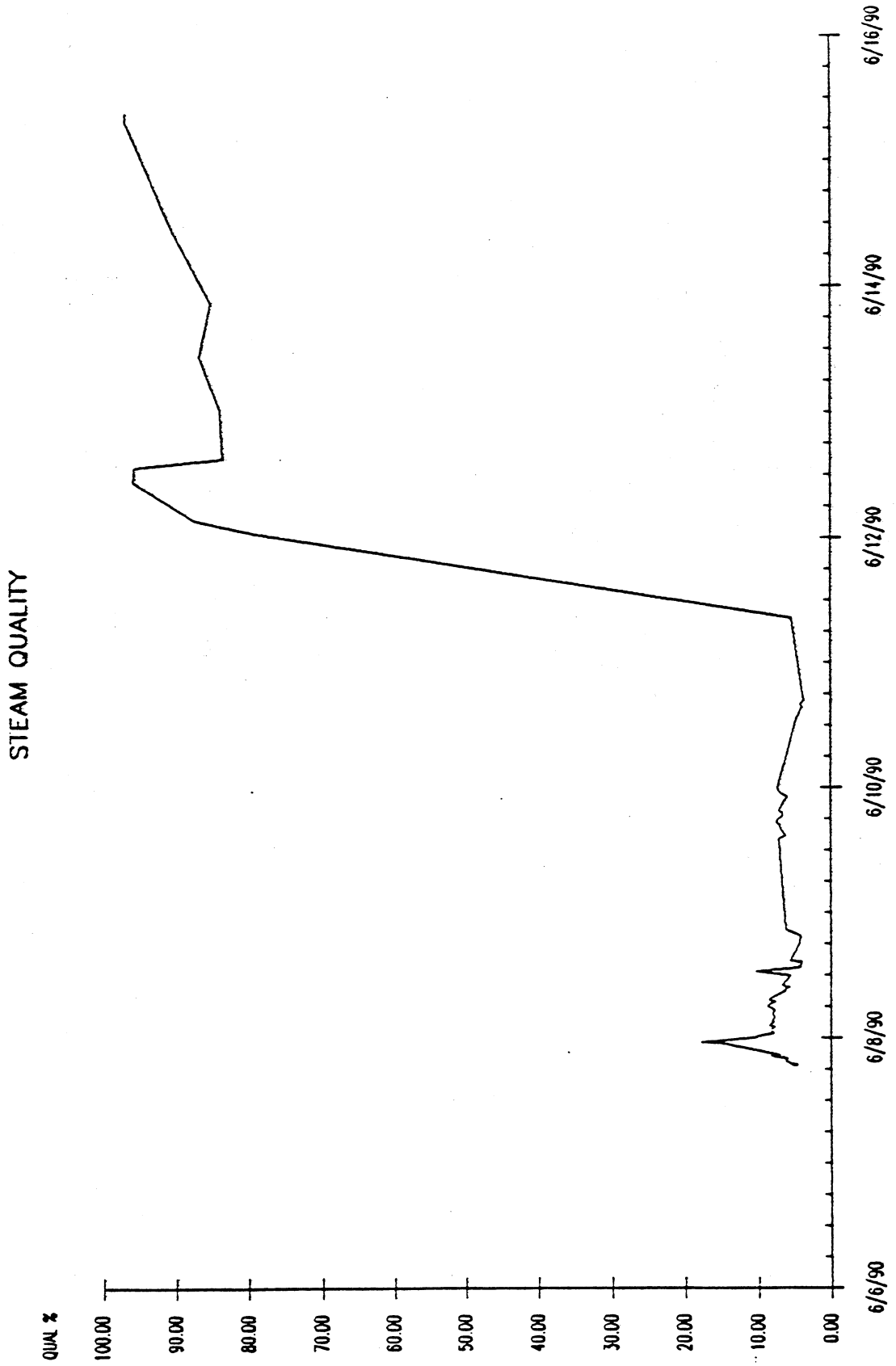
GRAPH A-1: STEAM TEMPERATURE VS. TIME (SHEET 2 OF 2)



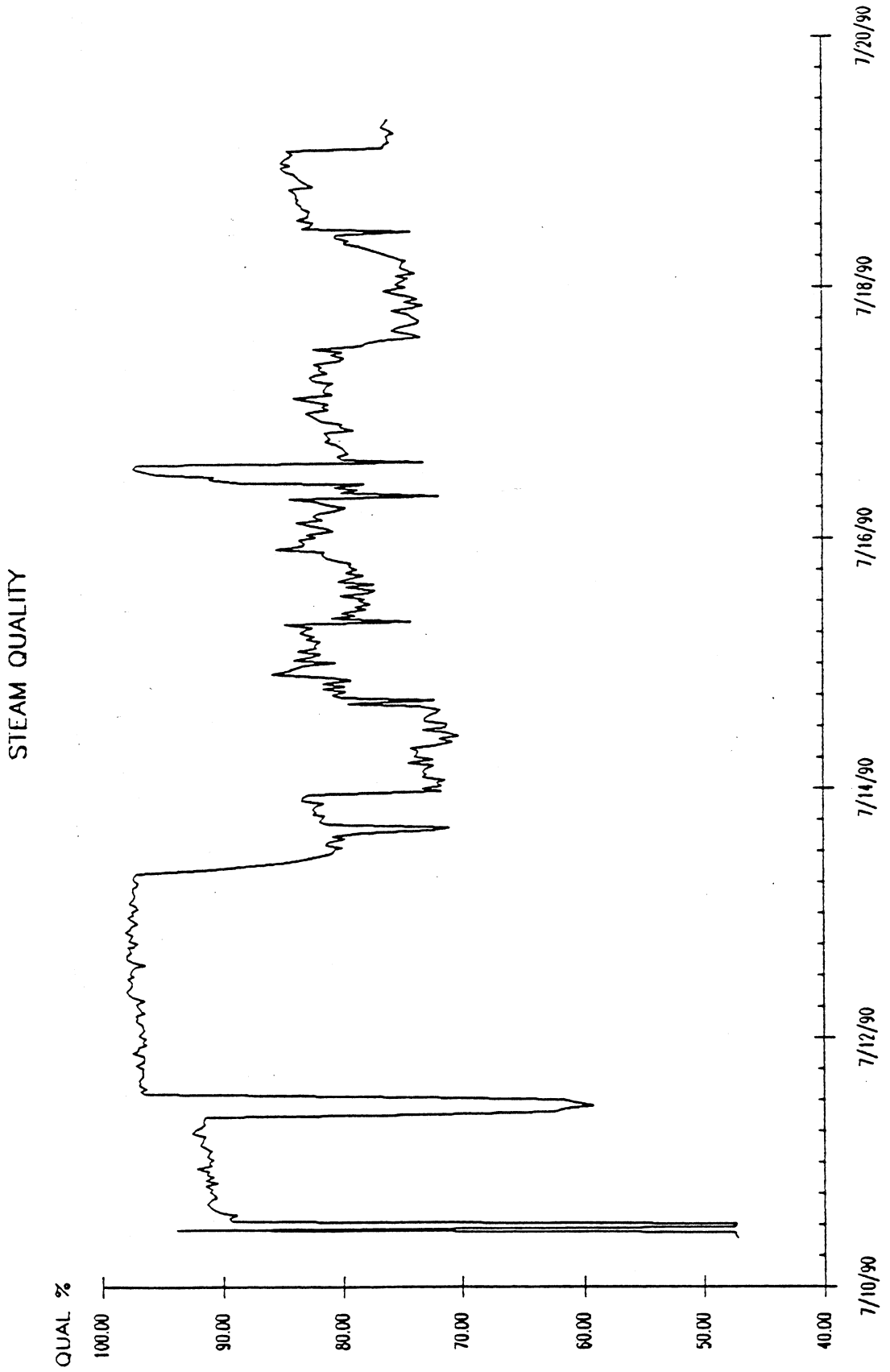
GRAPH A-2: STEAM AND WATER MASS FLOW VS. TIME (SHEET 1 OF 2)



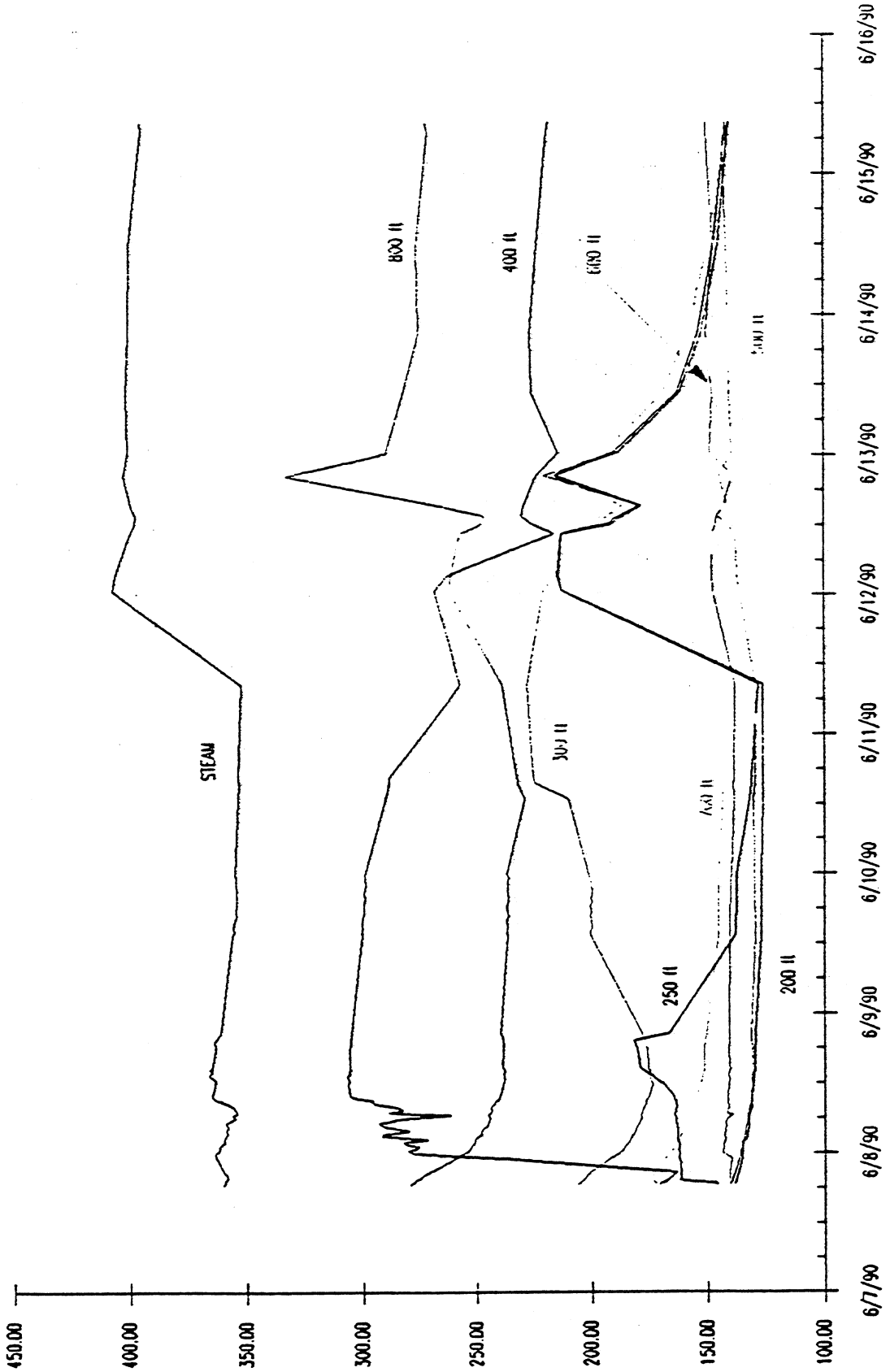
GRAPH A-2: STEAM AND WATER MASS FLOW VS. TIME (SHEET 2 OF 2)



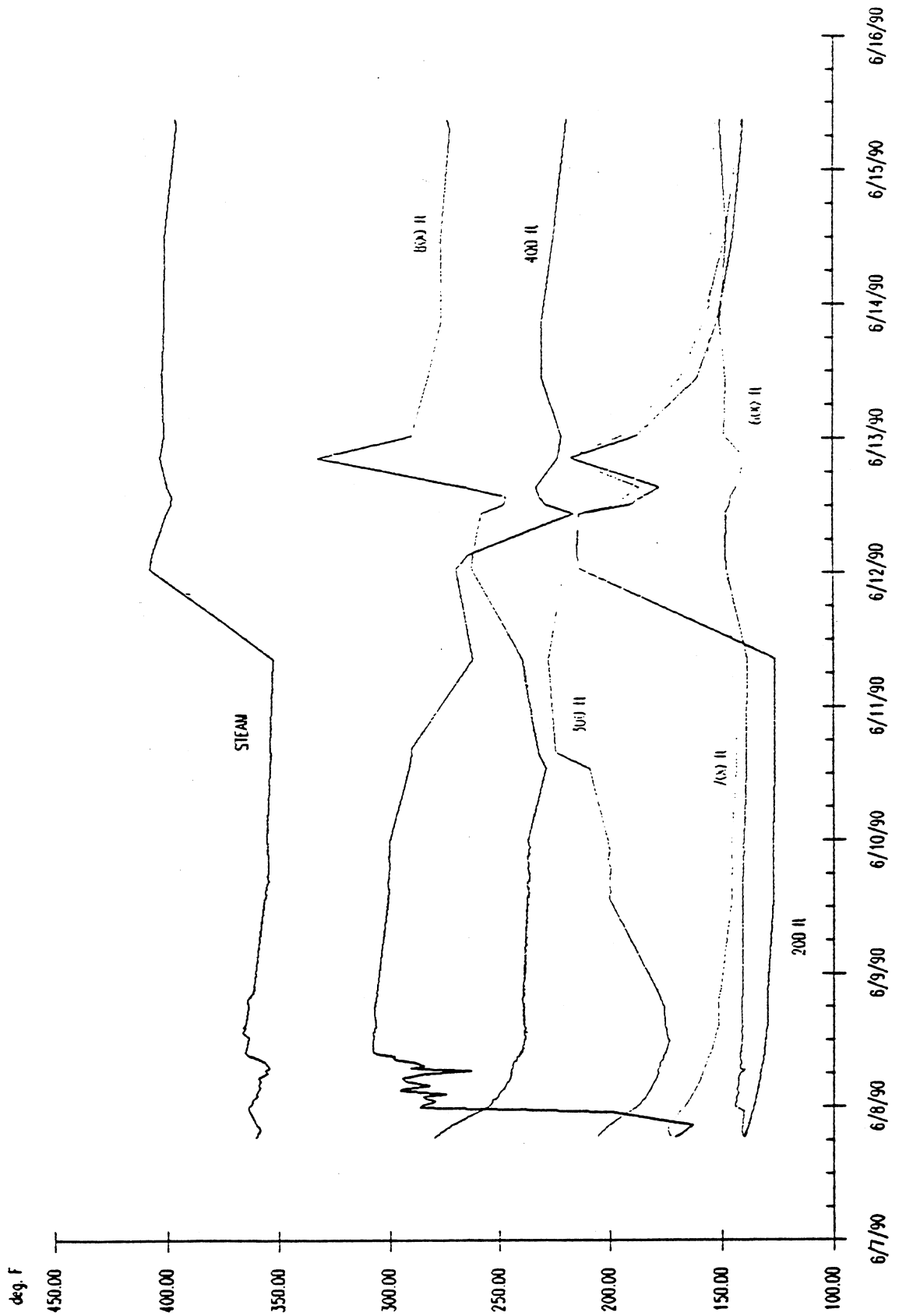
GRAPH A-3: STEAM QUALITY VS. TIME (SHEET 1 OF 2)



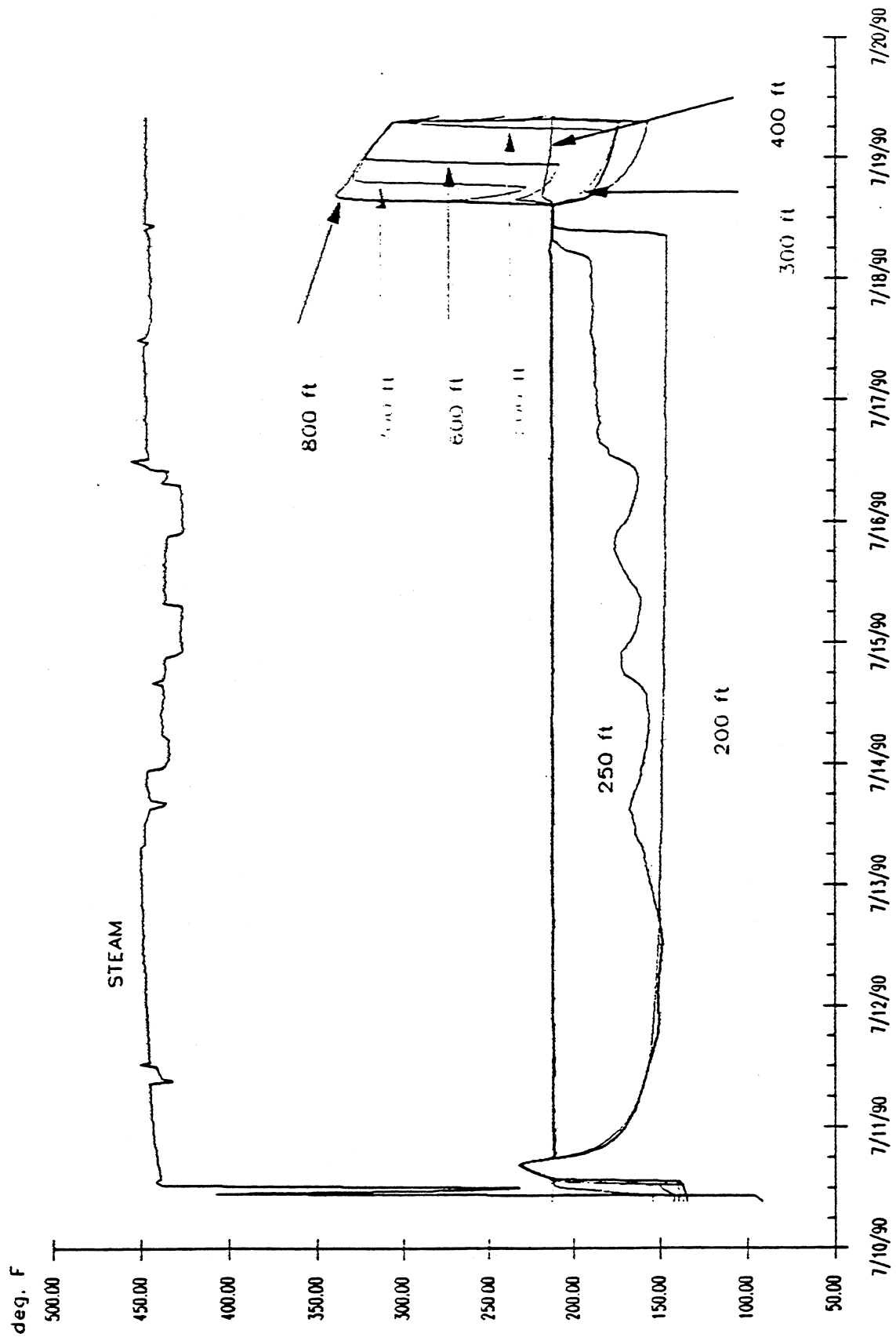
GRAPH A-3: STEAM QUALITY VS. TIME (SHEET 2 OF 2)



GRAPH A-4: CASING TEMPERATURE VS. TIME (SHEET 1 OF 3)

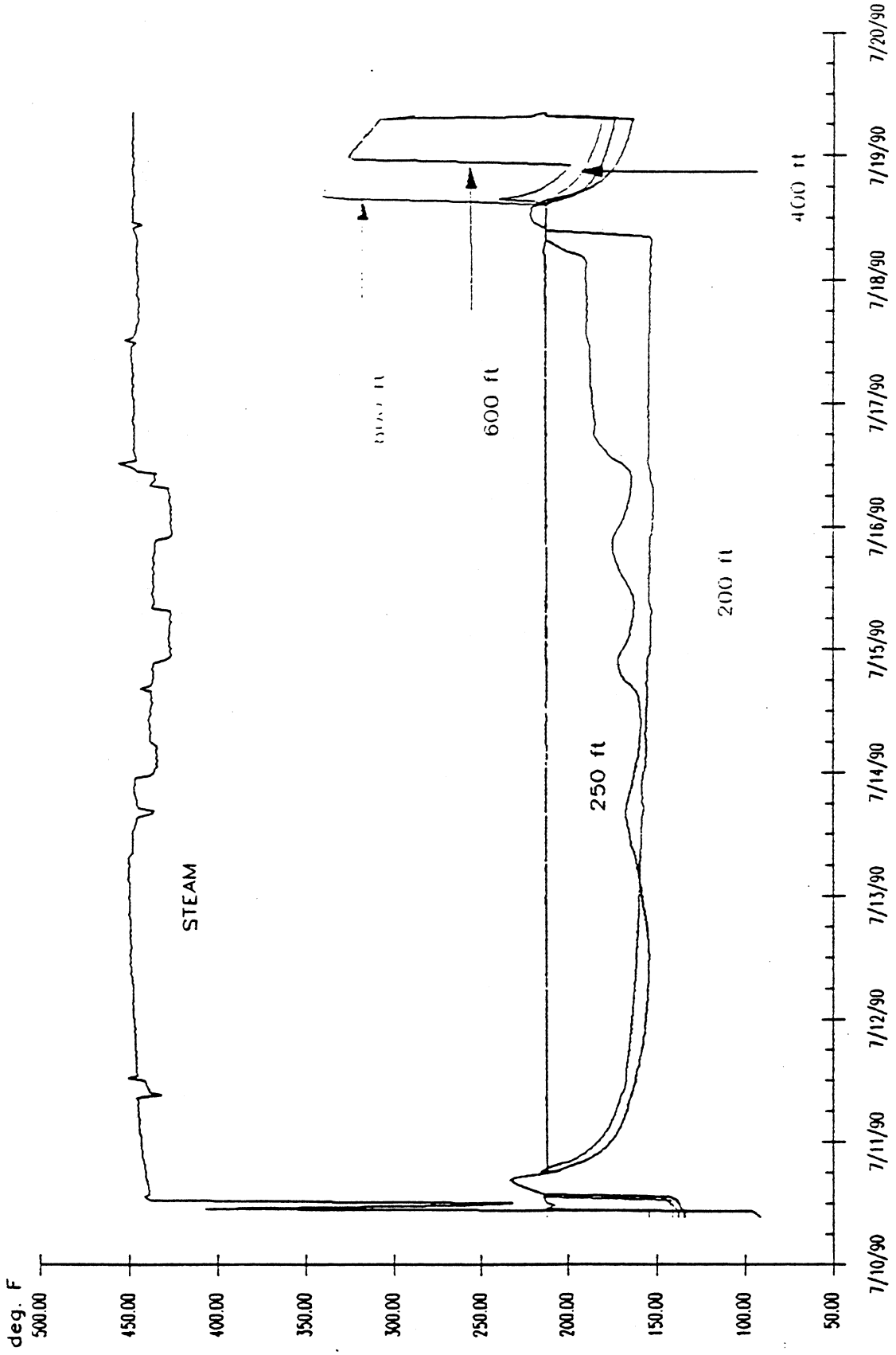


GRAPH A-4: CASING TEMPERATURE VS. TIME (SHEET 2 OF 3)



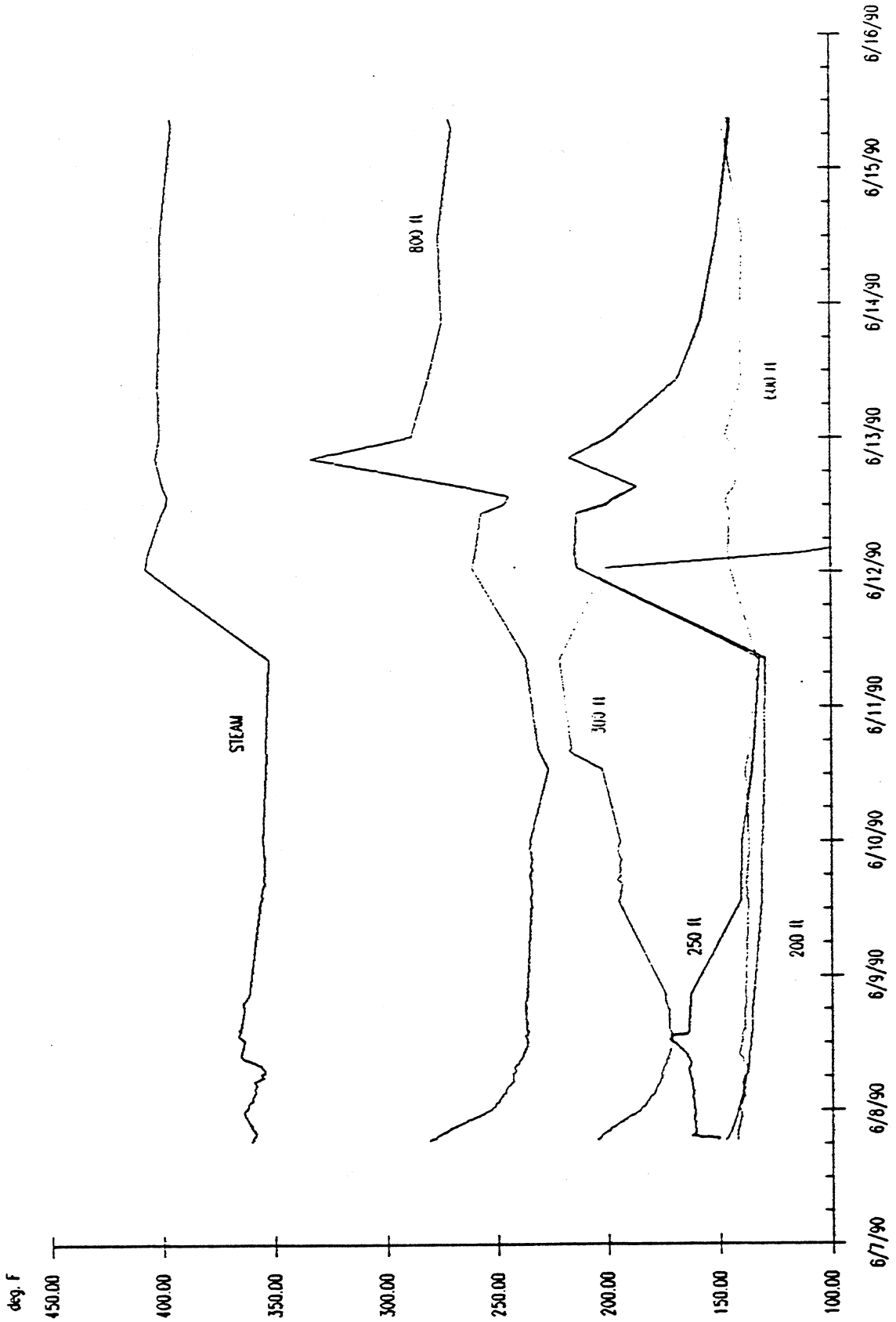
GRAPH A-4: CASING TEMPERATURE VS. TIME

(SHEET 3 OF 3)

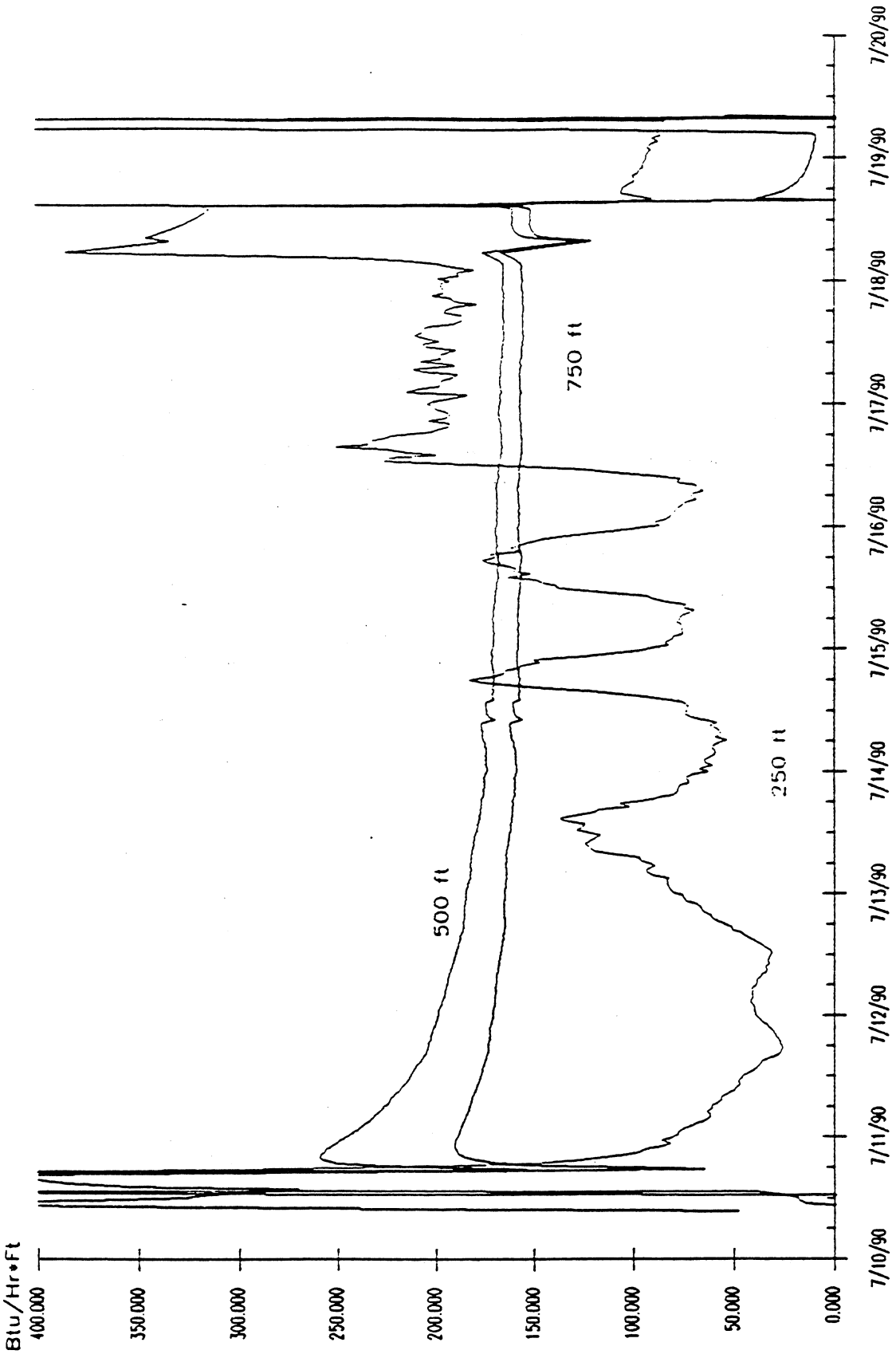


GRAPH A-5: TUBING SURFACE TEMPERATURE VS. TIME

(Sheet 2 of 2)

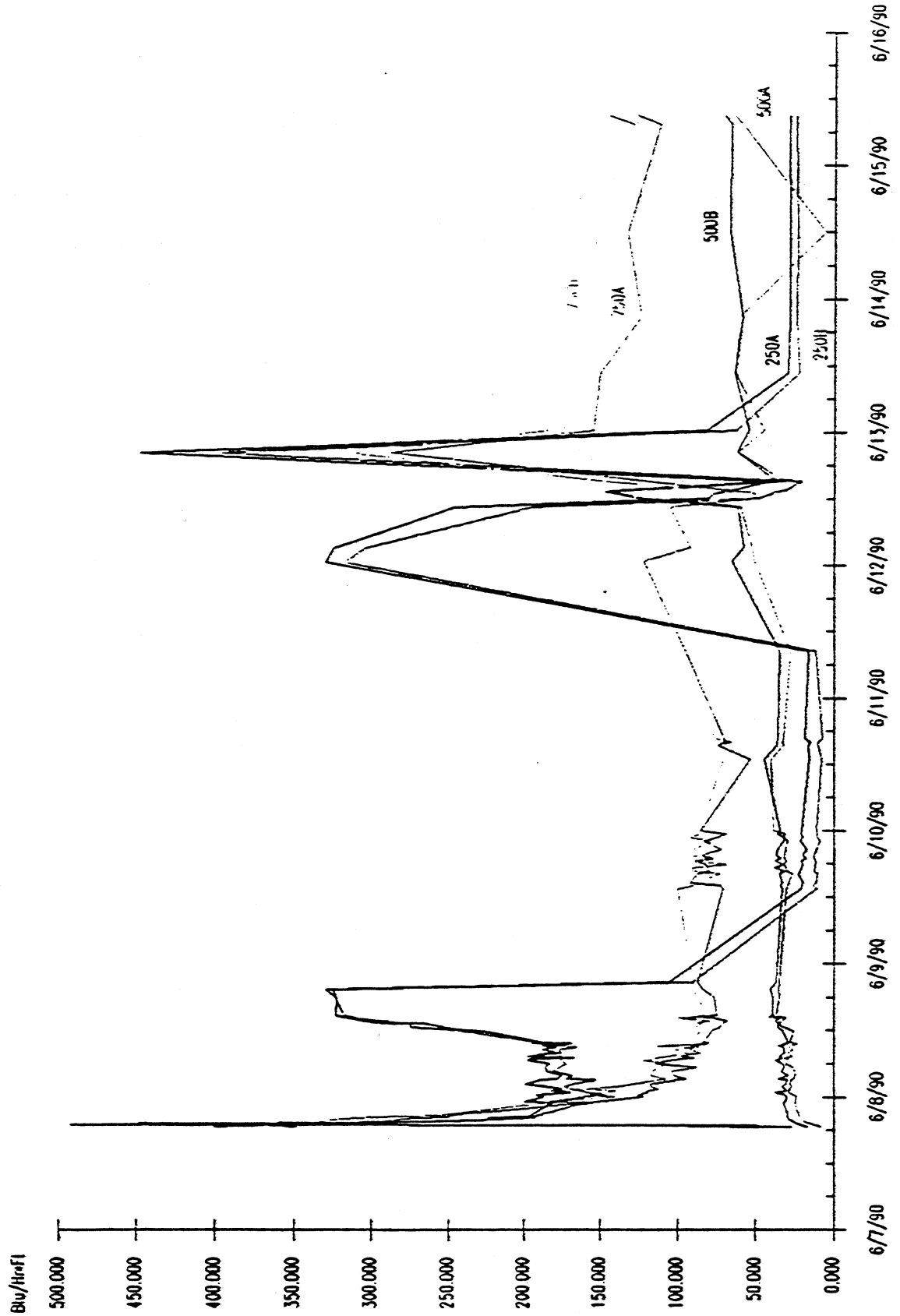


GRAPH A-5: TUBING SURFACE TEMPERATURE VS. TIME (SHEET 1 OF 2)

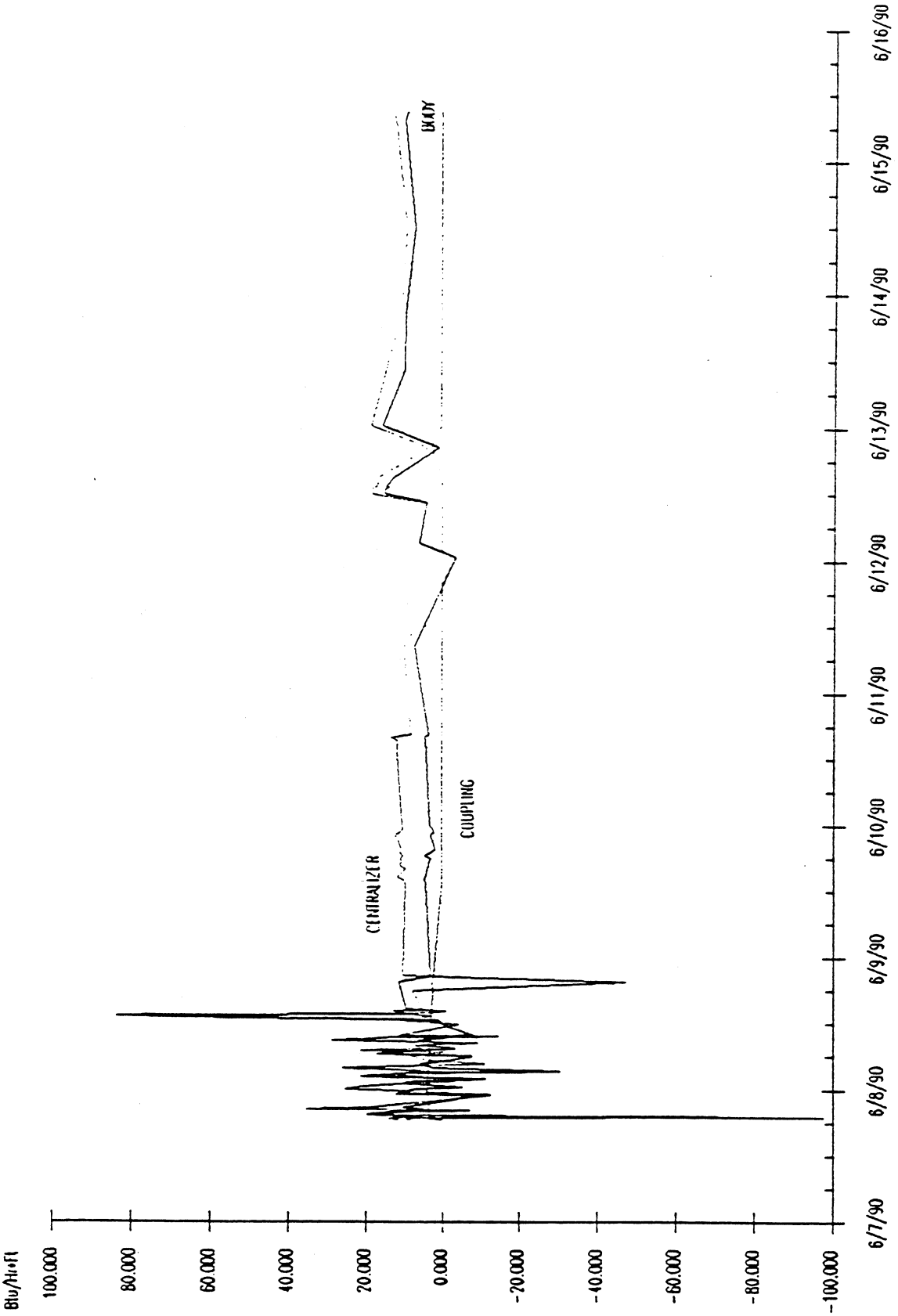


GRAPH A-6: CASING HEAT FLUX VS. TIME

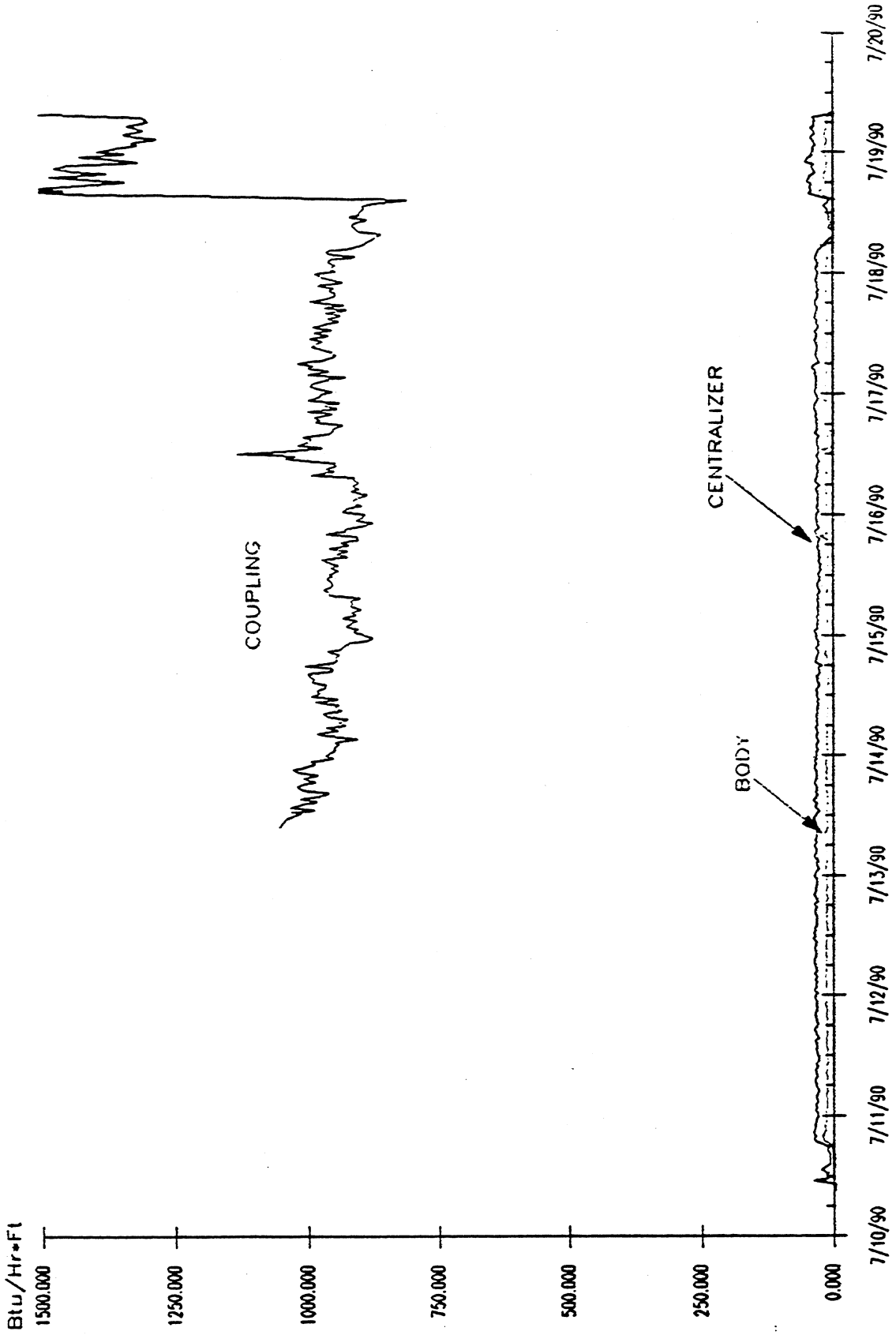
(SHEET 2 OF 2)



GRAPH A-6: CASING HEAT FLUX VS. TIME (SHEET 1 OF 2)

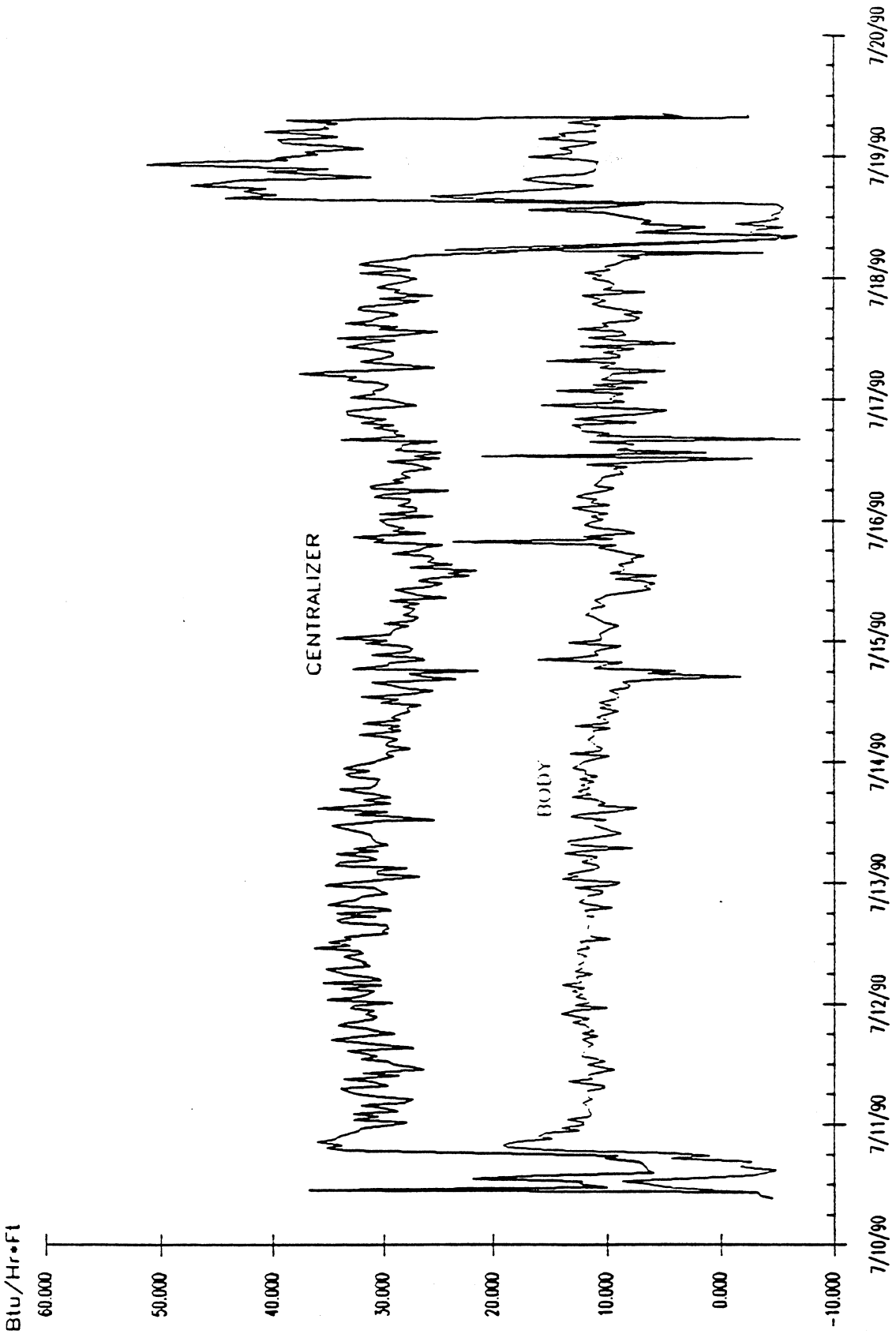


GRAPH A-7: TUBING HEAT FLUX VS. TIME (SHEET 1 OF 2)

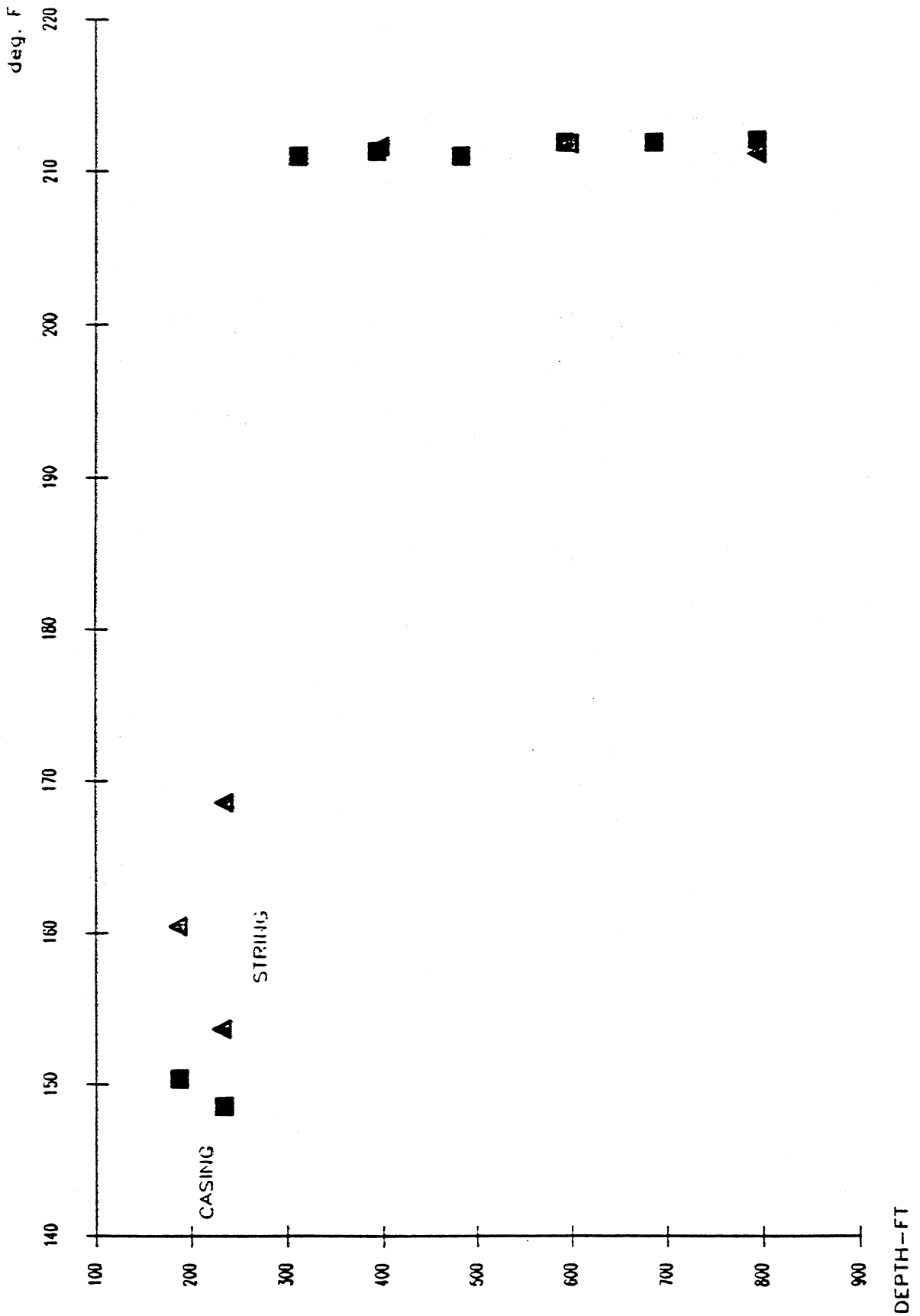


GRAPH A-7: TUBING HEAT FLUX VS. TIME

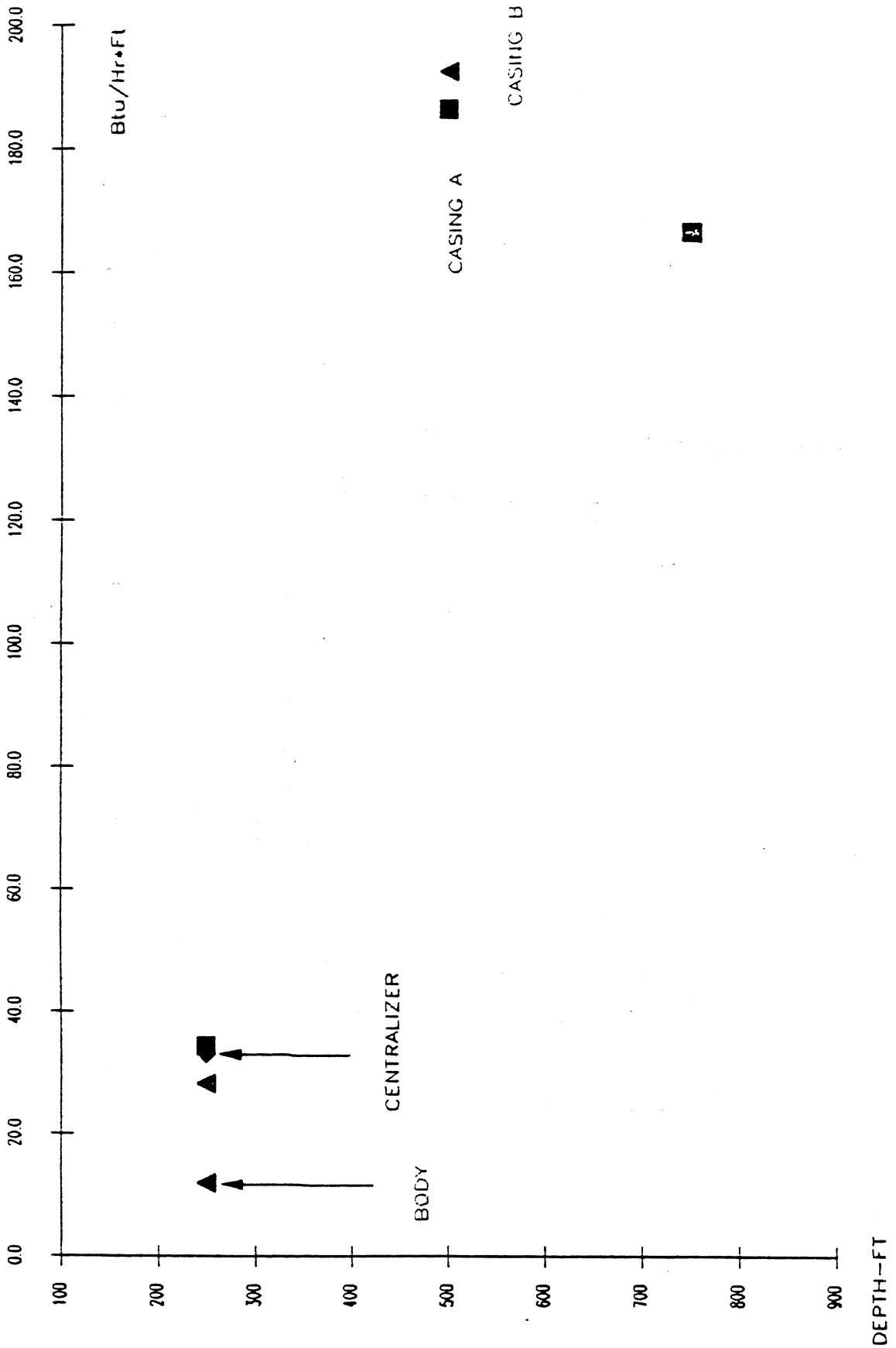
(SHEET 2 OF 2)



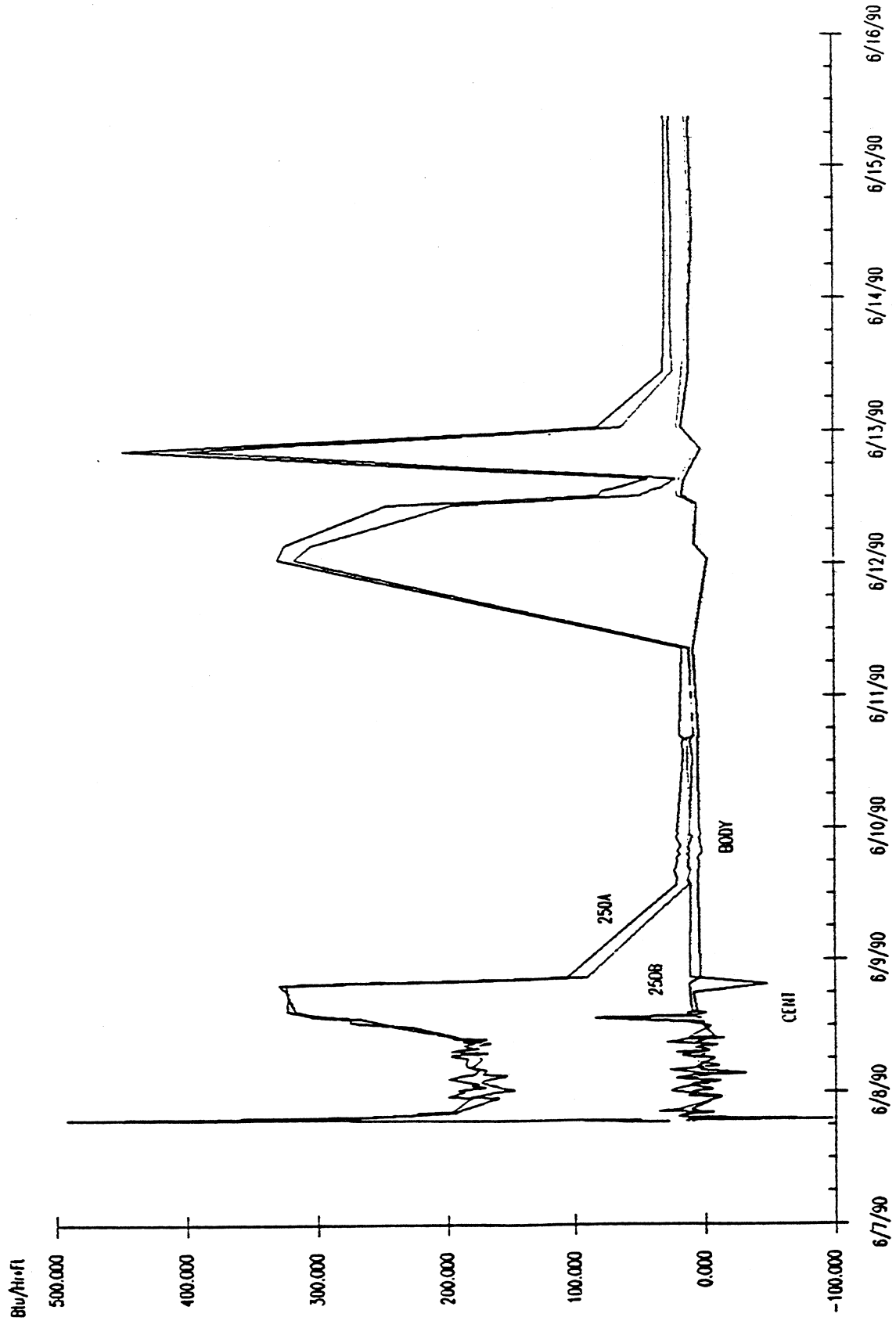
GRAPH A-8: TUBING BODY HEAT FLUX VS. TIME



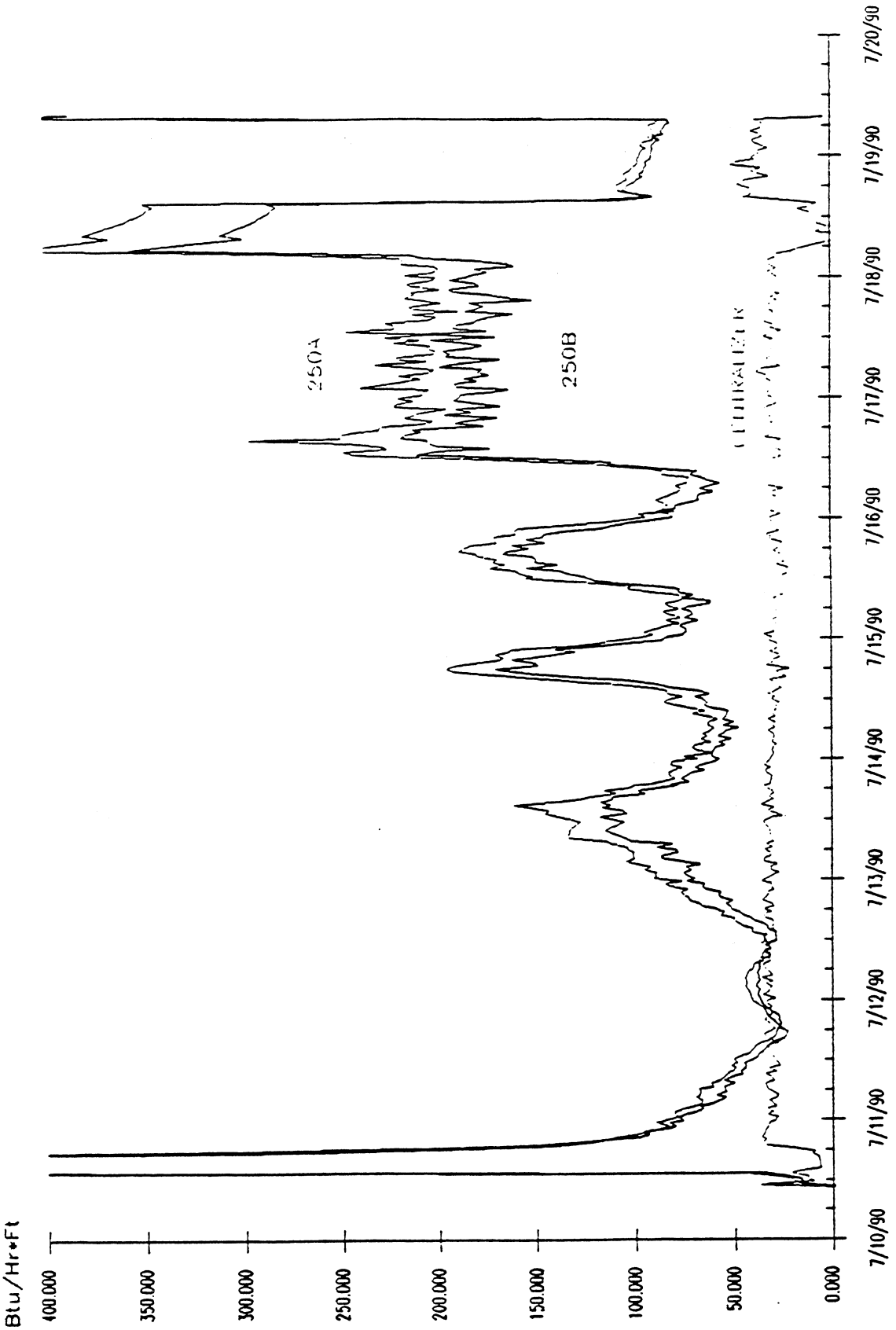
GRAPH A-9: TEMPERATURE PROFILES AT 12:00 ON 7/12/90



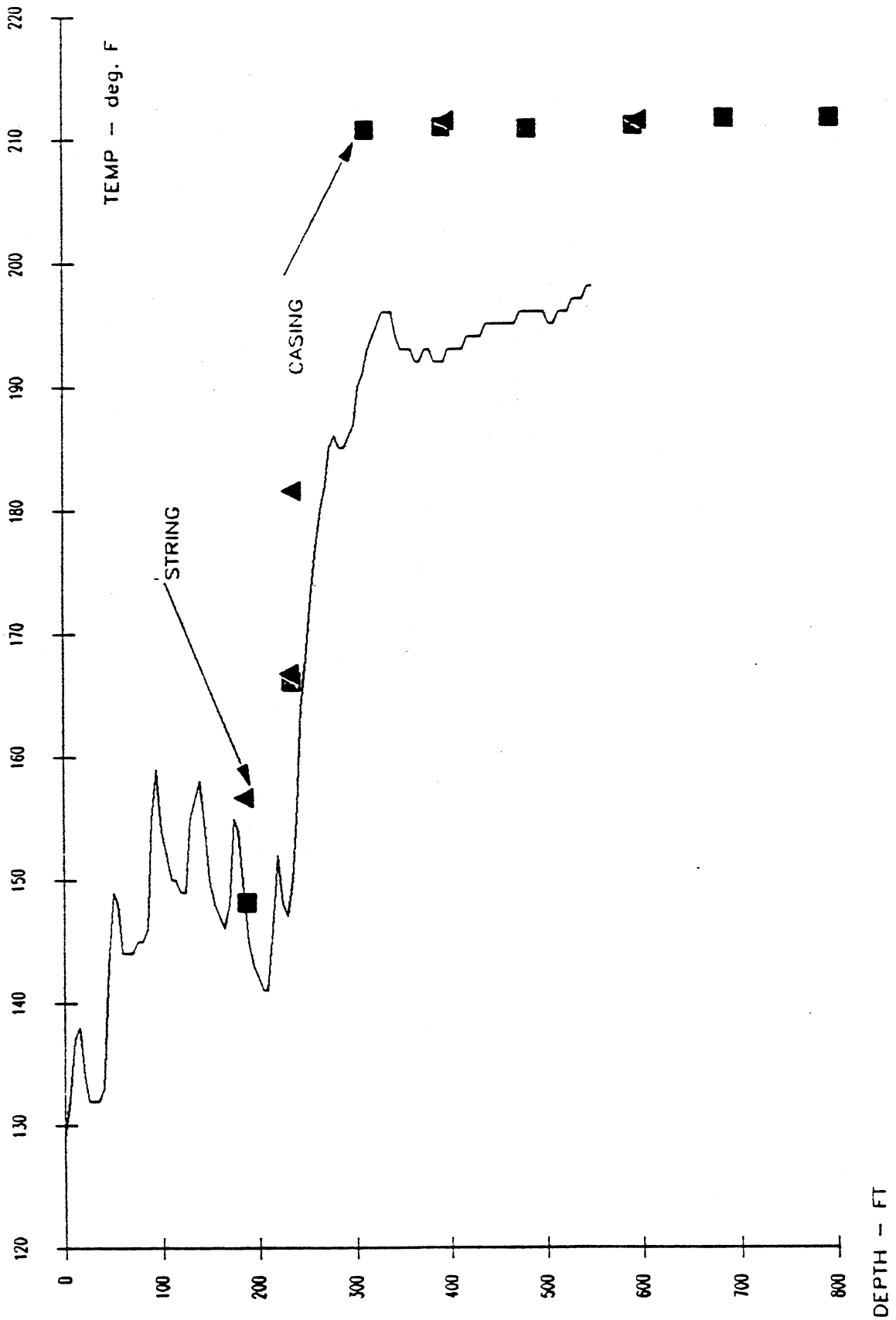
GRAPH A-10: HEAT FLUX PROFILE AT 12:00 ON 7/12/90



GRAPH A-11: HEAT FLUX AT 250 FT. DEPTH VS. TIME (SHEET 1 OF 2)



GRAPH A-11: HEAT FLUX AT 250 FT. DEPTH VS. TIME (SHEET 2 OF 2)



GRAPH A-12: SIDESTRING LOG COMPARED WITH FIXED THERMOCOUPLE MEASUREMENTS

THERMOCASE 750®

VACUUM INSULATED STEAM INJECTION TUBULARS

PRODUCT SPECIFICATION

PHYSICAL

Size	3 1/2" X 2 3/8"
Total Weight (#/Ft)	13.8
Length	Range 3

OUTER TUBE (Threaded and Coupled)

Grade	API 5CT, K-55 Seamless
O.D. (In.)	3.5
I.D. (In.)	2.992
Wall (in.)	0.254
Weight (#/Ft)	9.2
Threads	USS Buttress

INNER TUBE

Grade	API 5CT, L-80 Seamless
O.D. (In.)	2.375
I.D. (In.)	1.995
Wall (In.)	0.190
Weight (#/Ft)	4.43

COUPLING

Grade	API 5CT, K-55
O.D. (In.)	4.250
Threads	USS Buttress w/Seal Rings Manganese Phosphate Coated

OPERATIONAL

CONDUCTIVITY (BTU/HR·FT·°F) at 670°F

K-Factor:	Body	0.0023
	Coupling	0.15
	Overall	0.010

Gettered for 10-year Life Under Normal Well Conditions

Maximum Start-Up Pressure (psi)	4500 @ 200°F
Maximum Wellhead Operating Pressure	2600 @ 670°F
Maximum Downhole Operating Pressure	3500 @ 670°F

Table A-1

TABLE A-2: TABULATED HEAT FLUX AND STEAM DATA (SHEET 1 OF 4)

TEST CASE A, CONDITION 1 HEAT FLUX AND STEAM DATA													
	WATER	STEAM				CASING						STRING	
TIME	LB/HR	LB/HR	TEMP	QUAL		250FT A	250FT B'	500FT A	500FT B	750FT A	750FT B	CENT	BODY
6/9/90 13:31	2853.14	217.01	355.80	7.07		20.52	10.74	29.92	32.63	70.49	99.24	9.60	4.14
6/9/90 14:04	2822.44	216.25	355.07	7.12		20.40	12.51	29.04	33.38	71.97	89.20	10.13	4.57
6/9/90 14:39	2804.27	185.99	355.21	6.22		19.79	11.26	28.07	32.38	91.38	87.37	11.59	4.09
6/9/90 16:12	2793.26	207.64	354.45	6.92		22.36	9.97	26.35	34.15	86.53	72.71	9.56	3.80
6/9/90 16:46	2835.46	210.73	353.99	6.92		21.25	11.94	29.66	31.26	78.82	89.79	11.07	3.26
6/9/90 17:20	2860.33	227.21	354.19	7.36		20.67	11.44	29.83	37.38	80.19	90.39	10.63	3.41
6/9/90 17:54	2839.66	220.18	354.12	7.20		19.78	11.56	31.47	32.22	81.03	69.04	10.77	2.96
6/9/90 18:28	2899.35	206.28	353.71	6.64		20.87	10.92	30.02	36.80	88.47	89.64	10.19	4.35
6/9/90 19:01	2875.53	203.76	353.90	6.62		17.82	12.27	30.85	33.45	77.51	80.16	11.09	2.81
6/9/90 19:36	2877.72	218.98	353.86	7.07		19.66	12.37	31.03	36.21	84.10	90.79	10.58	1.55
6/9/90 20:39	2847.35	206.81	353.92	6.77		17.22	10.74	30.48	35.12	71.56	88.44	11.04	2.12
6/9/90 22:12	2830.07	180.25	354.26	5.99		21.20	8.67	28.89	31.16	82.25	79.08	12.03	2.96
6/9/90 22:46	2843.22	206.95	354.27	6.78		19.59	10.06	32.24	30.66	73.84	91.26	11.05	2.16
6/9/90 23:20	2804.67	216.14	354.15	7.16		20.64	10.30	30.11	35.58	69.08	85.44	10.25	2.28
6/9/90 23:54	2767.81	219.23	354.72	7.34		20.08	10.32	37.68	33.78	84.55	85.14	10.48	3.14
6/10/90 12:48	2737.88	139.72	353.13	4.86		15.51	7.59	39.53	43.76	52.59	70.26	11.66	3.97
6/10/90 15:31	2605.76	108.74	352.88	4.01		15.99	9.59	31.54	35.94	73.55	72.00	11.63	4.10
6/10/90 16:04	2612.36	115.03	353.29	4.22		15.08	9.27	32.38	35.58	69.13	65.05	13.49	4.40
6/10/90 16:39	2657.47	103.21	353.16	3.74		17.88	6.93	31.27	35.31	69.67	74.77	7.94	3.31
6/11/90 8:28	2843.11	163.44	351.57	5.44		16.04	10.87	27.15	34.33	94.01	105.31	9.86	7.23

TABLE A-2: TABULATED HEAT FLUX AND STEAM DATA (SHEET 2 OF 4)

TEST CASE A, CONDITION 2 HEAT FLUX AND STEAM DATA													
	WATER	STEAM				CASING						STRING	
TIME	LB/HR	LB/HR	TEMP	QUAL		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	CENT	BODY
6/12/90 0:46	450.20	1681.44	406.80	78.88		327.94	315.39	49.93	64.46	121.09	125.03	-3.52	-3.83
6/12/90 3:23	250.75	1689.94	405.59	87.08		322.81	301.99	51.94	57.04	90.87	116.38	6.12	5.97
6/12/90 10:37	84.42	1819.22	399.22	95.57		244.90	194.16	59.29	60.82	104.26	127.02	7.05	3.95
6/12/90 12:11	84.82	1817.19	397.01	95.54		79.85	47.40	120.17	125.93	50.45	62.85	18.39	14.85
6/12/90 13:05	84.82	1816.68	396.84	95.54		76.40	38.52	134.82	139.77	49.92	63.79	18.43	14.99
6/12/90 13:21	84.82	1812.87	396.43	95.53		69.02	36.33	141.47	146.05	58.50	65.87	17.72	14.10
6/12/90 13:33	85.46	1817.83	396.41	95.51		66.31	30.88	136.96	141.35	63.91	76.94	17.15	14.76
6/12/90 15:15	377.66	1879.89	398.47	83.27		41.65	20.08	31.43	36.48	117.84	145.47	16.56	12.58
6/12/90 20:30	395.41	2003.42	401.83	83.52		446.14	398.24	61.05	61.43	286.30	312.74	3.88	0.87
6/13/90 0:30	379.99	1939.07	400.09	83.61		80.96	61.74	44.31	53.94	153.42	183.11	18.63	15.43
6/13/90 10:43	326.71	2091.43	400.83	86.49		29.28	21.85	62.47	62.95	149.12	202.11	14.62	9.79
6/13/90 20:47	385.84	2175.38	399.73	84.94		28.25	23.35	60.42	58.38	123.18	154.10	10.77	9.52
6/14/90 12:00	229.59	2251.28	399.11	90.75		28.52	22.78	5.30	66.20	131.46	152.63	9.37	7.19
6/15/90 7:15	81.63	2347.29	393.96	96.64		28.60	24.15	58.66	65.82	110.48	127.50	12.37	9.80
6/15/90 8:59	82.27	2382.42	394.25	96.66		28.65	23.87	63.87	69.84	126.27	145.54	12.85	9.04

TABLE A-2: TABULATED HEAT FLUX AND STEAM DATA (SHEET 3 OF 4)

TEST CASE A, CONDITION 3 HEAT FLUX AND STEAM DATA JULY 12,1990													
	WATER	STEAM				CASING						STRING	
TIME	LB/HR	LB/HR	TEMP	QUAL.		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	CENT	BODY
0:22	236.84	7358.36	446.79	96.88		41.01	36.73	195.33	201.29	170.91	170.00	31.70	11.98
0:55	247.93	7356.24	446.66	96.74		41.24	37.52	195.39	200.95	170.81	169.94	38.06	12.23
1:29	273.28	7357.94	447.00	96.42		41.88	37.01	194.72	200.33	170.37	169.64	35.26	13.23
2:03	261.32	7345.61	446.61	96.56		42.67	36.55	193.91	199.38	169.87	169.15	34.14	12.59
2:37	257.12	7335.72	446.63	96.61		44.10	38.45	193.52	199.08	169.94	169.13	33.47	13.48
3:10	220.77	7362.99	447.01	97.09		43.08	37.96	193.13	198.74	169.84	169.13	36.68	12.46
3:44	227.68	7350.55	446.86	97.00		43.41	36.85	192.41	198.20	169.61	168.97	32.70	14.46
4:18	219.92	7384.20	446.99	97.11		43.91	37.22	191.81	197.60	169.38	168.64	38.47	12.68
4:52	274.29	7344.56	446.74	96.40		43.10	36.98	191.83	197.75	169.37	168.92	32.81	12.93
5:25	246.64	7350.01	446.62	96.75		42.62	38.11	191.17	197.12	169.20	168.67	33.64	13.19
5:59	233.94	7345.84	446.77	96.91		40.40	36.60	190.97	196.79	169.20	168.49	36.37	11.66
6:33	220.08	7343.69	446.90	97.09		39.67	36.70	190.65	196.59	169.05	168.49	37.14	13.26
7:07	270.41	7379.58	447.37	96.47		39.50	36.68	190.14	196.34	169.10	168.52	38.18	12.61
7:40	220.50	7400.30	447.26	97.11		35.15	36.58	189.99	195.94	168.99	168.48	33.98	13.02
8:14	179.85	7413.08	447.48	97.63		34.81	36.32	189.81	195.54	168.76	168.29	34.72	12.55
8:27	174.96	7472.10	447.83	97.71		31.80	35.56	189.50	195.30	168.37	168.04	34.29	12.39
9:01	162.57	7471.19	448.03	97.87		31.27	34.85	188.95	194.77	168.00	167.70	35.46	12.83
9:35	184.26	7447.54	447.75	97.59		33.65	34.06	188.35	194.26	167.84	167.56	36.44	12.21
10:08	196.22	7451.74	447.85	97.43		30.97	33.11	187.94	193.84	167.42	167.33	34.56	13.13
10:42	200.26	7505.95	448.56	97.40		31.36	33.23	187.27	193.52	167.28	167.05	35.08	13.02
11:16	167.15	7491.82	448.29	97.82		32.05	31.67	186.97	193.06	167.06	166.83	39.29	11.85
11:50	206.46	7460.87	448.33	97.31		34.36	28.12	186.72	192.76	166.91	166.86	35.89	12.45

TABLE A-2: TABULATED HEAT FLUX AND STEAM DATA (SHEET 4 OF 4)

TEST CASE A, CONDITION 3 HEAT FLUX AND STEAM DATA JULY 12, 1990													
	WATER	STEAM				CASING						STRING	
TIME	LB/HR	LB/HR	TEMP	QUAL		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	CENT	BODY
12:23	188.43	7478.95	448.56	97.54		33.78	28.02	185.84	192.23	166.58	166.55	37.91	12.83
12:57	196.89	7470.72	448.36	97.43		34.44	28.50	185.41	191.63	166.23	166.13	35.85	10.05
13:31	211.56	7443.24	448.06	97.24		40.53	27.94	185.23	191.33	166.05	165.95	36.49	11.80
14:05	280.61	7439.59	447.97	96.37		40.00	32.35	184.60	190.90	165.75	165.60	32.16	11.98
14:38	189.53	7472.40	448.26	97.53		45.04	32.55	184.25	190.72	165.62	165.62	32.62	12.20
15:12	166.08	7469.97	448.40	97.83		47.10	34.57	183.92	190.06	165.21	165.23	32.05	12.13
15:46	164.22	7475.98	448.54	97.85		49.71	39.67	183.74	189.80	165.23	165.09	32.20	12.07
16:20	188.30	7442.28	448.32	97.53		50.03	41.05	183.04	189.11	164.77	164.67	36.63	12.27
16:53	182.98	7467.42	448.57	97.61		56.26	44.65	182.63	188.81	164.67	164.58	37.09	12.07
17:27	167.73	7435.84	448.20	97.79		54.66	47.13	182.32	188.47	164.49	164.32	35.29	11.53
17:33	207.27	7432.61	448.15	97.29		55.80	47.31	182.40	188.40	164.47	164.40	33.29	12.17
18:07	229.86	7434.20	448.10	97.00		58.57	50.72	182.14	188.14	164.37	164.35	37.16	12.09
18:41	171.87	7438.83	448.31	97.74		65.63	51.51	182.17	187.96	164.49	164.42	31.82	12.45
19:15	192.60	7428.78	448.27	97.47		67.11	53.72	181.84	187.82	164.51	164.42	32.72	9.83
19:48	198.98	7465.40	448.56	97.40		72.30	51.07	181.96	187.61	164.65	164.40	38.02	11.94
20:22	151.55	7490.14	448.97	98.02		72.70	56.49	181.91	187.60	164.77	164.41	36.74	12.91
20:56	179.91	7463.65	448.68	97.65		74.67	57.20	181.86	187.57	164.74	164.36	35.34	12.45
21:30	190.63	7467.42	448.81	97.51		76.61	56.84	181.83	187.50	164.79	164.54	34.57	12.09
22:03	228.55	7463.65	448.67	97.03		73.64	63.54	181.58	187.37	164.89	164.57	32.18	10.81
22:37	200.14	7463.88	448.65	97.39		80.78	66.01	181.38	187.17	164.74	164.39	32.84	10.70
23:11	167.56	7466.78	448.63	97.81		84.16	65.13	181.31	186.90	164.54	164.29	33.36	13.25
23:45	203.56	7490.61	449.06	97.35		76.73	73.66	181.48	186.57	164.44	164.16	38.24	9.43

TABLE A-3: TABULATED TEMPERATURE DATA (SHEET 1 OF 4)

TEST CASE A, CONDITION 1 STABLE TEMPERATURE DATA													
	CASING								TUBING STRING				
TIME	200FT	250FT	300FT	400FT	500FT	600FT	700FT	800FT	200FT	250FT	300FT	600FT	800FT
6/9/90 13:31	126.55	137.73	199.78	299.80	129.28	140.06	145.19	235.80	130.55	140.10	194.68	136.63	233.55
6/9/90 14:04	126.53	137.75	199.72	299.81	129.28	140.19	145.20	235.90	130.54	140.10	193.49	137.22	234.45
6/9/90 14:39	126.57	137.79	199.05	299.66	129.28	140.18	145.15	235.59	130.55	140.08	193.47	137.15	233.43
6/9/90 16:12	126.60	137.70	199.53	299.71	129.23	140.16	145.08	236.03	130.55	140.05	192.65	137.47	233.60
6/9/90 16:46	126.60	137.60	199.39	299.50	129.29	140.25	145.03	235.30	130.55	139.98	193.64	137.44	233.77
6/9/90 17:20	126.56	137.55	199.45	299.31	129.22	140.17	145.03	235.30	130.52	139.89	194.93	137.23	233.99
6/9/90 17:54	126.52	137.55	199.48	299.30	129.38	140.04	145.05	235.58	130.52	139.92	193.43	137.07	234.32
6/9/90 18:28	126.55	137.42	199.43	299.24	129.45	140.00	144.98	235.66	130.49	139.82	193.83	137.11	233.88
6/9/90 19:01	126.58	137.33	199.00	299.01	129.44	139.90	144.92	235.69	130.51	139.79	193.64	136.85	233.37
6/9/90 19:36	126.50	137.37	199.50	298.91	129.44	139.78	145.06	235.40	130.50	139.75	193.89	136.72	233.92
6/9/90 20:39	126.48	137.33	199.50	299.14	129.35	139.89	145.04	235.61	130.50	139.72	193.23	136.68	233.28
6/9/90 22:12	126.53	137.29	199.40	298.52	129.37	139.61	145.11	235.55	130.48	139.71	194.81	136.33	234.18
6/9/90 22:46	126.63	137.30	199.39	298.68	129.37	139.68	145.14	235.25	130.46	139.61	194.23	136.29	234.68
6/9/90 23:20	126.56	137.28	200.19	298.91	129.34	139.80	145.16	235.43	130.45	139.55	194.69	136.25	233.94
6/9/90 23:54	126.51	137.25	200.30	298.74	129.50	139.59	145.10	235.83	130.43	139.60	193.49	136.07	234.23
6/10/90 12:48	125.78	131.76	208.65	289.80	129.94	138.42	142.98	227.96	129.23	134.61	201.43	137.76	225.84
6/10/90 15:31	125.60	131.14	223.06	288.54	129.16	138.60	142.71	231.08	129.17	134.23	214.35	136.09	229.08
6/10/90 16:04	125.63	131.07	223.75	288.43	129.15	138.27	142.64	231.02	129.16	134.20	216.58	135.93	229.79
6/10/90 16:39	125.63	131.13	224.02	288.41	129.13	138.36	142.62	231.23	129.16	134.17	215.23	135.83	230.18
6/11/90 8:28	125.68	127.84	226.75	258.68	129.19	137.89	144.87	238.08	128.64	131.41	220.56	132.32	235.90

TABLE A-3: TABULATED TEMPERATURE DATA (SHEET 2 OF 4)

TEST CASE A, CONDITION 2 STABLE TEMPERATURE DATA													
	CASING								TUBING STRING				
TIME	200FT	250FT	300FT	400FT	500FT	600FT	700FT	800FT	200FT	250FT	300FT	600FT	800FT
6/12/90 0:46	212.40	212.32	219.72	268.30	135.88	147.20	146.96	261.42	212.62	212.61	200.00	144.58	260.14
6/12/90 3:23	213.55	213.67	214.64	262.57	136.63	147.51	147.20	260.73	213.61	213.54	113.96	145.15	258.73
6/12/90 10:37	212.50	212.41	212.51	215.20	137.31	147.20	147.12	256.80	212.83	212.54	0.00	144.44	256.00
6/12/90 12:11	189.13	191.46	195.93	226.20	141.85	145.58	148.45	246.64	198.51	199.17	0.00	146.07	245.10
6/12/90 13:05	186.88	189.40	193.92	228.26	143.76	145.47	148.64	246.17	196.30	196.95	0.00	145.89	244.49
6/12/90 13:21	185.44	187.93	192.70	229.28	144.75	145.32	148.64	245.63	194.65	195.41	0.00	145.67	243.92
6/12/90 13:33	184.45	186.80	191.82	229.74	145.26	145.28	148.59	245.66	193.53	194.33	0.00	145.63	243.81
6/12/90 15:15	177.28	178.67	185.79	230.01	141.02	142.74	147.53	264.30	185.49	185.63	0.00	142.26	263.23
6/12/90 20:30	218.12	215.31	217.40	222.54	144.06	138.62	154.08	331.74	216.09	216.07	0.00	138.86	332.72
6/13/90 0:30	187.20	189.98	193.76	216.96	138.70	148.28	155.43	289.04	196.95	197.26	0.00	146.39	287.11
6/13/90 10:43	160.61	162.46	167.79	226.90	140.13	147.19	154.68	281.26	167.50	167.42	0.00	138.90	279.82
6/13/90 20:47	151.55	153.30	157.50	227.25	140.20	149.85	154.80	274.75	157.50	157.20	0.00	139.60	273.20
6/14/90 12:00	144.35	146.70	148.20	223.25	141.20	146.85	153.60	275.25	150.30	150.00	0.00	138.50	274.70
6/15/90 7:15	140.19	141.88	141.30	218.52	143.13	149.96	152.07	270.58	144.93	144.19	0.00	147.43	268.83
6/15/90 8:59	140.11	141.50	141.05	217.92	143.18	150.08	152.28	271.97	144.92	144.22	0.00	145.60	270.45

TABLE A-3: TABULATED TEMPERATURE DATA (SHEET 3 OF 4)

TEST CASE A, CONDITION 3 STABLE TEMPERATURE DATA JULY 12,1990

	CASING														TUBING STRING				
TIME	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT B	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	200FT	250FT	400FT	600FT	800FT
0:22	152.5	152.4	150.8	211.4	210.9	211.2	211.6	211.2	211.8	211.1	212.1	211.9	212.2	212.3	162.9	155.3	211.6	211.8	211.4
0:55	152.3	152.4	150.6	211.5	210.9	211.2	211.7	211.1	211.8	211.1	212.1	211.9	212.2	212.2	162.8	155.2	211.6	211.7	211.2
1:29	152.1	152.1	150.4	211.3	210.8	211.2	211.6	210.9	211.7	211.1	212.1	211.7	212.1	212.1	162.5	155.0	211.5	211.6	211.1
2:03	152.1	152.1	150.7	211.4	210.8	211.2	211.6	211.0	211.7	211.1	212.1	211.8	212.1	212.1	162.4	154.9	211.5	211.6	211.3
2:37	151.9	152.0	150.9	211.4	210.9	211.4	211.7	211.2	211.9	211.2	212.2	211.9	212.2	212.3	162.3	154.8	211.7	211.8	211.3
3:10	151.8	151.9	150.5	211.4	210.9	211.3	211.7	211.1	211.8	211.1	212.1	211.9	212.1	212.1	162.2	154.7	211.6	211.7	211.1
3:44	151.8	151.8	150.5	211.4	210.9	211.3	211.7	211.1	211.8	211.1	212.1	211.8	212.1	212.1	162.1	154.5	211.6	211.6	211.3
4:18	151.8	151.8	150.7	211.5	210.8	211.2	211.7	211.2	211.8	211.1	212.2	211.9	212.2	212.2	162.1	154.5	211.7	211.8	211.4
4:52	151.5	151.6	150.3	211.3	210.9	211.3	211.7	211.0	211.8	211.1	212.1	211.9	212.1	212.1	161.8	154.4	211.7	211.7	211.1
5:25	151.4	151.5	150.2	211.3	210.8	211.2	211.6	211.0	211.8	211.1	212.1	211.8	212.1	212.1	161.7	154.3	211.6	211.7	211.3
5:59	151.4	151.5	150.4	211.5	211.0	211.4	211.7	211.2	211.9	211.2	212.2	212.0	212.3	212.4	161.7	154.3	211.8	211.9	211.5
6:33	151.3	151.4	150.0	211.5	210.9	211.3	211.7	211.1	211.9	211.2	212.2	211.9	212.2	212.2	161.6	154.2	211.7	211.9	211.2
7:07	151.1	151.2	149.8	211.4	210.9	211.3	211.7	211.1	211.8	211.1	212.1	211.8	212.1	212.1	161.4	154.1	211.6	211.8	211.3
7:40	151.1	151.2	149.7	211.5	211.0	211.4	211.8	211.2	211.9	211.2	212.3	212.0	212.3	212.3	161.4	154.0	211.7	211.9	211.4
8:14	151.1	151.1	149.5	211.5	211.0	211.4	211.8	211.3	212.0	211.2	212.3	212.0	212.2	212.3	161.3	154.0	211.8	211.9	211.5
8:27	151.1	151.1	149.4	211.5	211.1	211.4	211.8	211.3	212.0	211.2	212.4	212.0	212.3	212.3	161.3	154.0	211.9	212.0	211.4
9:01	150.9	151.0	149.2	211.5	210.9	211.3	211.8	211.2	211.9	211.2	212.3	211.9	212.2	212.2	161.1	153.9	211.8	211.8	211.3
9:35	150.7	150.8	149.0	211.4	210.9	211.3	211.7	211.1	211.9	211.1	212.2	211.8	212.1	212.1	160.9	153.8	211.7	211.7	211.3
10:08	150.7	150.8	148.9	211.5	210.9	211.2	211.7	211.2	211.8	211.1	212.2	211.8	212.1	212.1	160.9	153.8	211.8	211.9	211.4
10:42	150.6	150.7	148.8	211.5	210.8	211.2	211.6	211.3	211.8	211.0	212.2	211.7	212.1	212.1	160.8	153.8	211.8	211.8	211.4
11:16	150.4	150.5	148.7	211.4	210.8	211.1	211.6	211.2	211.7	210.9	212.1	211.7	212.1	212.1	160.7	153.8	211.7	211.9	211.4
11:50	150.4	150.4	148.5	211.3	210.8	211.1	211.6	211.0	211.7	210.9	212.1	211.7	212.0	212.0	160.6	153.7	211.7	211.7	211.1

TABLE A-3: TABULATED TEMPERATURE DATA (SHEET 4 OF 4)

TEST CASE A, CONDITION 3 STABLE TEMPERATURE DATA JULY 12,1990

	CASING														TUBING STRING				
TIME	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT B	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	200FT	250FT	400FT	600FT	800FT
12:23	150.1	150.3	148.3	211.1	210.7	211.0	211.5	211.1	211.6	210.9	212.1	211.6	211.9	211.9	160.6	153.7	211.7	211.6	211.3
12:57	150.1	150.3	148.3	211.3	210.8	211.0	211.5	211.1	211.7	210.9	212.1	211.5	211.9	212.0	160.5	153.8	211.7	211.8	211.3
13:31	150.1	150.2	148.6	211.2	210.8	211.0	211.5	211.1	211.6	210.8	212.1	211.6	211.9	212.0	160.5	153.9	211.6	211.9	211.4
14:05	150.1	150.2	148.6	211.3	210.7	211.0	211.4	211.1	211.5	210.9	212.1	211.6	211.9	211.9	160.3	153.9	211.8	211.8	211.3
14:38	150.1	150.1	149.0	211.3	210.8	211.1	211.4	211.0	211.5	210.9	212.0	211.6	212.0	212.0	160.3	154.0	211.6	211.9	211.3
15:12	149.9	150.0	149.1	211.2	210.7	211.0	211.3	211.1	211.5	210.8	211.9	211.5	211.9	211.9	160.0	154.1	211.7	211.7	211.3
15:46	149.8	149.9	149.4	211.2	210.7	210.9	211.2	211.0	211.4	210.8	211.9	211.5	211.8	211.8	160.0	154.2	211.5	211.6	211.1
16:20	149.7	149.7	149.7	211.1	210.6	210.9	211.2	210.9	211.4	210.8	211.8	211.5	211.8	211.8	159.9	154.3	211.5	211.5	211.1
16:53	149.7	149.7	150.1	211.1	210.6	210.8	211.2	211.0	211.4	210.8	211.8	211.5	211.7	211.8	159.9	154.5	211.6	211.5	211.0
17:27	149.7	149.7	150.4	211.2	210.7	211.0	211.3	211.0	211.5	210.8	211.9	211.5	211.8	211.9	159.8	154.7	211.5	211.6	211.0
17:33	149.7	149.7	150.4	211.1	210.6	210.9	211.2	210.8	211.4	210.8	211.8	211.5	211.8	211.8	159.7	154.7	211.6	211.5	211.1
18:07	149.6	149.7	150.8	211.1	210.7	210.9	211.1	211.0	211.4	210.8	211.8	211.5	211.8	211.8	159.7	154.9	211.5	211.5	211.0
18:41	149.6	149.6	151.2	211.1	210.7	210.9	211.2	211.0	211.4	210.8	211.8	211.5	211.8	211.9	159.6	155.1	211.4	211.5	211.2
19:15	149.6	149.6	151.8	211.2	210.8	211.0	211.3	211.0	211.5	210.9	211.8	211.6	211.9	212.0	159.5	155.3	211.5	211.5	211.2
19:48	149.7	149.7	152.1	211.3	210.8	211.1	211.4	211.1	211.6	210.9	211.9	211.7	212.0	212.1	159.5	155.6	211.6	211.6	211.2
20:22	149.7	149.8	152.5	211.4	210.8	211.1	211.5	211.1	211.7	211.0	212.0	211.7	212.0	212.1	159.5	155.9	211.5	211.6	211.2
20:56	149.7	149.8	152.9	211.5	210.9	211.3	211.7	211.1	211.9	211.0	212.1	211.8	212.1	212.1	159.5	156.1	211.6	211.7	211.3
21:30	149.6	149.7	153.2	211.5	210.9	211.3	211.8	211.2	211.9	211.1	212.2	211.8	212.1	212.1	159.4	156.4	211.6	211.7	211.4
22:03	149.6	149.7	153.4	211.5	210.9	211.3	211.8	211.2	212.0	211.1	212.2	211.8	212.1	212.1	159.3	156.6	211.7	211.7	211.3
22:37	149.6	149.7	154.0	211.5	210.9	211.4	211.8	211.2	212.0	211.1	212.3	211.8	212.1	212.2	159.3	156.9	211.6	212.0	211.4
23:11	149.5	149.7	154.4	211.5	210.9	211.3	211.8	211.2	212.0	211.0	212.3	211.8	212.1	212.1	159.3	157.1	211.7	212.0	211.4
23:45	149.5	149.6	154.6	211.5	211.0	211.5	211.9	211.2	212.0	211.1	212.3	211.9	212.1	212.2	159.2	157.3	211.7	212.0	211.5

TIME	TEMPERATURE (Deg.F.)
0:22	173.2
0:55	173.2
1:29	173.0
2:03	173.0
2:37	173.0
3:10	172.9
3:44	172.9
4:18	172.8
4:52	172.7
5:25	172.7
5:59	172.7
6:33	172.6
7:07	172.6
7:40	172.5
8:14	172.5
8:27	172.5
9:01	172.4
9:35	172.3
10:08	172.3
10:42	172.3
11:16	172.2
11:50	172.1
12:23	172.1
12:57	172.1
13:31	172.2
14:05	172.2
14:38	172.3
15:12	172.3
15:46	172.4
16:20	172.4
16:53	172.6
17:27	172.7
17:33	172.7
18:07	172.9
18:41	173.1
19:15	173.3
19:48	173.5
20:22	173.7
20:56	174.0
21:30	174.2
22:03	174.4
22:37	174.6
23:11	174.8
23:45	175.0

Table A-4: Average Surface Temperature of Instrumented Joint on 7/12/90

TEST CASE A-1 DATA

APPENDIX A1: REDUCED DATA FOR UNCENTRALIZED, INSULATED TUBING WITH THERMAL PACKER

FIGURES

Figure A1-1: Layout of Tubular and Casing Sensors

Figure A1-2: Relationships between Sensor Locations

GRAPHS

Condition #2

Graph A1-1: Casing Side A Temperature vs. Time

Graph A1-2: Casing Side B Temperature vs. Time

Graph A1-3: Tubing String Temperature vs. Time

Graph A1-4: Casing Heat Flux vs. Time

Graph A1-5: Heat Flux at 250 Ft. vs. Time

Graph A1-6: Heat Flux at 500 Ft. vs. Time

Graph A1-7: Tubing String Heat Flux vs. Time

Graph A1-8: Steam Mass Flow vs. Time

Graph A1-9: Steam Quality Vs. Time

Graph A1-10: Steam Temperature vs. Time

Condition #3

Graph A1-11: Casing Side A Temperature vs. Time

Graph A1-12: Casing Side B Temperature vs. Time

Graph A1-13: Tubing String Temperature vs. Time

Graph A1-14: Casing Heat Flux vs. Time

Graph A1-15: Heat Flux at 250 Ft. vs. Time

Graph A1-16: Heat Flux at 500 Ft. vs. Time

Graph A1-17: Tubing String Heat Flux vs. Time

Graph A1-18: Steam Mass Flow vs. Time

Graph A1-19: Steam Quality vs. Time

Graph A1-20: Steam Temperature vs. Time

TABLES

Table A1-1 & A1-2: Condition 2 String and Casing Temperature Data

Table A1-3 & A1-4: Condition 2 String and Casing Heat Flux Data and Steam Data

Table A1-5 & A1-6: Condition 3 String and Casing Temperature Data

Table A1-7 & A1-8: Condition 3 String and Casing Heat Flux Data and Steam Data

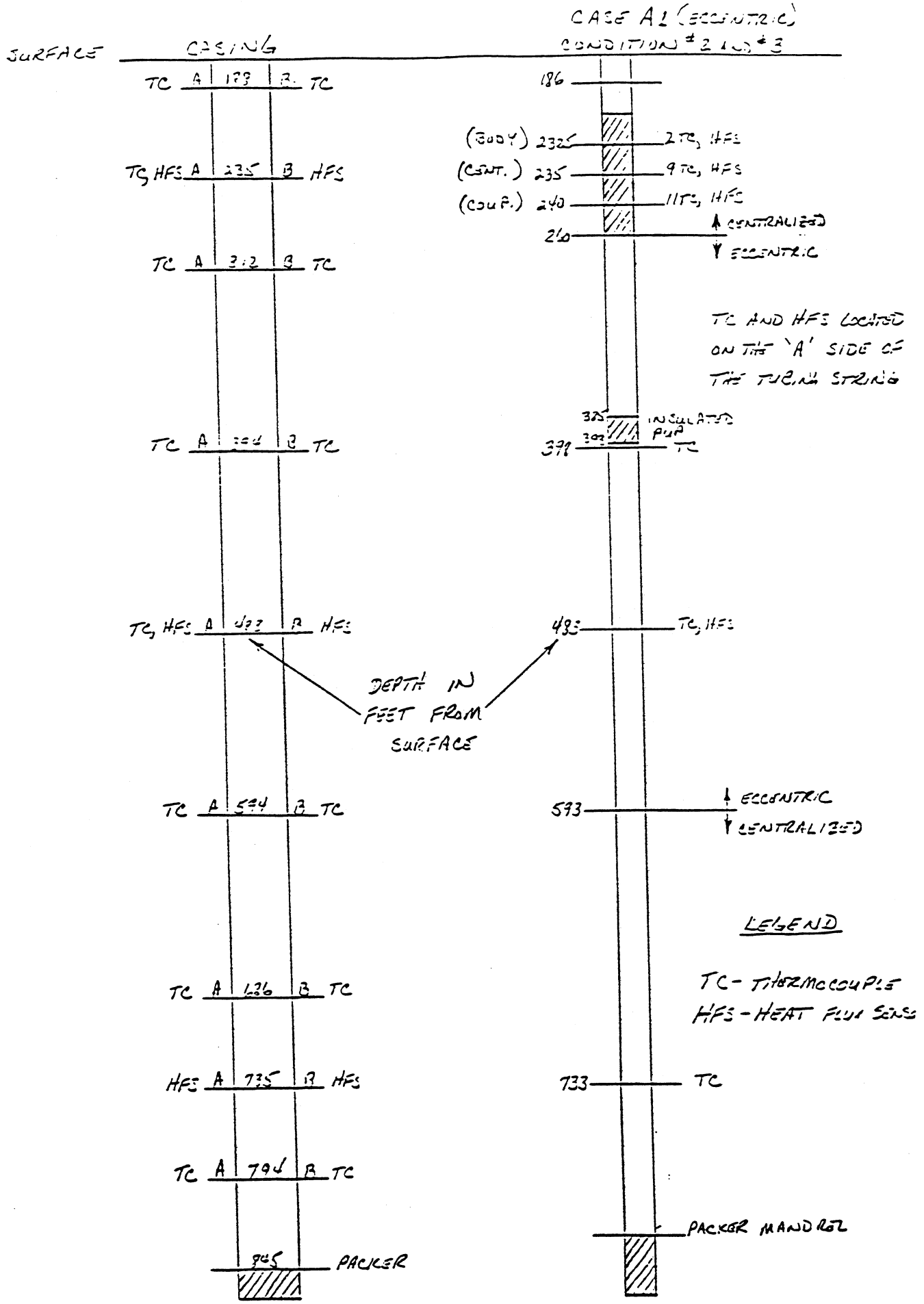


FIGURE A1-1: LAYOUT OF TUBULAR AND CASING SENSORS

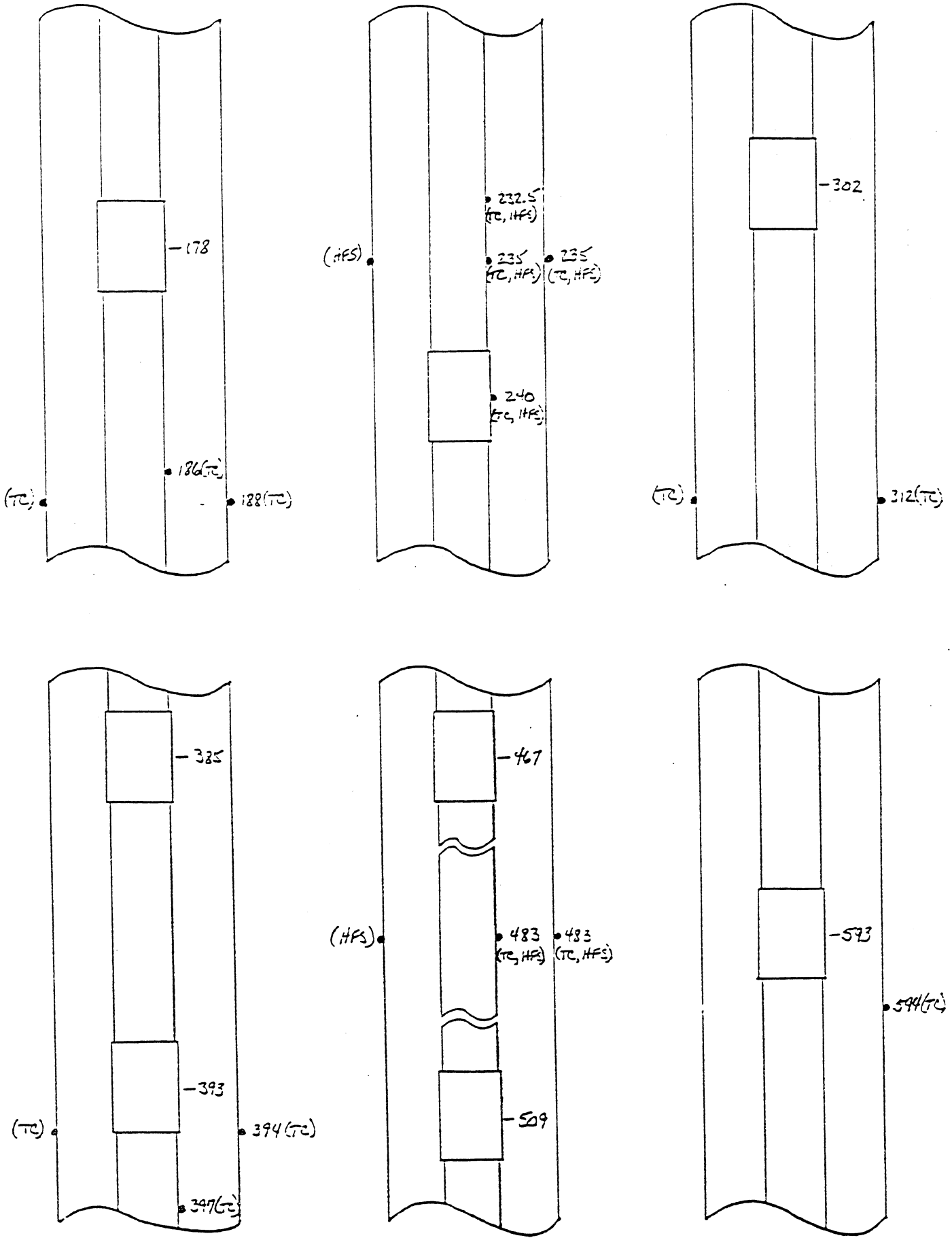
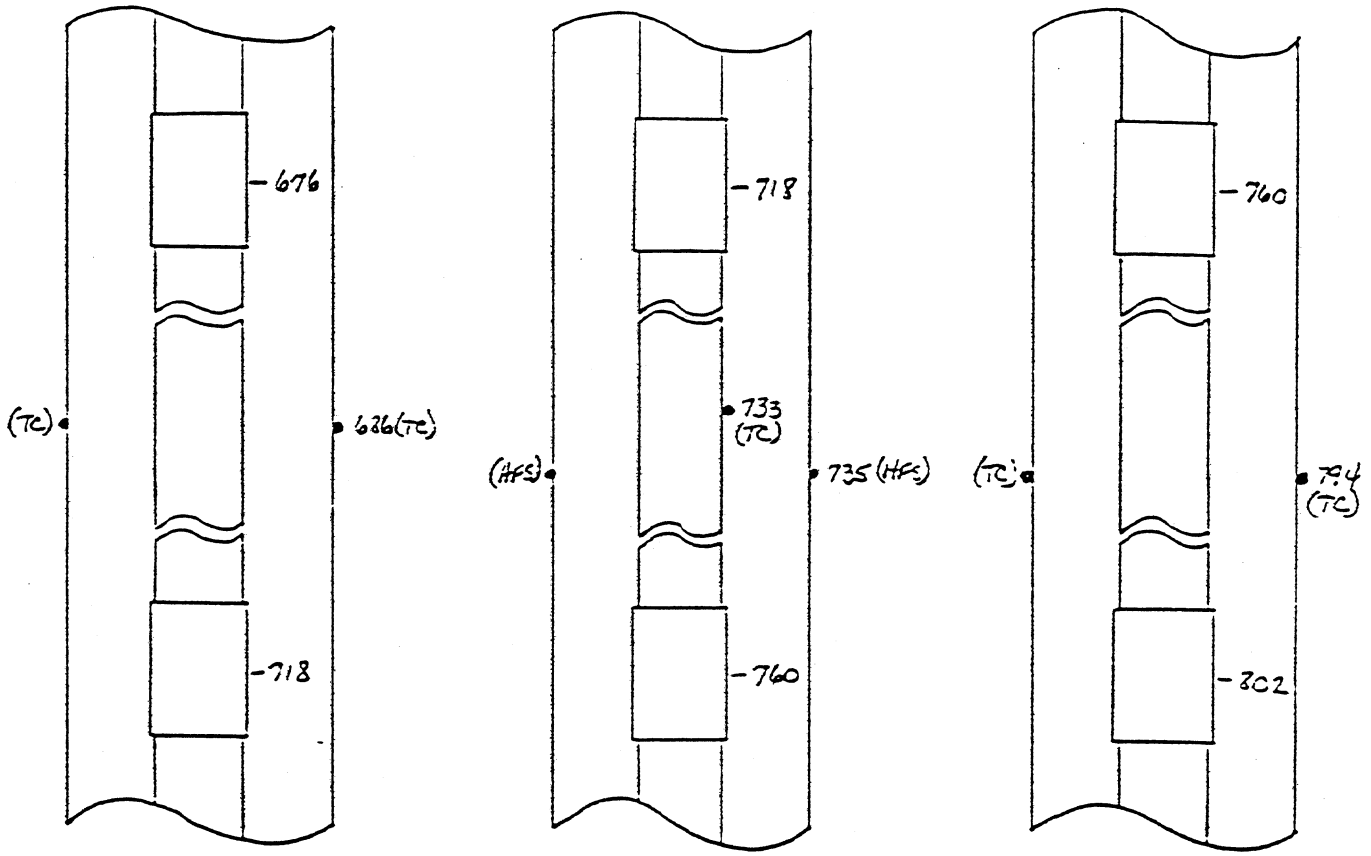


FIGURE A1-2: RELATIONSHIP BETWEEN SENSOR LOCATION (SHEET 1 OF 2)



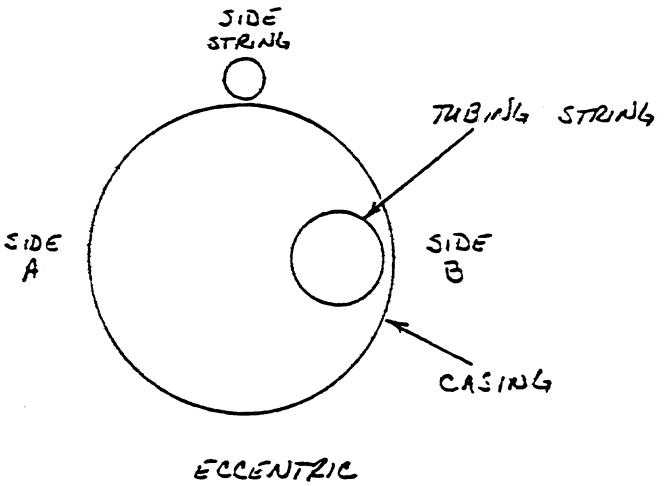
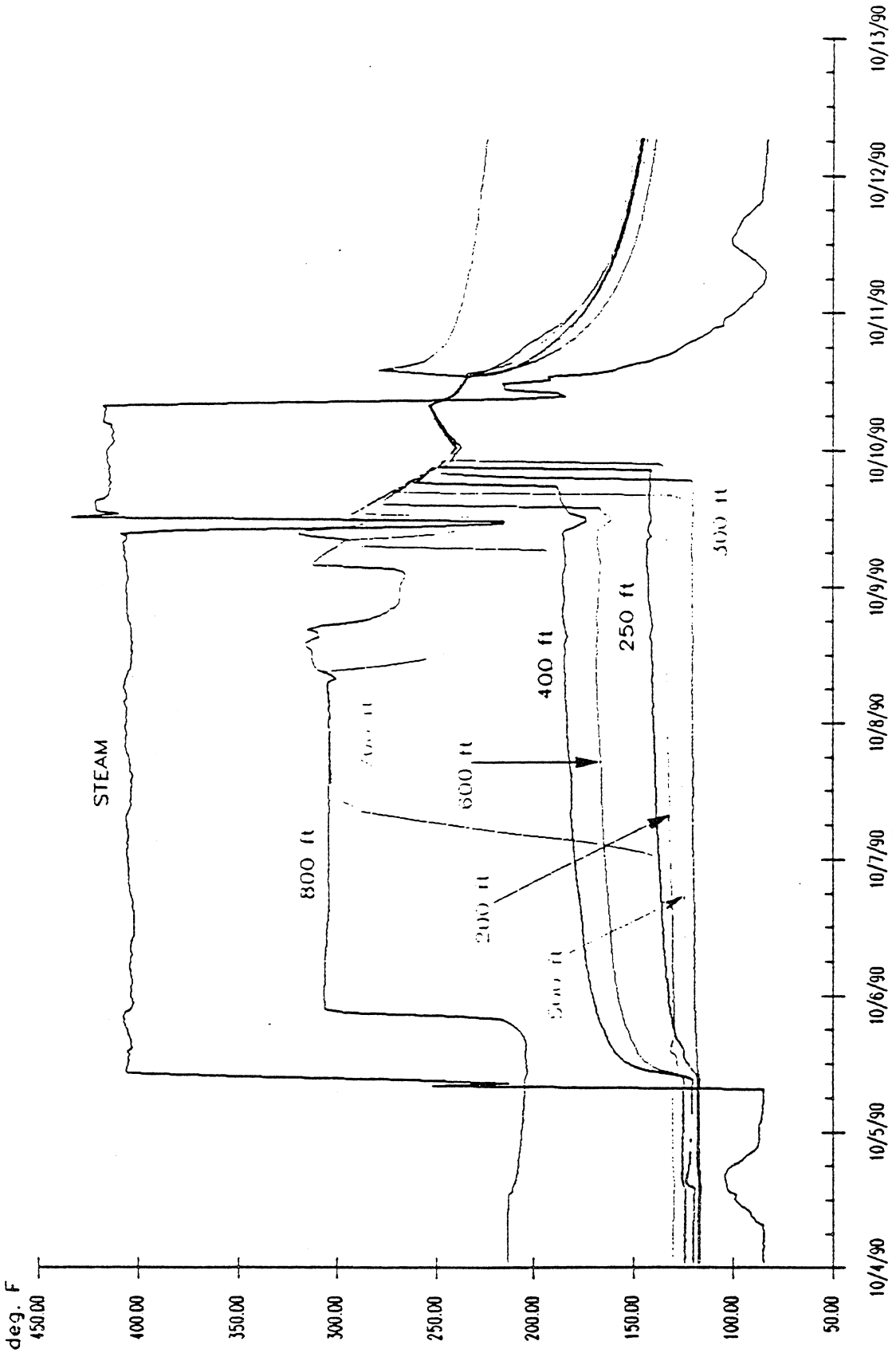
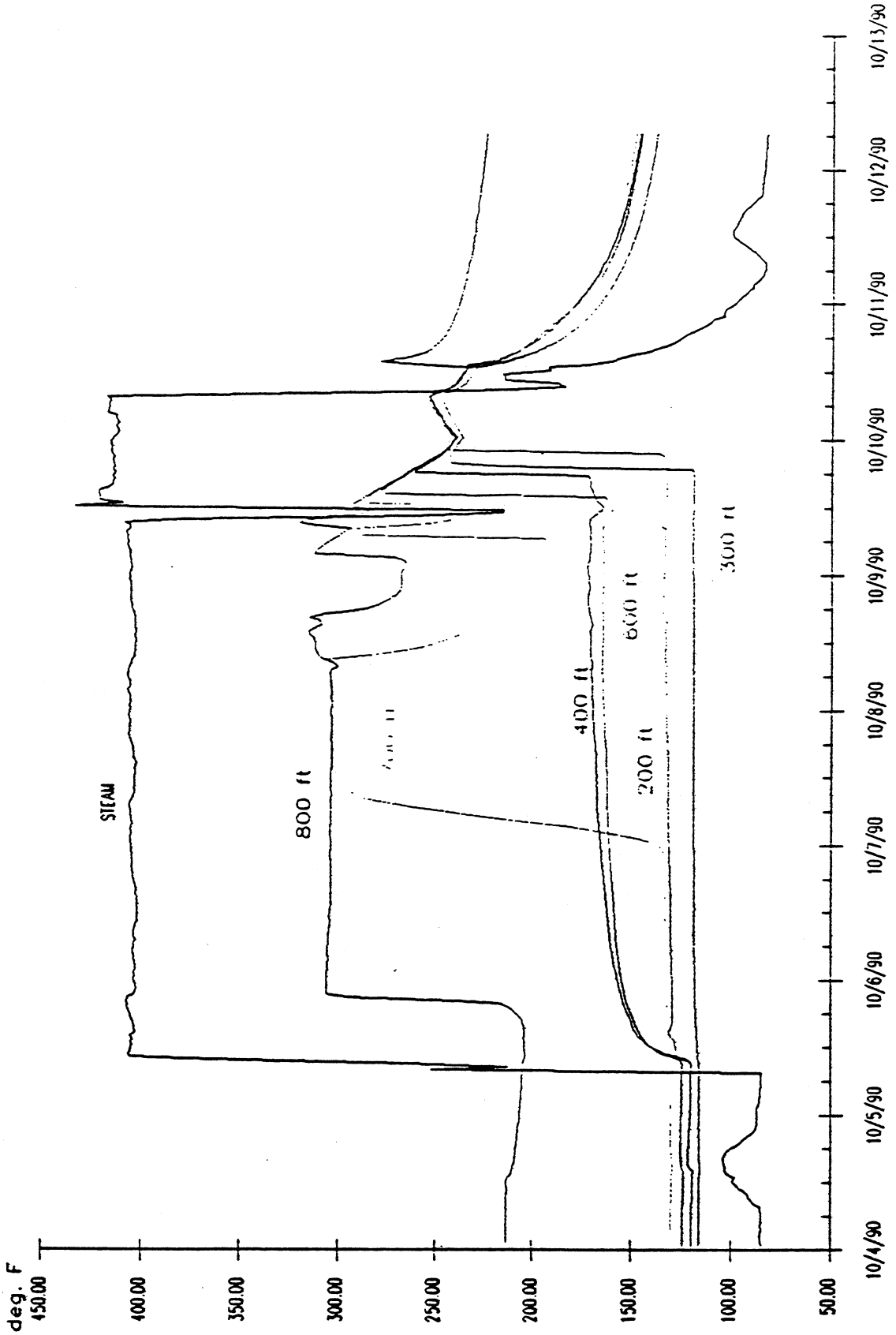


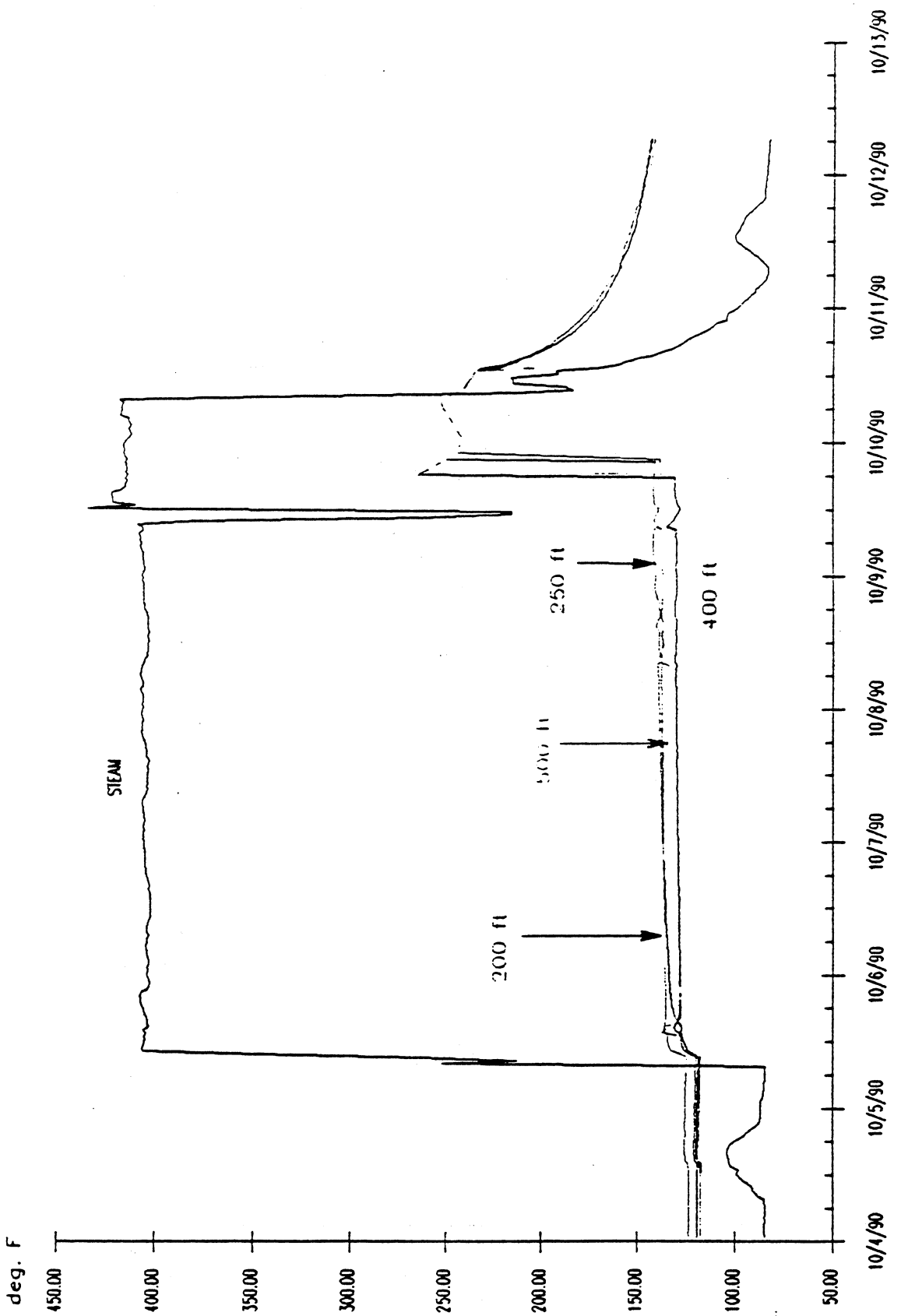
FIGURE A1-2: RELATIONSHIP BETWEEN SENSOR LOCATION (SHEET 2 OF 2)



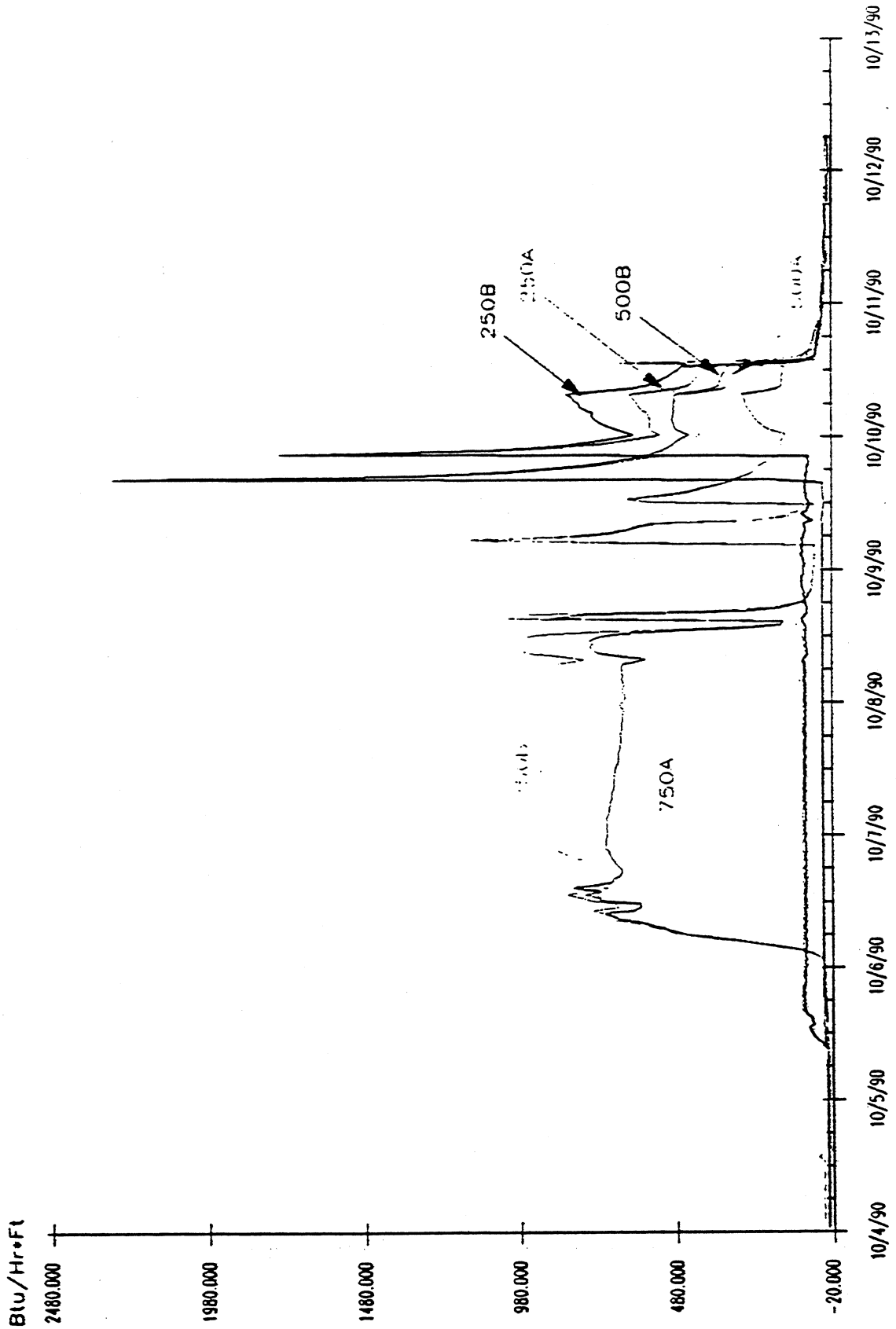
GRAPH A1-1: CASING SIDE A TEMPERATURE VS. TIME



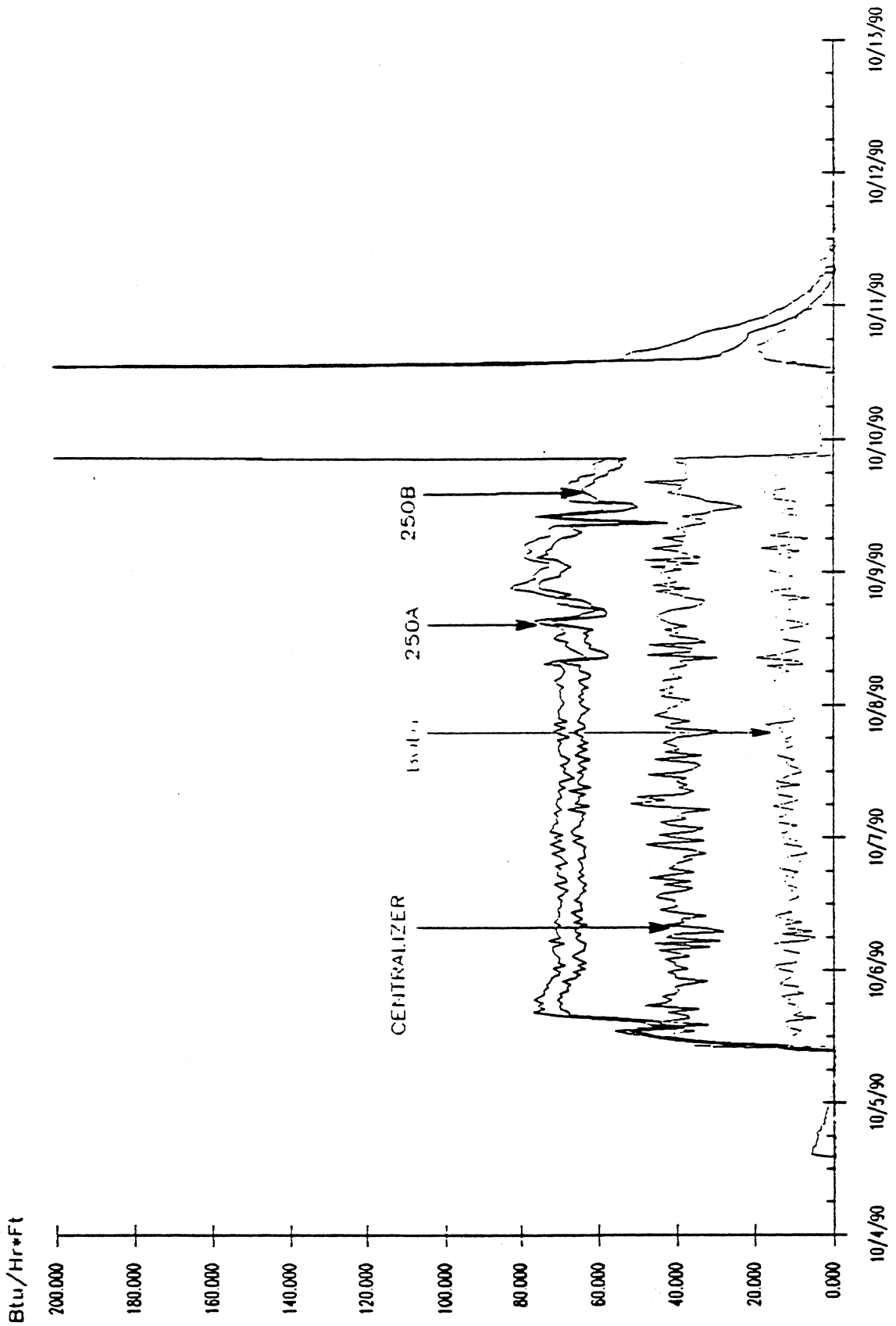
GRAPH A1-2: CASING SIDE B TEMPERATURE VS. TIME



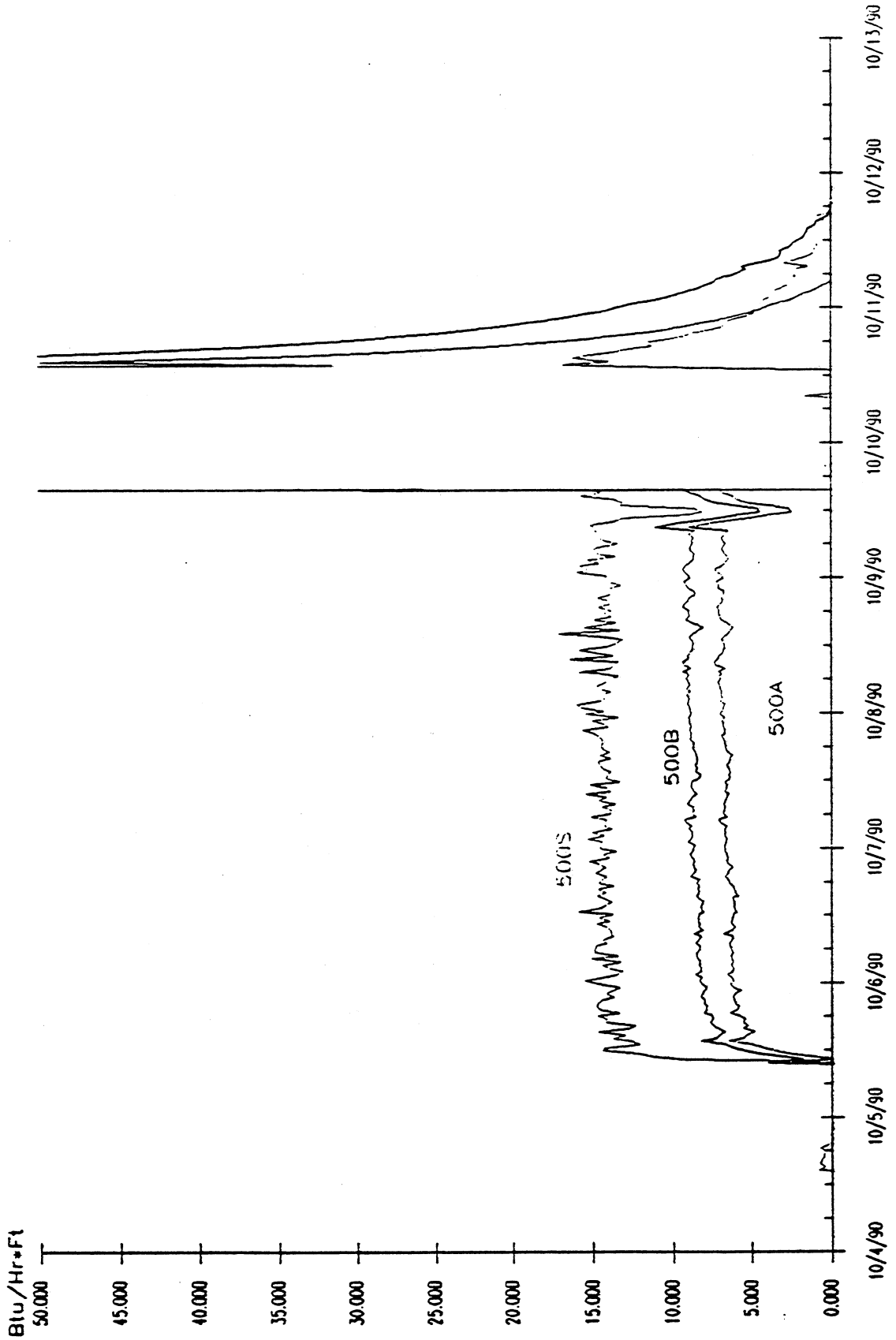
GRAPH A1-3: TUBING STRING TEMPERATURE VS. TIME



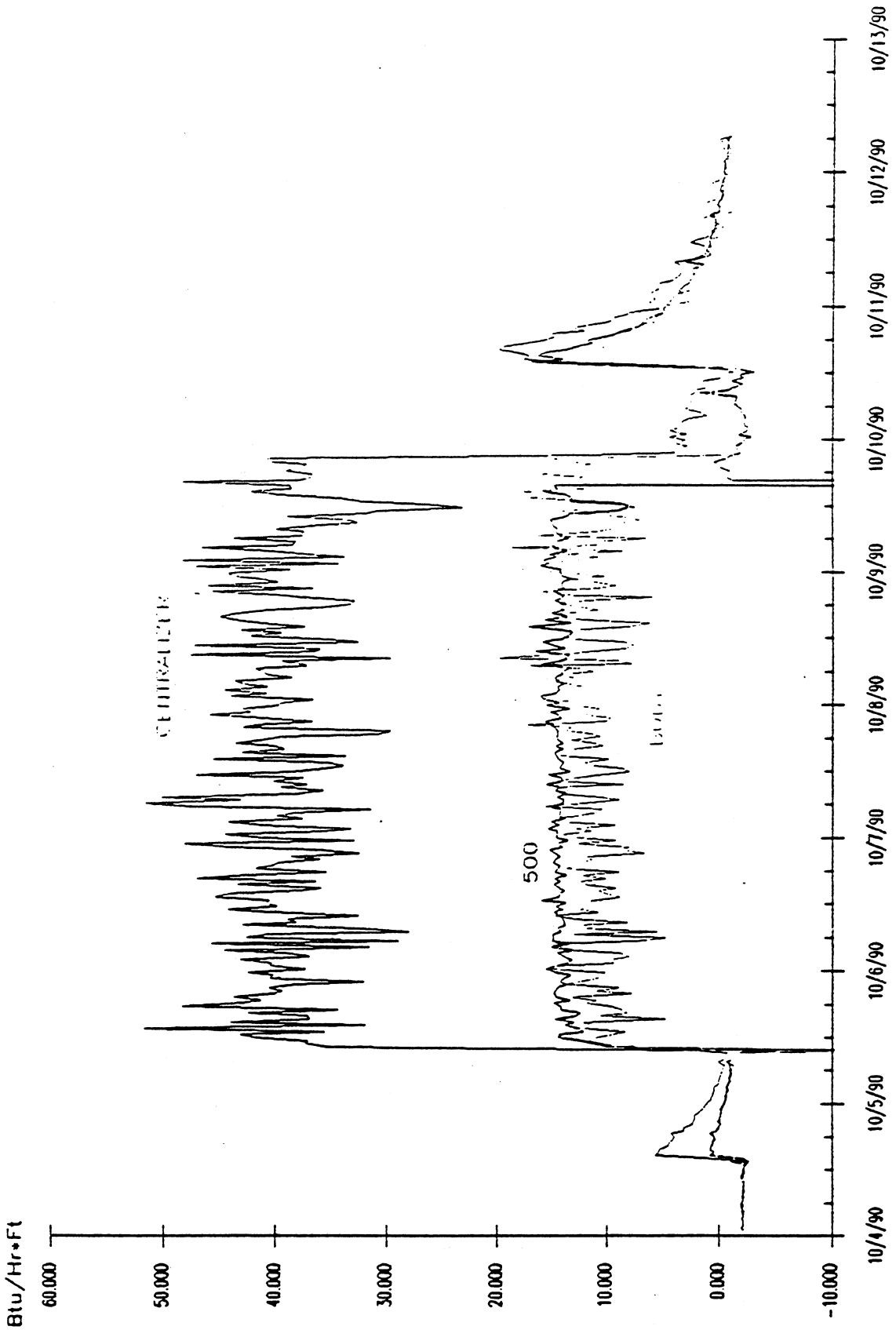
GRAPH A1-4: CASING HEAT FLUX VS. TIME



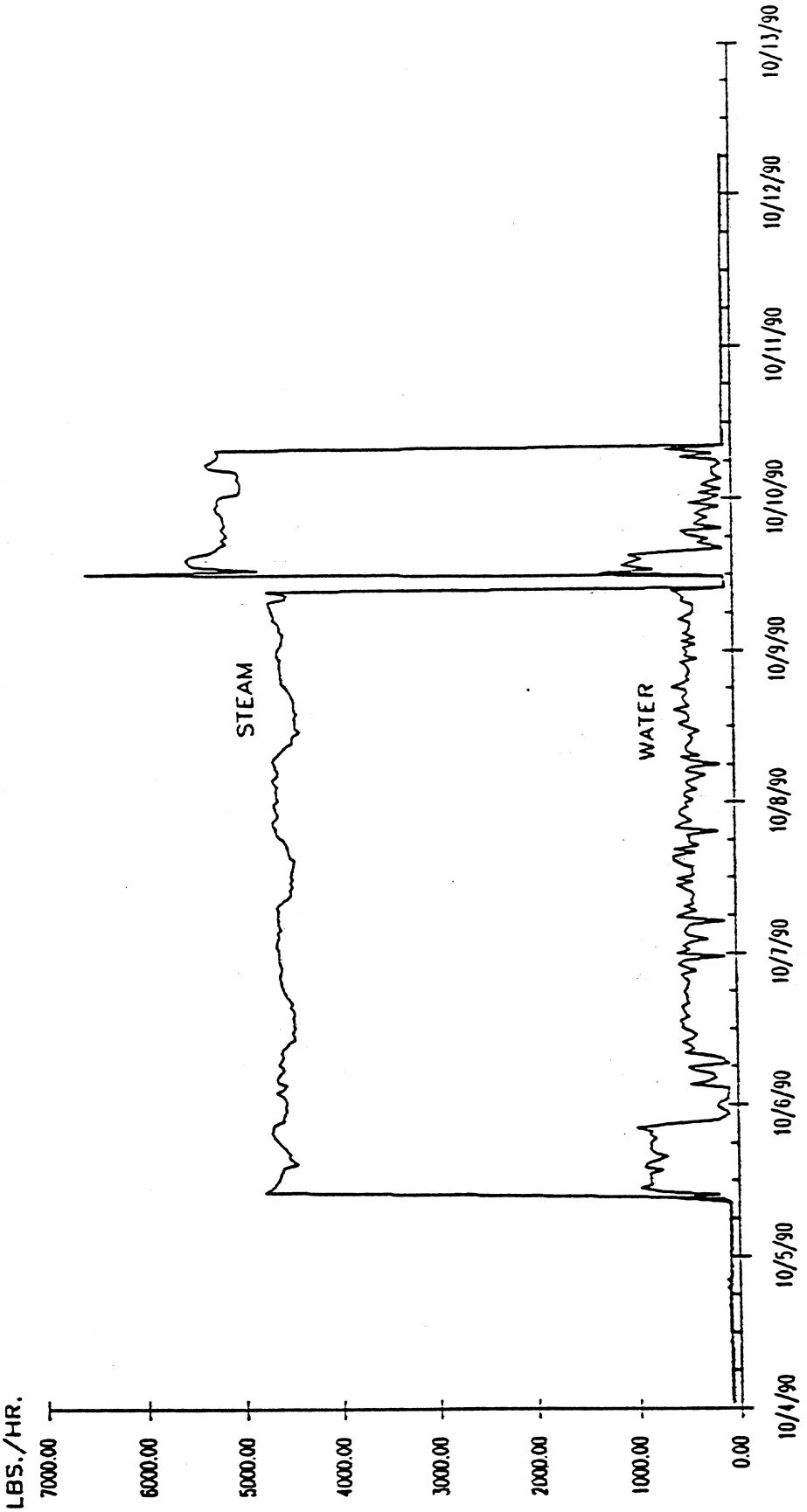
GRAPH A1-5: HEAT FLUX AT 250 FT. VS. TIME



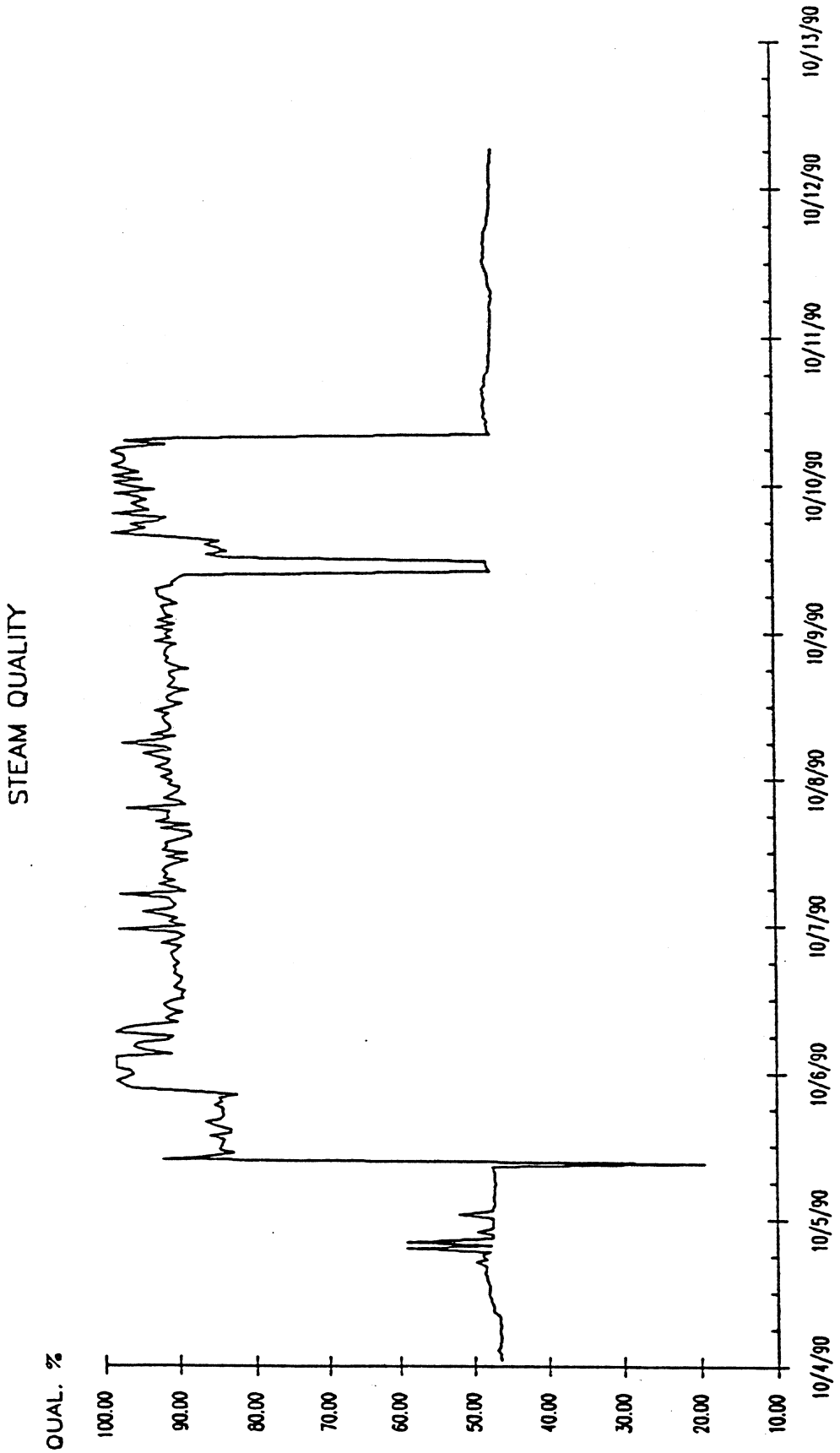
GRAPH A1-6: HEAT FLUX AT 500 FT. VS. TIME



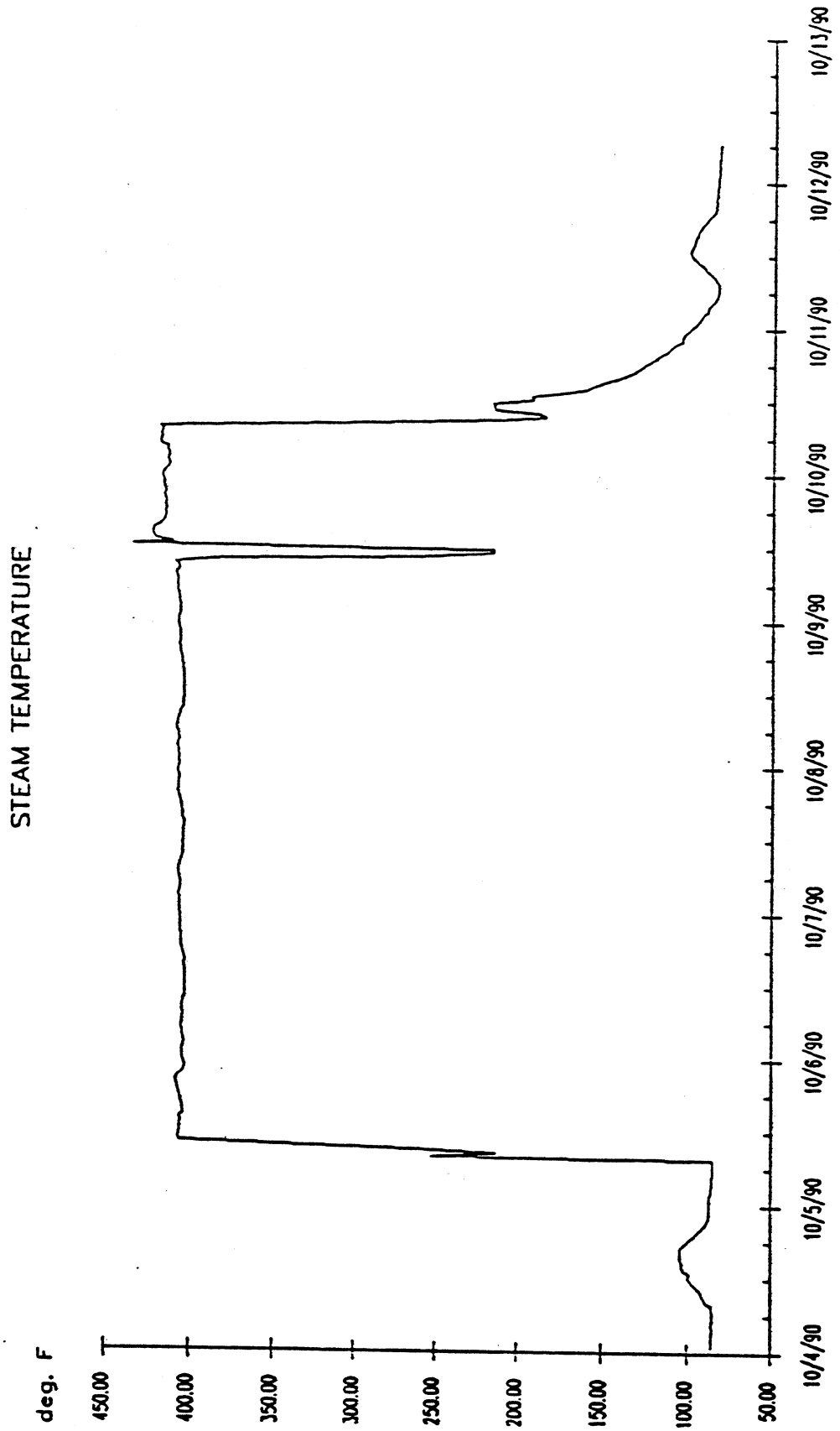
GRAPH A1-7: TUBING STRING HEAT FLUX VS. TIME



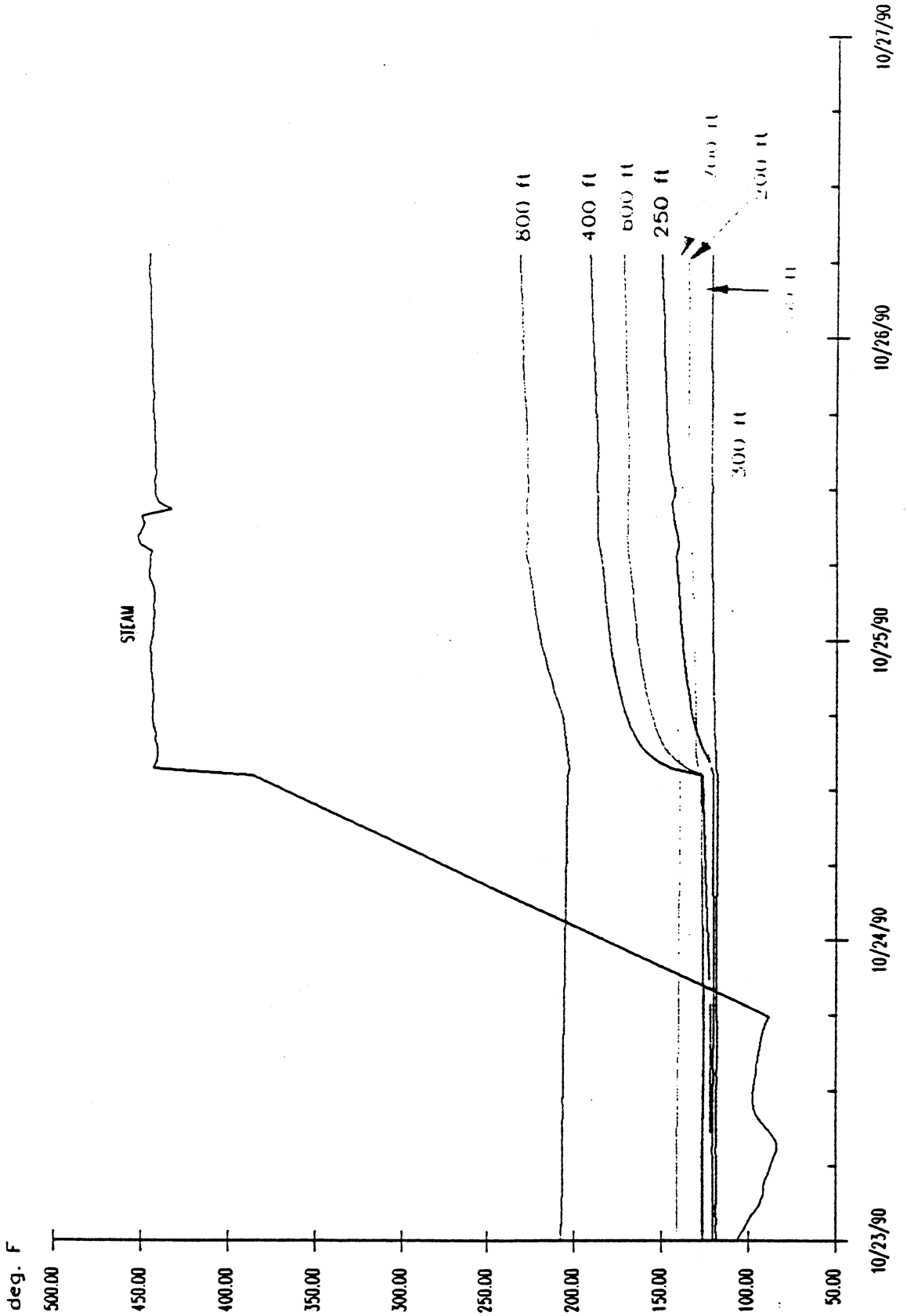
GRAPH A1-8: STEAM MASS FLOW VS. TIME



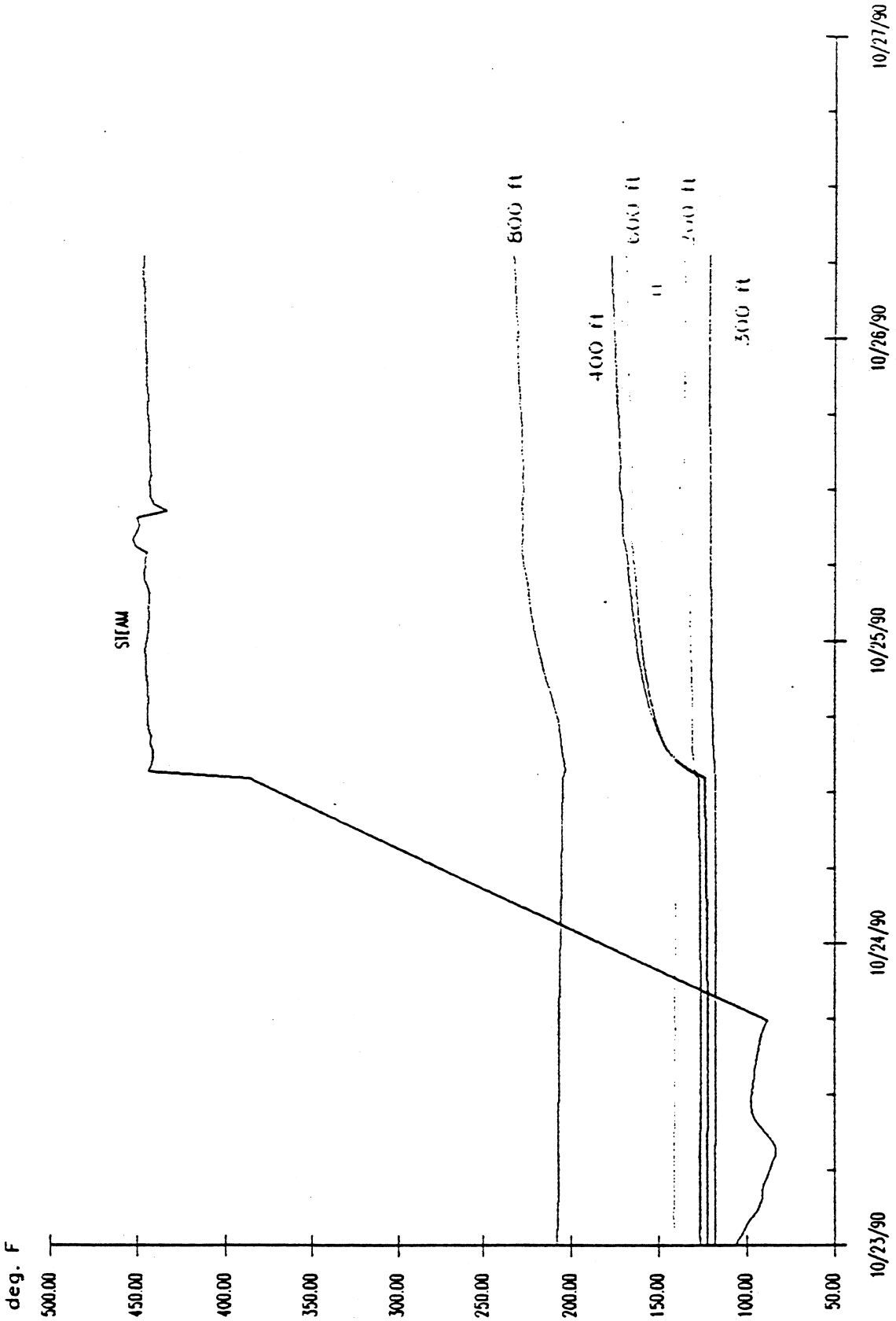
GRAPH A1-9: STEAM QUALITY VS. TIME



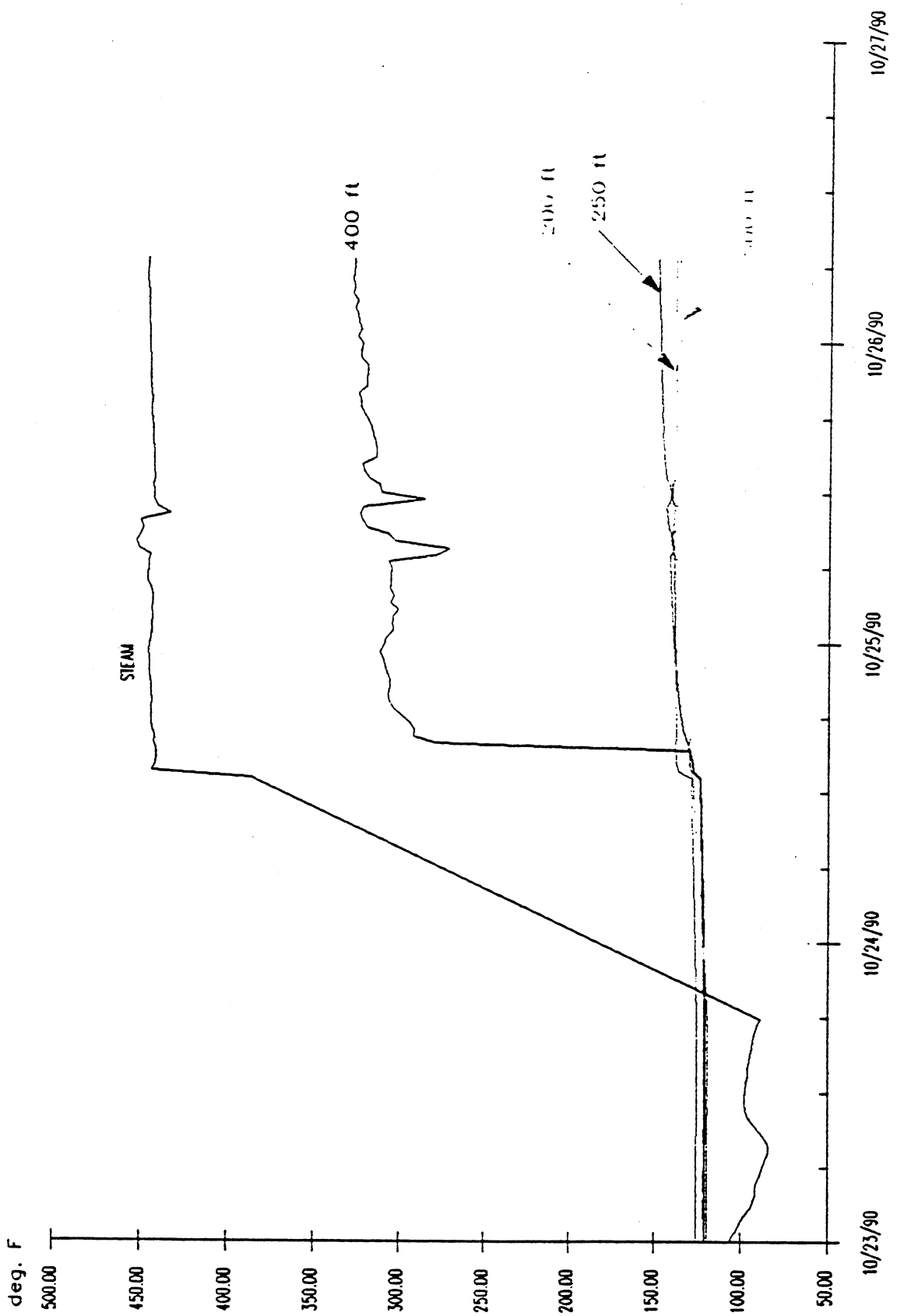
GRAPH A1-10: STEAM TEMPERATURE VS. TIME



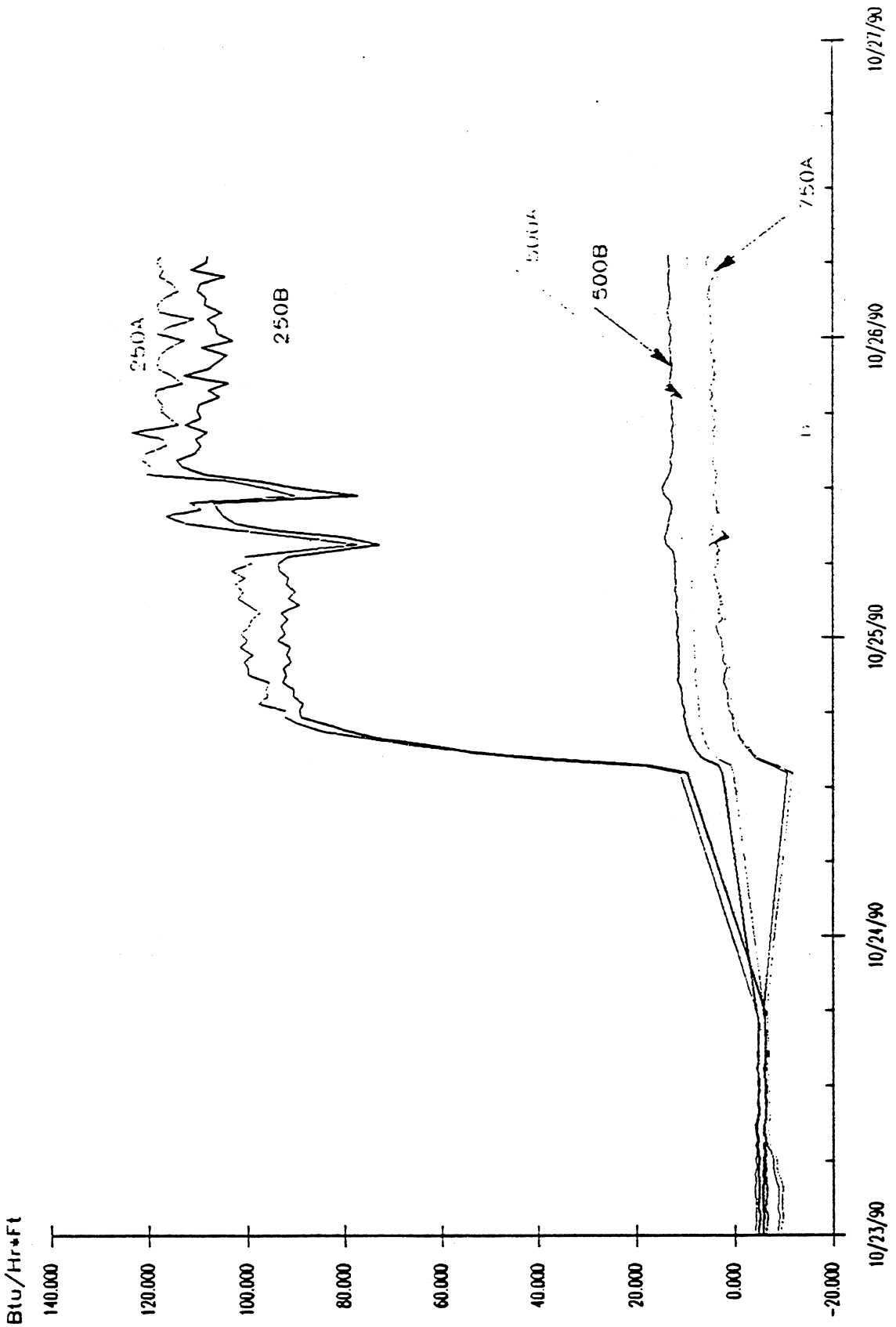
GRAPH A1-11: CASING SIDE A TEMPERATURE VS. TIME



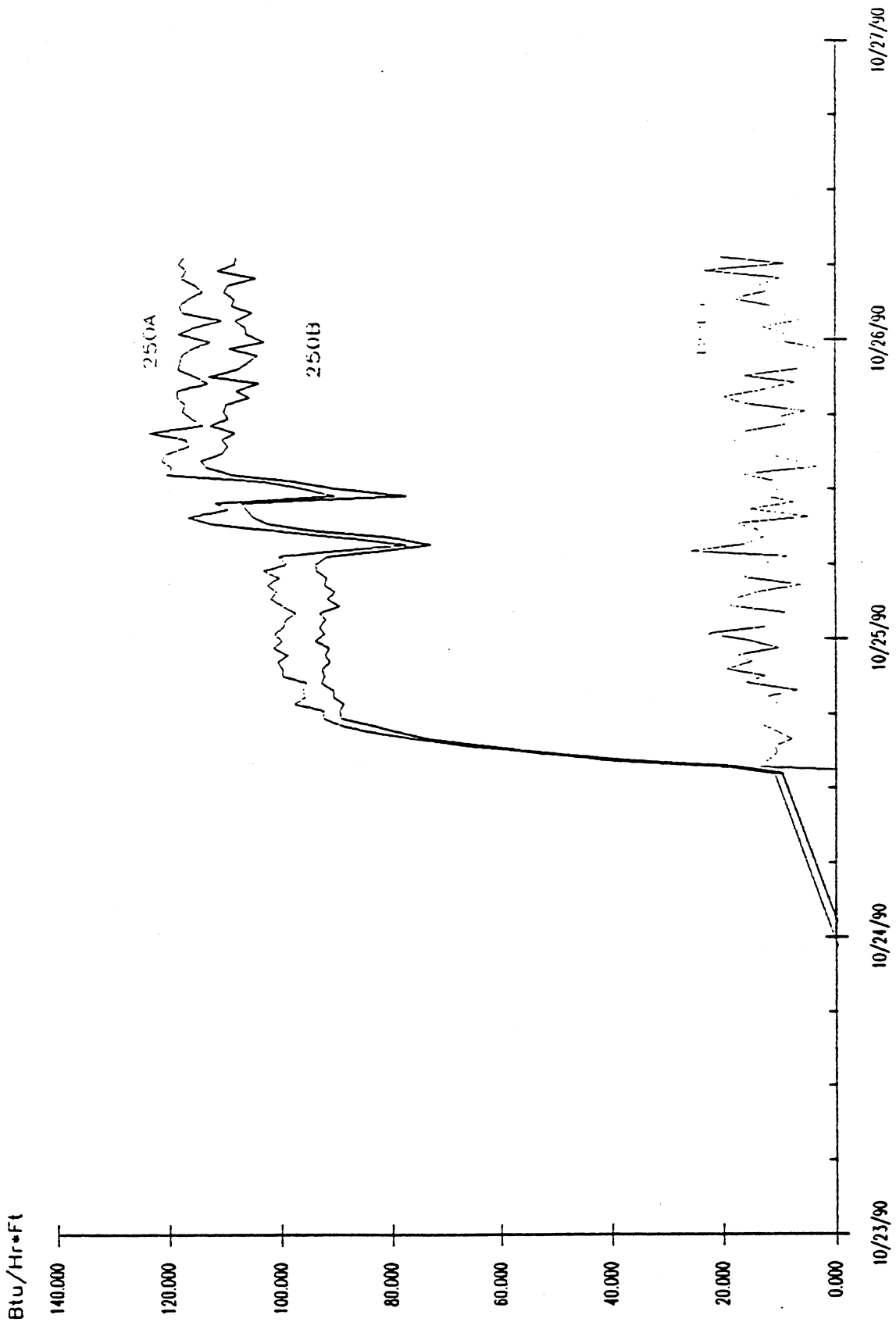
GRAPH A1-12: CASING SIDE B TEMPERATURE VS. TIME



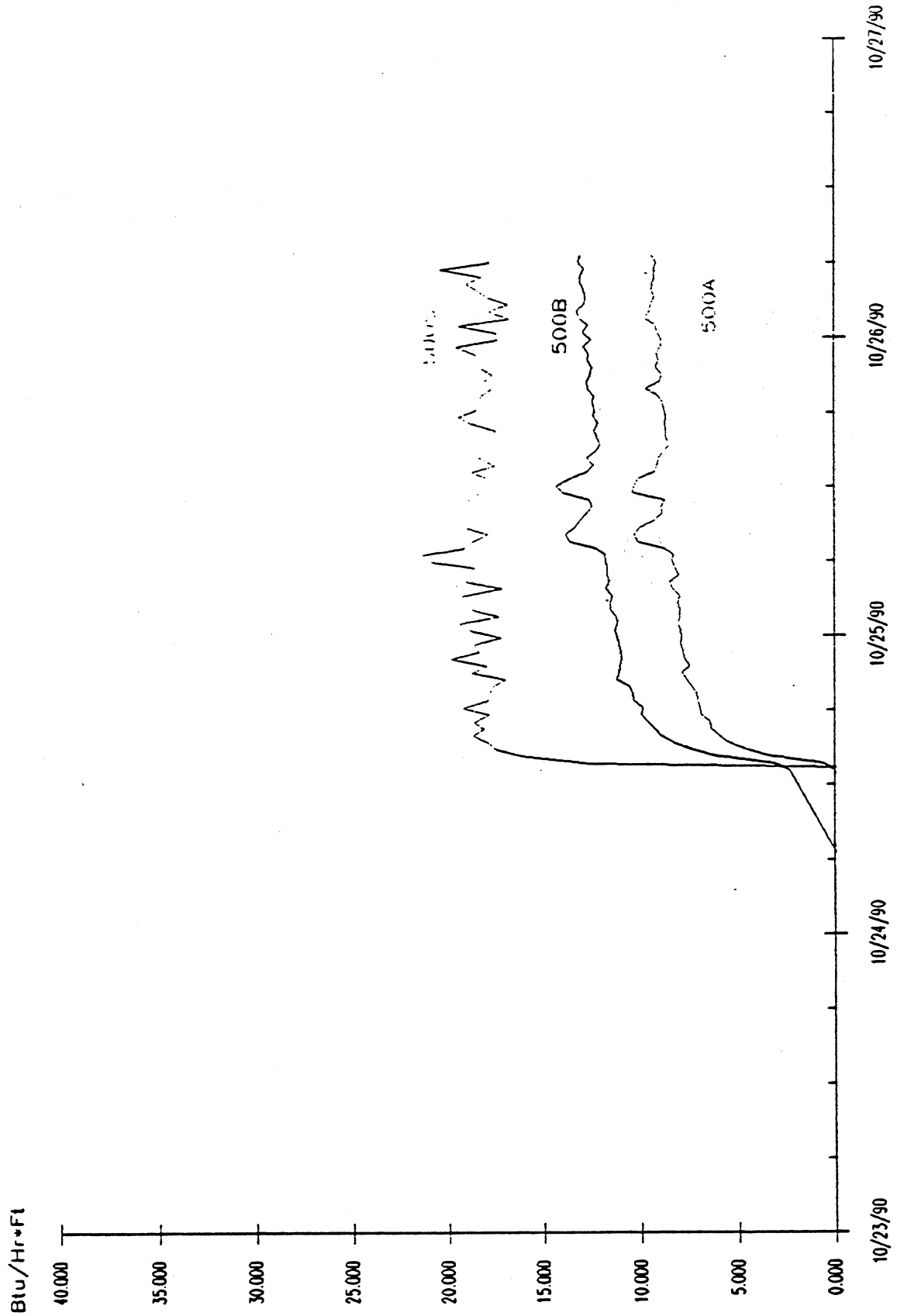
GRAPH A1-13: TUBING STRING TEMPERATURE VS. TIME



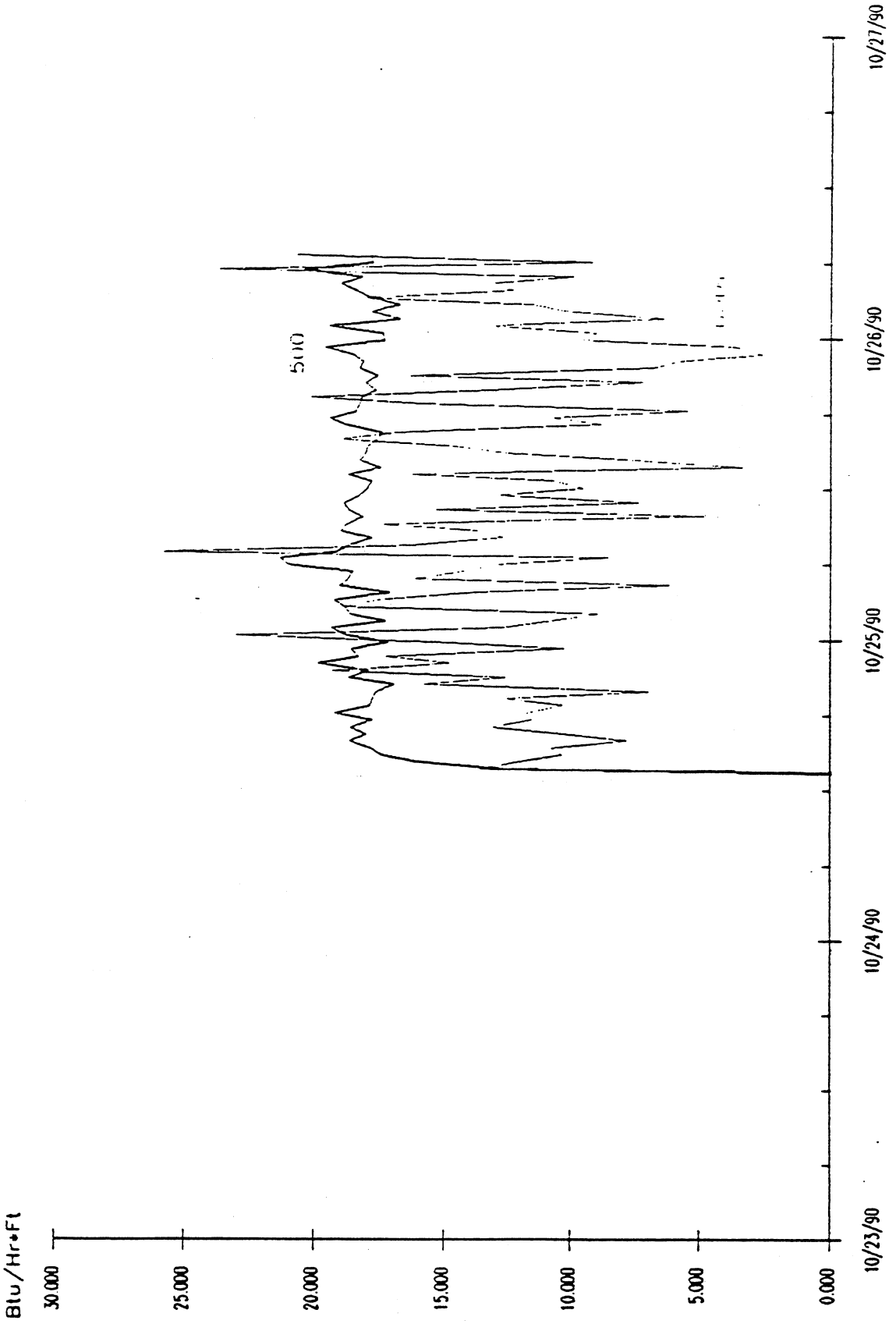
GRAPH A1-14: CASING HEAT FLUX VS. TIME



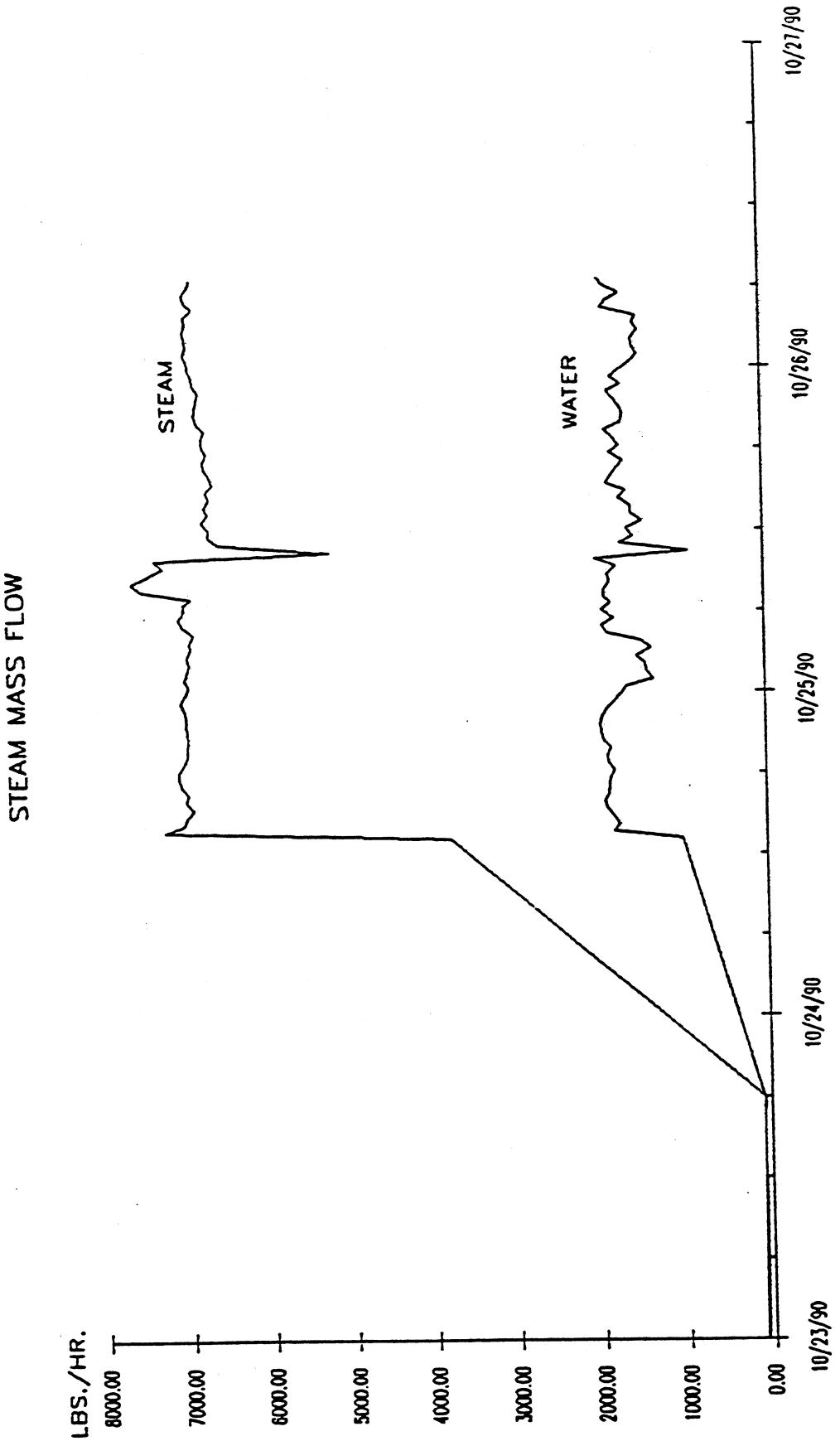
GRAPH A1-15: HEAT FLUX AT 250 FT. VS. TIME



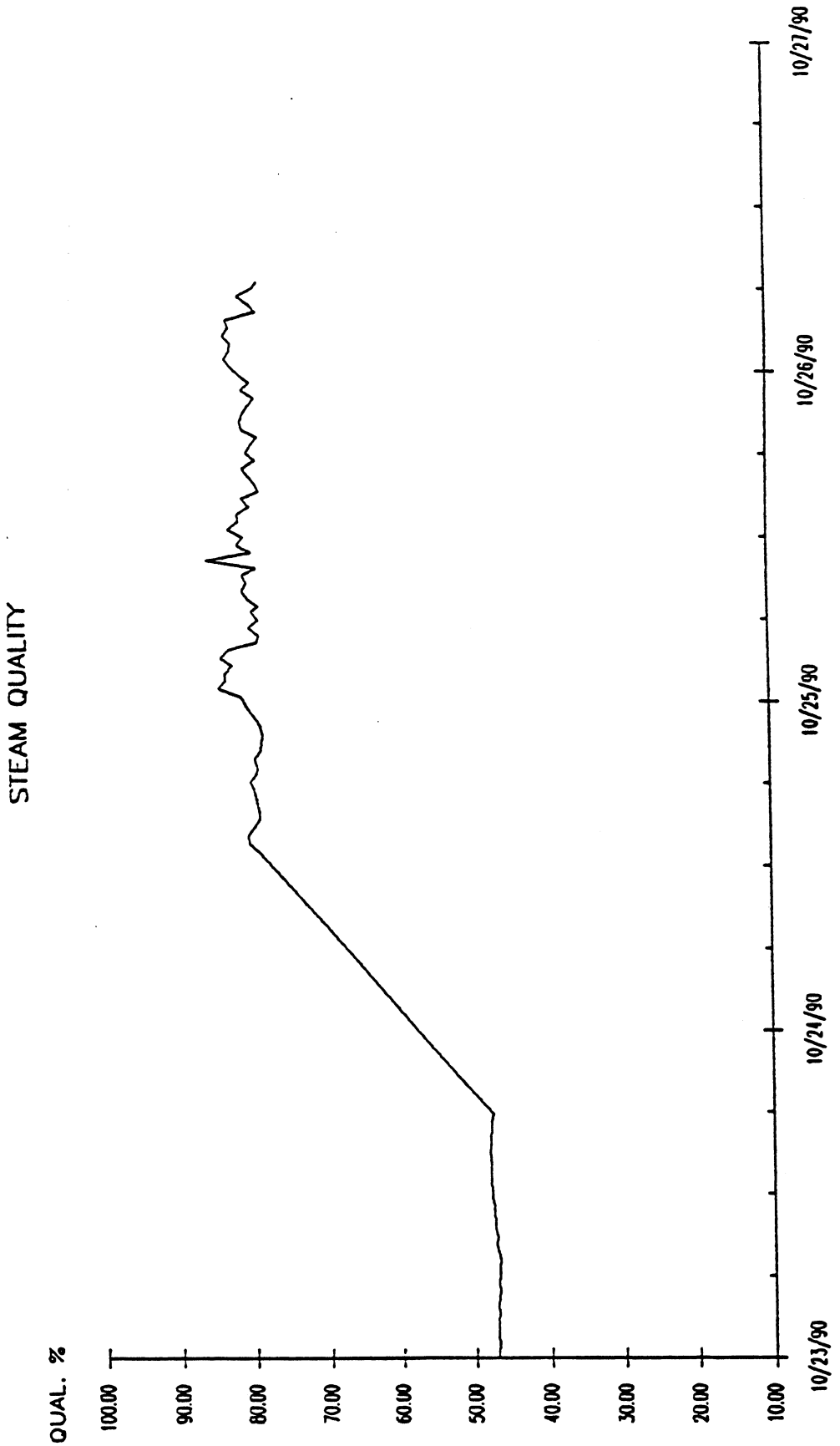
GRAPH A1-16: HEAT FLUX AT 500 FT. VS. TIME



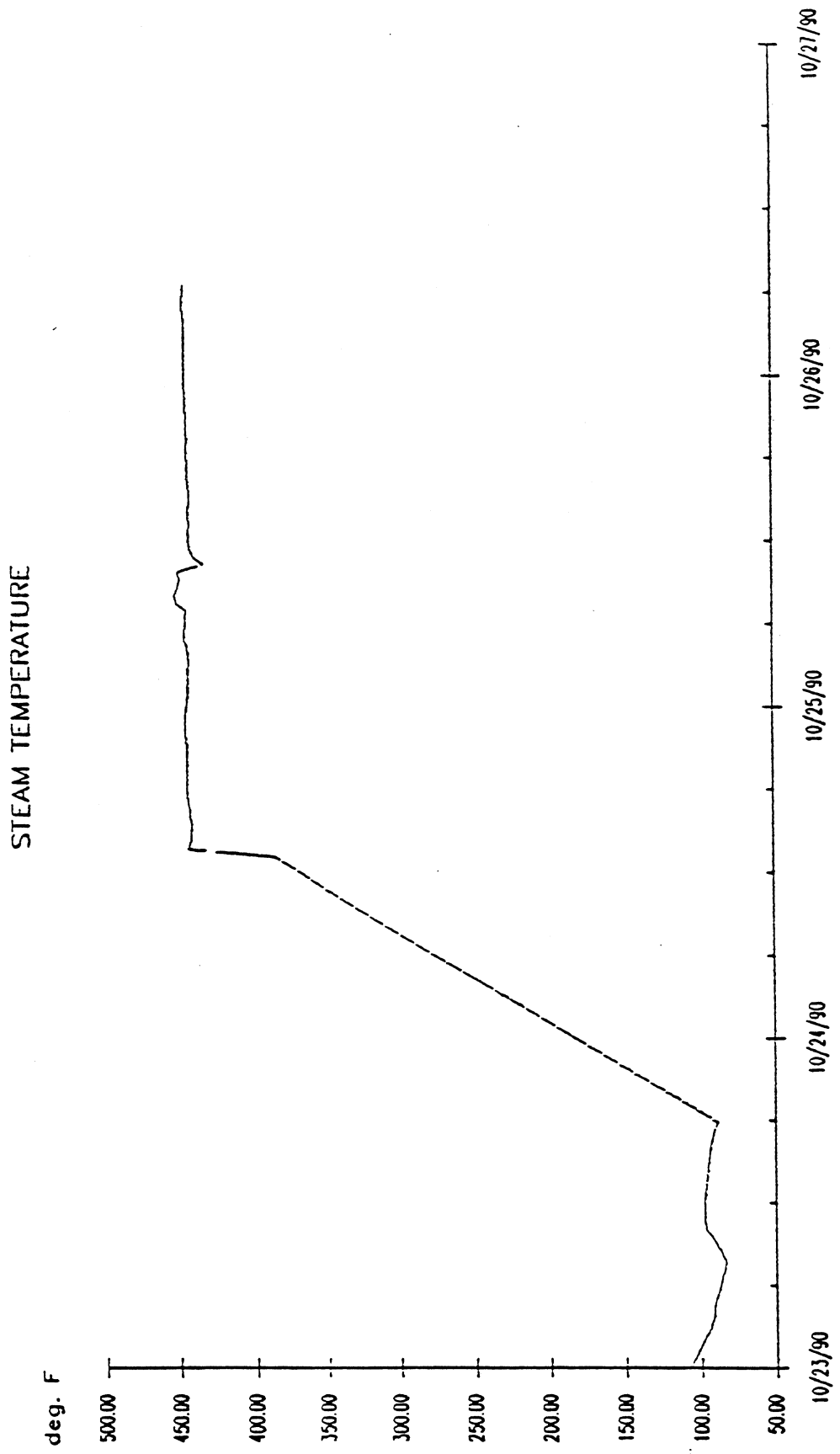
GRAPH A1-17: TUBING STRING HEAT FLUX VS. TIME



GRAPH A1-18: STEAM MASS FLOW VS. TIME



GRAPH A1-19: STEAM QUALITY VS. TIME



GRAPH A1-20: STEAM TEMPERATURE VS. TIME

Table A1-1: Condition 2 String and Casing Temperature Data

TEST CASE A1,CONDITION 2 TEMPERATURE DATA																			
		STABLE CASING DATA														STABLE STRING DATA			
DATE	HOUR	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT A	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	200FT	250FT	400FT	500FT
10/7/90	0:01	131.1	131.0	137.0	119.4	118.6	178.7	164.8	124.2	163.5	160.0	136.3	136.8	302.9	302.9	136.0	136.3	128.4	132.0
10/7/90	0:34	131.1	131.0	137.0	119.5	118.6	178.7	164.8	124.2	163.6	160.1	139.6	140.4	302.9	302.9	136.0	136.3	128.4	131.9
10/7/90	1:08	131.1	131.0	137.2	119.4	118.6	178.9	164.9	124.3	163.6	160.2	145.1	145.8	302.9	303.0	136.1	136.4	128.6	132.0
10/7/90	1:42	131.2	131.1	137.3	119.5	118.7	179.1	165.1	124.3	163.8	160.3	151.8	152.7	303.0	303.1	136.0	136.4	128.5	131.9
10/7/90	2:15	131.2	131.2	137.3	119.5	118.7	179.2	165.2	124.2	164.0	160.6	160.7	161.4	303.1	303.3	136.0	136.5	128.5	132.1
10/7/90	2:49	131.2	131.2	137.4	119.5	118.7	179.4	165.4	124.3	164.1	160.6	170.5	171.5	303.1	303.2	136.0	136.6	128.5	132.6
10/7/90	3:23	131.2	131.2	137.3	119.5	118.6	179.5	165.5	124.3	164.1	160.7	182.9	182.9	303.0	303.2	136.0	136.5	128.5	132.7
10/7/90	3:57	131.2	131.2	137.4	119.5	118.7	179.6	165.6	124.3	164.2	160.7	194.8	195.9	302.8	302.9	136.1	136.6	128.6	132.6
10/7/90	4:30	131.4	131.4	137.6	119.6	118.8	179.7	165.7	124.3	164.3	160.9	210.8	211.5	302.9	303.0	136.0	136.7	128.6	132.5
10/7/90	5:04	131.4	131.4	137.6	119.6	118.8	179.8	165.9	124.3	164.4	160.9	223.9	224.2	302.9	303.1	136.1	136.7	128.6	132.6
10/7/90	5:38	131.4	131.3	137.7	119.5	118.8	180.0	166.0	124.4	164.4	161.0	233.3	235.0	302.9	303.0	136.1	136.7	128.7	132.6
10/7/90	6:12	131.4	131.4	137.8	119.5	118.8	180.1	166.1	124.4	164.6	161.2	244.8	246.0	302.9	303.0	136.0	136.7	128.6	132.6
10/7/90	6:45	131.6	131.5	138.0	119.6	118.8	180.3	166.2	124.4	164.7	161.3	258.9	259.8	302.9	303.0	136.1	136.8	128.6	132.6
10/7/90	7:19	131.5	131.4	137.9	119.6	118.8	180.3	166.2	124.5	164.8	161.3	268.0	270.4	302.9	303.0	136.1	136.9	128.7	132.8
10/7/90	7:53	131.5	131.5	138.0	119.6	118.8	180.3	166.3	124.5	164.7	161.2	277.8	278.5	302.9	303.0	136.2	137.0	128.8	133.1
10/7/90	8:27	131.5	131.4	138.0	119.5	118.7	180.3	166.3	124.5	164.8	161.3	288.0	287.3	302.6	302.7	136.1	137.0	128.8	133.2
10/7/90	9:00	131.4	131.3	138.0	119.4	118.6	180.2	166.3	124.5	164.8	161.2	289.7	290.2	302.5	302.6	136.1	136.9	128.7	133.2
10/7/90	9:34	131.4	131.3	138.5	119.5	118.7	180.1	166.4	124.7	164.9	161.4	292.8	293.7	302.7	302.9	136.1	137.1	128.9	133.4
10/7/90	10:08	131.4	131.3	138.2	119.5	118.6	180.0	166.5	124.5	164.9	161.3	296.1	296.2	302.6	302.8	136.1	136.9	128.8	133.3
10/7/90	10:42	131.5	131.4	138.0	119.5	118.6	180.0	166.6	124.5	164.9	161.4	297.3	297.4	302.7	302.9	136.1	137.0	128.8	133.4
10/7/90	11:15	131.4	131.3	138.0	119.4	118.6	179.9	166.5	124.5	164.9	161.4	297.9	298.1	302.9	302.9	136.0	137.0	128.7	133.4
10/7/90	11:49	131.5	131.4	138.2	119.4	118.7	180.0	166.6	124.4	164.9	161.4	299.1	299.2	302.9	303.0	136.1	137.0	128.8	133.2

Table A1-2: Condition 2 String and Casing Temperature Data

TEST CASE A1,CONDITION 2 TEMPERATURE DATA																			
		STABLE CASING DATA														STABLE STRING DATA			
DATE	HOUR	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT A	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	200FT	250FT	400FT	500FT
10/7/90	12:23	131.5	131.3	138.2	119.4	118.6	179.9	166.5	124.6	164.9	161.4	300.3	300.7	302.8	302.9	136.1	137.3	128.8	133.0
10/7/90	12:56	131.5	131.4	138.5	119.5	118.6	180.0	166.6	124.7	164.9	161.4	301.1	301.4	302.8	303.0	136.1	137.1	128.8	133.1
10/7/90	13:30	131.6	131.4	138.6	119.5	118.7	180.1	166.7	124.6	165.0	161.5	301.5	302.0	302.6	302.8	136.2	137.3	129.0	133.3
10/7/90	14:04	131.5	131.4	138.5	119.5	118.6	180.0	166.6	124.7	165.0	161.4	301.6	302.1	302.5	302.6	136.2	137.2	128.9	133.4
10/7/90	14:48	131.5	131.3	138.5	119.3	118.7	180.1	166.7	124.6	165.0	161.5	301.8	302.1	302.4	302.7	136.1	137.2	128.9	133.3
10/7/90	15:22	131.5	131.4	138.6	119.4	118.7	180.3	166.8	124.6	165.1	161.6	301.8	302.1	302.4	302.6	136.1	137.2	128.8	133.3
10/7/90	15:56	131.6	131.5	138.6	119.4	118.6	180.5	166.9	124.7	165.2	161.6	301.8	302.1	302.3	302.5	136.1	137.3	128.9	133.4
10/7/90	16:29	131.5	131.4	138.7	119.3	118.7	180.7	167.0	124.6	165.3	161.7	301.9	302.1	302.3	302.5	136.1	137.3	128.9	133.5
10/7/90	17:03	131.6	131.5	138.7	119.4	118.7	180.8	167.1	124.7	165.3	161.8	301.8	302.1	302.2	302.4	136.1	137.3	128.9	133.6
10/7/90	17:37	131.7	131.6	138.7	119.4	118.8	180.9	167.2	124.8	165.4	161.9	301.9	302.1	302.3	302.5	136.2	137.4	129.0	133.7
10/7/90	18:10	131.7	131.6	138.7	119.5	118.8	181.2	167.4	124.7	165.5	162.1	302.1	302.2	302.5	302.6	136.2	137.5	129.0	133.9
10/7/90	18:44	131.9	131.8	138.9	119.5	118.8	181.5	167.6	124.7	165.8	162.2	302.1	302.3	302.6	302.7	136.3	137.5	129.0	133.5
10/7/90	19:18	131.9	131.9	139.0	119.5	118.9	181.6	167.7	124.7	165.9	162.3	302.1	302.2	302.5	302.7	136.3	137.5	129.0	133.5
10/7/90	19:52	131.9	131.9	138.9	119.5	118.8	181.7	167.9	124.6	166.0	162.4	302.1	302.2	302.5	302.7	136.4	137.7	129.1	133.9
10/7/90	20:25	131.9	131.9	139.0	119.5	118.8	181.8	167.9	124.6	166.1	162.5	302.1	302.2	302.5	302.6	136.4	137.7	129.1	133.9
10/7/90	20:59	131.9	131.9	138.9	119.5	118.8	181.8	168.0	124.6	166.1	162.5	302.0	302.1	302.3	302.5	136.5	137.9	129.1	133.7
10/7/90	21:33	132.0	131.9	139.0	119.5	118.8	182.0	168.2	124.7	166.2	162.6	302.0	302.1	302.4	302.6	136.4	137.9	129.1	133.9
10/7/90	22:06	132.0	132.0	139.1	119.6	118.8	182.1	168.3	124.7	166.3	162.7	302.0	302.1	302.3	302.5	136.4	137.9	129.2	134.0
10/7/90	22:40	132.0	131.9	139.2	119.6	118.8	182.2	168.3	124.7	166.3	162.7	302.0	302.0	302.2	302.4	136.4	137.9	129.1	134.0
10/7/90	23:14	132.2	132.1	139.2	119.7	118.8	182.2	168.3	124.7	166.4	162.8	302.3	302.4	302.7	302.8	136.5	137.7	129.1	134.3
10/7/90	23:48	132.1	132.1	139.3	119.6	118.8	182.3	168.5	124.7	166.6	162.9	302.6	302.7	302.9	303.0	136.4	137.8	129.1	134.5

Table A1-3 : Condition 2 String and Casing Heat Flux Data and Steam Data

TEST CASE A1, CONDITION 2 HEAT FLUX AND STEAM DATA															
		WATER	STEAM				CASING HEAT FLUX						STRING HEAT FLUX		
DATE	HOUR	LB/HR	LB/HR	TEMP	QUAL		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	500FT	CENT	BODY
10/7/90	0:01	569.5	4614.0	404.6	89.0		71.0	63.8	6.6	8.7	697.1	900.2	14.5	41.0	12.5
10/7/90	0:34	449.3	4616.4	404.6	91.1		68.8	66.0	6.6	8.6	696.1	905.0	14.4	44.4	14.0
10/7/90	1:08	512.2	4641.9	404.6	90.1		72.1	66.7	6.6	9.0	696.9	911.7	14.4	35.6	11.3
10/7/90	1:42	433.2	4635.4	404.7	91.5		71.3	65.7	6.5	8.8	696.2	916.2	15.2	33.1	12.9
10/7/90	2:15	269.6	4627.4	404.6	94.5		71.1	64.5	6.6	8.7	696.5	920.6	14.2	41.2	9.2
10/7/90	2:49	477.5	4617.6	405.0	90.6		70.0	64.4	6.6	8.7	697.4	925.1	15.0	44.1	14.0
10/7/90	3:23	501.9	4622.5	404.5	90.2		70.6	63.5	6.6	8.9	695.7	926.0	13.8	37.5	14.6
10/7/90	3:57	475.8	4585.7	404.1	90.6		70.0	64.0	6.5	8.8	690.2	921.8	14.2	39.8	12.6
10/7/90	4:30	448.2	4613.3	404.2	91.1		71.0	63.2	6.9	9.1	689.3	922.4	14.1	38.2	10.8
10/7/90	5:04	113.5	4619.0	404.4	97.6		69.0	67.4	7.1	9.2	688.3	923.0	14.1	31.4	10.3
10/7/90	5:38	576.8	4627.6	404.9	88.9		70.1	62.3	6.5	8.5	686.6	923.3	15.1	47.3	15.6
10/7/90	6:12	512.3	4615.0	405.0	90.0		70.4	65.8	6.7	8.7	684.7	923.4	13.9	51.5	12.1
10/7/90	6:45	383.1	4617.0	405.1	92.3		70.1	64.6	6.7	8.6	681.9	921.4	13.8	43.0	8.8
10/7/90	7:19	500.0	4637.1	405.2	90.3		69.1	64.7	6.6	8.7	681.3	923.0	14.4	50.1	10.4
10/7/90	7:53	414.4	4611.6	404.9	91.8		69.4	63.1	6.7	9.1	679.7	923.0	13.6	38.2	14.3
10/7/90	8:27	433.9	4560.8	403.9	91.3		69.9	67.3	6.6	8.9	674.4	916.8	14.5	35.6	13.4
10/7/90	9:00	400.1	4500.3	403.0	91.8		68.3	61.8	6.5	8.7	673.5	916.3	14.1	39.5	14.5
10/7/90	9:34	421.0	4487.2	402.7	91.4		69.6	64.6	6.4	8.5	673.3	916.9	15.4	37.1	8.5
10/7/90	10:08	476.7	4488.9	402.9	90.4		69.6	65.1	6.6	8.6	671.6	915.9	13.9	40.1	14.4
10/7/90	10:42	576.5	4464.5	402.6	88.6		65.9	64.3	6.5	8.8	672.4	917.3	14.1	37.4	12.6
10/7/90	11:15	425.6	4490.4	402.9	91.3		67.2	63.5	6.5	8.7	672.9	918.1	15.1	47.0	10.7
10/7/90	11:49	564.8	4464.1	402.7	88.8		68.8	65.1	6.6	8.7	670.3	914.7	13.3	38.4	7.9

Table A1-4: Condition 2 String and Casing Heat Flux Data and Steam Data

TEST CASE A1, CONDITION 2 HEAT FLUX AND STEAM DATA															
		WATER	STEAM				CASING HEAT FLUX						STRING HEAT FLUX		
DATE	HOUR	LB/HR	LB/HR	TEMP	QUAL		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	500FT	CENT	BODY
10/7/90	12:23	398.9	4485.0	402.8	91.8		67.9	62.8	6.3	8.3	666.7	910.2	14.1	35.4	8.5
10/7/90	12:56	426.4	4471.3	402.4	91.3		69.3	64.5	6.3	8.2	663.2	905.2	14.0	33.8	11.0
10/7/90	13:30	415.7	4464.2	402.5	91.5		67.5	64.8	6.3	8.5	660.0	899.2	13.8	35.0	11.9
10/7/90	14:04	515.9	4451.5	402.1	89.6		67.1	62.1	6.4	8.4	657.7	894.4	14.2	45.3	9.8
10/7/90	14:48	599.2	4443.7	401.9	88.1		69.3	65.6	6.5	8.5	657.9	892.2	14.5	33.6	14.1
10/7/90	15:22	601.2	4491.3	403.0	88.2		69.6	64.5	6.3	8.4	655.4	888.0	14.6	42.9	13.5
10/7/90	15:56	391.1	4505.3	403.0	92.0		69.7	62.6	6.3	8.4	654.0	885.0	13.8	39.2	13.0
10/7/90	16:29	595.7	4508.7	403.2	88.3		69.6	65.1	6.2	8.4	652.6	882.4	14.5	39.9	10.3
10/7/90	17:03	354.0	4521.0	403.3	92.7		69.2	62.4	6.5	8.5	651.6	879.3	13.9	43.4	10.9
10/7/90	17:37	446.2	4536.7	403.6	91.0		70.2	64.1	6.6	8.6	651.7	878.5	14.3	41.2	13.2
10/7/90	18:10	434.7	4559.4	404.0	91.3		67.2	63.6	6.6	8.6	652.9	879.6	14.4	39.3	10.5
10/7/90	18:44	464.6	4614.6	404.8	90.9		70.0	65.7	6.6	8.6	650.5	876.4	14.3	30.6	11.1
10/7/90	19:18	159.3	4631.8	405.3	96.7		71.1	65.6	6.7	8.8	648.6	872.7	14.3	29.5	13.6
10/7/90	19:52	583.3	4639.5	405.7	88.8		68.3	63.1	6.8	8.8	648.8	871.8	14.6	42.7	13.2
10/7/90	20:25	543.5	4660.1	405.5	89.6		71.0	63.3	6.6	8.7	649.0	871.6	14.8	41.6	17.2
10/7/90	20:59	423.8	4667.9	405.4	91.7		67.7	65.1	6.6	8.9	645.7	867.2	15.5	36.6	10.0
10/7/90	21:33	482.8	4630.0	405.1	90.6		69.8	64.3	6.7	8.8	645.2	865.9	14.0	41.0	9.6
10/7/90	22:06	533.5	4607.0	404.6	89.6		69.6	64.1	6.7	8.9	644.4	864.1	14.3	45.7	12.2
10/7/90	22:40	539.8	4639.8	405.1	89.6		69.9	62.9	6.8	8.9	642.2	861.9	15.0	42.1	11.0
10/7/90	23:14	450.1	4646.8	405.6	91.2		69.5	62.0	6.7	8.9	649.9	870.6	13.4	42.8	10.6
10/7/90	23:48	486.5	4650.9	405.4	90.5		69.0	63.9	7.0	8.8	653.0	874.7	15.4	39.7	13.0

Table A1-5 : Condition 3 String and Casing Temperature Data

		TEST CASE A1, CONDITION 3 TEMPERATURE DATA																	
		STABLE CASING DATA														STABLE STRING DATA			
DATE	HOUR	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT A	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	200FT	250FT	400FT	500FT
10/25/90	0:23	131.5	131.4	138.7	120.6	119.7	179.6	162.8	125.0	163.8	159.7	141.5	141.9	219.4	219.4	138.0	138.8	307.1	131.3
10/25/90	0:57	131.6	131.5	139.0	120.7	119.7	180.0	163.2	124.9	164.2	160.0	141.5	142.0	220.2	220.2	138.0	139.2	302.8	131.5
10/25/90	1:31	131.7	131.6	139.3	120.7	119.8	180.4	163.5	125.0	164.7	160.6	141.5	142.0	221.1	220.8	138.0	139.4	303.4	131.9
10/25/90	2:04	131.7	131.6	139.5	120.7	119.9	180.9	164.1	125.0	165.0	160.9	141.6	142.1	222.0	221.6	138.1	139.7	302.8	131.9
10/25/90	2:38	131.9	131.8	139.9	120.8	119.8	181.4	164.6	125.0	165.4	161.2	141.6	142.1	222.3	222.1	138.1	139.6	300.0	132.1
10/25/90	3:12	131.9	131.9	140.2	120.8	119.9	181.8	165.0	125.1	165.7	161.5	141.6	142.1	222.6	222.7	138.1	139.9	304.2	132.3
10/25/90	3:46	132.0	131.9	140.3	120.9	119.9	182.2	165.4	125.2	166.0	161.9	141.6	142.1	223.3	223.2	138.2	140.1	302.2	132.4
10/25/90	4:19	132.1	131.9	140.6	120.9	120.0	182.6	165.8	125.3	166.3	162.1	141.6	142.1	224.0	224.0	138.4	140.3	304.8	132.6
10/25/90	4:53	132.3	132.2	140.8	121.0	120.0	183.1	166.2	125.3	166.9	162.6	141.6	142.1	224.6	224.4	138.3	140.3	304.4	132.8
10/25/90	5:27	132.3	132.2	141.2	121.0	120.1	183.5	166.7	125.3	167.6	163.2	141.7	142.2	225.4	225.1	138.5	140.6	304.2	133.1
10/25/90	6:01	132.4	132.3	141.5	121.0	120.1	184.0	167.1	125.5	168.0	163.5	141.7	142.2	225.7	226.2	138.6	140.9	303.9	133.2
10/25/90	6:34	132.5	132.4	141.7	121.0	120.1	184.2	167.4	125.5	168.3	163.8	141.8	142.2	227.1	226.7	138.6	141.0	305.4	133.3
10/25/90	7:00	132.8	132.6	141.6	121.0	120.1	184.7	167.8	125.6	168.6	164.1	141.8	142.2	227.7	227.3	138.7	141.0	277.5	143.2
10/25/90	7:34	135.6	135.4	140.5	121.1	120.2	185.5	169.0	125.7	168.9	164.4	141.8	142.2	226.9	226.9	140.2	138.8	270.3	144.9
10/25/90	8:07	136.6	136.5	140.8	121.1	120.2	186.2	169.7	125.8	169.1	164.8	141.8	142.2	226.3	226.7	140.5	139.3	301.9	143.3
10/25/90	8:41	136.4	136.3	141.8	121.1	120.3	186.2	170.2	126.0	169.0	164.7	141.8	142.2	226.9	227.0	140.0	140.2	305.6	140.3
10/25/90	9:15	135.5	135.4	142.7	121.1	120.2	186.1	170.1	125.9	168.8	164.7	141.7	142.2	226.7	226.9	139.3	141.7	318.2	137.0
10/25/90	9:49	134.9	134.7	143.5	121.0	120.2	186.0	170.0	126.0	168.7	164.6	141.8	142.2	227.0	226.7	139.0	142.5	321.2	136.0
10/25/90	10:22	134.5	134.4	143.8	120.9	120.2	186.1	170.3	125.9	168.8	164.8	141.7	142.2	227.1	226.9	138.8	143.0	322.3	135.5
10/25/90	10:56	134.2	134.1	144.1	120.9	120.2	186.1	170.3	125.9	168.7	164.8	141.6	142.1	226.9	227.1	138.5	143.2	320.5	135.0
10/25/90	11:30	136.8	136.7	142.9	120.9	120.2	186.3	171.0	126.1	168.6	164.7	141.7	142.2	226.6	226.7	140.0	141.0	284.7	145.8
10/25/90	12:03	137.8	137.6	142.9	120.9	120.2	186.6	171.5	126.0	168.5	164.7	141.6	142.1	226.3	226.3	140.1	140.8	309.8	143.9

Table A1-6: Condition 3 String and Casing Temperature Data

TEST CASE A1, CONDITION 3 TEMPERATURE DATA																			
		STABLE CASING DATA														STABLE STRING DATA			
DATE	HOUR	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT A	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	200FT	250FT	400FT	500FT
10/25/90	12:37	137.6	137.4	143.6	121.0	120.3	186.8	171.7	126.3	168.6	164.9	141.8	142.2	226.2	226.4	139.8	141.6	310.8	141.2
10/25/90	13:11	136.7	136.6	144.9	121.0	120.3	186.5	171.7	126.3	168.4	164.7	141.8	142.2	226.5	226.5	139.0	143.2	317.0	137.7
10/25/90	13:45	135.9	135.8	145.5	121.0	120.2	186.1	171.4	126.2	168.3	164.6	141.7	142.1	226.6	226.4	138.6	144.0	320.1	136.5
10/25/90	14:18	135.4	135.3	146.0	121.0	120.2	186.1	171.4	126.2	168.2	164.5	141.7	142.2	226.8	226.7	138.4	144.5	320.9	135.9
10/25/90	14:52	135.3	135.1	146.3	121.1	120.3	186.2	171.5	126.2	168.3	164.7	141.7	142.2	226.8	227.0	138.2	144.7	313.1	135.3
10/25/90	15:26	135.0	134.8	146.4	121.0	120.4	186.3	171.5	126.2	168.3	164.8	141.7	142.2	226.8	227.0	138.1	144.9	312.8	135.1
10/25/90	16:00	134.8	134.6	146.7	121.0	120.4	186.5	171.7	126.3	168.5	165.0	141.7	142.2	227.2	227.3	138.1	145.2	313.5	135.1
10/25/90	16:33	134.7	134.6	147.1	121.0	120.3	186.7	171.9	126.3	168.7	165.0	141.7	142.2	227.0	227.1	138.1	145.5	314.9	135.0
10/25/90	17:07	134.6	134.6	147.1	121.0	120.4	186.8	172.1	126.3	168.8	165.2	141.7	142.2	227.2	227.3	138.2	145.5	315.6	135.2
10/25/90	17:41	134.7	134.5	147.3	121.0	120.5	187.2	172.4	126.4	169.1	165.5	141.8	142.2	227.6	227.6	138.2	145.6	317.1	135.3
10/25/90	18:15	134.7	134.6	147.6	121.2	120.5	187.5	172.8	126.4	169.2	165.7	141.8	142.2	227.8	227.6	138.3	146.1	319.7	135.3
10/25/90	18:48	134.7	134.6	147.7	121.2	120.5	187.7	173.0	126.4	169.2	165.6	141.7	142.2	228.0	228.4	138.2	146.0	321.9	135.5
10/25/90	19:22	134.7	134.6	147.9	121.2	120.6	187.8	173.1	126.4	169.5	165.9	141.8	142.2	228.5	228.3	138.3	146.0	322.2	135.3
10/25/90	19:56	134.8	134.7	148.1	121.4	120.6	188.1	173.3	126.4	169.7	166.1	141.8	142.2	228.5	228.4	138.2	146.3	323.5	135.4
10/25/90	20:30	134.8	134.6	148.1	121.3	120.7	188.2	173.5	126.4	169.7	166.2	141.8	142.3	228.8	228.8	138.2	146.3	318.5	135.4
10/25/90	21:03	134.7	134.6	148.3	121.4	120.7	188.3	173.7	126.4	169.9	166.4	141.9	142.3	229.0	229.0	138.2	146.6	318.9	135.3
10/25/90	21:37	134.7	134.6	148.6	121.4	120.7	188.5	173.8	126.4	170.0	166.4	141.8	142.3	229.3	229.2	138.3	146.8	318.3	135.4
10/25/90	22:11	134.7	134.6	148.7	121.4	120.7	188.7	174.1	126.5	170.2	166.7	141.9	142.3	229.4	229.4	138.1	146.7	318.3	135.3
10/25/90	22:45	134.7	134.6	148.9	121.4	120.7	189.0	174.3	126.5	170.3	166.7	141.8	142.2	229.6	229.6	138.3	146.9	322.0	135.5
10/25/90	23:18	134.8	134.7	148.9	121.5	120.6	189.0	174.3	126.5	170.3	166.8	141.8	142.2	229.4	229.6	138.3	147.1	322.1	135.6
10/25/90	23:52	134.7	134.6	149.0	121.4	120.8	189.4	174.7	126.6	170.4	166.9	141.8	142.3	229.9	229.8	138.3	147.3	321.3	135.5

TABLE A1-7: CONDITION 3 STRING AND CASING HEAT FLUX DATA AND STEAM DATA

TEST CASE A1, CONDITION 3 HEAT FLUX AND STEAM DATA														
		WATER	STEAM				CASING HEAT FLUX						STRING	
DATE	HOUR	LB/HR	LB/HR	TEMP	QUAL		250FT A	250FT B	500FT A	500FT B	750FT A	750FTB	500FT	BODY
10/25/90	0:23	1619.0	6927.2	442.9	81.1		100.8	91.7	7.9	11.2	3.1	1.6	18.6	23.0
10/25/90	0:57	1305.4	6975.1	442.5	84.2		99.1	92.6	8.0	11.1	3.5	2.2	19.3	12.6
10/25/90	1:31	1393.1	6943.4	442.2	83.3		98.7	91.3	7.9	11.1	2.1	1.5	17.2	10.6
10/25/90	2:04	1397.5	6919.9	442.1	83.2		96.9	92.6	7.9	11.4	3.0	2.0	18.5	8.9
10/25/90	2:38	1502.8	6943.4	442.6	82.2		99.3	89.0	8.0	11.4	2.6	2.1	18.7	18.9
10/25/90	3:12	1327.9	6896.6	441.9	83.9		101.5	91.1	7.9	11.3	2.7	2.4	19.1	17.5
10/25/90	3:46	1445.2	6914.3	442.1	82.7		100.3	89.8	8.3	11.7	3.1	2.5	17.0	13.7
10/25/90	4:19	1835.5	6859.5	442.8	78.9		102.0	91.5	8.4	11.5	3.3	2.4	18.9	6.1
10/25/90	4:53	1900.6	6984.4	444.6	78.6		99.9	91.2	8.0	11.6	3.8	3.2	18.6	16.1
10/25/90	5:27	1759.7	7040.6	444.8	80.0		103.0	93.0	8.2	11.6	4.0	1.9	18.5	14.2
10/25/90	6:01	1897.0	6974.0	444.3	78.6		98.6	93.2	8.3	11.7	2.9	2.9	20.9	12.8
10/25/90	6:34	1793.6	6976.5	444.4	79.5		100.1	91.1	8.2	11.7	3.6	2.9	21.2	8.5
10/25/90	7:00	1866.8	6876.8	443.5	78.6		90.9	82.7	8.7	12.2	2.7	3.6	19.1	25.8
10/25/90	7:34	1862.9	7473.3	450.0	80.0		77.0	72.6	10.0	13.5	3.2	5.5	18.6	16.2
10/25/90	8:07	1807.7	7596.7	451.5	80.8		89.2	79.9	10.2	13.7	4.2	4.7	17.7	12.6
10/25/90	8:41	1827.3	7411.2	449.2	80.2		101.4	94.1	9.9	13.3	4.3	2.7	18.9	13.6
10/25/90	9:15	1732.4	7219.4	447.8	80.6		112.0	102.0	9.3	13.0	3.8	2.9	18.7	17.4
10/25/90	9:49	1962.0	7326.6	449.1	78.9		116.1	104.5	8.8	12.6	3.1	2.6	18.1	4.8
10/25/90	10:22	869.1	5203.3	432.1	85.7		109.1	105.7	8.8	12.4	3.2	3.1	18.6	15.4
10/25/90	10:56	1671.2	6534.3	439.4	79.6		111.3	106.5	8.7	12.5	3.3	2.4	18.8	7.3
10/25/90	11:30	1522.7	6661.6	441.3	81.4		89.7	76.9	10.3	13.9	3.9	2.8	18.2	12.9
10/25/90	12:03	1601.8	6652.5	441.4	80.6		95.8	89.7	10.2	14.2	3.3	2.8	17.9	9.5

Table A1-8: Condition 3 String and Casing Heat Flux Data and Steam Data

TEST CASE A1, CONDITION 3 HEAT FLUX AND STEAM DATA														
		WATER	STEAM				CASING HEAT FLUX						STRING	
DATE	HOUR	LB/HR	LB/HR	TEMP	QUAL		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	500FT	BODY
10/25/90	12:37	1414.2	6735.9	441.8	82.6		102.6	97.0	10.0	13.5	3.5	2.9	17.7	10.6
10/25/90	13:11	1540.2	6663.4	441.1	81.2		119.9	108.3	9.2	12.6	3.1	2.0	18.6	16.3
10/25/90	13:45	1545.1	6707.0	441.6	81.3		119.0	112.8	9.0	12.3	3.9	3.0	17.4	3.3
10/25/90	14:18	1689.0	6643.6	441.5	79.7		120.8	113.8	9.0	12.6	3.9	2.2	18.2	7.9
10/25/90	14:52	1597.8	6681.3	441.4	80.7		120.0	110.3	8.7	12.2	3.4	2.8	18.0	12.5
10/25/90	15:26	1820.7	6592.9	441.3	78.4		116.0	109.1	8.4	11.9	4.0	2.8	17.9	14.5
10/25/90	16:00	1758.6	6626.3	441.8	79.0		116.6	110.2	8.6	12.1	3.7	3.0	17.5	18.9
10/25/90	16:33	1692.8	6687.6	442.1	79.8		123.0	107.8	8.6	12.2	4.2	3.1	17.3	16.8
10/25/90	17:07	1613.6	6708.6	442.1	80.6		113.5	112.1	8.6	12.1	3.2	2.9	18.7	8.8
10/25/90	17:41	1782.1	6662.3	442.4	78.9		115.3	109.0	8.6	12.3	4.0	3.4	19.3	10.7
10/25/90	18:15	1665.2	6710.5	442.8	80.1		117.0	109.8	8.7	12.2	3.6	3.4	18.3	5.4
10/25/90	18:48	1746.6	6713.9	442.8	79.4		116.6	109.4	8.8	12.3	4.7	3.3	18.2	15.8
10/25/90	19:22	1836.2	6682.9	442.5	78.4		117.9	105.3	9.0	12.3	4.1	3.3	18.1	20.1
10/25/90	19:56	1639.7	6767.4	443.1	80.5		117.9	107.6	9.6	12.6	4.6	3.6	17.6	13.1
10/25/90	20:30	1613.5	6798.5	443.2	80.8		112.7	103.6	8.9	12.6	4.1	3.6	17.9	7.1
10/25/90	21:03	1650.8	6785.6	443.2	80.4		114.8	112.4	8.8	12.4	3.7	3.9	17.5	16.3
10/25/90	21:37	1720.5	6771.7	443.3	79.7		117.7	107.5	9.1	12.4	4.1	3.3	18.2	6.7
10/25/90	22:11	1803.5	6742.3	443.3	78.9		117.5	105.7	9.0	12.6	4.0	3.6	18.0	5.8
10/25/90	22:45	1644.1	6816.1	443.5	80.6		117.2	103.7	9.1	12.5	4.3	3.1	18.4	2.6
10/25/90	23:18	1762.9	6820.8	444.0	79.5		115.3	108.9	8.9	12.8	4.6	3.1	19.5	3.6
10/25/90	23:52	1629.7	6861.8	443.9	80.8		112.3	102.6	8.8	12.4	4.0	3.2	17.2	9.5

TEST CASE B DATA

APPENDIX B: REDUCED DATA FOR CENTRALIZED BARE TUBING WITH THERMAL PACKER

FIGURES

Figure B-1: Layout of Tubular and Casing Sensors

Figure B-2 & B-3: Relationships between Sensor Locations

GRAPHS

Graph B-1: Casing Temperature Vs. Time
Thermocouples at 200, 250, 300, 400, 500, 600, 700 and 800 Ft.

Graph B-2: Tubing String Temperature vs. Time
Thermocouples at 250, 400, 500, 600 and 750 Ft.

Graph B-3: Casing Heat Flux vs. Time
Heat Flux Sensors at 250, 500 and 750 Ft.
Side A and B

Graph B-4 Heat Flux at 500 Feet vs. Time
500S - Tubing String
500 A & B - Casing Side A & B

Graph B-5 Heat Flux at 250 Feet Vs. Time
250S - Tubing String
250 A & B - Casing Side A & B

Graph B-6 Tubing String Heat Flux Vs. Time
Heat Flux Sensors at 250 and 500 Feet

Graph B-7 Steam Mass Flow vs. Time

Graph B-8 Steam Quality vs. Time

Graph B-9 Steam Temperature vs. Time

TABLES

Table B-1 & B-2: Condition 2 String and Casing Temperature Data

Table B-3 & B-4: Condition 2 String and Casing Heat Flux Data and Steam Data

Table B-5 & B-6: Condition 3 String and Casing Temperature Data

Table B-7 & B-8: Condition 3 String and Casing Heat Flux Data and Steam Data

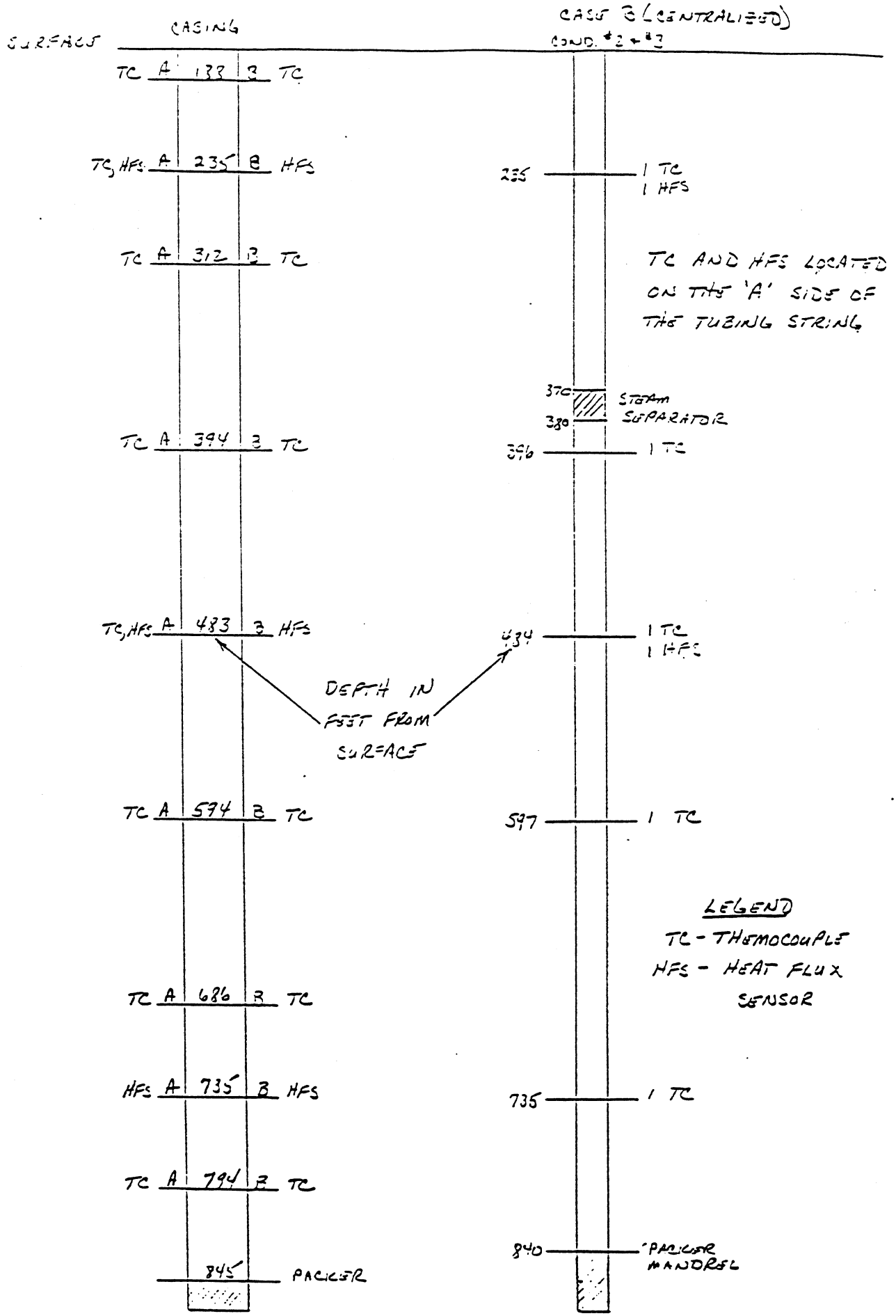


FIGURE B-1: LAYOUT OF TUBULAR AND CASING SENSORS

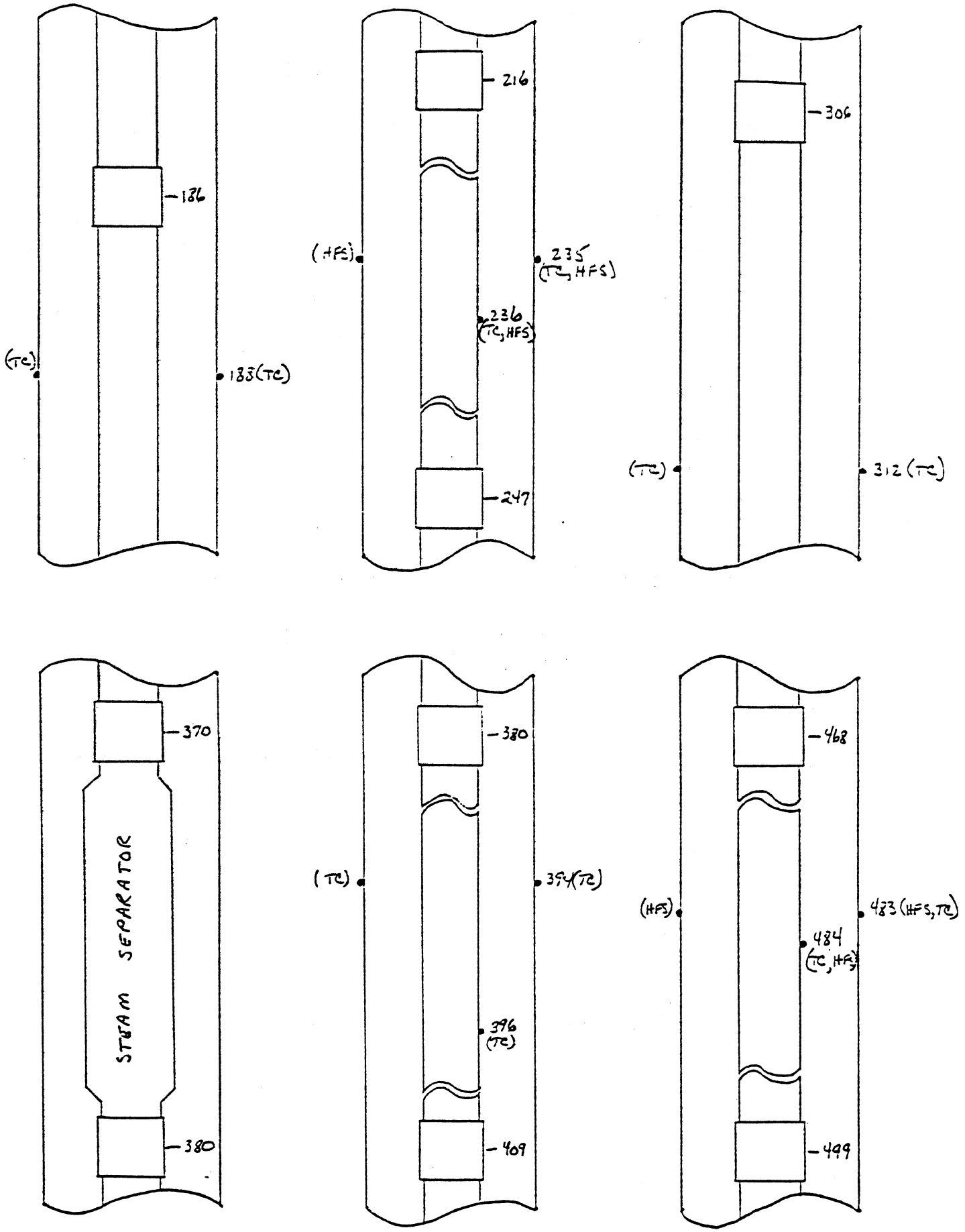


FIGURE B-2: RELATIONSHIP BETWEEN SENSOR LOCATION

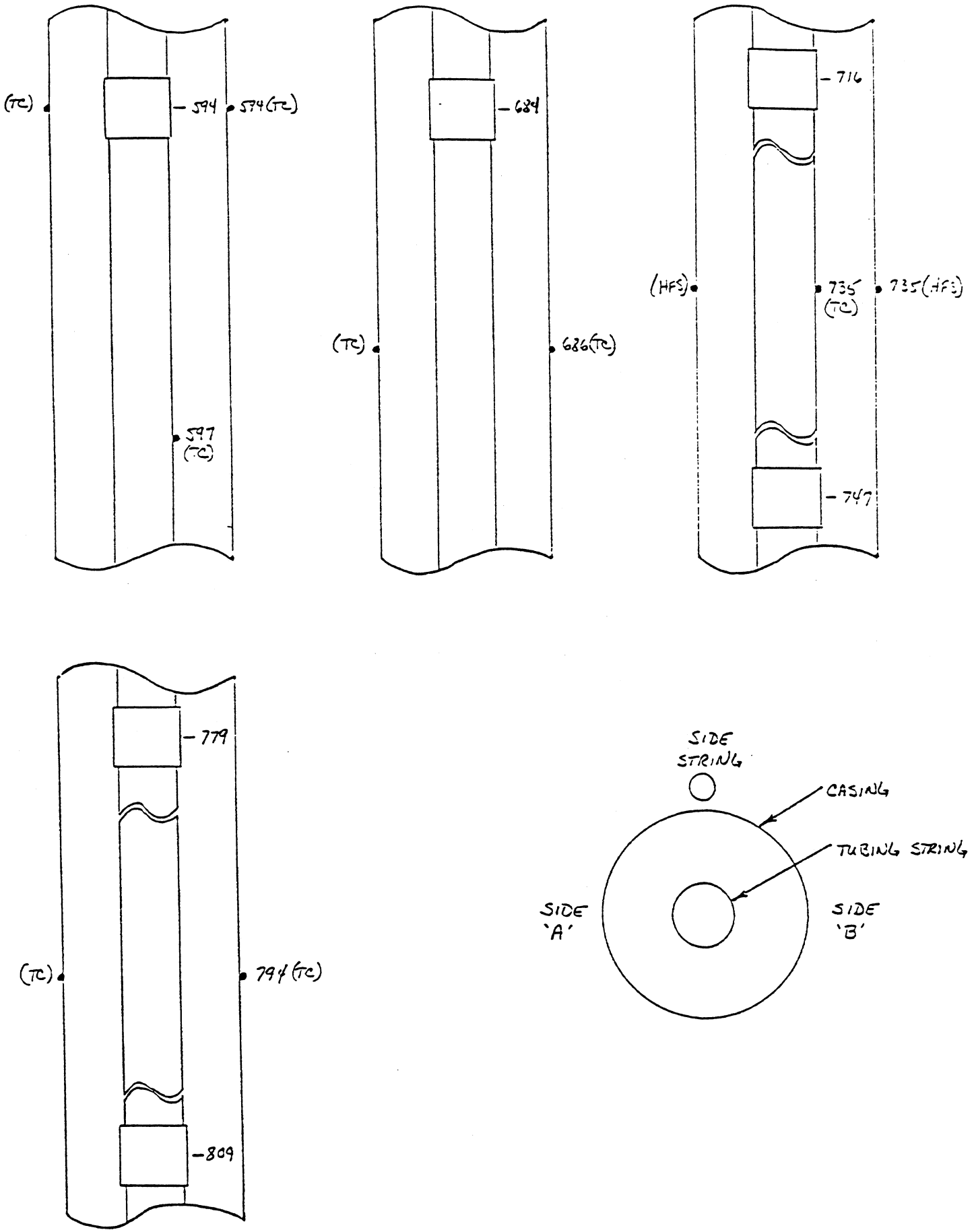
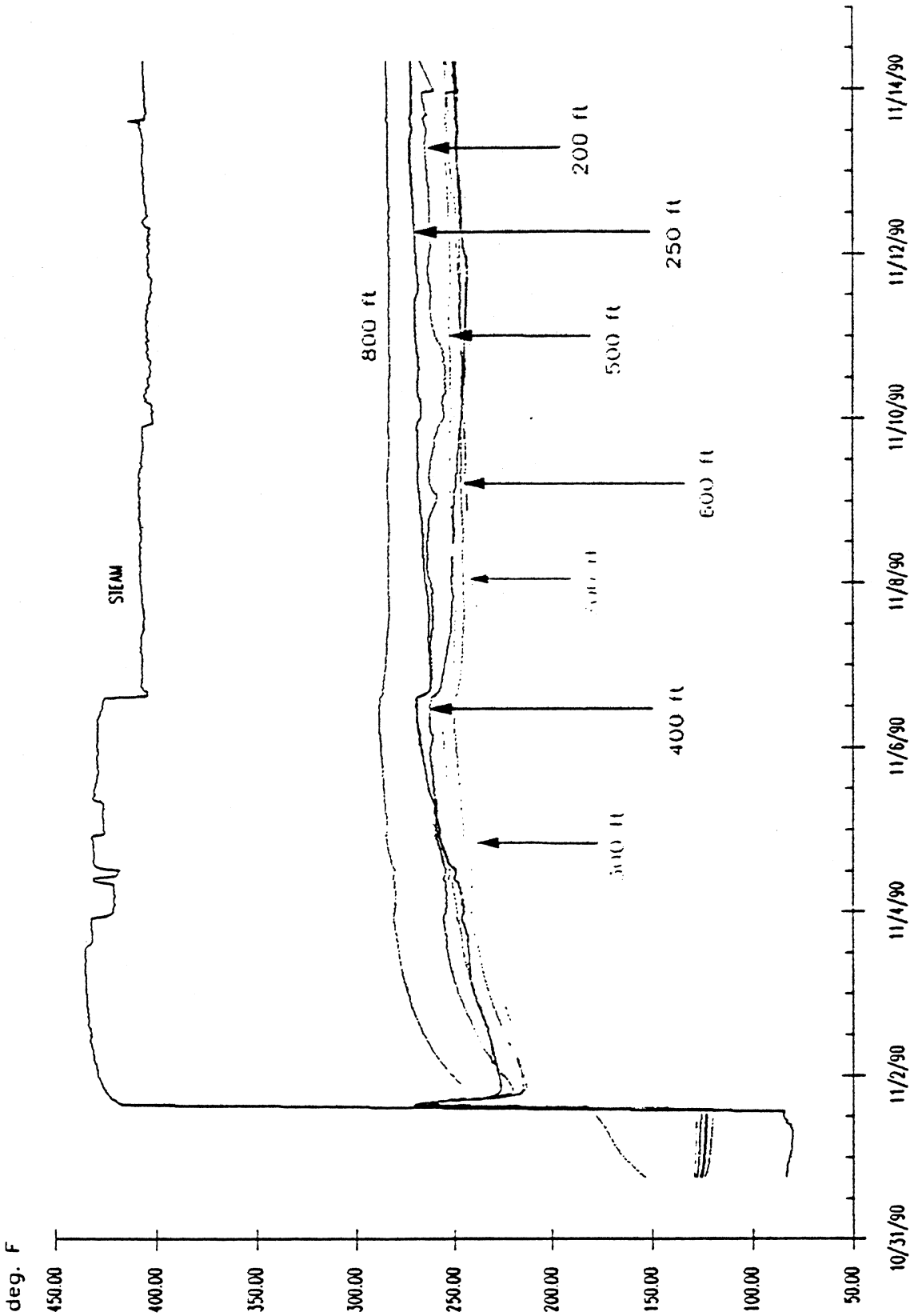
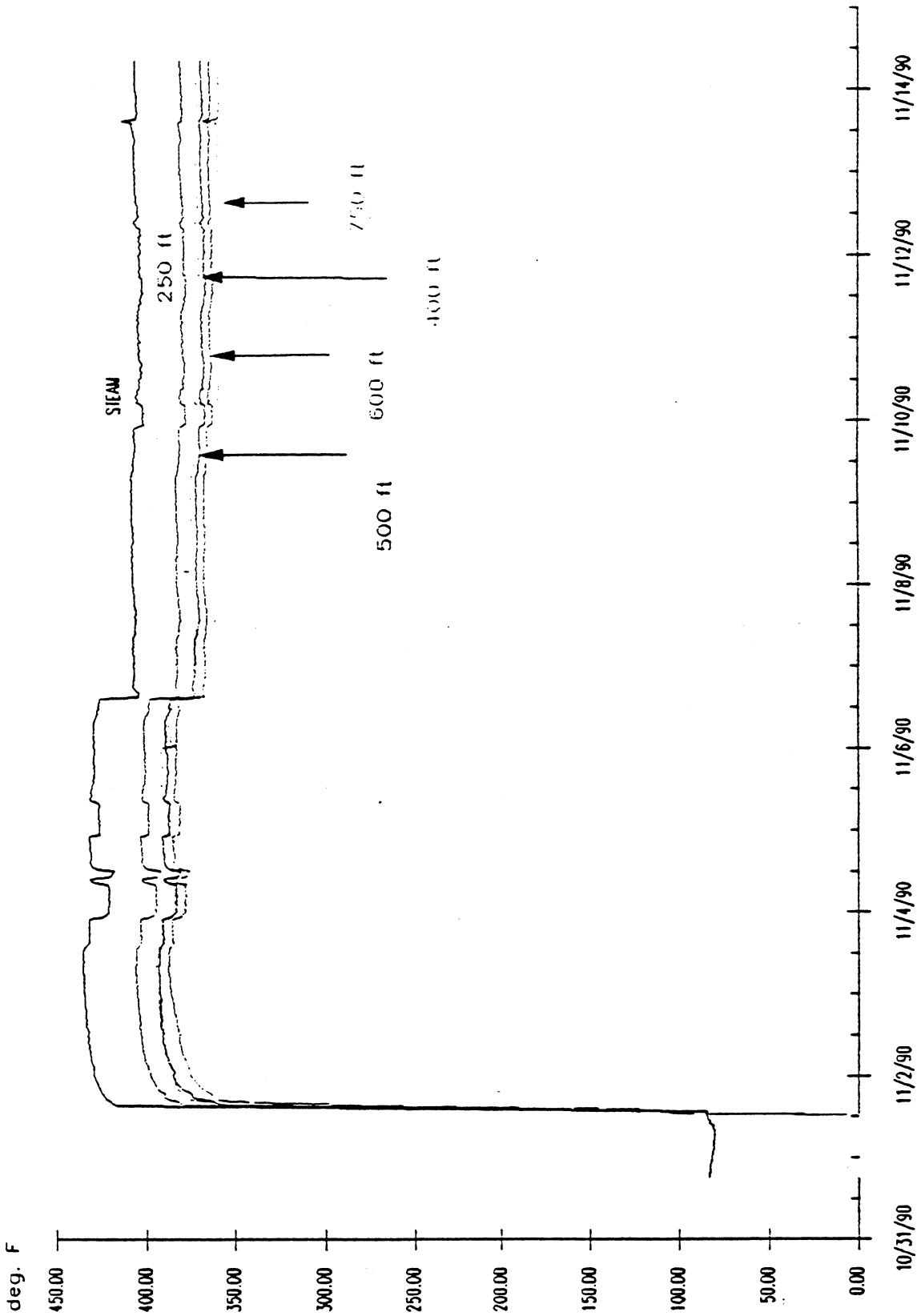


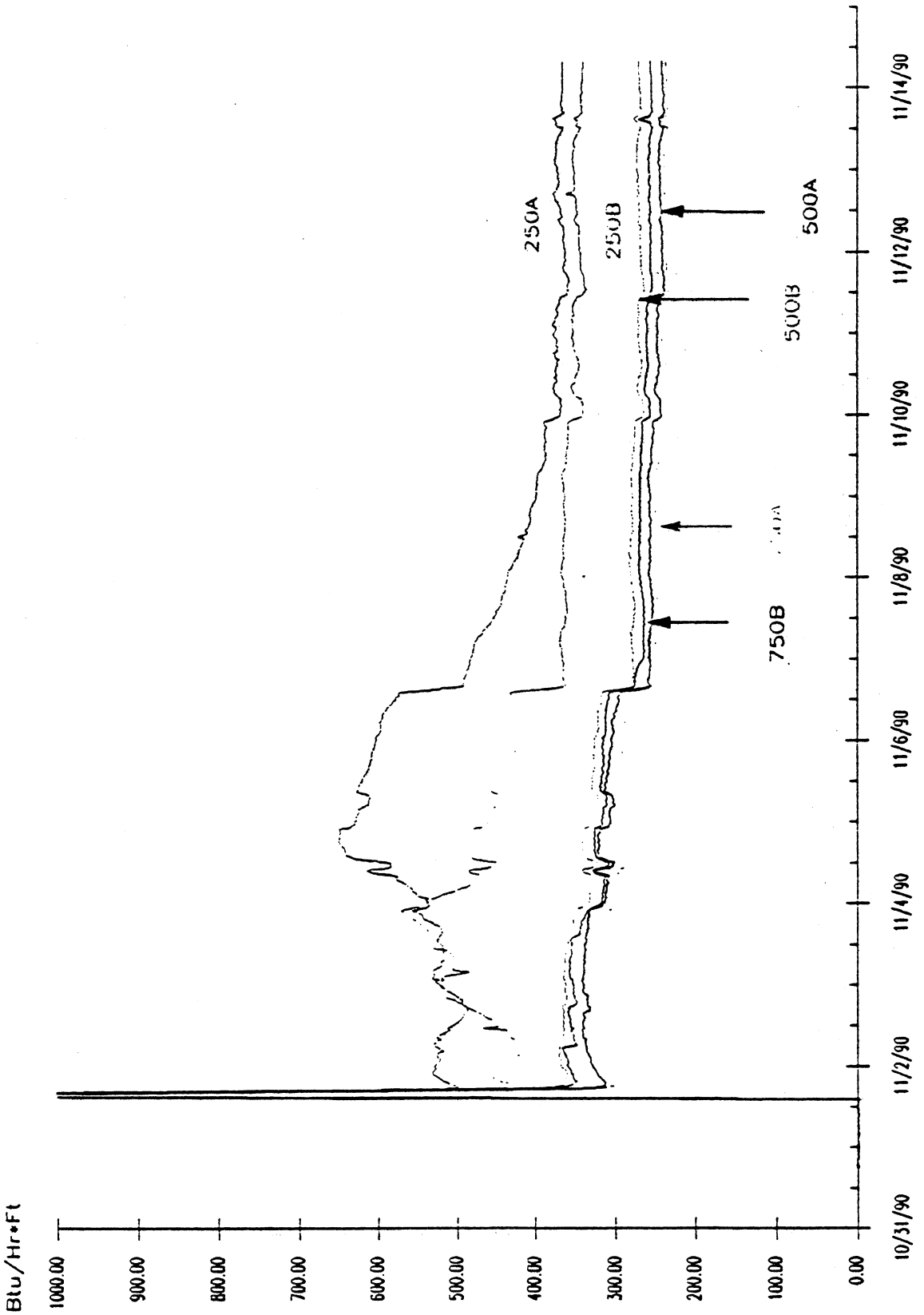
FIGURE B-3: RELATIONSHIP BETWEEN SENSOR LOCATION



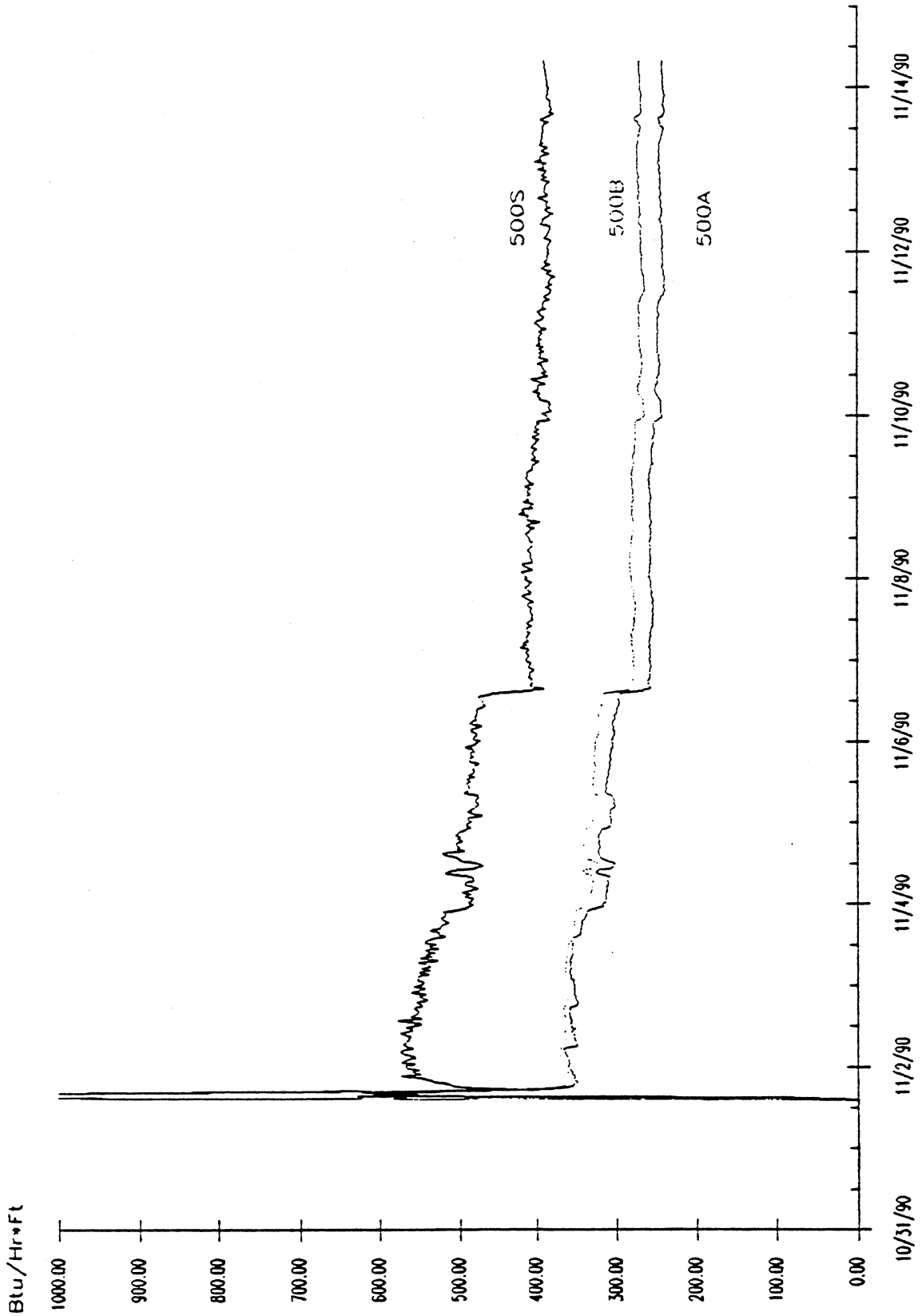
GRAPH B-1: CASING TEMPERATURE VS. TIME



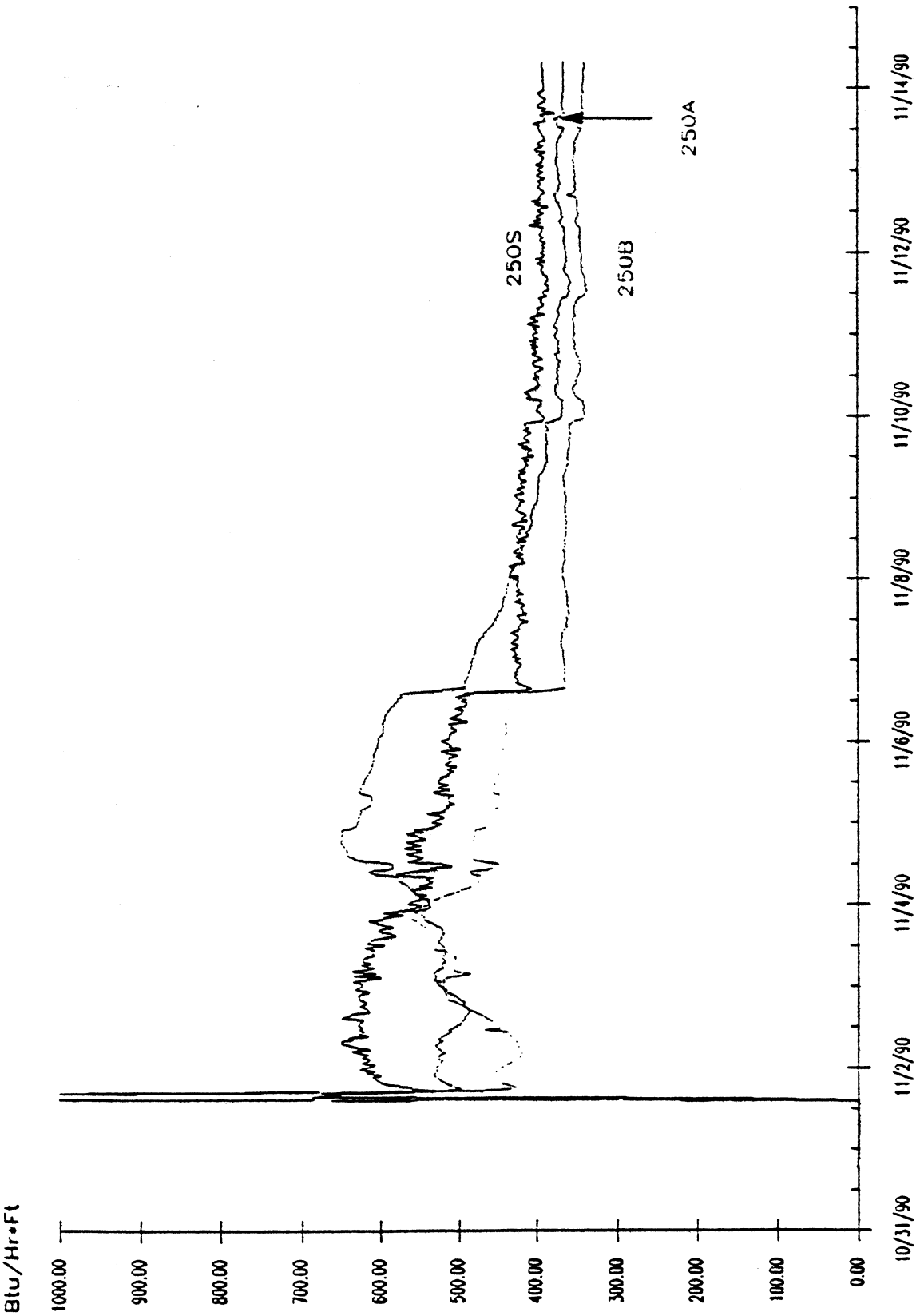
GRAPH B-2: TUBING STRING TEMPERATURE VS. TIME



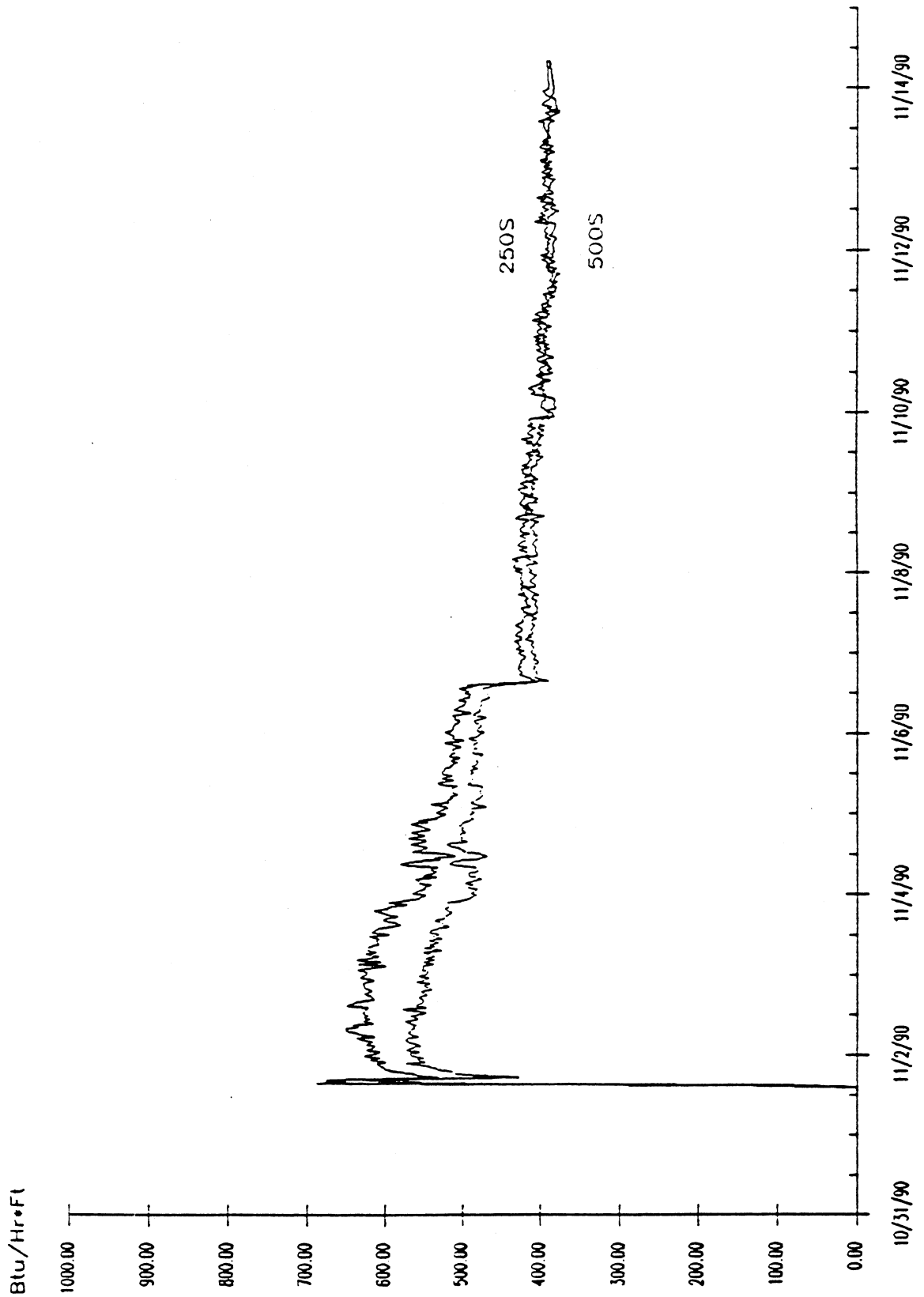
GRAPH B-3: CASING HEAT FLUX VS. TIME



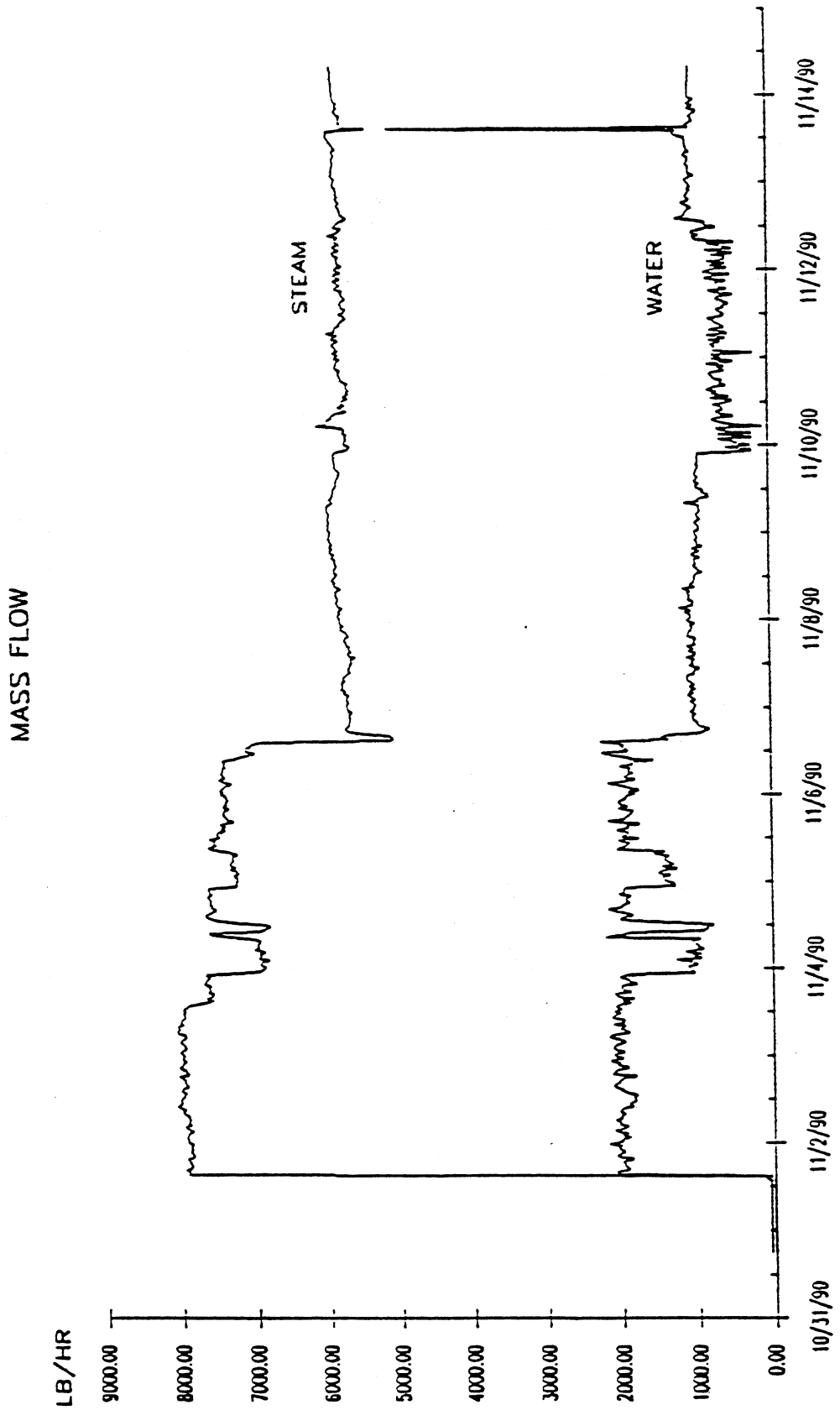
GRAPH B-4: HEAT FLUX AT 500 FEET VS. TIME



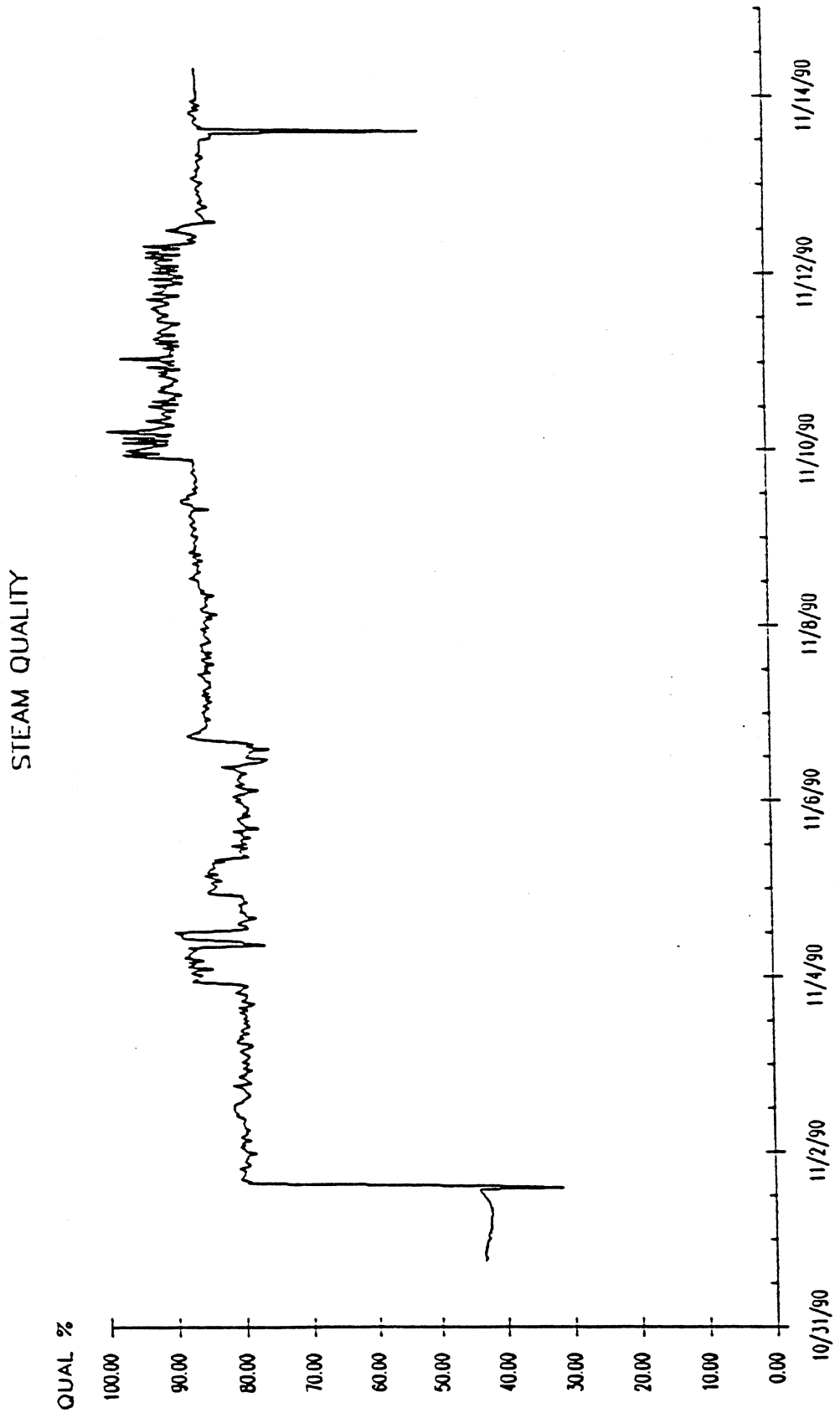
GRAPH B-5: HEAT FLUX AT 250 FEET VS. TIME



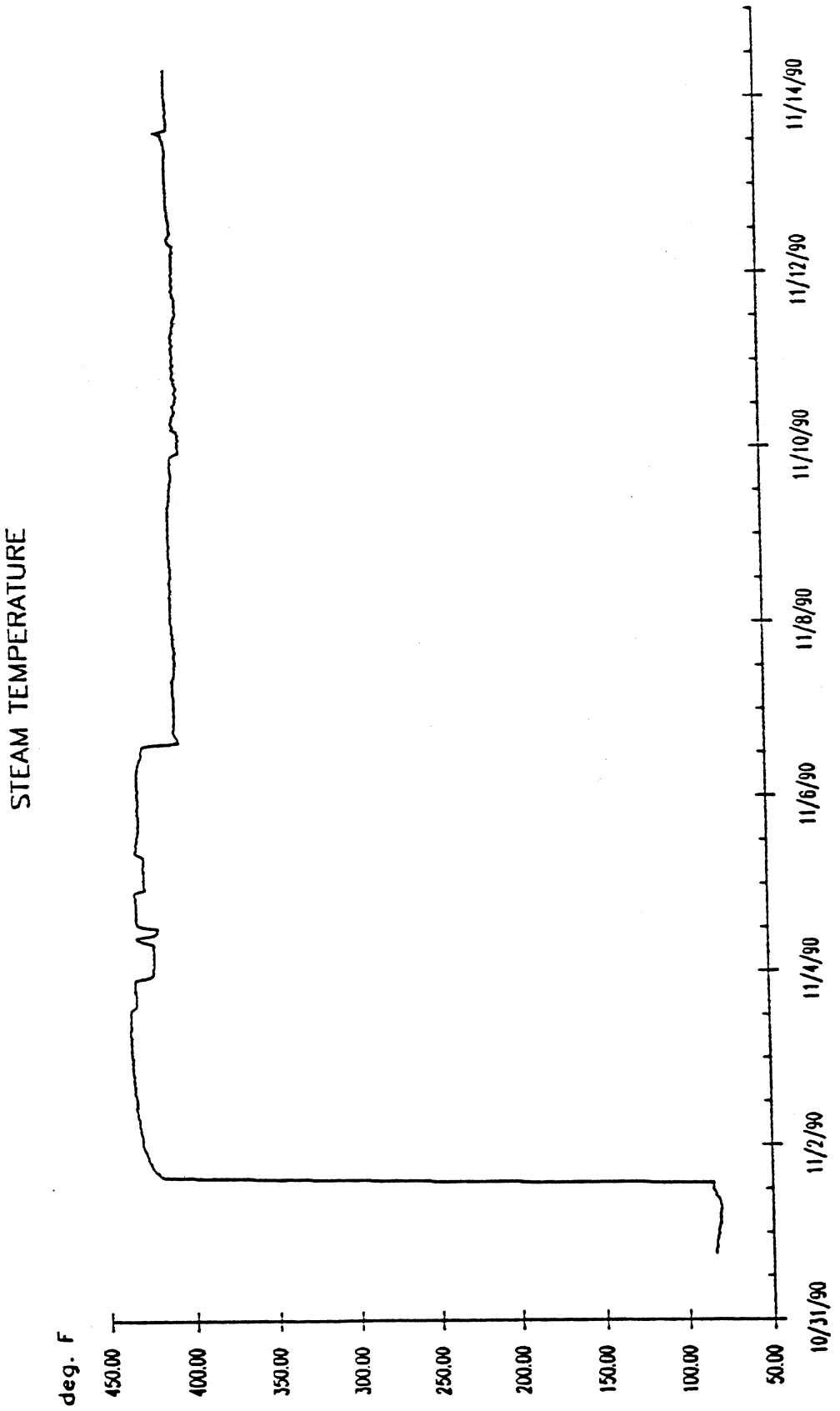
GRAPH B6: TUBING STRING HEAT FLUX VS. TIME



GRAPH B-7: STEAM MASS FLOW VS. TIME



GRAPH B-8: STEAM QUALITY VS. TIME



GRAPH B-9: STEAM TEMPERATURE VS. TIME

TEST CASE B, CO[illegible]ON 2 TEMPERATURE DATA														
STABLE CASING DATA										STABLE STRING DATA				
DATE	HOUR	200FT	250FT	300FT	400FT	500FT	600FT	700FT	800FT	250FT	400FT	500FT	600FT	750FT
11/12/90	0:30	261.63	269.36	247.43	243.76	251.18	246.18	242.06	283.08	378.42	369.88	366.88	362.52	357.63
11/12/90	1:05	261.43	269.31	247.46	243.82	251.22	245.97	241.96	282.98	378.26	369.56	366.54	362.14	357.27
11/12/90	1:40	261.19	269.44	247.62	244.06	251.19	246.14	242.01	283.01	378.61	370.10	367.11	362.69	357.74
11/12/90	2:15	261.14	269.47	247.71	244.13	251.22	246.13	242.06	283.02	378.67	369.93	366.86	362.38	357.33
11/12/90	2:50	261.17	269.61	247.69	244.33	251.28	246.10	242.09	283.08	378.32	369.78	366.71	362.26	357.27
11/12/90	3:26	261.34	269.63	247.80	244.37	251.33	246.14	242.12	283.04	378.41	369.92	366.93	362.56	357.54
11/12/90	4:01	261.45	269.66	247.75	244.46	251.37	246.11	242.11	283.05	378.94	370.16	367.08	362.55	357.45
11/12/90	4:36	261.46	269.69	247.84	244.51	251.34	246.08	242.07	282.99	378.79	370.18	367.19	362.69	357.66
11/12/90	5:11	261.52	269.77	247.79	244.69	251.41	246.14	242.23	283.06	378.79	370.06	366.98	362.52	357.42
11/12/90	5:47	261.61	269.86	248.08	244.85	251.38	246.14	242.28	283.05	378.29	369.72	366.61	362.12	357.09
11/12/90	6:22	261.79	269.87	248.12	244.89	251.44	246.10	242.35	283.07	379.08	370.34	367.28	362.73	357.67
11/12/90	6:57	261.82	269.84	248.17	244.92	251.45	246.17	242.25	283.02	378.39	369.67	366.58	362.06	357.08
11/12/90	7:32	261.93	269.87	248.29	245.05	251.52	246.19	242.34	283.07	378.44	370.03	366.98	362.55	357.37
11/12/90	8:08	261.97	270.11	248.32	245.23	251.55	246.14	242.43	283.15	380.16	371.29	368.26	363.74	358.72
11/12/90	8:43	261.94	270.29	248.26	245.12	251.64	245.91	242.35	283.08	379.78	370.89	367.96	363.56	358.94
11/12/90	9:18	261.83	270.41	248.47	245.22	251.86	245.88	242.41	283.10	380.86	371.94	369.04	364.61	359.97
11/12/90	9:53	261.77	270.57	248.25	245.28	251.96	245.79	242.46	283.09	379.62	370.61	367.66	363.32	358.84
11/12/90	10:28	261.61	270.39	248.16	245.16	251.83	245.76	242.42	283.00	379.17	370.14	367.29	362.92	358.51
11/12/90	11:04	261.62	270.34	248.27	245.24	251.79	245.82	242.52	283.03	378.57	369.76	366.95	362.68	358.33
11/12/90	11:39	261.69	270.37	248.21	245.39	251.83	245.97	242.65	283.07	379.27	370.43	367.62	363.30	358.64
11/12/90	12:14	261.74	270.44	248.28	245.38	251.93	245.98	242.66	283.06	379.63	370.76	367.85	363.54	358.92
11/12/90	12:49	261.86	270.55	248.24	245.41	251.95	246.01	242.64	282.99	379.01	370.25	367.44	363.14	358.66
11/12/90	13:25	261.91	270.59	248.29	245.33	252.02	246.03	242.74	283.00	378.87	370.02	367.18	362.87	358.22
11/12/90	14:00	261.91	270.51	248.32	245.36	252.01	246.09	242.83	283.01	378.94	370.03	367.21	362.91	358.21
11/12/90	14:35	261.90	270.72	248.42	245.59	252.09	246.32	242.89	283.10	379.36	370.44	367.57	363.29	358.48
11/12/90	15:10	262.06	270.66	248.76	245.55	252.13	246.33	242.82	283.05	379.60	370.71	367.91	363.56	358.72
11/12/90	15:45	262.07	270.81	248.81	245.74	252.21	246.37	242.89	283.14	379.61	370.73	367.91	363.59	358.79
11/12/90	16:21	262.12	270.97	248.62	245.75	252.29	246.41	242.92	283.14	379.72	370.69	367.92	363.55	359.05
11/12/90	16:56	262.39	271.09	249.46	245.73	252.19	246.39	242.89	283.09	379.62	370.60	367.81	363.52	358.98
11/12/90	17:31	262.07	271.45	250.67	245.70	252.36	246.51	242.99	283.22	380.20	371.07	368.26	363.73	359.01
11/12/90	18:06	262.32	271.42	250.04	245.92	252.26	246.71	243.19	283.43	380.05	370.99	368.15	363.71	358.87
11/12/90	18:42	262.08	271.32	250.12	246.00	252.39	246.66	243.13	283.37	380.02	370.98	368.07	363.65	358.80
11/12/90	19:17	262.27	271.35	250.04	246.39	252.39	246.73	243.28	283.47	380.08	371.09	368.23	363.78	358.84
11/12/90	19:52	262.63	271.46	250.20	246.39	252.52	246.77	243.30	283.52	380.12	371.09	368.23	363.74	358.76
11/12/90	20:27	262.68	271.50	250.22	246.55	252.57	246.76	243.31	283.52	380.19	371.11	368.23	363.71	358.75
11/12/90	21:03	262.91	271.57	250.37	246.61	252.64	246.77	243.31	283.53	380.09	371.03	368.20	363.70	358.76
11/12/90	21:38	262.96	271.61	250.28	246.52	252.62	246.80	243.28	283.52	380.21	371.21	368.32	363.80	358.81
11/12/90	22:13	263.01	271.72	250.40	246.56	252.82	246.87	243.30	283.58	380.30	371.28	368.37	363.87	358.93

Table B-1: Condition 2 String and Casing Temperature Data

Table B-2: Condition 2 String and Casing Temperature Data

TEST CASE B, CONDITION 2 TEMPERATURE DATA														
		STABLE CASING DATA								STABLE STRING DATA				
DATE	HOUR	200FT	250FT	300FT	400FT	500FT	600FT	700FT	800FT	250FT	400FT	500FT	600FT	750FT
11/12/90	22:48	263.17	271.82	250.53	246.73	252.79	246.91	243.34	283.63	380.53	371.52	368.60	364.07	358.98
11/12/90	23:23	263.22	271.90	250.68	246.86	252.89	246.88	243.41	283.69	380.63	371.60	368.66	364.09	358.99
11/12/90	23:59	263.22	271.93	250.82	246.89	252.92	246.89	243.38	283.67	380.69	371.61	368.70	364.14	359.04
11/13/90	0:34	263.34	271.97	250.79	247.07	252.98	246.97	243.40	283.69	380.34	371.29	368.38	363.87	358.84
11/13/90	1:09	263.44	272.09	250.92	247.16	252.99	247.08	243.44	283.74	380.72	371.64	368.70	364.13	359.04
11/13/90	1:44	263.51	272.19	251.03	247.28	253.11	247.08	243.36	283.73	380.77	371.77	368.84	364.29	359.14
11/13/90	2:20	263.54	272.36	251.11	247.47	253.24	247.25	243.48	283.81	380.84	371.78	368.83	364.27	359.15
11/13/90	2:55	263.72	272.41	251.14	247.53	253.26	247.16	243.30	283.76	380.87	371.80	368.88	364.33	359.18
11/13/90	3:30	263.91	272.46	251.31	247.68	253.24	247.24	243.34	283.78	380.71	371.62	368.67	364.07	359.01
11/13/90	4:05	264.00	272.45	251.31	247.72	253.28	247.25	243.31	283.79	380.80	371.76	368.75	364.21	359.08
11/13/90	4:41	264.01	272.48	251.39	247.80	253.28	247.23	243.29	283.79	380.71	371.63	368.66	364.09	358.92
11/13/90	5:16	264.11	272.51	251.52	247.86	253.47	247.26	243.17	283.79	380.67	371.63	368.66	364.12	358.93
11/13/90	5:51	264.13	272.62	251.58	248.02	253.41	247.24	243.14	283.83	380.69	371.64	368.64	364.07	358.91
11/13/90	6:26	264.15	272.62	251.69	248.09	253.39	247.30	243.03	283.81	380.65	371.64	368.66	364.10	358.92
11/13/90	7:02	264.11	272.69	251.79	248.12	253.47	247.32	243.03	283.87	380.61	371.57	368.54	363.99	358.83
11/13/90	7:37	264.18	272.64	251.60	248.10	253.57	247.32	242.95	283.86	380.83	371.76	368.72	364.10	358.86
11/13/90	8:12	264.19	272.67	251.78	248.10	253.49	247.30	242.83	283.86	380.50	371.51	368.58	364.03	358.89
11/13/90	8:55	264.07	272.44	251.53	247.93	253.37	247.15	242.67	283.68	380.07	370.91	368.10	363.62	358.60
11/13/90	12:02	263.38	271.28	251.66	247.43	252.98	247.02	242.53	283.64	380.95	371.62	368.71	364.18	359.49
11/13/90	12:37	264.02	271.73	252.13	247.84	253.25	247.00	242.41	283.77	381.41	372.07	369.17	364.63	359.59
11/13/90	13:13	264.52	271.93	252.29	247.89	253.50	247.11	242.52	283.79	381.47	372.14	369.24	364.69	359.61
11/13/90	13:48	264.72	271.93	252.30	248.04	253.47	247.12	242.61	283.83	381.27	371.97	369.16	364.59	359.47
11/13/90	14:23	264.76	272.04	252.24	248.09	253.57	247.38	243.01	284.37	379.47	371.06	369.67	367.38	365.85
11/13/90	14:58	265.04	272.66	252.38	248.41	253.90	247.81	243.41	284.61	379.89	371.03	368.29	363.99	359.50
11/13/90	15:34	264.79	272.33	252.10	248.06	253.51	247.47	243.18	284.21	379.33	370.33	367.62	363.31	358.87
11/13/90	16:09	263.27	272.11	252.09	247.99	253.47	247.42	243.18	284.14	379.49	370.42	367.63	363.33	358.89
11/13/90	16:44	263.76	271.81	252.12	247.93	253.40	247.42	243.13	284.12	379.26	370.23	367.39	363.03	358.53
11/13/90	17:19	264.15	271.75	252.17	248.13	253.43	247.63	243.22	284.23	379.63	370.63	367.80	363.37	358.52
11/13/90	17:54	264.37	271.68	252.14	248.19	253.35	247.57	243.02	284.23	379.47	370.52	367.68	363.31	358.42
11/13/90	18:30	264.78	271.73	252.30	248.38	253.37	247.55	243.14	284.23	379.68	370.67	367.79	363.39	358.51
11/13/90	19:05	264.95	271.60	252.26	248.26	253.36	247.50	243.04	284.16	379.84	370.86	368.00	363.56	358.56
11/13/90	19:40	265.26	271.66	252.36	248.36	253.31	247.49	243.02	284.17	379.78	370.78	367.88	363.38	358.35
11/13/90	20:15	265.42	271.61	252.38	248.25	253.29	247.43	242.95	284.08	379.52	370.49	367.58	363.11	358.19
11/13/90	20:51	265.59	271.69	252.49	248.38	253.32	247.33	243.00	284.11	379.66	370.70	367.82	363.34	358.28
11/13/90	21:26	265.62	271.69	252.44	248.44	253.30	247.37	243.03	284.14	379.56	370.57	367.65	363.20	358.16
11/13/90	22:01	265.77	271.78	252.64	248.64	253.34	247.38	242.99	284.12	379.87	370.92	368.04	363.58	358.36
11/13/90	22:36	265.74	271.69	252.59	248.72	253.32	247.36	242.85	284.11	379.86	370.94	367.98	363.46	358.22

Table B-3: Condition 2 String and Casing Heat Flux Data and Steam Data

TEST CASE B, COND. 2 HEAT FLUX AND STEAM DATA													
		CASING						STRING			STEAM		
DATE	HOUR	250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	250FT	500FT		WATER	STEAM	QUALITY	TEMP
11/12/90	0:30	360.64	343.32	240.91	267.38	234.81	255.90	387.99	382.00		527.71	5812.46	91.68	403.46
11/12/90	1:05	361.08	341.96	239.41	266.87	233.70	255.35	390.52	383.03		766.89	5724.90	88.19	403.62
11/12/90	1:40	361.71	342.92	239.86	266.89	234.34	255.30	387.11	383.16		553.55	5785.46	91.27	403.68
11/12/90	2:15	361.83	343.56	240.40	267.27	234.96	255.16	390.38	381.90		783.91	5775.27	88.05	404.34
11/12/90	2:50	362.18	342.96	239.91	266.51	233.85	254.58	385.76	378.08		552.49	5804.99	91.31	403.36
11/12/90	3:26	363.15	343.53	239.83	266.98	234.47	255.11	392.40	379.52		540.89	5781.02	91.44	403.38
11/12/90	4:01	362.87	343.70	240.90	266.90	233.84	255.14	393.03	387.26		738.39	5839.17	88.77	404.40
11/12/90	4:36	362.06	344.49	240.60	267.39	234.72	255.49	389.09	383.88		456.57	5857.37	92.77	403.87
11/12/90	5:11	361.96	343.44	240.07	267.37	234.13	254.97	394.11	382.44		811.41	5770.58	87.67	404.32
11/12/90	5:47	361.75	343.58	239.95	267.09	233.92	255.14	392.73	380.93		467.57	5816.31	92.56	403.07
11/12/90	6:22	362.77	343.47	240.33	266.88	233.87	255.12	390.39	380.23		572.65	5844.93	91.08	403.75
11/12/90	6:57	362.86	343.25	240.65	266.61	234.19	255.22	390.14	379.75		802.03	5759.41	87.78	403.68
11/12/90	7:32	362.42	343.04	240.32	266.68	234.20	254.78	388.84	380.47		432.74	5812.29	93.07	403.28
11/12/90	8:08	365.31	346.22	241.62	268.93	236.14	255.98	406.30	391.22		927.44	5817.22	86.25	405.83
11/12/90	8:43	366.55	347.19	242.14	269.12	236.92	256.65	392.96	388.73		985.65	5775.56	85.42	405.86
11/12/90	9:18	369.41	349.37	244.13	269.74	238.20	257.32	401.61	389.18		908.81	5910.53	86.67	407.10
11/12/90	9:53	366.08	347.78	242.52	269.79	235.62	256.36	392.08	386.25		997.85	5813.77	85.35	405.90
11/12/90	10:28	363.85	346.01	240.82	267.73	235.29	256.12	398.12	380.34		975.37	5769.33	85.54	405.32
11/12/90	11:04	365.63	345.53	240.50	268.37	235.23	256.15	392.02	376.62		859.81	5722.61	86.94	404.30
11/12/90	11:39	366.00	344.06	240.79	268.49	235.86	255.66	388.46	381.83		678.19	5840.42	89.60	404.84
11/12/90	12:14	365.87	346.06	241.08	268.66	235.51	256.59	396.30	385.67		814.86	5812.71	87.70	405.42
11/12/90	12:49	367.25	345.95	241.16	268.45	235.31	255.63	393.68	380.06		806.85	5764.22	87.72	404.83
11/12/90	13:25	368.09	346.72	241.45	268.92	235.28	256.17	382.98	384.35		946.14	5716.80	85.80	404.74
11/12/90	14:00	368.70	346.42	241.38	268.46	235.86	256.34	398.96	383.97		1204.17	5651.29	82.43	405.13
11/12/90	14:35	369.22	347.50	241.85	269.07	236.83	257.13	392.19	382.90		1085.17	5700.72	84.01	405.37
11/12/90	15:10	372.97	346.69	242.32	270.17	236.46	257.35	403.39	386.79		1074.98	5741.64	84.23	405.66
11/12/90	15:45	371.70	347.50	242.46	270.03	237.38	257.38	392.73	394.45		1061.13	5744.04	84.41	405.63
11/12/90	16:21	372.74	348.94	242.88	270.47	236.26	256.67	393.55	382.86		1028.84	5750.70	84.82	405.65
11/12/90	16:56	375.26	358.86	241.94	268.46	236.41	256.23	391.58	384.02		997.60	5770.09	85.26	405.70
11/12/90	17:31	372.72	351.77	242.33	269.67	236.49	256.79	388.25	387.51		1030.91	5792.13	84.89	405.25
11/12/90	18:06	370.20	348.91	242.80	270.06	237.05	256.68	387.94	385.98		1123.43	5752.50	83.66	405.26
11/12/90	18:42	370.03	348.78	243.17	269.94	237.22	255.97	392.49	386.59		1054.18	5777.18	84.57	405.25
11/12/90	19:17	369.03	349.67	242.51	269.35	236.91	257.00	395.92	385.91		1023.02	5796.64	85.00	405.15
11/12/90	19:52	369.37	348.92	242.70	270.21	236.48	257.50	392.11	382.91		1068.18	5778.73	84.40	405.16
11/12/90	20:27	368.22	348.81	243.21	271.05	236.95	257.56	392.37	380.33		1058.11	5801.51	84.57	405.30
11/12/90	21:03	367.84	349.60	243.15	270.84	236.96	257.67	396.02	390.74		1045.90	5789.52	84.70	405.19
11/12/90	21:38	369.88	349.65	242.59	269.72	237.23	256.65	387.20	383.90		1010.26	5806.83	85.18	404.20
11/12/90	22:13	369.15	349.39	242.68	270.84	236.93	256.82	392.39	390.20		1048.33	5795.55	84.68	404.25

Table B-4: Condition 2 String and Casing Heat Flux Data and Steam Data

TEST CASE B, CON. .4 2 HEAT FLUX AND STEAM DATA														
		CASING						STRING			STEAM			
DATE	HOUR	250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	250FT	500FT		WATER	STEAM	QUALITY	TEMP
11/12/90	22:48	369.29	348.39	242.77	270.76	237.06	256.91	396.49	385.82		1009.66	5843.77	85.27	406.55
11/12/90	23:23	370.14	349.20	244.02	271.05	237.83	258.16	389.22	384.05		1022.91	5840.95	85.10	406.60
11/12/90	23:59	371.55	350.66	243.61	271.29	237.78	257.51	394.30	394.39		1058.48	5838.90	84.65	406.77
11/13/90	0:34	370.18	349.85	243.27	271.36	237.23	257.31	394.40	386.68		1082.42	5815.04	84.31	406.48
11/13/90	1:09	370.74	350.89	243.78	271.54	237.52	257.25	389.39	387.95		1007.19	5851.84	85.32	406.64
11/13/90	1:44	372.84	351.13	245.55	271.59	237.74	257.74	398.26	385.34		955.10	5869.33	86.00	406.81
11/13/90	2:20	372.11	351.02	244.74	272.03	238.03	257.90	390.41	399.29		1033.28	5848.28	84.98	406.89
11/13/90	2:55	372.86	351.40	244.09	271.52	237.82	258.49	391.67	390.61		1016.43	5856.56	85.21	406.86
11/13/90	3:30	371.99	350.74	244.73	271.85	237.60	257.77	389.08	392.27		1038.99	5847.08	84.91	406.80
11/13/90	4:05	372.39	350.68	243.58	271.68	237.90	257.49	388.09	387.77		1013.68	5853.39	85.24	406.83
11/13/90	4:41	370.63	350.40	243.48	271.24	238.14	256.95	394.21	380.86		1064.72	5833.01	84.56	406.72
11/13/90	5:16	371.37	350.75	244.52	271.40	237.89	257.04	386.26	390.15		1050.06	5833.97	84.75	406.60
11/13/90	5:51	370.78	349.72	243.34	271.39	237.57	256.87	398.67	385.92		1027.78	5844.58	85.04	406.64
11/13/90	6:26	372.47	348.75	243.49	271.72	237.86	257.74	398.82	382.98		1024.11	5841.85	85.08	406.67
11/13/90	7:02	371.26	349.83	243.87	271.46	237.32	257.11	389.02	392.72		1085.91	5824.45	84.29	406.63
11/13/90	7:37	372.03	350.05	243.58	270.96	237.47	256.85	395.48	388.61		1093.45	5842.57	84.24	406.78
11/13/90	8:12	371.05	349.99	242.41	270.62	236.74	256.63	394.28	391.74		1022.63	5846.90	85.11	406.57
11/13/90	8:55	369.71	349.01	241.86	270.24	236.74	256.16	386.32	389.22		1055.45	5796.99	84.60	406.31
11/13/90	12:02	362.97	340.81	238.53	266.87	233.60	253.19	394.24	388.56		1077.55	5934.22	84.63	407.66
11/13/90	12:37	369.86	346.39	242.84	268.72	237.14	255.54	394.26	388.54		1215.07	5947.27	83.04	408.51
11/13/90	13:13	372.06	346.74	243.45	270.51	237.25	255.90	393.62	387.19		1231.28	5924.11	82.79	408.40
11/13/90	13:48	371.41	345.90	242.80	270.06	236.82	256.11	400.87	381.45		1198.15	5936.09	83.21	408.22
11/13/90	14:23	372.11	345.46	244.66	274.57	245.13	270.61	386.19	391.43		5074.35	5393.47	51.52	413.61
11/13/90	14:58	375.00	349.22	244.89	275.09	239.21	263.89	387.40	385.92		1025.87	5730.01	84.82	405.68
11/13/90	15:34	369.98	344.27	239.18	270.08	234.24	256.99	387.27	382.53		1065.99	5724.94	84.30	405.49
11/13/90	16:09	364.26	340.92	238.46	267.63	232.87	254.97	392.27	375.12		1003.25	5748.88	85.14	405.48
11/13/90	16:44	361.74	338.61	237.66	266.50	232.45	253.76	375.66	380.86		972.29	5738.90	85.51	405.02
11/13/90	17:19	364.48	339.94	237.84	266.55	233.10	253.77	390.03	377.07		981.70	5757.19	85.43	405.27
11/13/90	17:54	363.30	339.84	238.67	266.97	232.67	254.26	385.23	379.12		1014.81	5745.52	84.99	405.42
11/13/90	18:30	365.59	339.99	239.18	267.20	233.79	254.11	395.30	380.02		982.94	5775.27	85.46	405.58
11/13/90	19:05	366.09	341.13	239.24	267.62	233.76	254.20	396.18	380.10		936.65	5813.56	86.12	405.65
11/13/90	19:40	365.31	341.10	238.45	267.40	233.64	253.85	389.70	379.80		936.05	5818.95	86.14	405.59
11/13/90	20:15	365.09	340.36	238.71	267.34	233.57	254.11	387.22	380.53		1042.21	5774.89	84.71	405.47
11/13/90	20:51	364.44	340.77	238.48	266.84	233.68	254.01	385.01	384.35		970.95	5799.11	85.66	405.60
11/13/90	21:26	364.64	340.68	237.56	266.73	233.40	254.41	392.63	384.04		1046.74	5781.55	84.67	405.55
11/13/90	22:01	364.50	340.58	238.89	266.99	233.74	254.18	393.48	381.47		989.81	5808.41	85.44	405.65
11/13/90	22:36	363.66	339.40	238.86	267.12	233.82	254.27	395.62	383.17		958.61	5833.72	85.89	405.77

TEST CASE B.CONDITION 3 TEMPERATURE														
		STABLE CA[illegible] DATA								STABLE STRING DATA				
TIME	HOUR	200FT	250FT	300FT	400FT	500FT	600FT	700FT	800FT	250FT	400FT	500FT	600FT	750FT
11/4/90	13:20	253.00	251.10	234.39	254.38	247.28	240.78	239.52	281.01	400.87	388.47	388.99	382.63	381.24
11/4/90	13:55	253.73	251.97	235.09	254.91	248.00	241.12	239.92	281.40	401.73	388.98	389.34	383.42	381.43
11/4/90	14:30	254.38	252.67	235.37	255.26	248.31	241.53	240.16	281.77	402.22	389.58	389.73	384.24	381.11
11/4/90	15:06	254.81	253.05	235.52	255.46	248.77	241.84	240.41	282.13	402.40	390.21	389.88	384.61	380.26
11/4/90	15:41	255.23	253.43	235.83	255.87	249.10	242.16	240.68	282.31	401.94	390.22	390.17	383.79	378.82
11/4/90	16:16	255.44	253.71	236.03	255.91	249.34	242.38	240.85	282.53	401.83	390.19	390.18	383.64	379.22
11/4/90	16:51	255.96	254.18	236.11	256.07	249.53	242.57	241.04	282.83	402.07	389.43	390.23	383.86	379.94
11/4/90	17:27	256.39	254.55	236.10	256.35	249.79	242.91	241.39	283.02	402.19	389.52	390.28	384.26	380.69
11/4/90	18:02	256.83	254.90	236.27	256.06	250.01	243.23	241.64	283.32	402.52	390.59	390.43	384.62	380.96
11/4/90	18:37	257.28	255.25	236.67	256.64	250.24	243.32	241.72	283.47	402.40	390.61	390.35	384.56	381.37
11/4/90	19:12	257.59	255.69	236.96	257.27	250.51	243.56	242.00	283.69	402.57	390.38	390.41	384.69	381.94
11/4/90	19:48	257.95	256.00	237.12	257.50	250.58	243.73	242.19	283.80	402.78	390.56	390.64	384.95	382.38
11/4/90	20:23	258.26	256.51	237.19	257.73	250.91	243.98	242.41	284.01	402.56	387.47	390.38	384.72	382.91
11/4/90	20:58	258.58	256.78	237.41	257.94	250.99	244.08	242.48	284.09	402.90	388.76	390.71	385.01	384.11
11/4/90	21:33	259.04	257.23	237.53	258.40	251.22	244.23	242.60	284.31	403.03	389.14	390.84	385.15	384.71
11/4/90	22:09	259.45	257.60	237.76	258.52	251.30	244.44	242.86	284.48	402.92	389.54	390.74	385.05	384.71
11/4/90	22:44	259.27	257.41	237.47	258.42	251.03	244.57	242.94	284.33	398.65	386.13	386.88	381.37	380.89
11/4/90	23:19	259.12	257.18	237.72	258.14	250.84	244.48	242.78	284.14	398.53	386.23	387.00	381.29	380.04
11/4/90	23:54	259.17	257.31	237.78	258.21	250.80	244.38	242.61	284.01	398.63	386.24	387.18	381.24	379.36
11/5/90	0:30	259.32	257.57	237.67	258.42	250.81	244.44	242.66	284.03	398.66	386.02	387.27	381.12	378.98
11/5/90	1:05	259.57	257.64	237.40	258.60	250.78	244.47	242.65	283.99	398.58	385.96	387.33	381.08	378.94
11/5/90	1:40	259.88	258.03	237.44	258.71	250.96	244.54	242.74	284.09	398.74	386.08	387.49	381.19	379.00
11/5/90	2:15	260.00	258.24	237.45	258.88	250.99	244.59	242.72	284.08	398.77	386.09	387.38	380.98	378.89
11/5/90	2:51	260.15	258.55	237.21	259.01	251.05	244.75	242.86	284.23	398.62	386.12	387.32	380.77	379.20
11/5/90	3:26	260.29	258.78	237.18	258.96	251.08	244.74	242.86	284.20	399.04	386.55	387.64	381.15	379.63
11/5/90	4:01	260.44	259.06	237.09	259.12	251.19	244.80	242.99	284.20	398.84	386.53	387.42	381.09	379.41
11/5/90	4:36	260.08	259.01	236.99	258.66	250.95	244.98	243.21	284.44	399.07	386.74	387.53	381.09	379.59
11/5/90	5:12	259.56	259.03	236.92	258.38	250.81	245.32	243.31	284.74	398.93	386.56	387.28	380.95	379.43
11/5/90	5:47	259.51	259.16	236.95	258.26	250.85	245.44	243.37	284.89	398.88	386.86	387.29	381.19	379.36
11/5/90	6:22	259.54	259.30	237.01	258.25	250.82	245.52	243.46	285.06	398.87	387.01	387.11	380.98	378.63
11/5/90	6:57	259.71	259.41	237.37	258.16	251.01	245.47	243.39	284.94	398.83	387.03	387.07	381.04	378.38
11/5/90	7:32	259.99	259.72	237.41	258.25	250.89	245.52	243.48	285.01	398.64	386.93	386.73	380.84	378.04
11/5/90	8:08	260.09	260.21	237.41	258.42	251.12	245.50	243.68	285.20	399.13	387.62	387.27	381.51	378.22
11/5/90	8:43	260.57	260.80	237.92	258.65	251.47	245.36	243.73	285.27	402.14	390.36	389.77	384.02	380.15
11/5/90	9:18	261.38	261.57	238.03	259.13	251.88	245.52	243.99	285.41	402.56	391.15	390.04	384.47	379.78
11/5/90	10:00	261.88	261.93	238.14	259.27	252.09	245.72	244.08	285.41	401.74	390.66	389.35	384.01	379.12
11/5/90	10:36	262.30	262.34	238.52	259.49	252.17	245.94	244.21	285.50	401.80	390.94	389.17	383.99	378.74
11/5/90	11:11	262.53	262.51	238.49	259.62	252.37	245.97	244.29	285.58	401.84	391.28	389.19	384.15	378.59
11/5/90	11:46	262.90	262.78	238.57	259.83	252.66	246.16	244.49	285.74	401.98	391.76	389.23	384.29	378.36
11/5/90	12:21	263.08	263.13	238.27	259.82	252.66	246.28	244.59	285.80	401.29	391.36	388.69	383.87	378.02

Table B-5: Condition 3 String and Casing Temperature Data

TEST CASE B.[illegible]ION 3 TEMPERATURE														
		STABLE CASING DATA								STABLE STRING DATA				
TIME	HOUR	200FT	250FT	300FT	400FT	500FT	600FT	700FT	800FT	250FT	400FT	500FT	600FT	750FT
11/5/90	12:57	263.20	263.25	238.54	259.96	252.82	246.47	244.69	285.86	401.32	391.56	388.63	383.74	377.79
11/5/90	13:32	263.32	263.43	238.36	259.87	252.86	246.54	244.74	285.88	401.11	391.36	388.45	383.61	377.51
11/5/90	14:07	263.36	263.64	237.74	259.99	252.89	246.65	244.81	285.95	400.71	391.07	388.15	383.35	377.33
11/5/90	14:42	263.67	263.78	238.01	260.04	252.95	246.76	244.81	285.97	400.99	391.36	388.39	383.58	377.59
11/5/90	15:17	263.81	264.01	238.24	260.13	253.09	246.79	244.93	286.09	400.44	390.93	387.96	383.12	377.16
11/5/90	15:53	263.96	264.07	238.24	260.29	253.10	246.83	244.94	286.13	400.89	391.49	388.40	383.56	377.44
11/5/90	16:28	264.10	264.18	238.64	260.33	253.23	246.89	244.98	286.18	400.20	390.79	387.70	382.99	377.07
11/5/90	17:03	264.25	264.42	238.61	260.62	253.25	247.08	245.08	286.22	400.29	390.96	387.76	382.96	376.93
11/5/90	17:38	264.68	264.59	238.16	260.70	253.37	247.25	245.17	286.28	400.46	391.13	388.01	383.19	377.14
11/5/90	18:14	264.76	264.80	238.35	260.82	253.45	247.29	245.27	286.38	400.63	391.21	388.09	383.18	377.18
11/5/90	18:49	265.02	264.96	238.38	260.93	253.56	247.30	245.31	286.39	400.63	391.21	388.08	383.20	377.05
11/5/90	19:24	265.31	265.31	238.38	261.11	253.61	247.46	245.52	286.59	401.02	391.64	388.51	383.67	377.53
11/5/90	19:59	265.54	265.49	238.69	261.18	253.70	247.47	245.53	286.69	400.66	391.28	388.18	383.35	377.25
11/5/90	20:35	265.69	265.58	238.69	261.34	253.85	247.39	245.41	286.63	400.81	391.44	388.27	383.33	377.24
11/5/90	21:10	265.82	265.77	238.62	261.46	254.02	247.54	245.42	286.68	400.69	391.32	388.22	383.36	377.23
11/5/90	21:45	266.11	266.14	240.08	261.62	254.15	247.75	245.60	286.87	400.69	391.24	388.19	383.23	376.71
11/5/90	22:20	266.29	266.17	240.16	261.58	254.33	247.96	245.66	286.92	400.57	391.31	388.51	382.84	376.54
11/5/90	22:55	266.42	266.27	240.25	261.53	254.30	247.97	245.59	286.89	400.75	391.77	388.85	382.88	377.07
11/5/90	23:31	266.68	266.54	240.14	261.52	254.47	248.07	245.73	287.01	400.82	391.28	388.83	382.86	377.39
11/6/90	0:06	266.92	266.57	240.24	261.27	254.53	248.11	245.71	287.01	401.22	391.03	389.23	383.13	377.99
11/6/90	0:41	267.19	266.88	240.51	260.96	254.74	248.15	245.88	287.06	401.06	383.92	389.19	383.02	378.08
11/6/90	1:16	267.21	267.08	240.34	260.80	254.70	248.23	246.19	287.19	401.19	385.46	389.29	383.15	378.18
11/6/90	1:52	267.08	267.16	240.52	260.28	254.66	248.54	246.47	287.44	400.88	386.07	388.84	382.80	377.72
11/6/90	2:27	267.00	267.17	240.19	260.38	254.69	248.69	246.50	287.53	400.88	386.13	388.92	382.80	377.54
11/6/90	3:02	267.06	267.18	240.46	260.24	254.74	248.61	246.53	287.62	400.84	385.97	388.97	382.84	377.77
11/6/90	3:37	267.02	267.36	240.11	260.36	254.86	248.71	246.52	287.68	400.95	386.32	389.08	382.88	377.98
11/6/90	4:13	267.14	267.68	239.81	261.22	254.89	248.91	246.59	287.78	401.23	386.72	389.29	383.02	378.68
11/6/90	4:48	267.40	267.88	239.73	261.48	254.99	248.88	246.68	287.79	401.10	386.75	389.28	382.99	379.01
11/6/90	5:23	267.83	268.03	239.85	261.58	255.17	248.91	246.71	287.86	401.17	387.19	389.38	382.99	379.19
11/6/90	5:58	267.93	268.18	240.33	261.61	255.22	248.96	246.68	287.84	401.29	387.34	389.51	383.19	379.38
11/6/90	6:34	268.21	268.43	240.48	261.61	255.24	249.10	246.75	287.91	401.16	387.46	389.28	382.90	379.17
11/6/90	7:09	268.30	268.65	240.26	261.69	255.20	249.28	246.86	288.05	401.25	387.66	389.44	383.14	379.32
11/6/90	7:44	268.49	268.64	240.56	261.69	255.33	249.17	246.80	287.98	401.12	387.64	389.34	382.96	379.34
11/6/90	8:19	268.57	268.76	240.03	261.72	255.32	249.12	246.71	287.97	400.95	387.62	389.31	382.96	379.55
11/6/90	8:54	268.63	268.81	239.72	261.58	255.42	249.22	246.66	287.88	400.33	386.85	388.61	382.36	378.89
11/6/90	9:30	268.70	268.84	240.09	261.75	255.34	249.29	246.64	287.91	400.25	387.03	388.46	382.25	378.42
11/6/90	9:45	268.70	268.78	240.08	261.60	255.33	249.23	246.57	287.86	399.78	386.59	388.15	381.98	378.22
11/6/90	10:20	268.73	268.77	240.10	261.62	255.34	249.26	246.56	287.83	399.34	386.11	387.81	381.79	378.30
11/6/90	10:55	268.86	268.72	240.57	261.57	255.29	249.23	246.49	287.83	398.76	385.72	387.33	381.38	377.81

Table B-6: Condition 3 String and Casing Temperature Data

Table B-7: Condition 3 String and Casing Heat Flux Data and Steam Data

TEST CASE B, CONDITION		HEAT FLUX AND STEAM DATA												
		CASING						STRING			STEAM			
TIME	HOUR	250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	250FT	500FT		WATER	STEAM	QUALITY	TEMP
11/4/90	13:20	625.38	476.68	314.91	334.12	295.03	321.05	552.59	496.84		1986.68	7518.47	79.10	430.40
11/4/90	13:55	633.14	481.22	318.94	336.26	296.69	324.02	544.77	502.92		1989.64	7586.89	79.22	431.08
11/4/90	14:30	640.12	481.87	320.23	337.61	297.93	324.42	552.53	515.97		1848.35	7661.69	80.56	431.49
11/4/90	15:06	639.57	479.97	320.24	338.95	299.65	325.20	565.08	518.65		1893.22	7627.04	80.11	431.41
11/4/90	15:41	640.71	480.65	320.79	339.31	299.71	325.96	547.96	492.01		2041.60	7564.23	78.75	431.11
11/4/90	16:16	640.29	479.34	319.78	338.77	299.00	325.62	547.07	500.67		2144.39	7516.92	77.80	431.02
11/4/90	16:51	643.19	480.82	319.06	338.16	299.19	325.22	568.50	497.56		1975.85	7574.31	79.31	431.10
11/4/90	17:27	645.10	480.13	319.12	339.32	299.87	325.74	547.91	501.37		1968.01	7572.93	79.37	431.04
11/4/90	18:02	647.48	481.07	320.94	338.65	301.01	325.43	556.34	500.77		1887.41	7605.01	80.12	431.40
11/4/90	18:37	648.59	481.01	319.25	338.82	299.69	325.35	564.42	494.31		1916.70	7590.35	79.84	431.23
11/4/90	19:12	647.72	479.48	320.05	338.98	299.19	326.19	541.30	499.53		1912.93	7604.20	79.90	431.40
11/4/90	19:48	648.12	478.46	320.53	339.10	299.68	325.25	546.69	496.47		1869.25	7625.52	80.31	431.45
11/4/90	20:23	647.08	478.07	319.47	337.73	299.69	324.79	551.74	501.56		2001.69	7577.62	79.10	431.36
11/4/90	20:58	646.63	477.03	317.58	337.69	299.74	325.20	564.88	498.12		1939.90	7604.31	79.67	431.84
11/4/90	21:33	647.66	477.73	317.73	336.21	300.09	325.43	543.89	493.74		1948.99	7619.57	79.63	432.00
11/4/90	22:09	648.37	477.55	316.31	336.86	299.33	325.44	556.38	488.04		1919.63	7620.24	79.88	431.87
11/4/90	22:44	633.62	465.18	307.10	331.97	291.61	319.21	532.28	483.19		1302.45	7250.53	84.77	426.08
11/4/90	23:19	629.29	460.70	305.68	329.11	290.07	315.97	526.04	487.47		1295.51	7239.85	84.82	425.96
11/4/90	23:54	627.78	457.82	305.22	327.06	290.35	316.74	520.95	487.41		1383.95	7232.91	83.94	426.12
11/5/90	0:30	627.46	457.09	305.21	327.56	290.07	316.31	533.14	482.13		1413.57	7225.39	83.64	426.28
11/5/90	1:05	625.08	456.57	305.14	327.15	289.90	315.94	523.67	486.87		1424.88	7228.11	83.53	426.26
11/5/90	1:40	626.87	454.28	306.20	326.87	290.11	315.99	517.73	481.94		1348.21	7272.53	84.36	426.31
11/5/90	2:15	624.93	453.47	305.41	326.78	290.06	315.38	519.76	467.63		1492.60	7216.97	82.86	426.37
11/5/90	2:51	624.09	453.96	305.70	326.72	289.21	314.85	539.61	482.47		1424.00	7239.04	83.56	426.27
11/5/90	3:26	622.72	452.89	305.60	326.68	288.92	314.58	516.38	486.63		1256.57	7318.79	85.35	426.52
11/5/90	4:01	623.92	452.70	304.98	326.69	289.30	315.47	517.70	479.98		1444.84	7247.92	83.38	426.49
11/5/90	4:36	616.22	445.62	300.23	321.95	285.67	311.58	510.87	475.51		1299.18	7324.35	84.93	426.69
11/5/90	5:12	611.87	441.82	299.53	320.27	284.89	310.61	514.28	472.49		1347.82	7311.97	84.44	426.61
11/5/90	5:47	611.04	440.88	301.08	320.76	285.32	311.48	505.31	471.79		1403.10	7274.67	83.83	426.46
11/5/90	6:22	609.68	440.42	300.78	319.92	285.06	311.09	511.03	476.52		1403.80	7287.19	83.85	426.39
11/5/90	6:57	609.83	439.93	301.80	320.40	285.17	310.27	511.07	473.49		1365.48	7283.06	84.21	426.34
11/5/90	7:32	609.19	441.28	301.57	319.85	284.72	310.59	512.15	472.05		1548.36	7223.38	82.35	426.30
11/5/90	8:08	611.14	443.79	304.29	320.84	285.68	311.52	506.28	473.19		1423.79	7336.50	83.75	427.06
11/5/90	8:43	620.48	450.50	310.53	325.34	291.42	315.80	527.69	491.22		2033.24	7543.50	78.77	431.32
11/5/90	9:18	625.98	454.52	312.19	326.89	292.59	317.62	530.36	487.53		1963.94	7614.46	79.50	431.69
11/5/90	10:00	622.33	453.13	310.08	326.99	290.89	317.51	510.76	484.19		1893.70	7499.51	79.84	430.56
11/5/90	10:36	623.47	452.65	311.01	326.97	291.05	318.22	525.19	485.47		1873.70	7540.93	80.10	430.74
11/5/90	11:11	621.00	452.57	310.86	327.02	291.16	317.50	512.69	485.29		2000.07	7513.15	78.98	430.98
11/5/90	11:46	620.65	451.44	309.86	326.41	290.70	316.97	523.81	487.28		1756.24	7591.02	81.21	430.87
11/5/90	12:21	618.59	450.80	308.78	326.89	289.93	316.32	525.31	483.82		1972.01	7457.15	79.09	430.35

Table B-8: CONDITION 3 STRING AND CASING HEAT FLUX DATA AND STEAM DATA

TEST CASE B, CONDITION 3 HEAT FLUX AND STEAM DATA														
		CASING						STRING			STEAM			
TIME	HOUR	250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	250FT	500FT		WATER	STEAM	QUALITY	TEMP
11/5/90	12:57	617.95	449.90	309.63	326.92	290.10	316.06	521.14	487.45		1886.03	7497.39	79.90	430.27
11/5/90	13:32	616.26	448.22	309.47	326.10	290.06	316.30	522.31	478.09		1889.63	7477.40	79.83	430.18
11/5/90	14:07	614.77	447.93	307.23	326.42	289.48	315.91	511.30	485.23		2022.21	7386.88	78.51	429.61
11/5/90	14:42	612.84	446.35	308.16	324.82	290.01	314.88	512.70	480.26		1874.55	7433.00	79.86	429.78
11/5/90	15:17	612.04	446.65	307.99	325.35	289.43	315.81	504.51	476.73		1902.85	7371.94	79.48	429.11
11/5/90	15:53	610.34	445.57	306.67	323.95	290.33	315.58	513.10	479.88		1745.70	7448.29	81.01	429.28
11/5/90	16:28	609.85	443.25	305.68	323.81	289.24	314.51	501.93	477.20		2140.62	7278.69	77.27	428.89
11/5/90	17:03	609.10	445.13	305.48	324.05	288.18	313.90	516.04	475.38		1924.68	7345.06	79.24	428.87
11/5/90	17:38	608.34	444.69	307.09	325.54	289.94	314.45	515.09	471.72		1915.29	7356.81	79.34	429.17
11/5/90	18:14	607.44	443.72	306.05	324.80	289.06	314.36	507.79	484.94		1855.36	7392.59	79.94	429.27
11/5/90	18:49	606.58	443.91	304.39	324.93	289.08	313.84	511.13	483.80		1835.41	7401.90	80.13	429.25
11/5/90	19:24	606.32	442.94	304.32	323.72	289.15	313.78	506.97	479.32		1819.91	7399.94	80.26	429.48
11/5/90	19:59	606.72	442.76	305.53	325.73	289.89	315.31	500.71	481.12		2009.52	7341.83	78.51	429.28
11/5/90	20:35	606.51	441.80	304.77	325.00	289.88	313.93	512.13	483.50		1896.19	7403.59	79.61	429.52
11/5/90	21:10	605.39	441.99	304.74	325.03	289.39	314.70	520.86	478.43		1982.87	7356.88	78.77	429.47
11/5/90	21:45	604.57	440.94	303.78	324.44	289.69	315.41	496.61	478.97		2000.15	7369.92	78.65	429.39
11/5/90	22:20	602.33	439.49	302.91	324.08	288.62	315.24	511.67	489.75		1967.68	7343.87	78.87	428.89
11/5/90	22:55	602.52	439.65	303.03	324.57	288.88	314.17	507.96	478.17		1911.73	7365.03	79.39	429.13
11/5/90	23:31	602.33	438.04	302.91	324.29	288.82	313.93	511.72	477.60		1893.12	7377.40	79.58	429.15
11/6/90	0:06	600.55	439.56	303.49	323.68	289.80	313.70	521.32	469.44		1794.17	7435.74	80.56	429.58
11/6/90	0:41	601.11	439.98	303.15	324.44	289.03	315.09	512.18	478.71		1885.68	7401.83	79.70	429.46
11/6/90	1:16	600.82	440.55	302.50	321.56	288.28	312.25	510.48	478.39		1744.68	7443.88	81.01	429.40
11/6/90	1:52	597.62	438.08	300.10	320.39	286.25	311.45	510.32	473.63		1870.84	7401.26	79.82	429.12
11/6/90	2:27	595.84	435.75	300.33	320.20	285.97	311.35	509.08	473.94		1975.55	7377.39	78.88	429.29
11/6/90	3:02	594.93	436.11	300.74	320.31	286.15	311.46	503.68	481.22		2137.20	7303.33	77.36	429.31
11/6/90	3:37	594.87	435.44	301.16	318.98	286.12	311.13	501.52	482.47		1913.18	7399.04	79.46	429.37
11/6/90	4:13	595.10	436.45	301.45	320.26	286.32	311.18	507.96	472.57		1799.00	7456.15	80.56	429.36
11/6/90	4:48	595.19	437.80	302.21	319.70	286.65	311.05	507.52	466.94		1932.56	7388.81	79.27	429.37
11/6/90	5:23	596.24	437.68	303.14	319.91	286.97	311.61	509.87	483.14		1870.56	7409.54	79.84	429.34
11/6/90	5:58	594.63	436.60	303.07	320.30	287.03	311.51	487.97	481.70		1821.10	7427.10	80.31	429.41
11/6/90	6:34	594.29	437.50	300.63	319.71	286.87	311.82	497.26	475.03		1885.58	7412.01	79.72	429.28
11/6/90	7:09	593.20	437.18	299.81	319.96	286.52	311.48	509.43	476.44		1850.37	7411.62	80.02	429.39
11/6/90	7:44	592.53	435.91	300.35	319.63	286.89	311.57	500.29	475.42		1975.32	7377.75	78.88	429.27
11/6/90	8:19	591.86	437.26	298.60	319.66	286.76	310.33	496.11	474.04		1827.34	7397.46	80.19	429.23
11/6/90	8:54	589.28	435.33	297.74	319.48	286.09	311.29	494.11	472.92		1800.20	7371.44	80.37	428.75
11/6/90	9:30	587.01	433.37	296.81	317.71	284.32	309.79	493.42	474.06		1567.07	7408.93	82.54	428.28
11/6/90	9:45	587.15	432.68	297.65	318.91	284.31	310.00	502.61	471.23		1818.74	7299.18	80.05	428.10
11/6/90	10:20	584.11	431.05	295.29	317.55	283.66	310.45	494.48	463.69		1893.65	7202.52	79.18	427.72
11/6/90	10:55	582.48	430.27	294.68	315.76	283.85	309.60	488.55	462.99		2152.89	7065.49	76.65	427.34

TEST CASE B-1 DATA

APPENDIX B1: REDUCED DATA FOR UN-CENTRALIZED BARE TUBING WITH THERMAL PACKER

FIGURES

Figure B1-1: Layout of Tubular and Casing Sensors

Figure B1-2: Relationships Between Sensor Locations

GRAPHS

Graph B1-1: Casing Side A Temperature

Graph B1-2: Casing Side B Temperature

Graph B1-3: Tubing String Temperature

Graph B1-4: Casing Heat Flux

Graph B1-5: Heat Flux at 250 feet

Graph B1-6: Steam Mass Flow

Graph B1-7: Steam Quality

Graph B1-8: Steam Temperature

TABLES

Table B1-1: Condition 2 String and Casing Temperature Data

Table B1-2: Condition 2 String and Casing Heat Flux Data, and Steam Flow Data

Table B1-3: Condition 3 String and Casing Temperature Data

Table B1-4: Condition 3 String and Casing Heat Flux Flow Data and Steam Flow Data

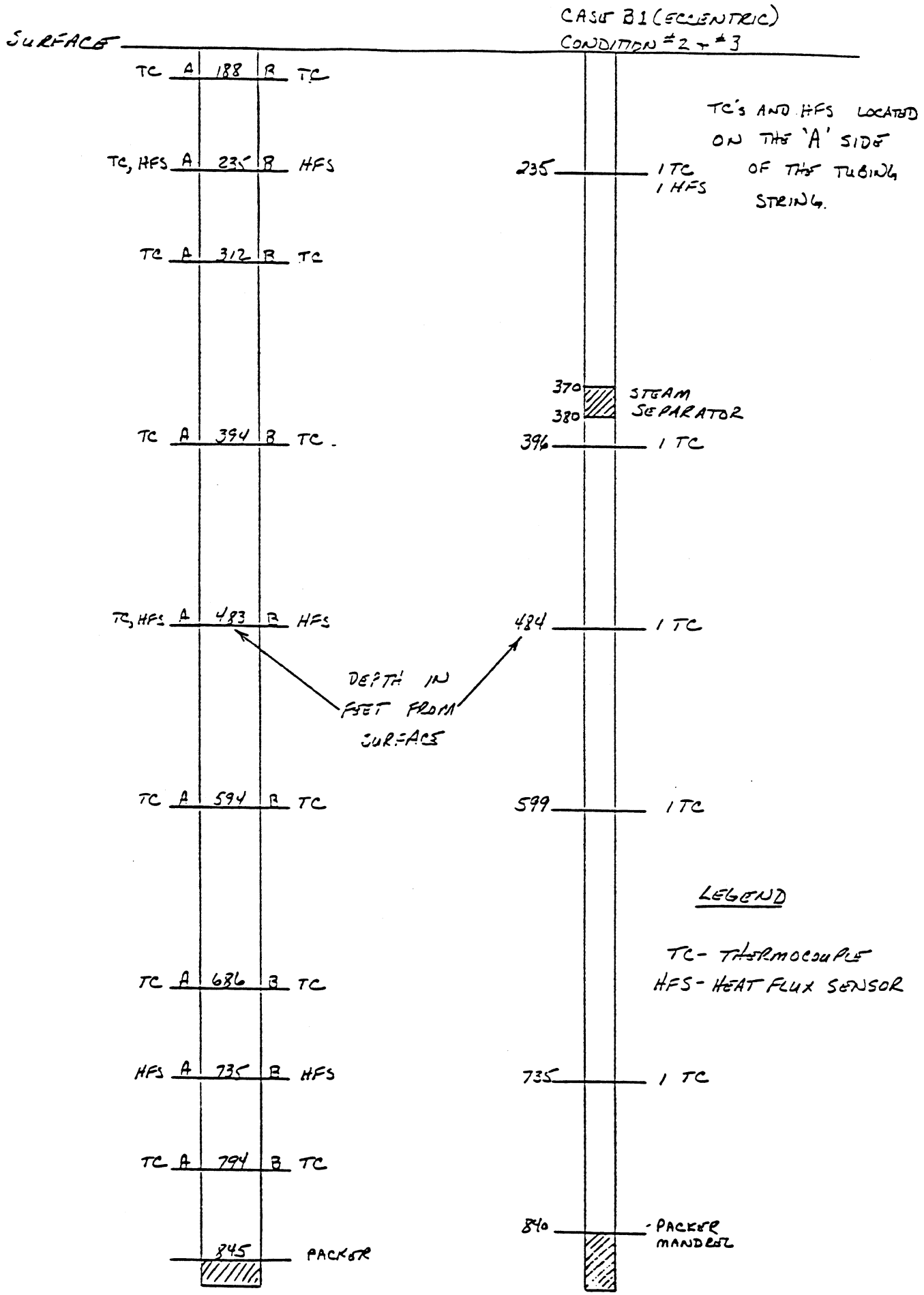


FIGURE B1-1: LAYOUT OF TUBULAR AND CASING SENSORS

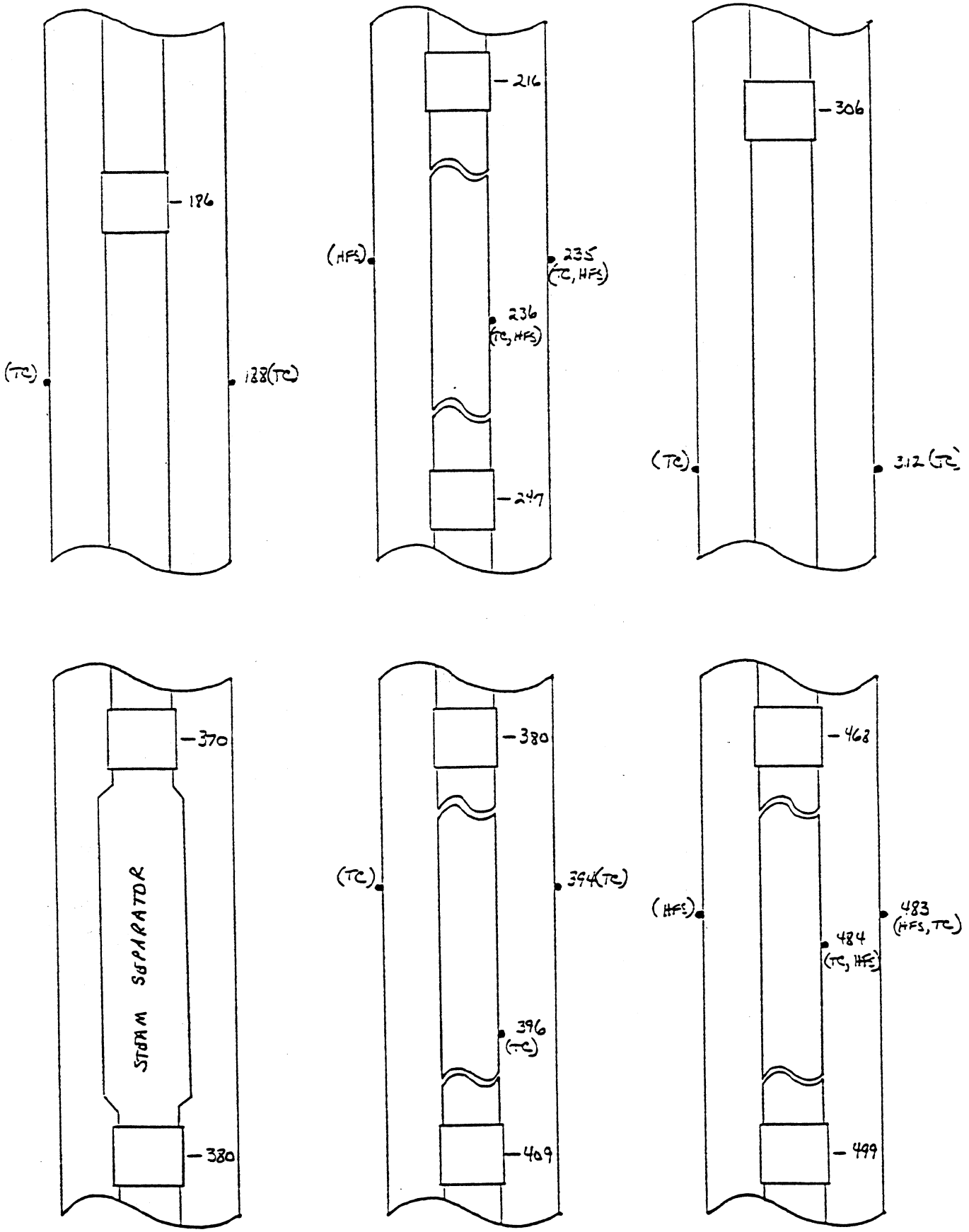


FIGURE B1-2: RELATIONSHIPS BETWEEN SENSOR LOCATIONS (SHEET 1 OF 2)

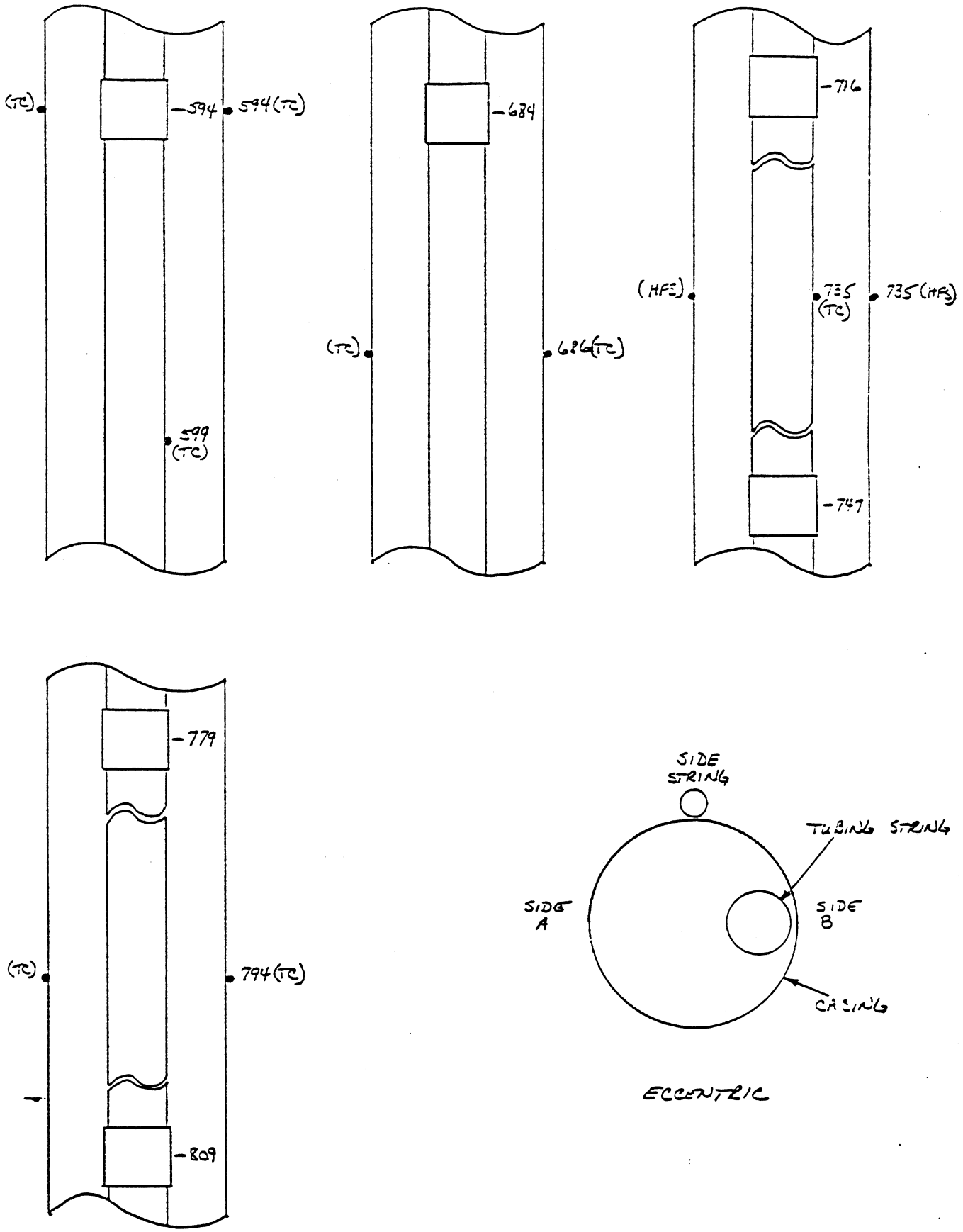
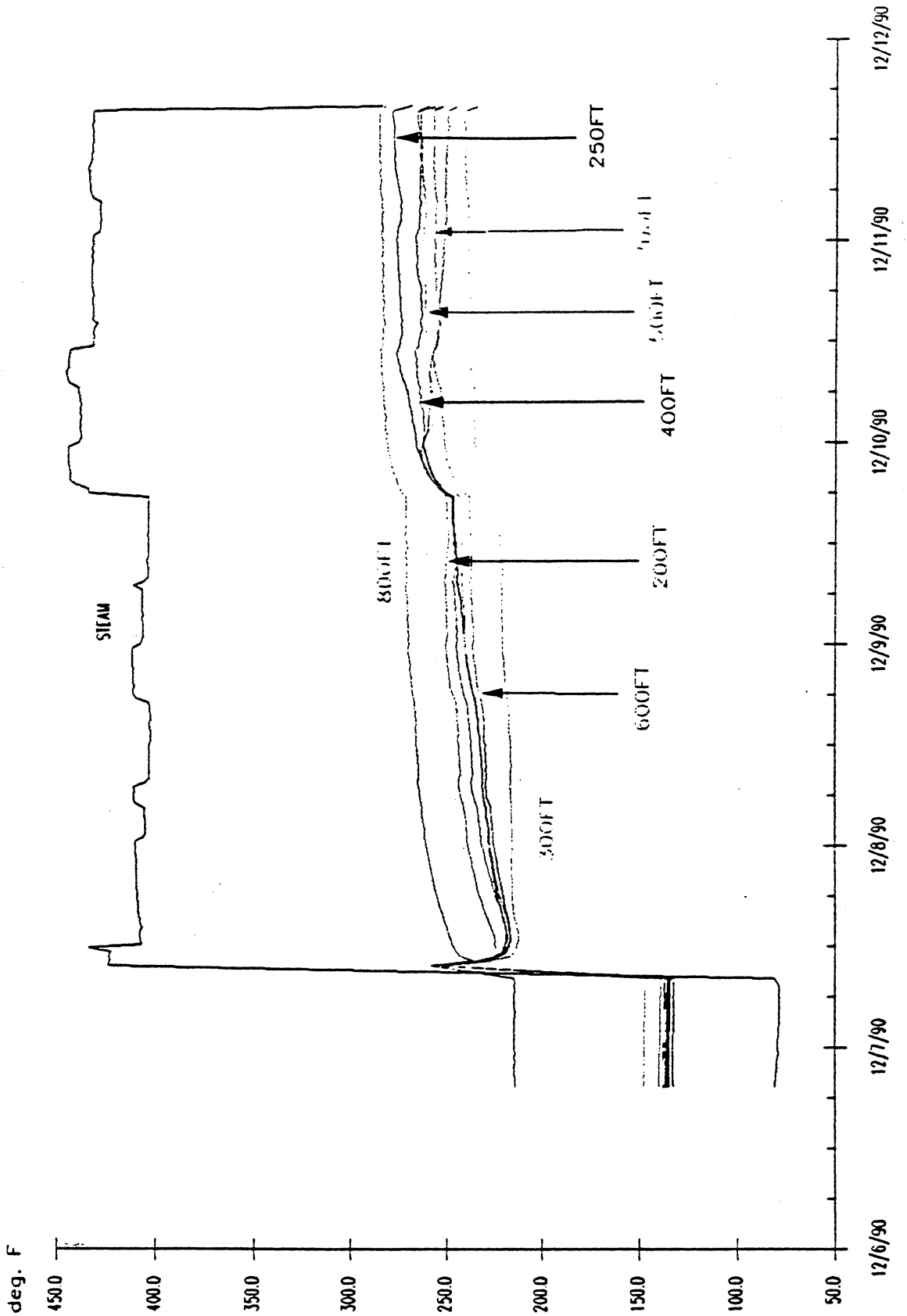
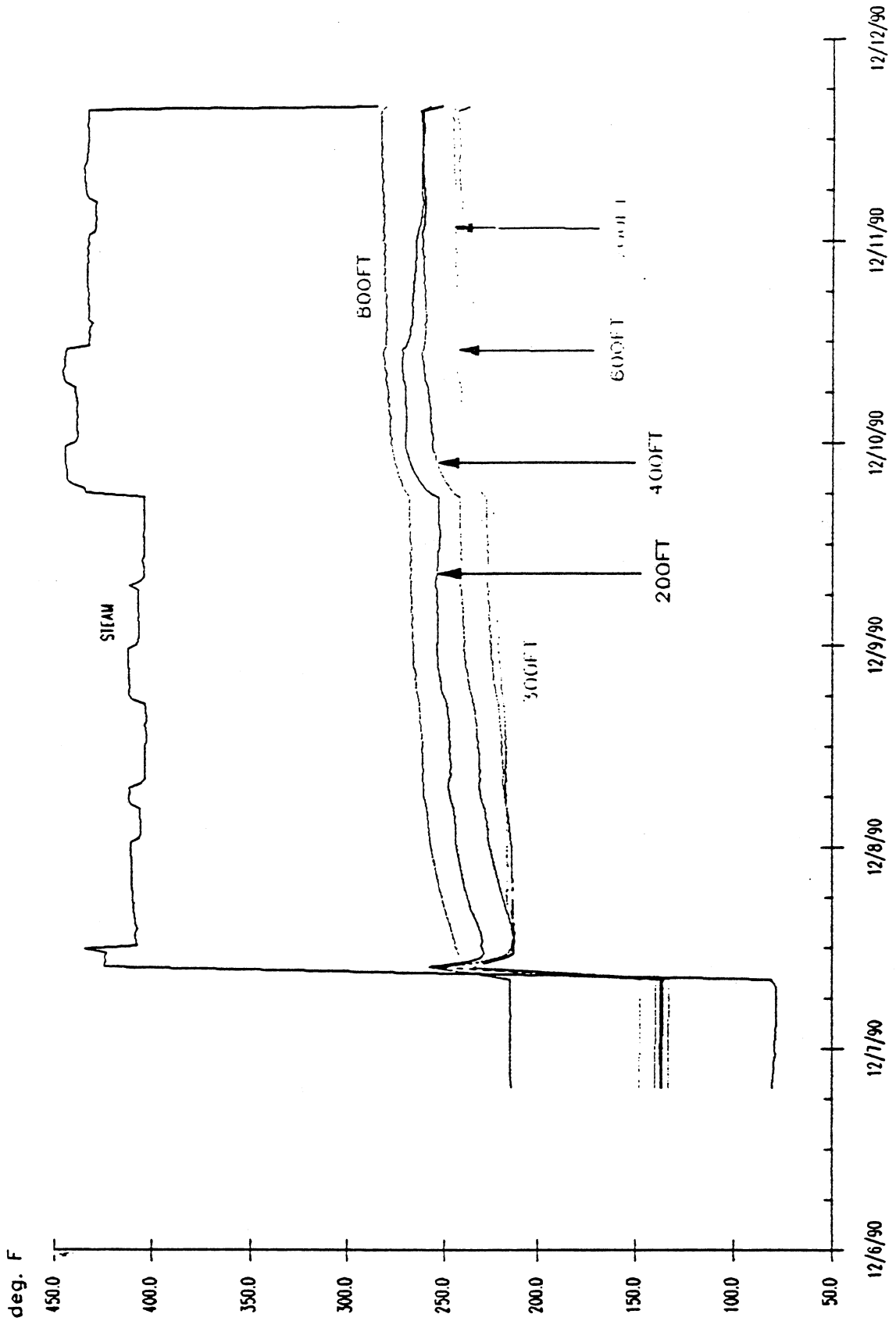


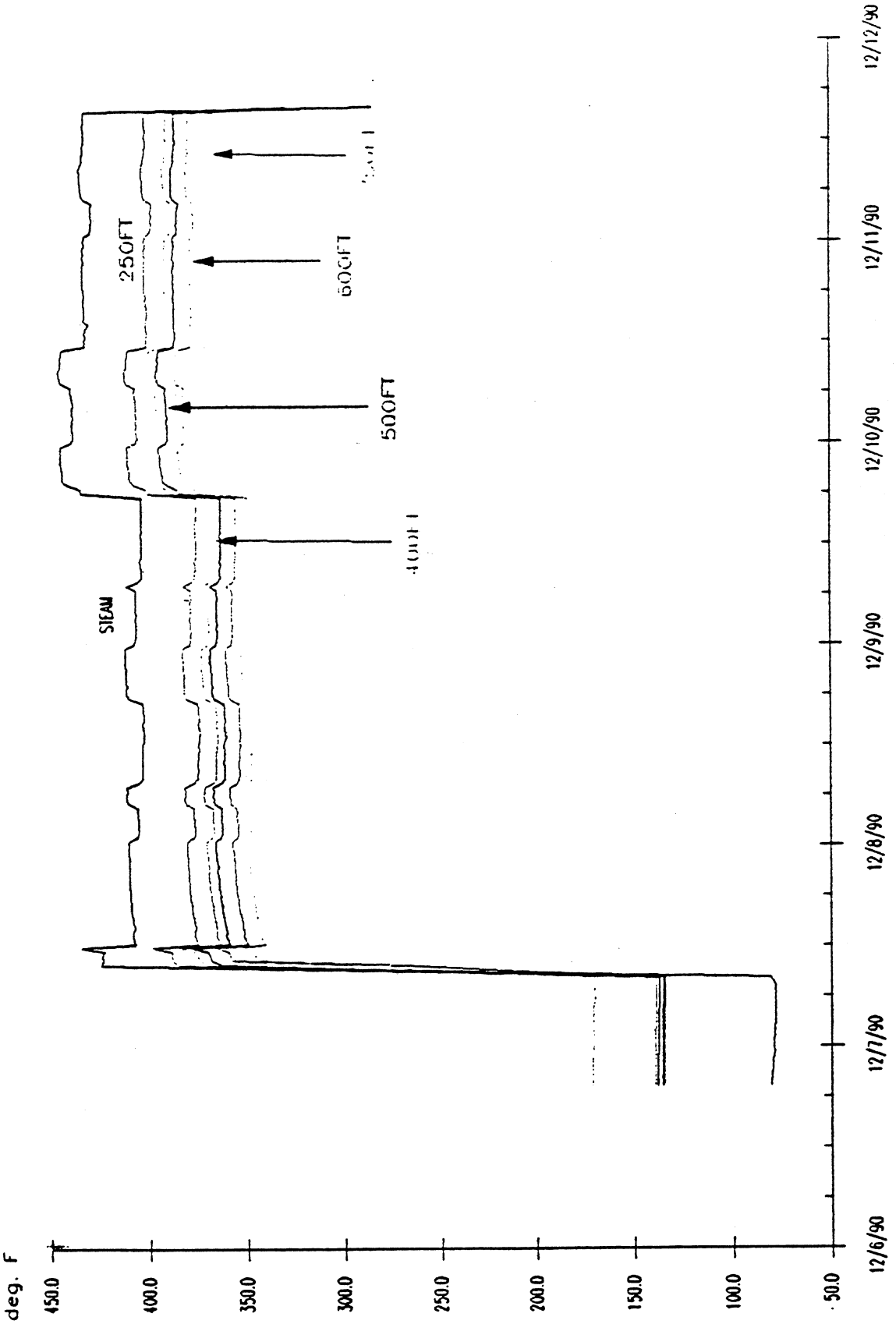
FIGURE B1-2: RELATIONSHIPS BETWEEN SENSOR LOCATIONS (SHEET 2 OF 2)



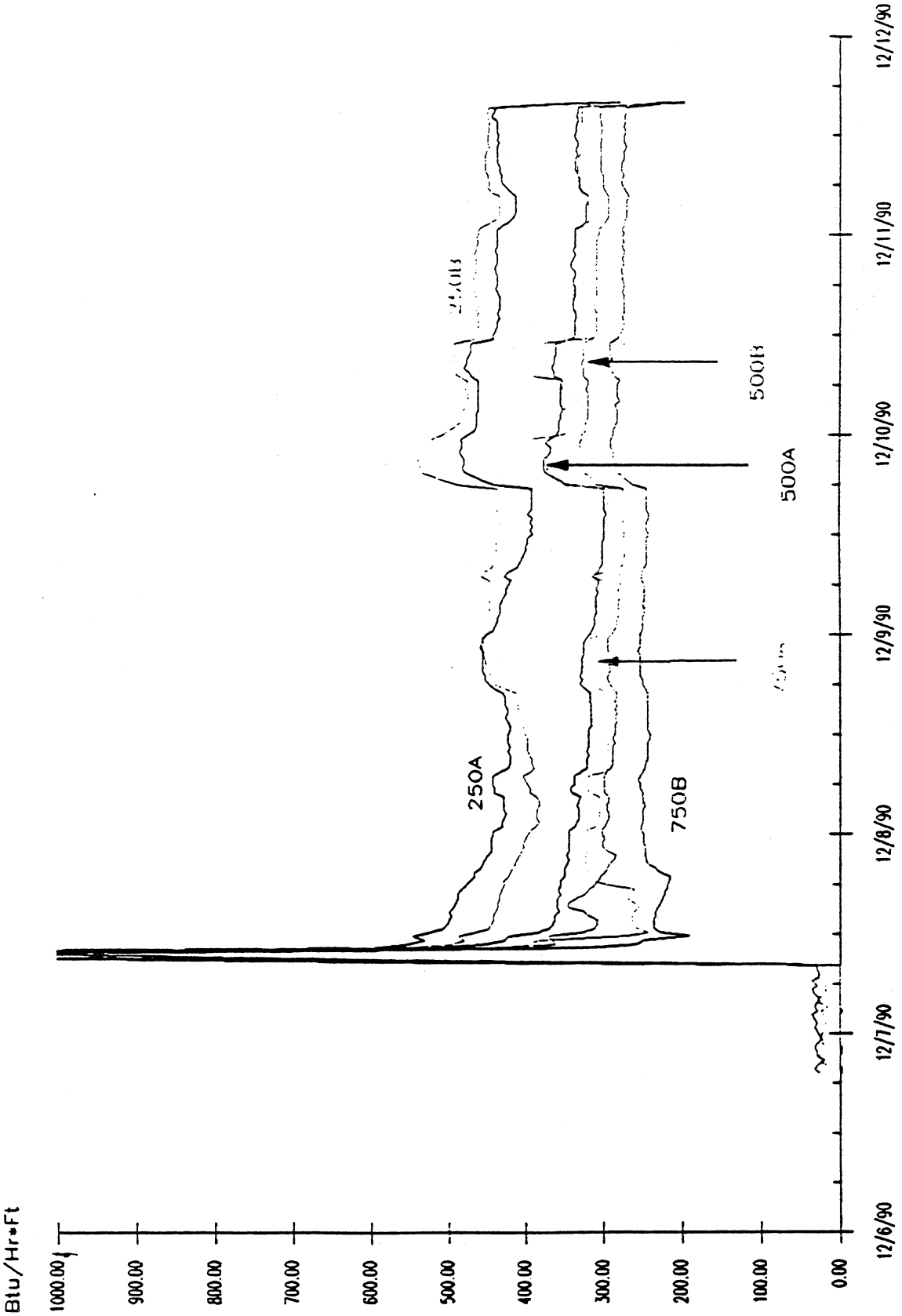
GRAPH B1-1: CASING SIDE A TEMPERATURES



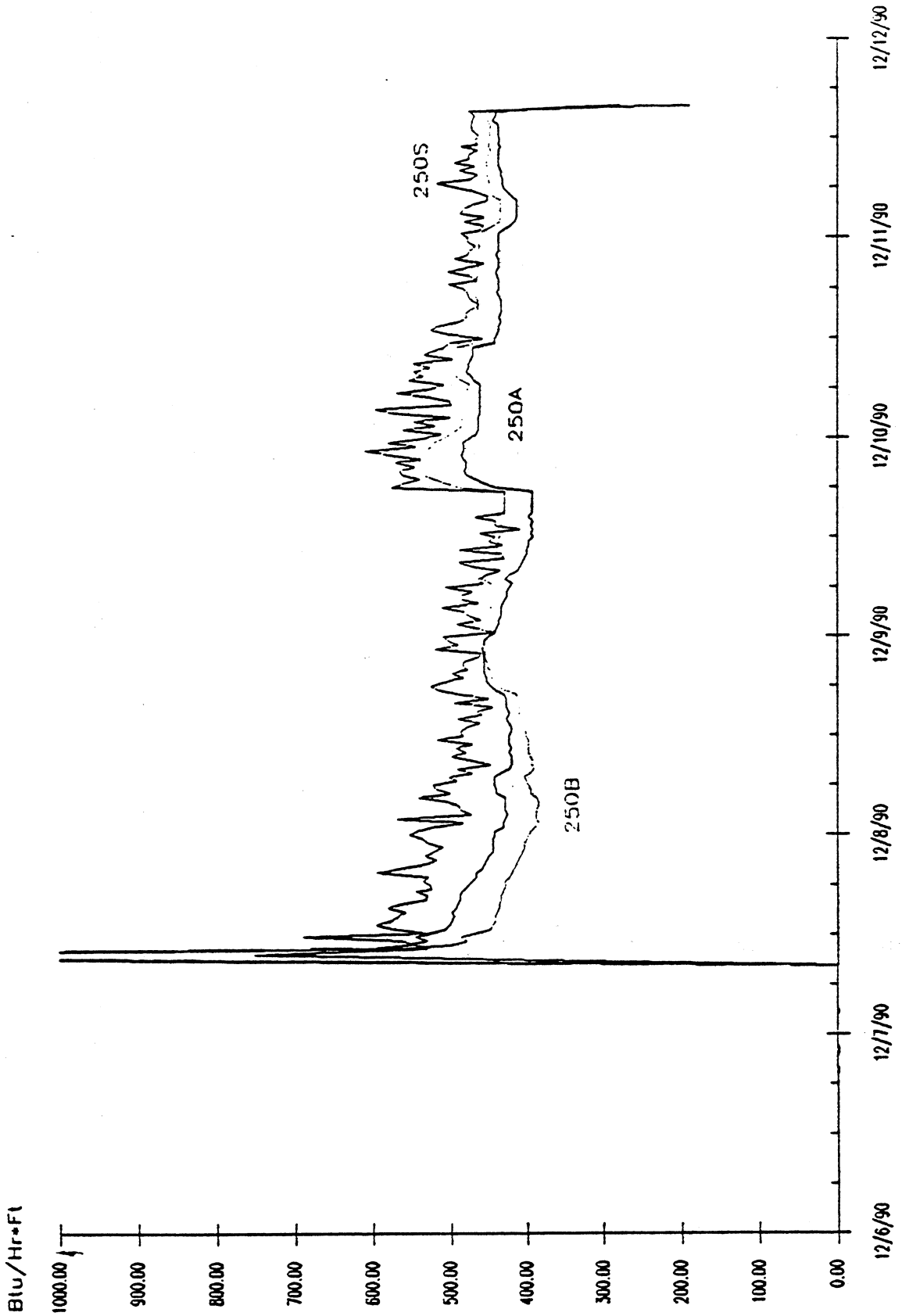
GRAPH B1-2: CASING SIDE B TEMPERATURES



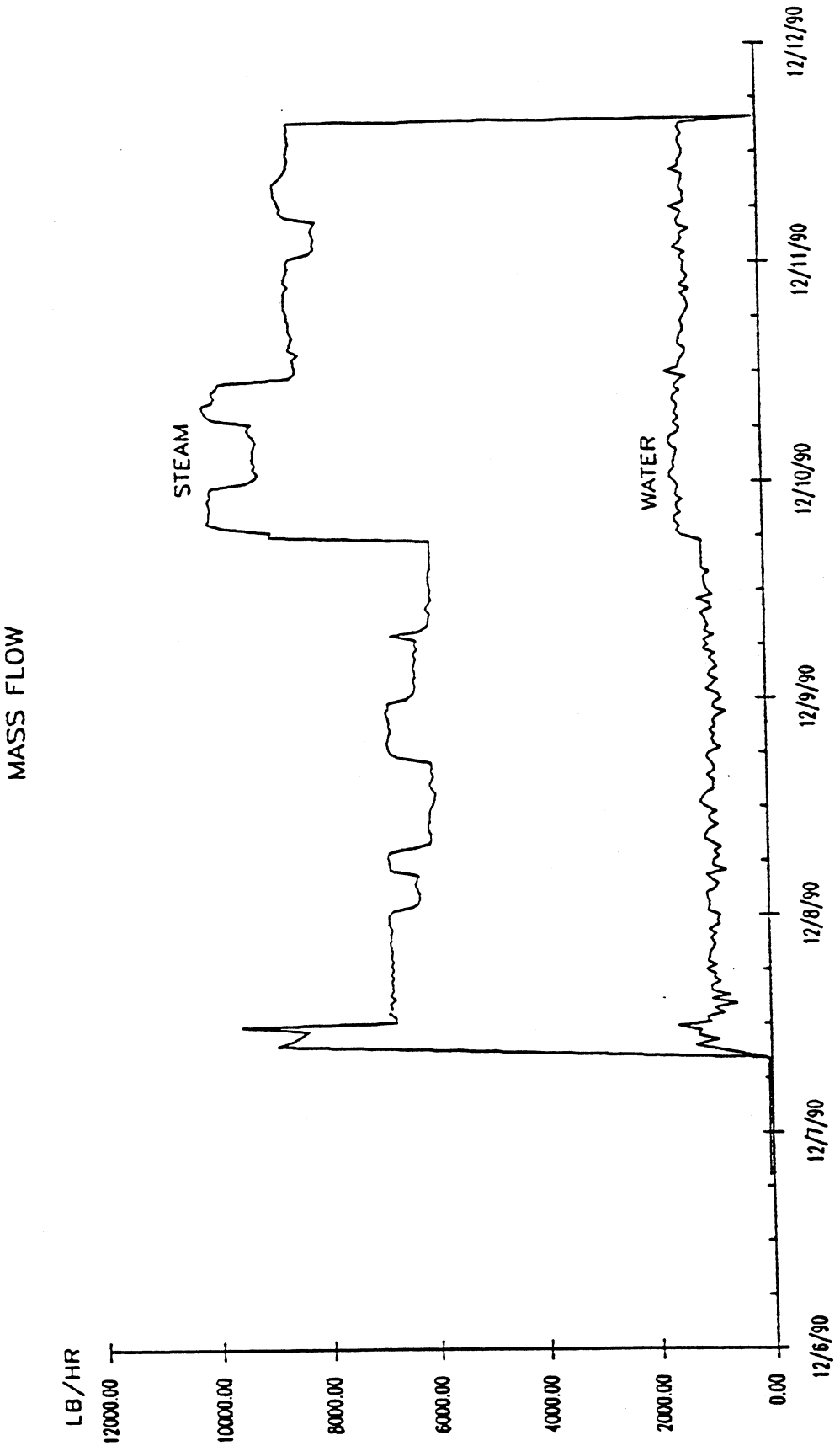
GRAPH B1-3: TUBING STRING TEMPERATURES



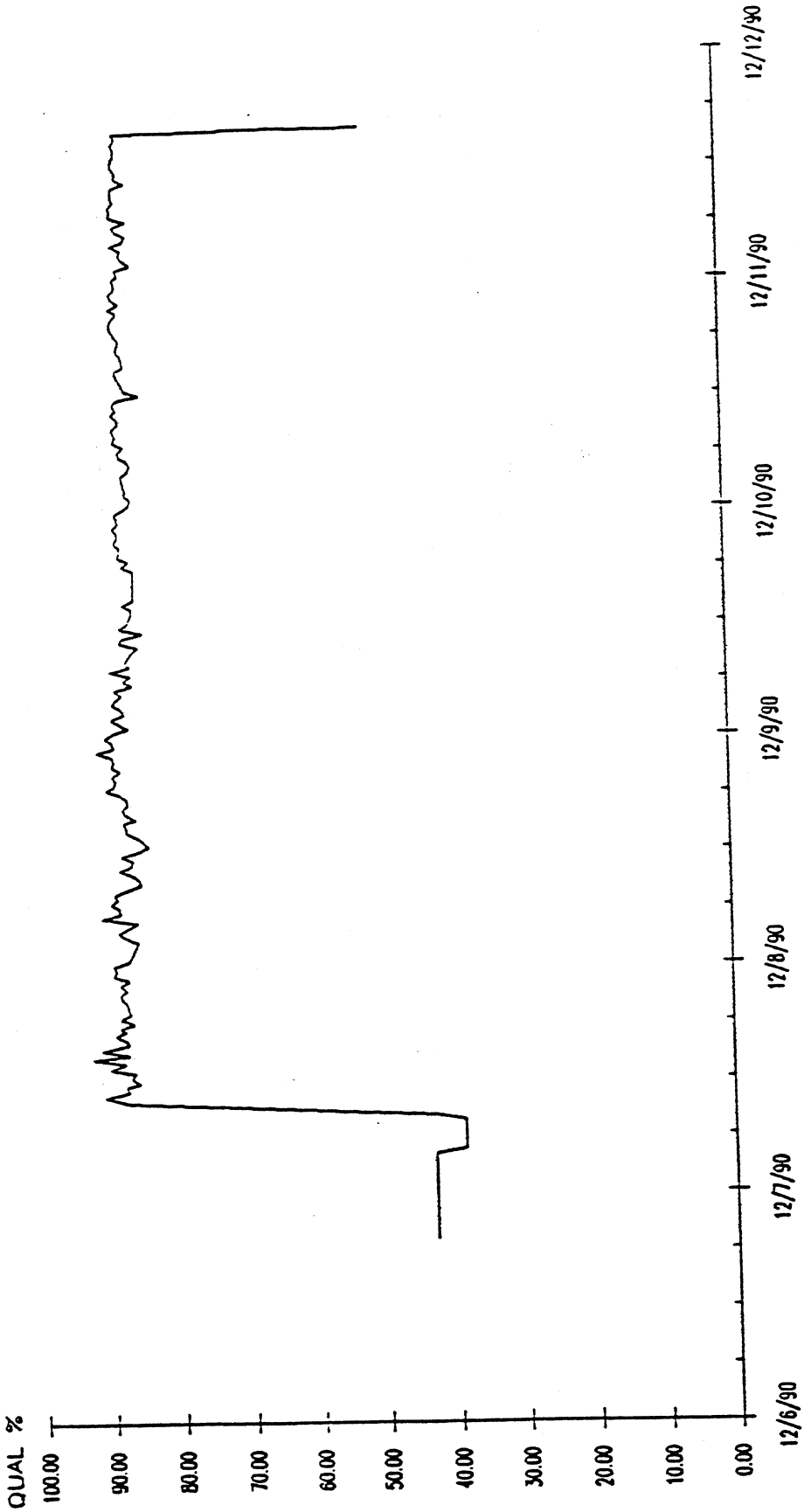
GRAPH B1-4: CASING HEAT FLUX



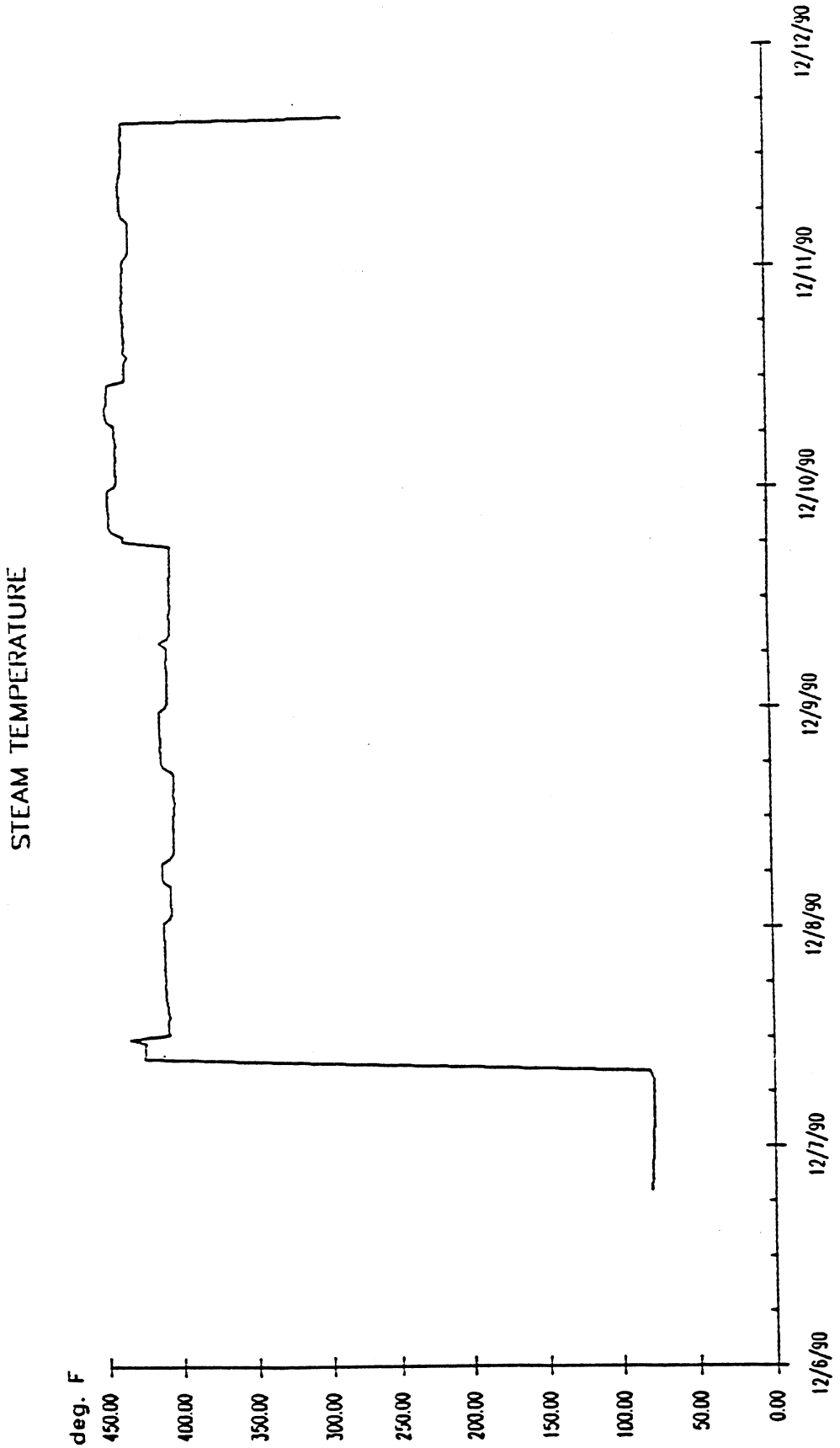
GRAPH B1-5: HEAT FLUX AT 250 FT.



GRAPH B1-6: STEAM MASS FLOW



GRAPH B1-7: STEAM QUALITY



GRAPH B1-8: STEAM TEMPERATURE

Table B1-1: Condition 2 String and Casing Temperature Data

TEST CASE B1, CONDITION 2 TEMPERATURE DATA																				
		STABLE CASING DATA														STABLE STRING DATA				
DATE	HOUR	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT A	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	250FT	400FT	500FT	600FT	750FT
12/8/90	12:00	242.6	246.0	231.7	215.8	215.6	236.2	231.0	233.2	228.4	217.9	234.1	221.6	264.8	260.1	373.7	364.0	360.6	352.2	346.6
12/8/90	12:30	242.8	246.0	231.7	215.7	216.0	236.1	230.7	233.0	229.2	218.0	233.5	222.4	264.7	260.1	373.0	363.9	360.3	352.4	345.8
12/8/90	13:00	242.8	246.3	231.9	216.1	215.8	236.4	231.2	233.2	229.1	217.9	233.8	222.6	264.8	260.3	372.9	363.8	359.6	352.0	346.2
12/8/90	13:30	242.5	246.3	232.4	216.4	216.1	236.5	231.3	233.0	229.2	218.1	233.9	222.8	264.6	260.5	372.8	363.7	359.7	352.2	345.9
12/8/90	14:00	243.0	246.5	232.6	216.4	216.0	236.8	231.4	233.4	229.3	218.7	234.6	222.9	265.1	261.0	373.3	364.1	360.1	352.4	346.0
12/8/90	14:30	243.0	246.5	232.7	216.3	216.0	237.0	231.6	233.7	229.4	218.7	234.5	222.7	264.8	261.0	373.5	364.4	360.4	352.6	346.3
12/8/90	15:00	243.2	246.6	232.7	216.5	216.0	237.4	232.0	233.6	229.1	219.2	234.5	223.4	264.7	261.6	373.2	364.3	360.0	352.7	346.0
12/8/90	15:30	243.4	246.9	233.1	216.4	216.3	237.5	232.2	234.1	229.8	219.0	234.9	223.2	265.1	261.3	373.2	364.1	360.2	352.5	346.1
12/8/90	16:00	243.6	247.1	233.4	216.6	216.5	237.7	232.4	234.4	229.9	219.3	235.1	223.5	265.4	261.5	373.6	364.5	360.4	352.7	346.2
12/8/90	16:30	243.8	247.2	233.6	216.7	216.5	238.0	232.7	234.5	230.2	219.6	235.3	223.7	265.6	261.7	373.6	364.4	360.4	352.6	346.3
12/8/90	17:00	244.0	247.8	234.0	216.9	216.7	238.3	233.0	234.5	230.7	219.5	235.4	224.3	265.8	261.6	374.0	364.6	360.6	353.1	346.6
12/8/90	17:30	244.7	248.2	234.6	217.1	216.9	239.2	233.5	235.3	231.1	220.1	235.9	224.1	265.9	262.2	379.4	369.6	365.5	357.1	349.5
12/8/90	18:00	245.6	249.6	235.1	217.5	217.5	239.9	234.1	236.5	231.6	220.7	236.9	224.6	266.6	262.8	380.7	370.7	366.2	358.3	350.6
12/8/90	18:30	246.3	250.1	235.8	217.9	217.7	240.4	234.8	237.0	232.3	221.1	237.1	225.2	266.8	263.0	380.7	370.9	366.6	358.2	350.6
12/8/90	19:00	247.1	250.7	236.1	218.4	218.0	240.9	235.2	236.9	232.8	221.4	237.4	225.5	266.8	263.4	380.7	371.1	366.5	358.0	350.8
12/8/90	19:30	247.2	250.9	236.7	218.4	218.0	241.4	235.7	237.6	233.0	221.8	237.8	225.8	267.4	263.5	380.8	370.9	366.7	358.5	351.0
12/8/90	20:00	247.6	251.2	237.1	218.7	218.3	241.7	236.2	237.8	233.3	222.2	238.1	226.2	267.4	263.8	380.9	371.2	366.9	358.6	351.1
12/8/90	20:30	247.6	251.7	237.6	218.7	218.4	242.3	236.3	238.4	233.6	222.4	238.4	226.3	267.8	263.6	380.9	371.5	366.8	358.9	351.1
12/8/90	21:00	248.0	251.9	237.7	219.0	218.9	242.5	236.6	238.6	233.7	222.8	238.7	226.2	268.2	264.1	381.2	371.8	367.2	358.9	351.7
12/8/90	21:30	248.4	252.2	238.2	218.9	218.8	242.6	237.3	238.9	234.0	223.0	239.2	226.9	267.9	264.6	381.4	371.4	367.3	359.2	351.5
12/8/90	22:00	248.6	252.3	238.8	219.2	219.2	242.9	237.2	239.3	234.3	223.0	239.0	227.0	268.4	264.7	381.3	371.6	367.4	359.3	351.9
12/8/90	22:30	248.9	252.6	238.9	219.6	219.3	243.2	237.7	239.3	234.8	223.5	239.5	227.4	268.6	264.7	381.6	371.8	367.5	359.3	351.8
12/8/90	23:00	249.0	252.7	239.6	219.9	219.6	243.4	238.0	239.4	235.0	223.8	239.7	227.5	269.0	264.6	381.5	371.8	367.3	359.5	351.7
12/8/90	23:30	249.2	253.0	239.8	219.9	219.8	243.7	238.1	239.7	235.2	223.9	239.8	227.7	268.9	265.0	381.6	371.9	367.6	359.3	351.9
12/9/90	0:00	249.3	252.9	239.6	220.0	220.0	244.0	238.4	239.3	235.3	223.9	239.5	227.6	268.7	264.9	378.0	368.7	364.4	356.7	349.6
12/9/90	0:30	248.8	252.3	239.8	219.8	219.7	243.6	238.0	239.4	234.9	224.0	239.9	228.1	269.1	265.2	377.4	368.3	364.2	356.4	349.6
12/9/90	1:00	248.7	252.5	239.9	219.8	219.6	243.7	238.2	239.6	235.0	223.9	239.9	227.9	268.8	265.3	377.2	368.0	363.8	356.2	349.3
12/9/90	1:30	248.7	252.4	240.2	219.9	219.7	243.5	238.1	239.5	235.0	224.0	239.7	228.1	269.0	265.3	377.1	367.9	363.8	355.9	349.4
12/9/90	2:00	248.8	252.3	240.5	219.8	220.1	243.8	238.2	239.4	235.0	224.4	240.0	228.1	268.9	265.2	377.4	368.3	364.0	356.0	349.3
12/9/90	2:30	248.8	252.4	240.7	219.9	220.1	243.9	238.5	239.6	235.4	224.2	240.1	228.3	269.0	265.5	377.2	367.9	363.9	356.2	349.3
12/9/90	3:00	249.0	252.4	241.0	220.1	220.2	243.9	238.7	239.6	235.3	224.6	240.0	228.3	269.5	265.3	377.6	368.3	364.1	356.5	349.4
12/9/90	3:30	249.2	252.5	241.3	220.1	220.3	244.0	238.6	239.6	235.6	224.8	240.3	228.3	269.1	265.4	377.4	368.0	364.1	356.5	349.6
12/9/90	4:00	249.1	252.7	241.6	220.4	220.3	244.3	238.9	240.0	235.8	224.5	240.1	228.5	269.5	265.9	377.4	368.3	364.1	356.3	349.3
12/9/90	4:30	249.0	252.6	241.7	220.4	220.6	244.4	238.9	240.0	235.7	224.7	240.4	228.9	269.6	265.6	377.4	368.2	364.2	356.3	349.3
12/9/90	5:00	249.4	252.8	241.9	220.5	220.7	244.5	239.1	240.2	235.8	224.8	240.3	228.6	269.4	265.6	377.6	368.3	364.2	356.4	349.4

Table B1-1: Condition 2 String and Casing Temperature Data

TEST CASE B1 CONDITION 2 TEMPERATURE DATA																			
		STABLE CASING DATA														STABLE STRING DATA			
DATE	HOUR	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT A	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	250FT	400FT	500FT	600FT	750FT
12/9/90	5:30	249.3	252.8	242.2	220.5	220.6	244.7	239.3	240.4	236.0	225.2	240.7	229.0	269.7	265.7	377.0	367.7	363.8	355.9	349.1
12/9/90	6:00	249.4	252.8	242.6	220.4	220.7	244.8	239.5	240.4	236.2	225.4	240.5	229.0	270.0	266.2	377.3	368.2	364.2	356.2	349.2
12/9/90	6:30	249.5	252.9	242.8	220.4	221.1	245.1	239.4	240.6	236.1	225.1	240.9	229.4	270.2	265.9	377.3	368.2	364.2	356.5	349.7
12/9/90	7:00	249.7	253.6	243.6	220.9	221.3	245.3	240.2	240.8	236.5	225.7	241.4	229.5	270.5	266.0	381.3	371.5	367.5	359.3	351.7
12/9/90	7:30	250.3	253.7	243.7	220.7	221.6	245.8	240.4	240.9	236.9	225.8	241.2	229.5	270.0	266.1	377.0	367.9	363.8	356.1	349.1
12/9/90	8:00	249.7	253.3	243.7	219.7	221.2	245.2	240.1	241.1	236.3	226.0	241.0	229.8	270.0	266.4	375.1	366.3	362.1	354.9	348.3
12/9/90	8:30	249.4	253.0	243.5	219.7	221.1	244.9	239.6	240.7	236.2	225.7	241.4	229.5	269.8	265.9	375.3	366.4	362.5	354.8	348.3
12/9/90	9:00	249.2	252.7	243.9	219.7	221.3	244.9	239.9	240.5	236.1	225.7	240.8	229.5	269.9	266.2	375.0	365.8	362.4	354.8	348.3
12/9/90	9:30	249.2	252.5	244.0	220.2	221.1	245.1	239.8	240.8	236.3	225.6	240.9	229.5	270.1	266.3	374.8	365.9	362.0	354.6	348.3
12/9/90	10:00	249.2	252.5	244.1	220.6	221.0	245.1	239.7	240.9	236.3	225.6	241.0	229.6	270.1	266.2	375.2	366.3	362.4	354.7	348.5
12/9/90	10:30	249.1	252.4	244.3	221.1	221.3	245.0	239.9	240.8	236.3	225.6	241.2	229.3	270.4	266.1	374.5	365.7	362.2	354.4	348.3
12/9/90	11:00	249.0	252.3	244.6	221.2	221.3	245.1	239.8	241.0	236.4	225.6	241.0	229.7	270.2	266.3	374.3	365.5	361.9	354.4	348.3
12/9/90	11:30	248.4	251.6	244.9	221.4	221.2	244.8	239.5	241.3	236.4	226.1	241.4	229.5	269.7	265.8	374.4	365.4	361.9	354.6	348.6
12/9/90	12:00	248.2	251.7	244.8	221.5	221.4	245.4	240.1	241.4	236.3	225.5	240.9	229.5	270.0	266.1	374.2	365.6	362.1	354.3	348.1
12/9/90	12:30	248.1	251.4	245.1	221.2	221.4	245.2	240.2	241.1	236.5	225.8	241.4	229.8	270.4	266.5	374.3	365.6	362.0	354.4	348.2
12/9/90	13:00	248.1	251.3	245.2	221.4	221.7	245.4	240.1	241.3	236.5	225.9	241.3	229.9	270.7	266.7	374.8	365.8	362.3	354.6	348.4
12/9/90	13:30	248.2	251.3	245.7	221.4	221.7	245.5	240.2	241.4	236.6	225.9	241.3	230.1	270.3	266.4	374.7	365.6	362.2	354.4	348.4
12/9/90	14:00	248.3	251.4	245.7	221.7	222.0	245.6	240.3	241.4	236.7	226.1	241.4	230.1	270.3	266.8	374.8	365.7	361.9	354.6	348.4
12/9/90	14:30	248.9	251.8	246.3	222.1	222.2	245.6	240.4	241.4	236.6	226.2	241.8	230.2	270.4	266.7	374.7	365.8	362.0	354.5	348.6
12/9/90	15:00	249.1	252.1	246.3	222.4	222.4	245.7	240.6	241.6	236.9	226.2	241.6	230.2	270.4	266.8	374.5	365.8	361.9	354.5	348.4
12/9/90	17:30	249.1	252.1	246.3	222.4	222.4	245.7	240.6	241.6	236.9	226.2	241.6	230.2	270.4	266.8	374.5	365.8	361.9	354.5	348.4

Table B1-2: Condition 2 String and Casing Heat Flux Data, and Steam Flow Data

TEST CASE B1, CONDITION 2 HEAT FLUX AND STEAM DATA													
		WATER	STEAM				CASING HEAT FLUX						STRING
DATE	HOUR	LB/HR	LB/HR	QUAL	TEMP		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	250FT
12/8/90	12:00	1053.3	6002.5	85.1	402.7		421.6	398.8	317.5	283.7	293.0	239.0	481.5
12/8/90	12:30	1167.5	5945.4	83.6	402.0		418.7	398.8	317.5	283.6	290.2	241.9	484.1
12/8/90	13:00	1116.8	5932.7	84.2	401.9		418.8	401.8	314.8	283.7	287.6	241.9	476.8
12/8/90	13:30	1034.3	5920.1	85.1	401.7		421.7	401.8	314.8	280.8	290.3	241.9	459.7
12/8/90	14:00	920.1	5970.8	86.6	402.3		424.5	404.7	314.9	283.7	290.4	242.0	488.6
12/8/90	14:30	926.4	6034.3	86.7	402.5		421.7	407.7	314.9	280.9	287.6	242.0	456.2
12/8/90	15:00	894.7	5989.8	87.0	402.0		421.7	407.7	314.9	283.7	287.6	242.0	463.4
12/8/90	15:30	1027.9	5945.4	85.3	402.0		424.6	407.7	315.0	280.9	290.4	242.0	442.6
12/8/90	16:00	907.4	6002.5	86.9	402.2		424.6	410.6	315.0	283.8	287.7	242.1	493.2
12/8/90	16:30	894.7	5983.5	87.0	402.2		424.7	410.7	315.0	281.0	287.7	242.1	448.1
12/8/90	17:00	945.4	6002.5	86.4	402.8		427.5	410.7	315.0	281.0	290.4	242.1	485.2
12/8/90	17:30	1027.9	6611.7	86.5	409.2		438.9	425.3	323.2	286.7	306.8	245.1	512.4
12/8/90	18:00	983.5	6757.6	87.3	410.8		444.6	436.9	328.7	289.7	312.3	248.2	522.6
12/8/90	18:30	793.1	6795.7	89.5	410.6		450.3	440.0	326.1	292.6	312.3	248.2	505.4
12/8/90	19:00	901.0	6808.4	88.3	410.4		450.4	442.9	328.8	292.6	312.4	251.2	481.9
12/8/90	19:30	913.7	6789.3	88.1	410.9		453.3	443.0	326.1	289.8	312.4	251.3	495.5
12/8/90	20:00	882.0	6776.6	88.5	410.8		453.4	446.0	326.2	289.8	312.5	251.3	476.5
12/8/90	20:30	970.8	6751.3	87.4	410.6		453.5	448.9	326.2	292.7	312.5	251.3	481.0
12/8/90	21:00	869.3	6783.0	88.6	410.9		453.5	449.0	326.3	289.9	315.3	251.3	478.4
12/8/90	21:30	901.0	6776.6	88.3	411.1		453.6	451.9	323.6	289.9	312.6	251.4	460.3
12/8/90	22:00	862.9	6795.7	88.7	411.1		453.7	452.0	323.6	292.8	315.3	254.4	456.7
12/8/90	22:30	698.0	6846.4	90.7	411.2		456.5	454.9	323.6	292.8	315.3	251.4	517.3
12/8/90	23:00	901.0	6783.0	88.3	411.2		453.8	455.1	323.7	292.8	315.4	251.4	487.5
12/8/90	23:30	882.0	6795.7	88.5	411.2		453.8	458.0	321.0	292.9	315.4	251.5	500.2
12/9/90	0:00	755.1	6421.3	89.5	406.9		448.2	449.3	315.6	287.1	301.8	251.4	506.7
12/9/90	0:30	824.9	6319.8	88.5	406.0		439.7	443.5	312.9	284.3	296.4	248.5	441.6
12/9/90	1:00	1008.9	6269.0	86.1	405.8		436.9	443.5	310.2	281.5	296.4	248.5	463.2
12/9/90	1:30	901.0	6275.4	87.4	405.8		434.2	440.7	310.2	281.5	299.1	248.4	488.5
12/9/90	2:00	818.5	6300.8	88.5	405.8		434.2	443.6	310.2	278.6	296.4	248.5	457.8
12/9/90	2:30	964.5	6275.4	86.7	405.7		431.4	443.6	307.5	278.6	296.4	245.5	474.0
12/9/90	3:00	945.4	6269.0	86.9	406.0		431.5	443.7	307.5	278.6	299.1	245.5	481.3
12/9/90	3:30	824.9	6300.8	88.4	405.8		431.5	443.7	307.5	278.6	299.1	248.5	509.3
12/9/90	4:00	869.3	6269.0	87.8	406.0		428.7	443.8	307.5	278.7	299.1	245.5	460.5
12/9/90	4:30	945.4	6262.7	86.9	406.2		425.9	443.8	307.5	275.8	299.1	245.5	482.2
12/9/90	5:00	856.6	6300.8	88.0	406.2		423.1	446.7	304.9	278.7	299.1	245.5	484.0

Table B1-2: Condition 2 String and Casing Heat Flux Data, and Steam Flow Data

TEST CASE B1, CONDITION 2 HEAT FLUX AND STEAM DATA													
		WATER	STEAM				CASING HEAT FLUX						STRING
DATE	HOUR	LB/HR	LB/HR	QUAL	TEMP		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	250FT
12/9/90	5:30	1066.0	6231.0	85.4	406.0		423.2	446.8	307.6	278.7	296.4	245.5	469.5
12/9/90	6:00	964.5	6275.4	86.7	406.0		420.4	444.0	304.9	275.9	296.4	245.5	503.8
12/9/90	6:30	1047.0	6237.3	85.6	406.0		417.6	444.0	304.9	275.9	299.2	248.6	455.1
12/9/90	7:00	875.6	6725.9	88.5	410.6		426.2	455.7	313.0	278.8	312.8	248.6	461.2
12/9/90	7:30	1027.9	6167.5	85.7	405.4		420.6	452.8	304.9	275.9	296.5	248.6	448.7
12/9/90	8:00	964.5	6034.3	86.2	403.3		409.3	441.2	302.3	275.9	288.3	245.6	432.1
12/9/90	8:30	996.2	6021.6	85.8	403.3		406.5	438.3	299.5	273.1	288.4	242.6	470.1
12/9/90	9:00	1034.3	6002.5	85.3	403.3		403.7	438.4	299.5	273.0	288.3	242.6	487.2
12/9/90	9:30	1104.1	5983.5	84.4	403.5		400.9	438.4	299.5	270.2	288.3	242.6	426.7
12/9/90	10:00	907.4	6066.0	87.0	403.8		398.1	435.5	299.5	273.1	288.3	242.6	429.5
12/9/90	10:30	926.4	6008.9	86.6	403.3		398.1	435.5	299.5	270.2	288.3	242.6	486.2
12/9/90	11:00	1154.8	5945.4	83.7	403.0		395.3	435.6	299.6	270.2	285.6	242.6	429.3
12/9/90	11:30	888.3	5983.5	87.1	403.3		395.4	432.7	296.9	273.1	288.4	242.6	447.4
12/9/90	12:00	970.8	5964.5	86.0	403.1		389.7	432.7	296.9	270.3	288.3	239.6	438.3
12/9/90	12:30	1008.9	5983.5	85.6	403.1		392.6	429.8	296.9	273.1	285.6	242.6	459.1
12/9/90	13:00	1027.9	5989.8	85.4	403.5		389.8	432.8	296.9	270.3	288.4	242.6	406.8
12/9/90	13:30	1034.3	5996.2	85.3	403.3		392.7	429.9	296.9	273.1	285.6	242.6	438.4
12/9/90	14:00	939.1	6002.5	86.5	403.3		389.8	429.9	296.9	273.1	285.6	239.6	437.5
12/9/90	14:30	1066.0	5970.8	84.9	403.0		395.6	435.8	294.2	270.3	285.7	239.7	466.4
12/9/90	15:00	1066.0	5958.1	84.8	403.0		389.9	432.9	296.9	273.2	285.7	242.6	425.7
12/9/90	17:30	1066.0	5958.1	84.8	403.0		389.9	432.9	296.9	273.2	285.7	242.6	425.7

Table B1-3: Condition 3 String and Casing Temperature Data

TEST CASE B1,CONDITION 3 TEMPERATURE DATA																			
		STABLE CASING DATA													STABLE STRING DATA				
DATE	HOUR	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT A	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	250FT	400FT	500FT	600FT	750FT
12/10/90	12:00	254.1	267.8	273.6	236.4	235.5	264.0	259.0	260.2	255.1	241.7	257.7	244.9	282.6	279.1	399.7	389.4	385.2	376.6	368.8
12/10/90	12:30	253.8	267.1	273.3	236.0	234.4	263.6	258.8	259.9	254.0	241.5	257.8	244.7	282.3	279.1	399.5	389.3	384.8	376.3	368.6
12/10/90	13:00	253.5	266.5	273.0	236.3	232.7	263.0	258.4	259.9	254.7	241.2	257.5	244.7	282.3	278.8	399.3	389.1	384.8	376.3	368.4
12/10/90	13:30	253.5	266.4	272.9	236.0	233.1	262.4	258.5	259.9	255.0	240.9	257.2	245.0	282.2	278.6	399.5	389.1	385.1	376.5	368.5
12/10/90	14:00	252.9	265.8	273.4	236.8	232.4	263.0	258.6	259.3	254.5	240.9	257.7	244.9	281.7	278.6	399.8	389.5	384.9	376.4	369.0
12/10/90	14:30	253.4	265.7	273.0	236.5	232.2	263.2	258.0	259.6	254.8	241.3	257.2	244.9	281.8	279.0	399.5	389.5	385.1	376.5	368.6
12/10/90	15:00	253.1	265.2	273.4	237.0	232.7	262.3	257.9	260.0	255.1	241.2	257.0	245.0	282.5	278.3	399.3	389.5	385.2	376.1	368.5
12/10/90	16:00	253.1	265.3	273.6	236.9	232.7	262.5	258.2	260.3	254.6	241.6	257.4	244.8	282.5	278.4	399.4	389.3	385.0	376.2	368.5
12/10/90	16:30	253.2	265.5	273.9	236.7	233.4	262.6	258.2	260.5	255.3	241.3	257.6	245.4	282.0	278.8	399.8	389.9	385.1	376.5	368.9
12/10/90	17:00	253.1	265.1	273.9	237.1	233.0	262.9	258.4	260.3	255.0	241.7	257.9	245.2	282.5	279.1	400.0	389.7	385.4	376.6	368.6
12/10/90	17:30	252.9	265.2	274.2	237.5	233.9	263.0	258.8	260.6	254.9	241.4	258.1	245.7	282.4	278.7	399.7	389.4	385.4	376.7	368.1
12/10/90	18:00	253.0	264.8	274.2	237.1	235.8	262.8	258.3	260.5	255.1	242.2	258.1	245.0	282.6	279.5	400.4	390.1	385.3	376.6	368.7
12/10/90	18:30	252.5	264.8	274.2	237.3	236.1	263.0	258.7	260.7	255.0	242.1	258.0	245.6	282.3	279.5	400.5	389.8	385.6	376.5	368.7
12/10/90	19:00	252.6	264.7	274.4	237.4	234.6	263.3	259.1	260.5	255.4	241.7	257.9	245.6	283.1	279.5	400.7	390.2	385.5	376.6	368.8
12/10/90	19:30	252.0	264.4	274.7	237.4	236.1	264.2	258.9	260.7	255.0	242.0	258.3	245.6	282.7	279.3	400.5	390.2	385.7	376.9	368.7
12/10/90	20:00	251.9	264.2	274.8	238.1	236.8	264.8	259.2	260.9	255.5	241.9	258.7	245.6	282.5	279.7	400.5	390.1	385.4	377.0	368.4
12/10/90	20:30	251.5	264.1	275.1	237.8	236.9	264.7	259.1	261.0	255.4	242.0	258.4	245.7	282.8	279.5	400.6	390.3	385.8	377.1	368.8
12/10/90	21:00	251.6	263.9	275.1	238.4	237.3	265.1	259.4	261.5	255.4	242.5	258.2	246.4	282.3	279.7	400.4	390.2	385.7	376.7	368.8
12/10/90	21:30	251.1	264.0	275.0	238.3	238.2	264.8	259.2	260.8	255.8	242.5	258.1	245.8	283.3	279.4	400.5	390.0	385.2	376.7	368.7
12/10/90	22:00	251.6	263.7	275.2	237.9	238.5	264.7	259.3	261.2	256.0	242.5	258.3	246.0	283.3	279.4	400.3	390.1	386.0	376.7	368.3
12/10/90	22:30	251.3	263.5	275.5	238.3	238.6	265.1	259.6	261.2	255.8	242.2	258.7	245.9	282.8	279.6	400.4	389.9	385.6	376.8	368.6
12/10/90	23:00	251.1	263.5	275.6	238.3	238.5	265.3	259.9	261.1	255.4	242.4	258.9	246.3	282.8	279.4	400.4	390.1	385.5	376.6	368.7
12/10/90	23:30	251.1	263.5	275.5	238.7	238.6	265.2	259.6	261.1	255.6	242.6	258.8	246.0	282.8	279.4	400.1	389.7	385.3	376.6	368.3
12/11/90	0:00	250.9	263.3	275.8	238.3	238.6	265.8	259.7	261.6	255.9	242.9	258.7	246.7	282.8	280.2	400.6	390.0	385.4	376.9	368.3
12/11/90	0:30	250.5	262.9	275.7	238.9	238.7	265.6	260.1	261.9	255.8	242.9	258.9	246.2	283.6	279.9	399.9	389.8	385.6	376.4	368.5
12/11/90	1:00	250.3	262.7	275.4	238.6	238.8	264.9	260.1	261.4	255.3	242.7	259.2	246.1	283.1	280.1	397.8	387.4	383.3	374.9	366.7
12/11/90	1:30	250.1	262.1	275.2	238.5	239.0	264.1	259.2	261.3	255.8	242.1	258.5	245.9	282.7	280.2	397.0	387.1	383.3	374.7	366.4
12/11/90	2:00	250.1	261.2	274.1	238.6	239.1	263.9	258.6	260.4	255.5	242.6	257.9	245.1	283.4	279.9	396.7	387.0	384.0	374.6	366.3
12/11/90	2:30	249.8	260.8	273.8	238.4	238.7	263.9	258.6	260.3	255.2	242.5	257.7	245.1	283.4	279.7	396.9	386.6	383.4	374.9	365.7
12/11/90	3:00	249.8	260.4	273.7	238.2	239.0	263.6	258.6	260.6	255.2	242.5	257.7	245.1	283.2	279.8	396.8	386.5	383.4	374.8	365.8
12/11/90	3:30	249.8	260.3	273.4	238.3	239.0	263.8	258.2	260.5	255.4	242.2	257.5	245.1	282.9	280.1	397.2	386.7	383.3	375.1	365.6
12/11/90	4:00	250.0	259.9	273.6	238.3	239.1	263.3	258.2	260.5	255.0	242.3	257.7	244.9	283.2	280.0	396.8	386.5	383.1	375.1	365.6
12/11/90	4:30	250.1	259.7	273.3	238.2	238.9	263.2	258.3	260.3	254.7	242.2	257.7	244.4	283.2	280.1	396.7	386.1	382.7	374.9	365.5
12/11/90	5:00	250.5	260.0	274.0	238.5	239.4	263.8	258.3	261.1	255.0	242.4	258.2	244.7	283.1	280.4	400.4	389.3	385.6	377.5	367.3
12/11/90	5:30	250.3	260.5	274.3	239.0	239.4	263.7	258.7	261.2	255.2	242.7	258.0	244.8	284.0	280.2	400.9	390.2	386.3	378.1	367.9

Table B1-3: Condition 3 String and Casing Temperature Data

TEST CASE B1,CONDITION 3 TEMPERATURE DATA																			
		STABLE CASING DATA													STABLE STRING DATA				
DATE	HOUR	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT A	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	250FT	400FT	500FT	600FT	750FT
12/11/90	6:00	250.2	260.3	274.7	239.5	239.9	263.7	258.6	261.0	255.7	243.0	258.1	244.8	284.0	280.5	401.2	390.5	386.3	378.1	368.4
12/11/90	6:30	250.3	260.3	275.2	239.6	240.0	263.7	259.1	261.7	255.7	243.1	258.4	244.9	284.1	280.5	401.2	390.3	386.2	378.6	368.2
12/11/90	7:00	250.4	260.4	275.7	239.4	240.3	263.5	259.1	261.8	256.0	242.7	258.2	245.0	283.5	280.2	401.6	390.7	386.2	378.7	368.6
12/11/90	7:30	250.3	260.5	275.9	239.8	240.2	263.4	259.2	262.3	256.4	242.8	258.5	245.5	283.9	280.8	401.7	391.0	386.2	378.9	368.4
12/11/90	8:00	250.3	260.5	276.2	239.7	240.5	263.3	259.7	262.4	256.0	243.4	258.7	245.3	284.4	280.7	401.7	390.8	386.3	378.7	368.5
12/11/90	8:30	250.3	260.3	276.6	239.7	240.5	263.4	259.5	262.3	256.7	243.3	258.5	246.0	283.7	281.0	401.9	391.0	386.3	379.1	368.7
12/11/90	9:00	250.0	260.3	276.7	239.8	240.9	262.7	259.8	262.6	256.4	243.5	258.7	245.9	284.2	281.1	401.2	390.5	385.6	378.6	368.3
12/11/90	9:30	250.2	260.1	277.1	239.9	240.7	263.0	259.5	262.7	256.6	243.2	259.0	245.6	284.6	280.7	400.8	389.8	385.3	378.0	368.3
12/11/90	10:00	250.0	260.2	277.0	240.0	240.5	263.4	259.5	262.6	256.1	243.4	259.0	246.2	284.6	281.2	400.4	389.8	385.2	378.1	368.1
12/11/90	10:30	249.8	259.9	276.9	239.5	240.2	262.9	260.0	262.9	256.3	243.7	258.9	245.6	284.6	281.0	400.2	389.5	384.9	377.5	368.1
12/11/90	11:00	249.6	259.6	277.2	239.7	240.1	263.1	259.7	262.7	256.4	243.6	258.8	245.9	284.2	280.8	400.0	389.2	384.6	377.6	367.7
12/11/90	11:09	249.6	259.6	277.2	239.8	240.2	262.9	259.9	262.8	256.3	243.6	258.9	246.0	284.4	281.1	399.9	389.1	384.5	377.5	367.6
12/11/90	11:42	249.6	259.6	277.1	240.0	240.2	262.9	260.0	262.9	256.4	243.7	258.8	246.1	284.3	281.0	399.9	389.1	384.4	377.5	367.6
12/11/90	12:15	249.4	259.6	277.1	240.2	240.4	263.7	260.0	263.0	256.3	243.8	258.8	246.1	284.3	281.1	399.9	389.3	384.6	377.5	367.8
12/11/90	12:55	248.9	259.3	277.4	240.1	240.4	264.0	260.1	263.1	256.4	244.0	259.0	246.2	284.6	281.1	399.8	389.1	384.4	377.4	367.6
12/11/90	13:28	248.5	259.2	277.4	240.1	240.5	264.2	260.2	263.0	256.4	244.0	259.0	246.4	284.6	281.2	399.9	389.2	384.6	377.5	367.7
12/11/90	14:09	249.5	259.6	277.8	240.9	241.1	264.6	260.4	263.1	256.3	243.6	259.0	246.4	284.5	281.2	399.9	389.2	384.5	377.4	367.7
12/11/90	14:42	248.8	259.6	278.0	240.8	241.6	264.8	260.6	263.3	256.4	244.2	259.1	246.6	284.6	281.1	400.0	389.3	384.6	377.5	367.8
12/11/90	15:15	248.9	259.5	277.9	240.9	241.5	264.8	260.8	263.4	256.3	244.3	259.3	246.7	284.6	281.3	400.2	389.4	384.7	377.6	367.9

Table B1-4: Condition 3 String and Casing Heat Flux Flow Data and Steam Flow Data

TEST CASE B1, CONDITION 3 HEAT FLUX AND STEAM DATA													
		WATER	STEAM				CASING HEAT FLUX						STRING
DATE	HOUR	LB/HR	LB/HR	QUAL	TEMP		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	250FT
12/10/90	12:00	1656.1	8407.4	83.5	431.5		439.6	460.8	334.3	306.5	322.9	277.2	455.4
12/10/90	12:30	1415.0	8401.0	85.6	431.1		436.7	460.8	334.3	306.5	323.0	274.2	499.1
12/10/90	13:00	1408.6	8413.7	85.7	431.2		433.8	457.8	334.3	306.5	322.9	271.2	522.8
12/10/90	13:30	1351.5	8426.4	86.2	431.1		433.7	457.8	334.3	306.5	322.9	271.1	513.7
12/10/90	14:00	1288.1	8343.9	86.6	429.0		431.0	460.8	334.2	306.4	325.7	274.2	485.5
12/10/90	14:30	1294.4	8515.2	86.8	431.7		433.8	457.8	334.2	306.5	325.6	271.1	476.3
12/10/90	15:00	1427.7	8477.2	85.6	431.5		431.0	460.8	337.0	309.4	325.6	271.1	477.2
12/10/90	16:00	1389.6	8439.1	85.9	431.4		431.0	460.8	337.0	309.4	325.6	271.2	459.9
12/10/90	16:30	1326.1	8502.5	86.5	431.7		431.0	460.9	334.3	306.6	328.4	271.2	469.1
12/10/90	17:00	1319.8	8496.2	86.6	431.7		433.9	463.8	334.3	306.6	325.7	274.2	473.7
12/10/90	17:30	1370.6	8489.8	86.1	431.5		436.8	460.9	334.4	306.6	325.7	271.2	474.6
12/10/90	18:00	1332.5	8527.9	86.5	431.9		433.9	460.9	337.1	306.6	325.7	271.2	480.2
12/10/90	18:30	1269.0	8534.3	87.1	432.0		433.9	463.9	337.1	306.6	325.7	274.2	499.3
12/10/90	19:00	1224.6	8572.3	87.5	432.3		434.0	463.9	334.3	306.6	325.7	274.2	462.9
12/10/90	19:30	1237.3	8572.3	87.4	432.3		436.9	461.0	334.4	306.6	325.8	274.3	472.0
12/10/90	20:00	1269.0	8572.3	87.1	432.2		436.9	461.0	339.8	309.5	325.8	274.3	500.2
12/10/90	20:30	1357.9	8572.3	86.3	432.3		434.1	461.1	339.8	306.6	325.8	271.3	474.7
12/10/90	21:00	1211.9	8566.0	87.6	432.0		434.1	461.1	337.2	306.7	325.7	274.3	453.7
12/10/90	21:30	1376.9	8496.2	86.1	431.7		434.1	464.0	334.4	306.6	328.5	271.2	492.0
12/10/90	22:00	1281.7	8572.3	87.0	432.0		437.0	461.1	337.2	306.7	325.8	271.3	474.7
12/10/90	22:30	1231.0	8566.0	87.4	431.9		434.2	461.2	334.4	306.7	325.8	274.3	472.0
12/10/90	23:00	1313.5	8521.6	86.6	432.0		434.2	458.2	334.4	306.7	325.8	271.3	464.7
12/10/90	23:30	1313.5	8489.8	86.6	431.5		434.2	461.2	334.4	306.7	325.8	274.3	473.7
12/11/90	0:00	1288.1	8527.9	86.9	431.7		434.2	458.3	334.5	303.8	325.8	271.3	473.8
12/11/90	0:30	1370.6	8477.2	86.1	431.5		434.2	458.3	334.5	303.9	323.1	274.3	482.8
12/11/90	1:00	1269.0	8109.1	86.5	428.4		428.4	452.3	326.3	301.0	320.4	271.4	457.8
12/11/90	1:30	1491.1	8026.6	84.3	427.9		419.8	440.5	320.9	295.2	317.6	271.3	453.1
12/11/90	2:00	1383.2	8052.0	85.3	427.7		413.9	431.6	320.7	292.2	317.5	268.2	479.5
12/11/90	2:30	1332.5	8026.6	85.8	427.6		411.0	431.5	320.7	292.2	317.5	268.2	453.1
12/11/90	3:00	1364.2	8039.3	85.5	427.7		411.0	431.5	320.8	292.3	317.5	268.2	484.9
12/11/90	3:30	1199.2	8071.1	87.1	427.9		411.0	431.4	320.8	292.3	317.4	268.2	479.6
12/11/90	4:00	1395.9	8045.7	85.2	427.9		411.0	431.5	318.0	292.3	317.5	268.2	469.5
12/11/90	4:30	1427.7	7994.9	84.8	427.4		411.0	431.4	318.0	292.2	317.5	265.2	447.6
12/11/90	5:00	1351.5	8527.9	86.3	431.9		416.8	440.4	326.3	295.2	328.5	268.2	448.3
12/11/90	5:30	1338.8	8642.1	86.6	432.6		422.5	446.3	329.0	298.1	331.2	271.2	463.8

Table B1-4: Condition 3 String and Casing Heat Flux Flow Data and Steam Flow Data

TEST CASE B1, CONDITION 3 HEAT FLUX AND STEAM DATA													
		WATER	STEAM				CASING HEAT FLUX						STRING
DATE	HOUR	LB/HR	LB/HR	QUAL	TEMP		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	250FT
12/11/90	6:00	1541.9	8629.4	84.8	433.1		428.3	443.4	329.0	298.0	331.2	274.3	488.5
12/11/90	6:30	1269.0	8661.2	87.2	433.0		428.4	446.4	329.1	298.1	331.2	274.3	515.9
12/11/90	7:00	1294.4	8705.6	87.1	433.3		428.5	446.5	331.8	298.1	331.2	271.2	470.4
12/11/90	7:30	1288.1	8743.7	87.2	433.6		431.4	449.5	334.6	301.1	331.3	274.3	462.2
12/11/90	8:00	1364.2	8743.7	86.5	433.6		431.4	449.5	334.6	301.1	331.3	274.3	485.9
12/11/90	8:30	1338.8	8750.0	86.7	433.8		434.3	449.6	334.6	301.1	331.3	274.3	465.9
12/11/90	9:00	1313.5	8661.2	86.8	433.1		434.4	449.6	334.6	301.1	331.3	271.3	492.2
12/11/90	9:30	1307.1	8578.7	86.8	432.3		434.4	449.7	331.9	301.1	328.6	271.3	472.9
12/11/90	10:00	1522.8	8515.2	84.8	432.2		434.4	446.7	334.6	301.1	328.6	271.3	472.9
12/11/90	10:30	1357.9	8489.8	86.2	431.9		434.4	443.8	331.9	301.1	325.8	268.3	461.9
12/11/90	11:00	1376.9	8483.5	86.0	431.7		431.6	446.8	331.9	301.1	325.8	271.3	483.7
12/11/90	11:09	1362.2	8470.6	86.1	431.6		434.1	446.1	334.3	300.9	327.1	271.4	461.8
12/11/90	11:42	1299.6	8496.2	86.7	431.5		433.3	445.8	335.4	301.5	327.0	271.2	464.6
12/11/90	12:15	1284.5	8474.0	86.8	431.4		433.8	445.2	333.7	300.5	326.5	271.0	460.3
12/11/90	12:55	1352.2	8446.7	86.2	431.5		433.8	444.8	333.6	300.0	325.7	271.1	468.7
12/11/90	13:28	1357.0	8469.9	86.2	431.7		433.9	444.0	332.0	301.1	326.7	270.3	469.4
12/11/90	14:09	1304.5	8482.8	86.7	431.4		441.9	447.8	332.4	302.4	326.5	270.1	468.9
12/11/90	14:42	1381.3	8460.1	86.0	431.4		437.9	446.0	331.6	301.8	326.7	269.7	465.2
12/11/90	15:15	1325.9	8487.7	86.5	431.5		437.4	444.6	330.8	302.6	326.4	270.0	472.5

TEST CASE C DATA

APPENDIX C: REDUCED DATA FOR CENTRALIZED BARE TUBING WITH GAS PACKED ANNULUS

FIGURES

Figure C-1: Layout of Tubular and Casing Sensors

Figure C-2 & C-3: Relationships between Sensor Locations

GRAPHS

Graph C-1: Casing Side A Temperature vs. Time

Graph C-2: Casing Side B Temperature vs. Time

Graph C-3: Casing Heat Flux vs. Time

Graph C-4: Tubing String Temperature vs. Time

Graph C-5: Heat Flux at 250 Feet vs. Time

Graph C-6: Steam Mass Flow vs. Time

Graph C-7: Steam Quality vs. Time

Graph C-8: Steam Temperature vs. Time

TABLES

Table C-1 & C-2: Condition 2 String and Casing Temperature Data

Table C-3 & C-4: Condition 2 String and Casing Heat Flux Data and Steam Data

Table C-5 & C-6: Condition 3 String and Casing Temperature Data

Table C-7 & C-8: Condition 3 String and Casing Heat Flux Data and Steam Data

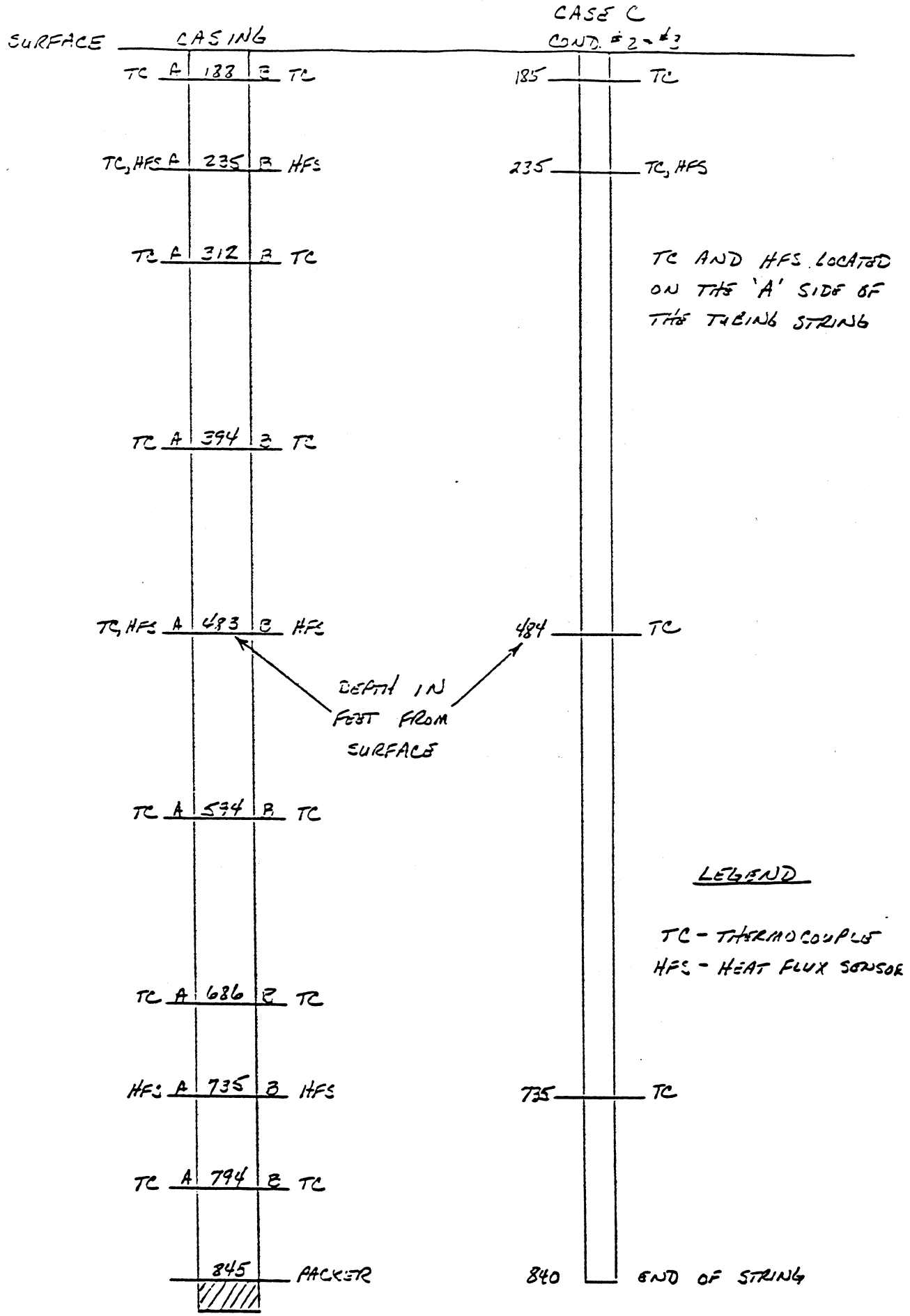


FIGURE C-1: LAYOUT OF TUBULAR AND CASING SENSORS

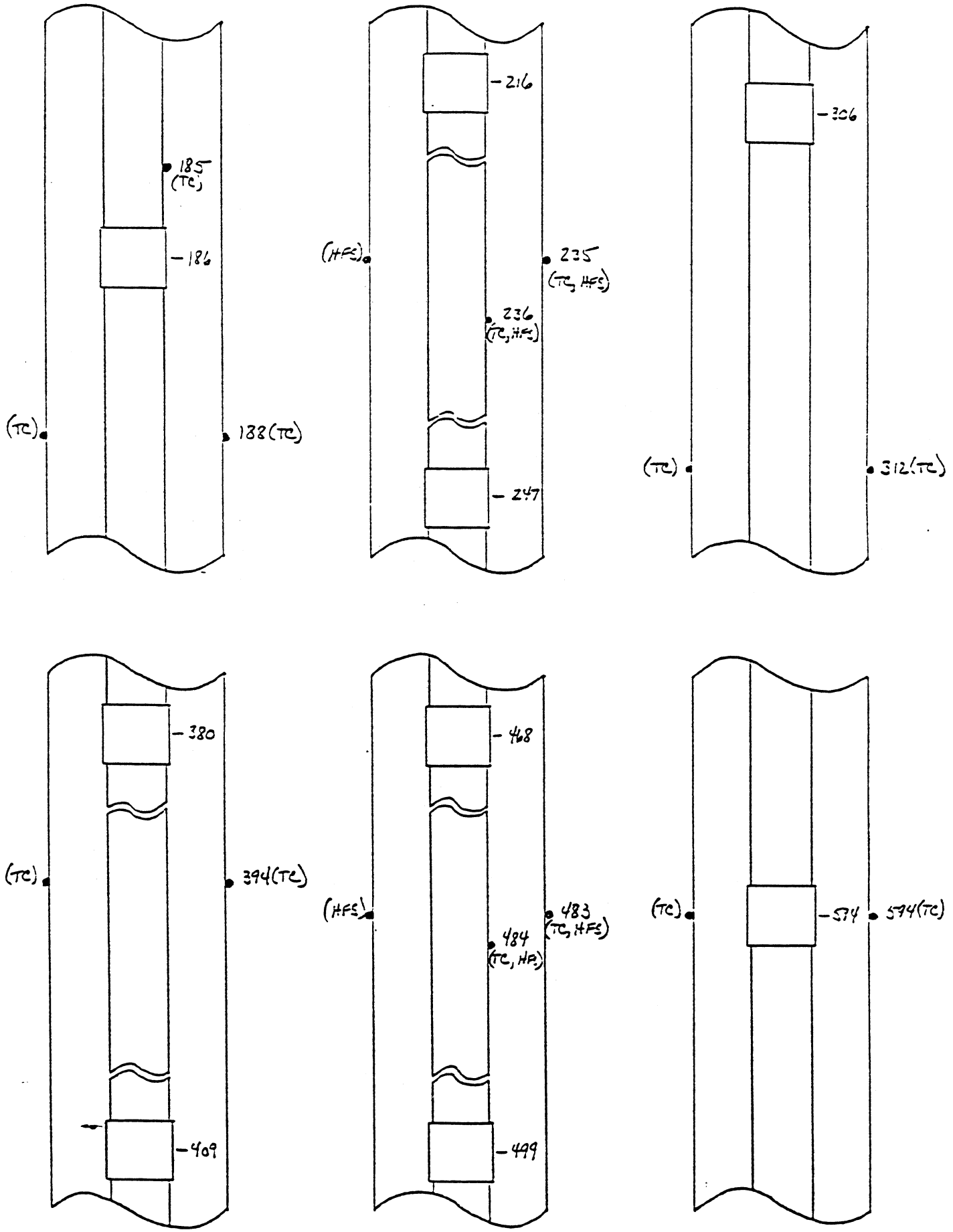


FIGURE C-2: RELATIONSHIP BETWEEN SENSOR LOCATION

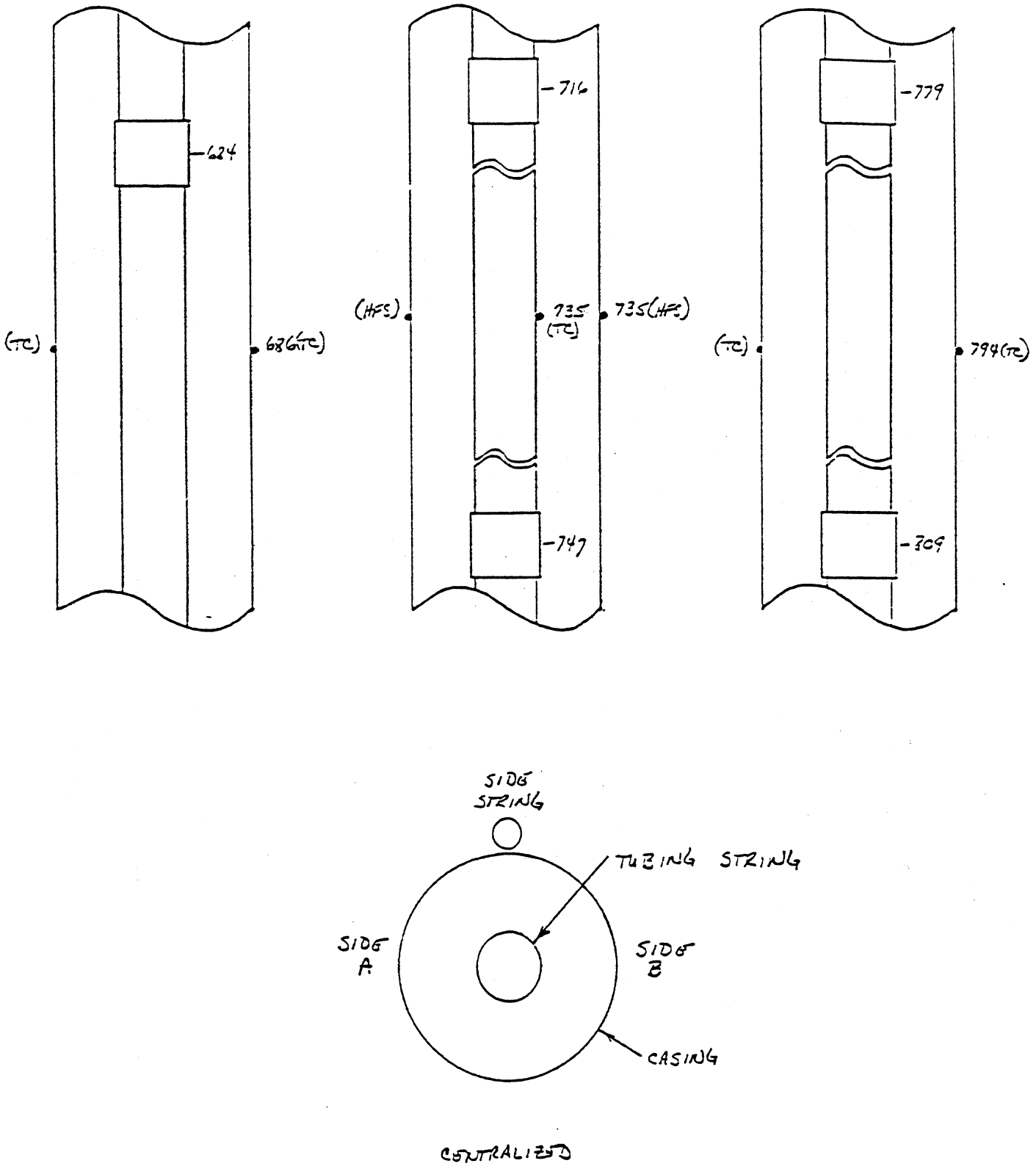
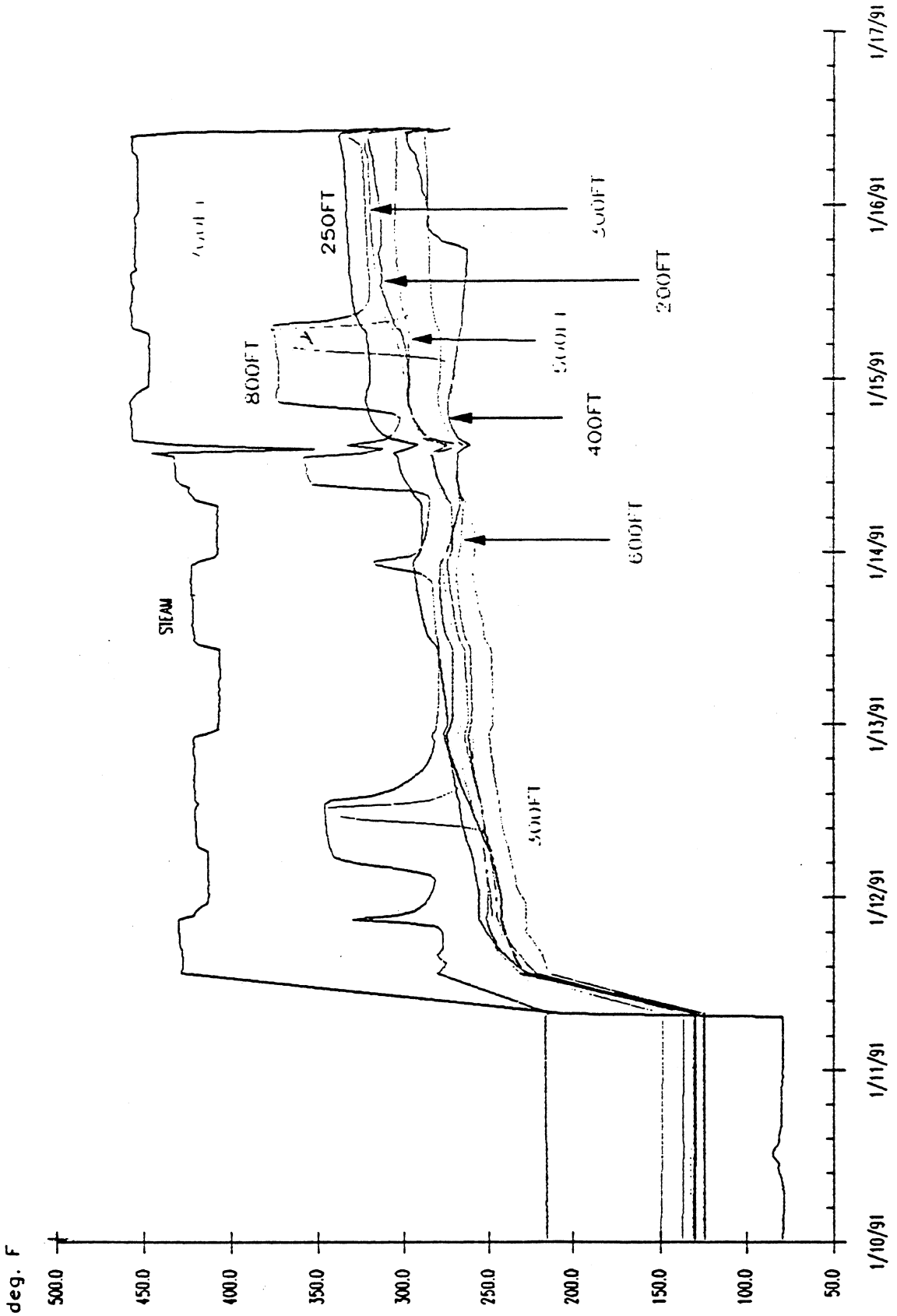
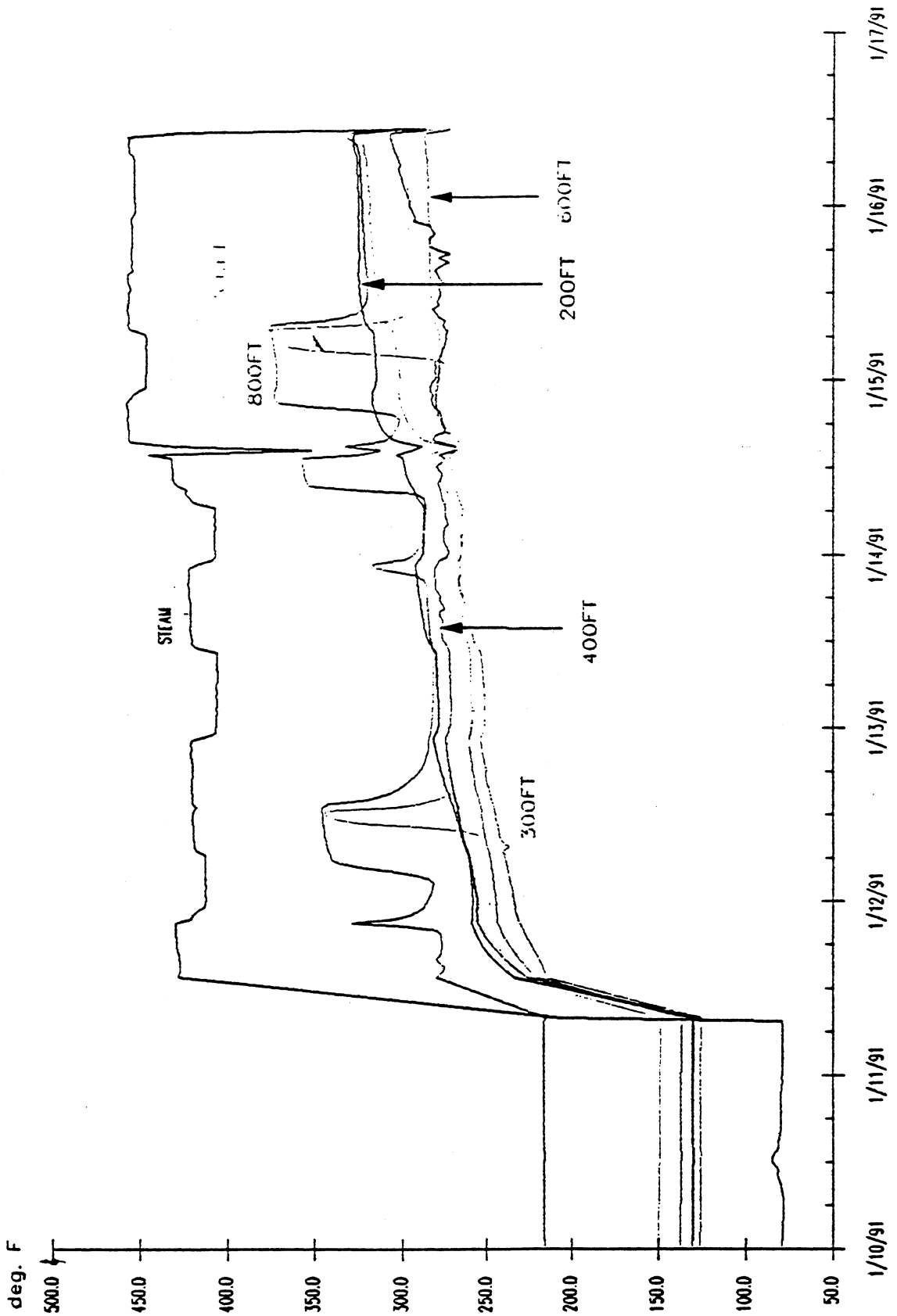


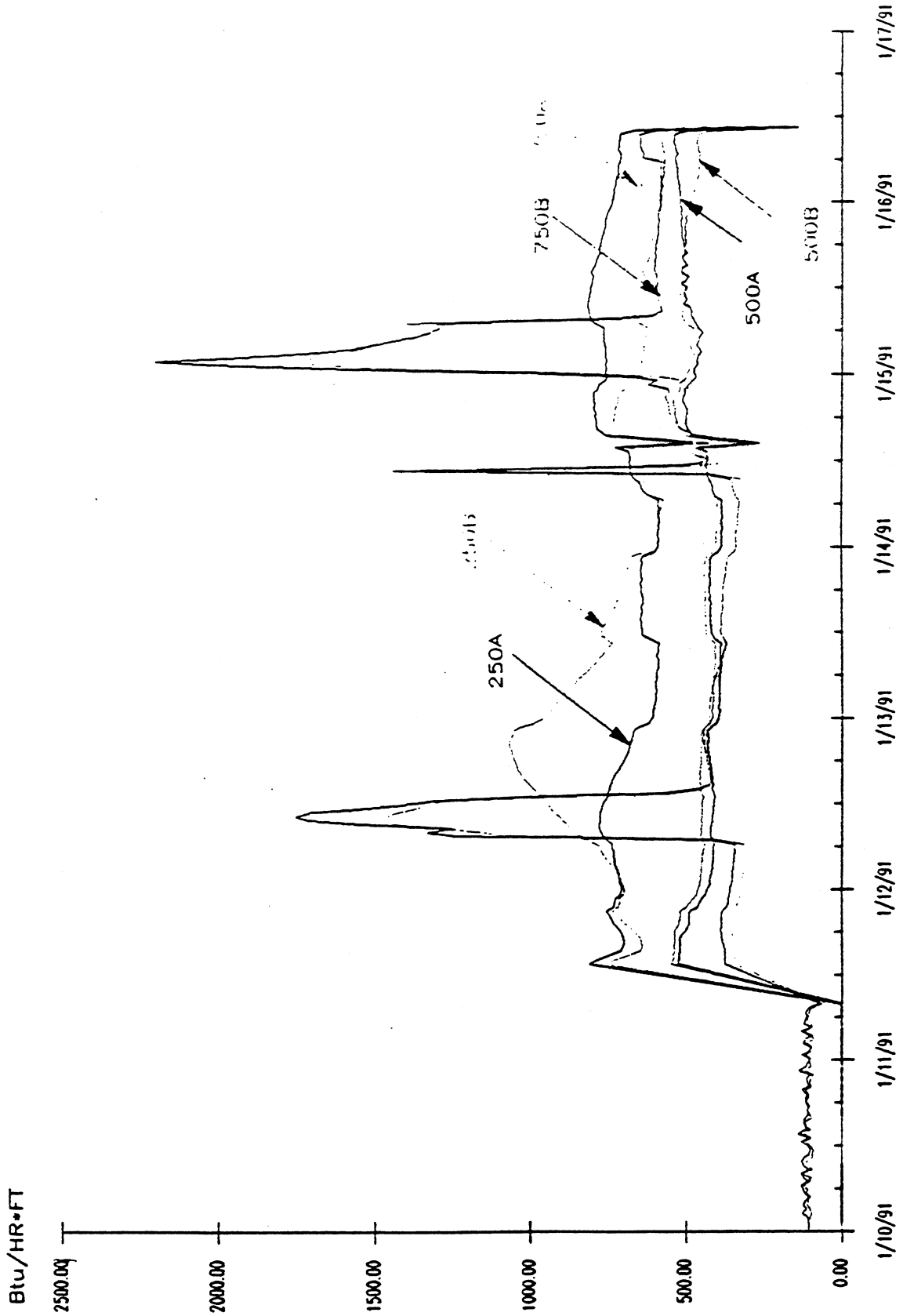
FIGURE C-3: RELATIONSHIP BETWEEN SENSOR LOCATION



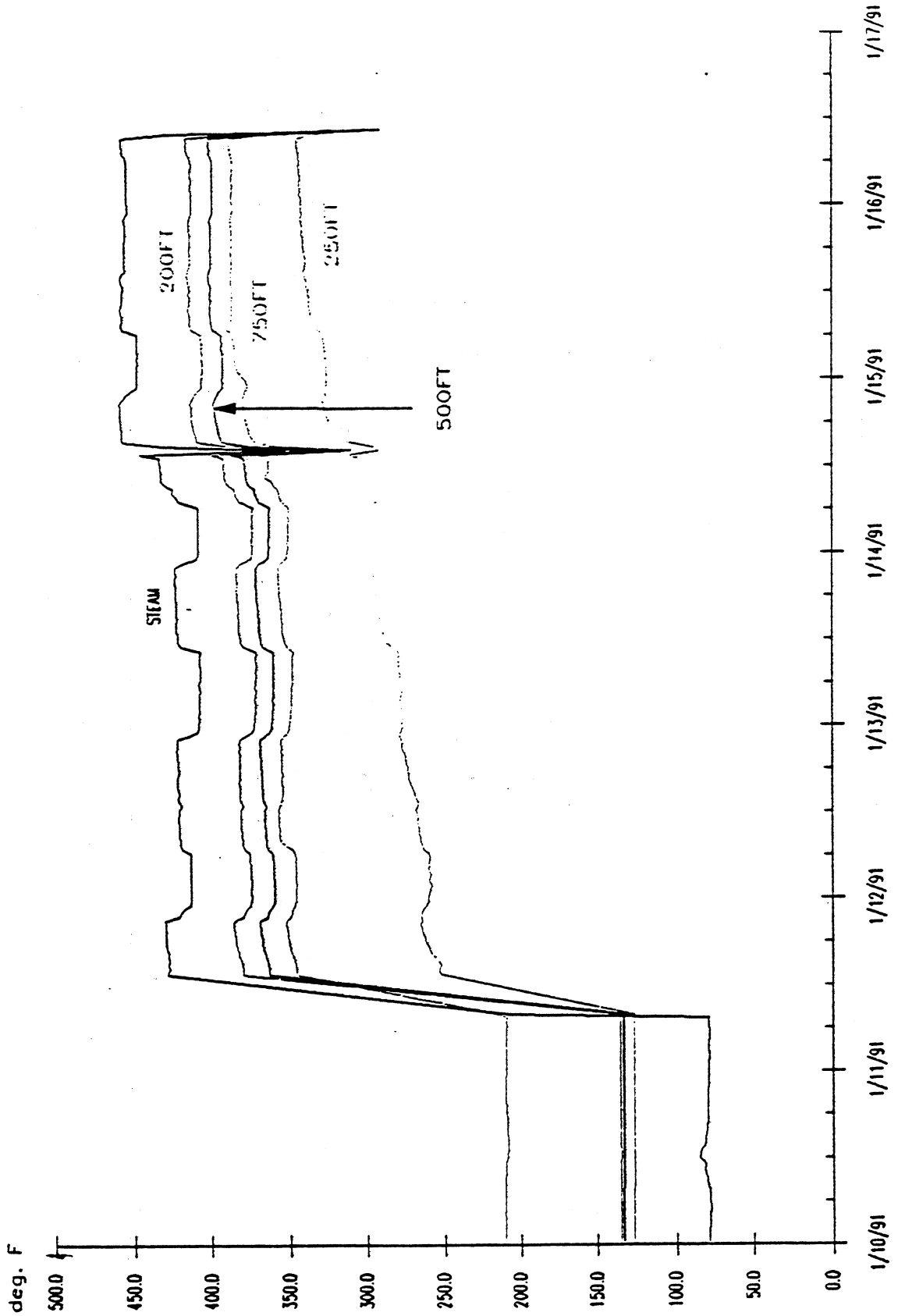
GRAPH C-1: CASING SIDE A TEMPERATURE VS. TIME



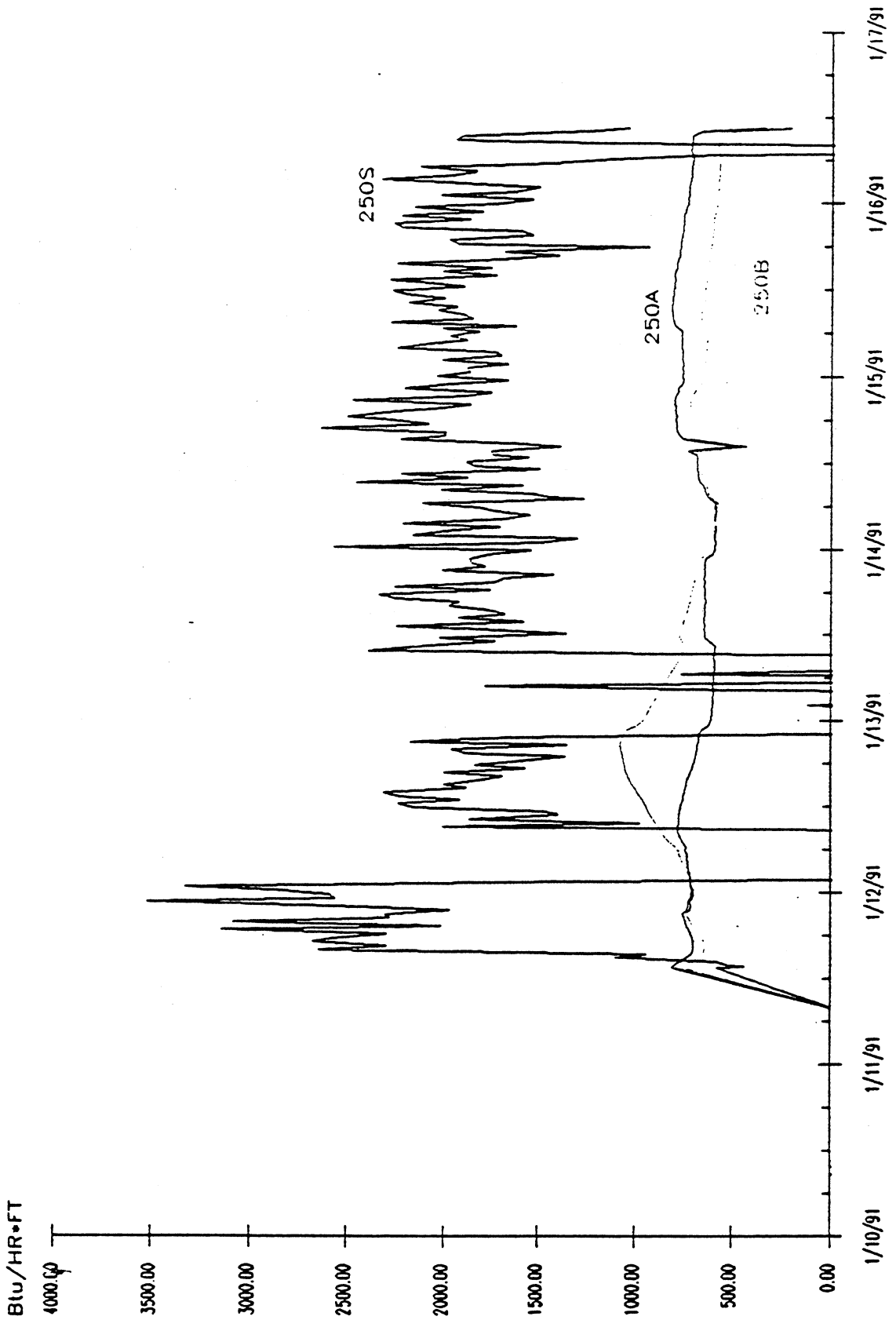
GRAPH C-2: CASING SIDE B TEMPERATURE VS. TIME



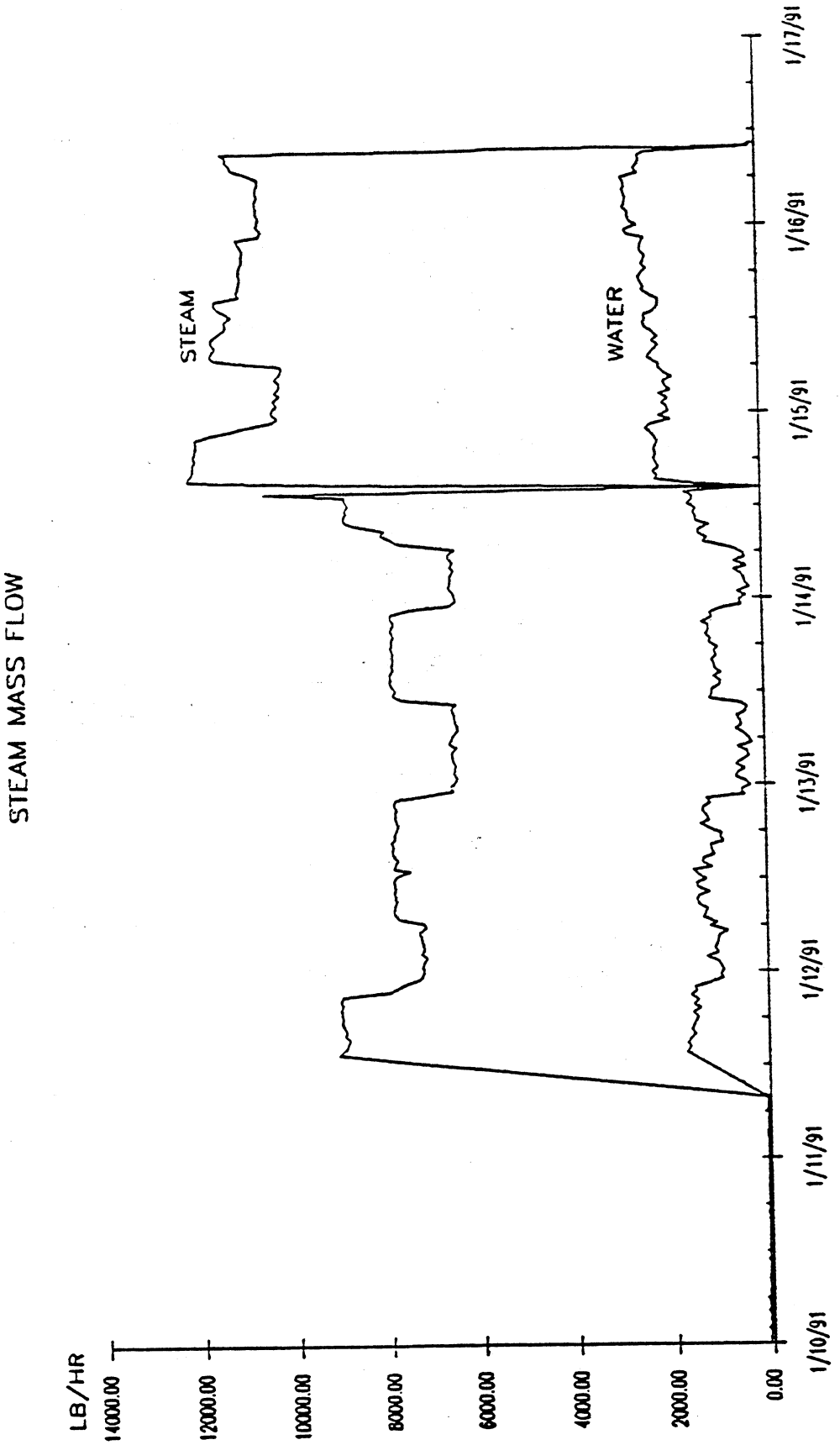
GRAPH C-3: CASING HEAT FLUX VS. TIME



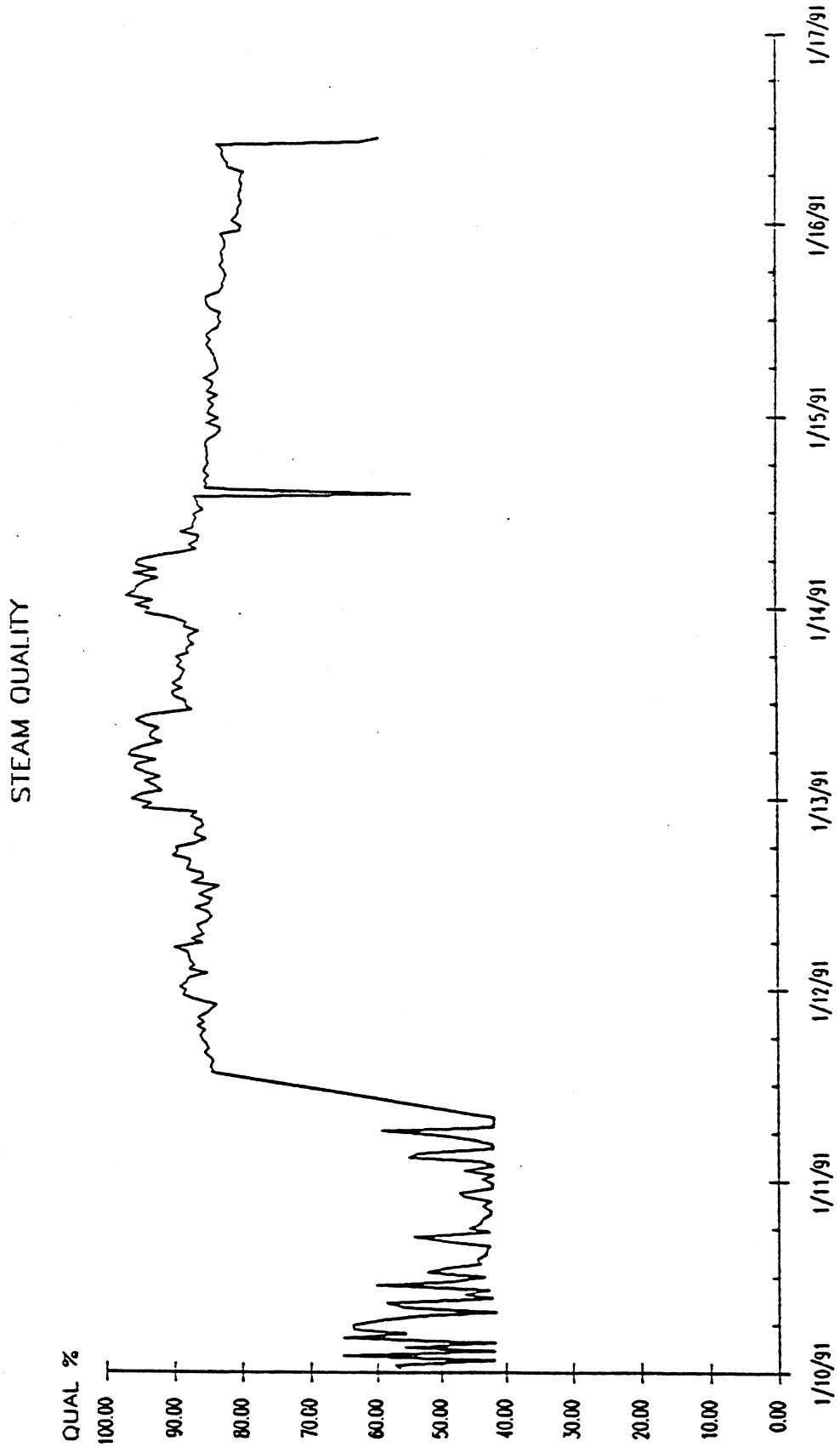
GRAPH C-4: TUBING STRING TEMPERATURE VS. TIME



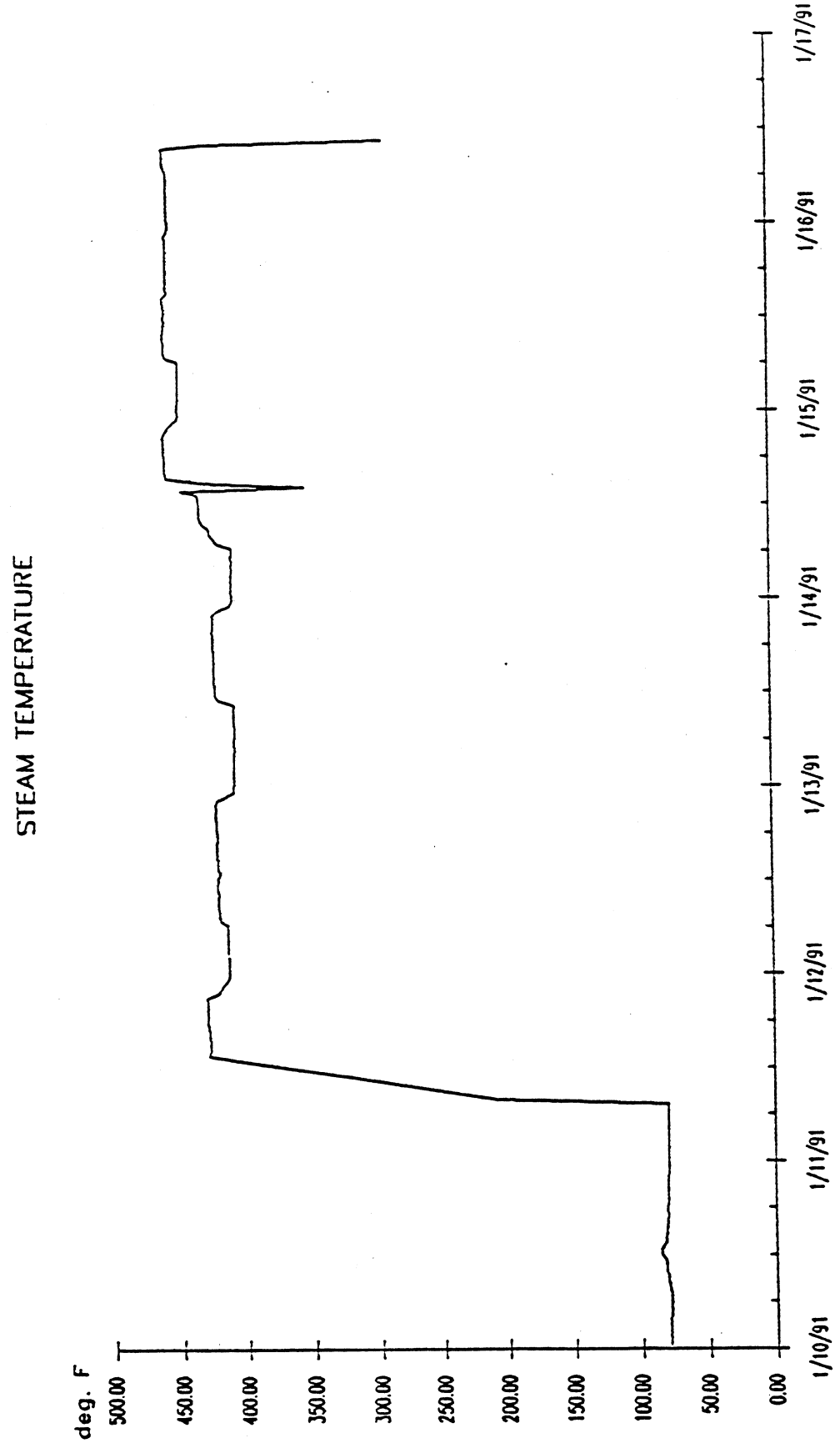
GRAPH C-5: HEAT FLUX AT 250 FT. VS. TIME



GRAPH C-6: STEAM MASS FLOW VS. TIME



GRAPH C-7: STEAM QUALITY VS. TIME



GRAPH C-8: STEAM TEMPERATURE VS. TIME

Table C-1: Condition 2 String and Casing Temperature Data

		TEST CASE C, CONDITION 2 TEMPERATURE DATA																	
		STABLE CASING DATA														STABLE STRING DATA			
DATE	TIME	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FTA	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	200FT	250FT	500FT	750FT
1/12/91	18:20	259.6	276.7	269.9	246.5	249.5	271.2	271.0	264.4	258.3	257.3	259.2	260.7	285.5	287.8	379.8	271.6	366.4	352.9
1/12/91	18:53	260.0	277.3	270.7	247.0	250.2	271.4	271.4	264.8	258.7	257.7	258.8	260.4	284.0	286.5	379.9	272.7	366.3	352.9
1/12/91	19:27	260.5	278.0	271.5	247.3	250.8	271.7	271.8	265.2	259.1	258.0	258.4	260.0	283.0	285.5	379.9	273.1	366.6	353.1
1/12/91	20:00	261.1	278.7	272.4	247.6	251.2	272.0	272.2	265.7	259.4	258.4	258.2	259.8	282.2	284.8	379.9	273.4	366.8	353.3
1/12/91	20:33	261.5	279.3	273.3	247.9	251.5	272.4	272.5	266.0	259.7	258.6	258.0	259.6	281.5	284.2	380.4	275.0	367.1	353.3
1/12/91	21:06	262.0	279.8	274.0	248.2	252.0	272.7	272.7	266.3	260.0	258.9	257.9	259.4	281.0	283.7	380.0	275.3	366.8	353.3
1/12/91	21:39	262.5	280.3	274.7	248.5	252.3	272.9	272.9	266.7	260.3	259.3	257.7	259.3	280.8	283.4	380.1	275.3	367.2	353.5
1/12/91	22:13	263.0	280.8	275.4	248.8	252.5	273.2	273.3	267.0	260.6	259.5	257.7	259.1	282.4	283.4	380.0	276.2	367.1	353.4
1/12/91	22:46	263.0	280.7	275.6	248.7	252.4	273.3	273.2	267.0	260.6	259.6	257.4	258.9	281.4	283.0	375.9	277.4	363.8	351.4
1/12/91	23:19	261.8	279.2	274.2	247.7	251.3	272.1	272.1	266.0	259.8	258.9	256.5	258.1	279.7	282.2	371.5	275.9	360.3	349.0
1/12/91	23:52	261.2	278.2	273.6	246.5	250.6	271.1	271.3	265.4	259.2	258.3	256.0	257.5	279.4	281.8	370.8	275.5	359.6	348.3
1/13/91	0:25	261.0	277.9	273.4	246.6	250.3	270.4	270.7	265.1	259.0	258.2	255.6	257.2	279.2	281.6	370.5	275.2	359.2	347.9
1/13/91	0:59	260.9	277.8	273.5	246.7	250.2	270.2	270.6	264.9	258.8	258.1	255.3	256.8	278.9	281.4	369.9	274.7	358.9	347.6
1/13/91	1:32	261.0	277.8	273.7	246.7	250.1	270.1	270.4	264.8	258.8	257.9	255.1	256.6	278.7	281.2	370.0	275.6	358.9	347.4
1/13/91	2:05	260.9	277.8	273.9	246.6	250.0	270.0	270.1	264.8	258.6	257.9	254.9	256.4	278.6	281.0	369.8	275.4	358.8	347.2
1/13/91	2:38	261.1	277.8	274.2	246.5	250.0	270.1	270.0	264.8	258.5	257.3	254.7	256.2	278.4	280.9	369.6	275.3	358.6	346.9
1/13/91	3:11	261.2	277.9	274.5	246.3	250.2	270.0	270.0	264.8	258.8	257.8	254.5	256.1	278.3	280.8	369.7	276.1	358.4	346.8
1/13/91	3:44	261.2	278.0	274.8	246.4	250.3	270.0	270.1	264.9	258.8	257.8	254.4	256.0	278.2	280.7	370.0	276.3	358.7	346.7
1/13/91	4:18	261.4	278.0	275.2	246.7	250.4	270.0	270.3	264.9	258.8	257.8	254.4	255.9	278.1	280.6	369.8	276.0	358.4	346.5
1/13/91	4:51	261.6	278.2	275.6	246.6	250.5	270.0	270.4	265.0	258.9	257.9	254.3	255.9	278.1	280.6	369.3	275.5	358.3	346.4
1/13/91	5:24	261.8	278.3	275.9	246.8	250.7	270.0	270.5	265.0	258.9	258.0	254.2	255.8	278.0	280.6	369.9	276.6	358.6	346.5

Table C-2: Condition 2 String and Casing Temperature Data

		TEST CASE C, CONDITION 2 TEMPERATURE DATA																	
		STABLE CASING DATA														STABLE STRING DATA			
DATE	TIME	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FTA	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	200FT	250FT	500FT	750FT
1/13/91	5:57	261.9	278.4	276.3	246.9	250.9	270.0	270.6	265.1	259.0	258.2	251.2	255.7	278.1	280.6	369.9	277.1	358.5	346.4
1/13/91	6:30	262.2	278.5	276.5	246.9	251.0	269.9	270.7	265.2	259.0	258.3	254.1	255.7	278.0	280.6	369.7	277.8	358.5	346.3
1/13/91	7:04	262.2	278.6	276.8	247.0	251.1	269.9	270.7	265.3	259.1	258.4	254.0	255.7	278.0	280.6	369.1	276.6	358.1	346.1
1/13/91	7:37	262.5	278.7	277.1	247.3	251.4	269.8	270.6	265.3	259.2	258.4	253.9	255.6	278.0	280.5	369.5	277.2	358.3	346.1
1/13/91	8:10	262.5	278.9	277.5	247.1	251.6	269.8	270.8	265.4	259.3	258.5	254.0	255.6	278.0	280.6	369.3	277.5	358.4	346.1
1/13/91	8:43	262.6	279.0	277.9	247.4	251.9	270.0	270.8	265.6	259.5	258.6	254.0	255.6	278.0	280.6	369.3	277.6	358.5	346.1
1/13/91	9:16	262.7	279.1	278.2	247.5	252.1	270.1	271.0	265.7	259.5	258.6	253.9	255.6	278.0	280.6	369.6	277.9	358.4	346.0
1/13/91	9:50	262.8	279.2	278.5	247.5	252.3	269.8	271.0	265.8	259.4	258.6	254.0	255.6	278.1	280.5	369.6	277.8	358.5	346.0
1/13/91	10:23	263.0	279.2	278.7	247.6	252.5	270.0	271.1	265.8	259.4	258.7	254.0	255.6	278.0	280.6	369.3	277.4	358.2	345.8
1/13/91	11:03	264.5	281.0	280.5	249.0	254.0	271.0	272.1	266.9	260.5	259.2	254.4	256.1	278.3	280.9	377.2	282.0	364.7	349.6
1/13/91	11:36	265.8	283.1	283.0	250.6	255.6	272.5	273.6	268.3	261.7	260.1	255.1	256.9	278.8	281.5	379.2	285.6	366.4	351.1
1/13/91	12:09	266.5	284.1	284.3	251.6	256.5	273.5	274.6	269.1	262.6	260.7	255.6	257.3	279.2	281.9	379.2	286.3	366.6	351.4
1/13/91	12:42	267.2	284.9	285.4	251.8	257.2	274.4	275.3	269.8	263.2	261.0	255.9	257.7	279.5	282.3	379.8	287.2	367.0	351.9
1/13/91	13:16	267.8	285.5	286.1	252.1	257.9	274.8	275.7	270.4	263.8	261.4	256.2	258.0	279.8	282.5	380.2	287.7	367.3	352.3
1/13/91	13:49	268.3	286.2	286.8	252.4	258.6	275.4	276.1	270.9	264.3	261.6	256.4	258.3	280.0	282.7	380.5	288.6	367.5	352.5
1/13/91	14:22	268.7	286.6	287.4	252.8	259.0	275.7	275.4	271.4	264.6	261.9	256.7	258.5	280.2	283.0	380.4	288.6	367.6	352.7
1/13/91	14:55	269.0	287.0	287.9	253.1	259.7	276.0	274.8	271.8	265.1	262.4	256.9	258.7	280.4	283.2	380.2	289.8	367.7	352.8
1/13/91	15:28	269.1	287.4	288.3	253.8	260.1	276.2	276.7	272.1	265.3	263.2	257.2	259.0	280.6	283.4	380.9	289.3	368.1	353.1
1/13/91	16:01	269.3	287.6	288.7	254.4	260.7	276.4	276.9	272.5	265.7	262.7	257.4	259.1	280.8	283.5	380.3	290.3	368.0	353.2
1/13/91	16:35	269.8	288.1	289.2	254.9	261.2	276.8	274.0	272.8	265.9	262.7	257.6	259.4	281.0	283.7	380.8	290.3	368.4	353.4
1/13/91	17:08	270.1	288.4	289.6	255.2	261.7	276.7	275.1	273.2	266.2	263.4	257.7	259.5	281.1	283.9	381.0	290.8	368.4	353.8
1/13/91	17:41	270.6	288.8	290.1	255.7	262.4	277.1	276.7	273.6	266.5	264.2	258.0	259.8	281.3	284.1	381.3	291.5	369.0	354.3
1/13/91	18:14	270.9	289.2	290.5	256.4	262.9	277.2	276.3	274.0	266.7	263.7	258.2	260.0	281.5	284.2	381.6	292.2	369.1	354.6

Table C-3: Condition 2 String and Casing Heat Flux Data and Steam Data

TEST CASE C, CONDITION 2 HEAT FLUX AND STEAM DATA													
		WATER	STEAM				CASING HEAT FLUX						STRING
DATE	TIME	LB/HR	LB/HR	QUAL	TEMP		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	250FT
1/12/91	18:20	1184.61	7721.83	86.70	419.33		689.83	1047.28	419.57	446.38	436.05	428.52	1578.60
1/12/91	18:53	1353.24	7693.40	85.04	419.44		683.72	1052.61	421.01	448.32	434.80	431.38	1347.81
1/12/91	19:27	1186.99	7732.30	86.69	419.75		679.94	1054.92	423.41	447.08	435.96	433.65	1862.82
1/12/91	20:00	1220.24	7765.55	86.42	420.16		676.71	1060.50	423.99	445.53	436.35	435.47	1945.56
1/12/91	20:33	1320.05	7751.02	85.45	420.24		673.14	1062.80	426.03	446.44	434.31	437.05	1337.20
1/12/91	21:06	1301.49	7743.27	85.61	419.97		668.63	1058.61	423.06	444.43	432.41	439.49	2155.59
1/12/91	21:39	1142.61	7789.85	87.21	420.08		666.56	1050.60	425.17	445.09	429.11	438.85	1649.47
1/12/91	22:13	1217.26	7736.87	86.41	419.74		662.83	1047.11	425.30	444.09	427.00	440.32	-264.60
1/12/91	22:46	425.73	7115.01	94.35	412.62		648.77	1029.83	414.13	433.52	416.14	433.70	-2393.26
1/12/91	23:19	485.18	6490.45	93.04	406.53		614.76	978.99	397.62	417.42	401.47	423.29	-2135.65
1/12/91	23:52	289.31	6550.35	95.77	406.25		606.18	952.84	391.04	411.51	393.04	419.89	-1788.81
1/13/91	0:25	363.77	6454.12	94.66	405.86		602.30	940.33	389.79	409.39	386.88	419.72	-1662.36
1/13/91	0:59	594.42	6390.13	91.49	405.67		600.52	927.72	388.25	410.36	384.92	420.37	-2420.91
1/13/91	1:32	533.95	6470.37	92.38	405.85		598.13	917.67	389.76	408.89	378.41	419.51	-581.77
1/13/91	2:05	410.95	6441.43	94.00	405.50		595.35	906.14	387.30	408.09	375.51	418.22	109.83
1/13/91	2:38	572.49	6439.59	91.84	405.62		592.36	895.50	388.27	407.08	372.90	416.71	-401.22
1/13/91	3:11	428.78	6480.43	93.79	405.54		593.02	883.49	386.46	405.51	367.67	414.03	-2179.27
1/13/91	3:44	311.17	6504.70	95.43	405.43		592.10	872.91	386.81	408.11	366.44	411.84	-2953.77
1/13/91	4:18	345.24	6498.38	94.96	405.62		592.26	860.38	386.85	407.44	358.96	410.14	486.82
1/13/91	4:51	533.15	6419.07	92.33	405.12		593.74	848.73	386.73	406.30	354.81	405.70	1768.33
1/13/91	5:24	259.55	6555.04	96.19	405.71		591.85	838.50	386.46	405.92	352.12	402.61	-259.56

Table C-4: Condition 2 String and Casing Heat Flux Data and Steam Data

TEST CASE C, CONDITION 2 HEAT FLUX AND STEAM DATA													
		WATER	STEAM				CASING HEAT FLUX						STRING
DATE	TIME	LB/HR	LB/HR	QUAL	TEMP		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	250FT
1/13/91	5:57	288.01	6530.30	95.78	405.80		590.96	825.82	385.97	404.65	345.77	398.71	-2356.57
1/13/91	6:30	408.82	6462.28	94.05	405.06		589.63	810.38	383.87	402.12	342.00	393.91	756.92
1/13/91	7:04	586.80	6375.19	91.57	404.97		586.20	797.79	384.80	402.34	338.86	390.27	-150.38
1/13/91	7:37	471.76	6399.52	93.13	404.87		585.87	785.06	382.24	401.39	333.89	383.32	-2558.06
1/13/91	8:10	487.40	6437.85	92.96	405.20		586.77	774.25	384.09	399.96	328.73	381.61	-1133.29
1/13/91	8:43	568.24	6440.86	91.89	405.44		589.60	761.13	385.65	401.47	325.55	377.74	-2254.19
1/13/91	9:16	416.28	6464.66	93.95	405.32		586.48	751.67	384.70	402.76	323.90	372.82	802.71
1/13/91	9:50	332.07	6506.69	95.14	405.28		586.29	742.56	383.45	400.88	317.84	369.32	2369.16
1/13/91	10:23	437.82	6411.99	93.61	405.13		582.60	730.57	381.57	399.99	316.28	366.41	2131.69
1/13/91	11:03	1126.62	7568.37	87.04	417.45		616.89	752.59	402.96	420.02	325.87	375.12	1718.94
1/13/91	11:36	1068.31	7773.48	87.92	419.63		635.47	766.26	412.04	429.03	329.60	382.39	2007.71
1/13/91	12:09	1071.51	7708.06	87.80	419.32		636.96	762.44	415.12	430.25	331.46	384.32	1342.39
1/13/91	12:42	910.47	7774.71	89.52	419.61		638.99	758.30	414.84	429.59	331.41	382.48	1793.69
1/13/91	13:16	886.80	7836.07	89.83	420.28		638.78	748.49	415.89	432.36	335.19	382.50	2228.11
1/13/91	13:49	1031.88	7817.29	88.34	420.60		641.84	744.26	416.13	431.70	332.19	382.51	1567.73
1/13/91	14:22	891.02	7827.66	89.78	420.42		639.49	735.63	415.66	433.88	331.93	380.92	1907.11
1/13/91	14:55	992.64	7761.36	88.66	420.13		636.33	728.41	416.09	432.21	329.84	379.09	1670.37
1/13/91	15:28	1016.40	7776.33	88.44	420.41		637.57	722.11	415.42	433.53	327.07	377.10	1751.62
1/13/91	16:01	1064.44	7753.52	87.93	420.45		634.69	716.97	415.23	434.73	328.67	378.22	1961.13
1/13/91	16:35	950.60	7765.51	89.09	420.26		634.47	710.87	418.27	434.02	327.25	375.74	1910.36
1/13/91	17:08	1022.11	7754.16	88.35	420.41		636.53	707.79	417.25	431.87	329.15	375.74	2227.61
1/13/91	17:41	947.78	7786.17	89.15	420.88		637.90	703.77	418.58	433.82	329.70	377.69	2320.21
1/13/91	18:14	1114.72	7766.28	87.45	421.19		638.07	699.97	418.51	431.87	329.31	376.27	1744.27

Table C-5: Condition 3 String and Casing Temperature Data

TEST CASE C, CONDITION 3 TEMPERATURE DATA																			
		STABLE CASING DATA														STABLE STRING DATA			
DATE	TIME	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT A	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	200FT	250FT	500FT	750FT
1/15/91	6:13	299.2	315.4	320.1	302.9	303.5	265.7	273.1	295.2	277.1	276.8	371.5	370.9	373.3	373.0	403.9	326.5	390.9	383.3
1/15/91	6:46	300.4	316.1	321.0	303.8	304.3	265.0	271.9	295.5	277.9	277.9	373.3	372.9	374.9	374.6	408.7	327.7	394.9	385.9
1/15/91	6:57	301.6	317.3	321.8	304.9	305.3	265.2	273.0	295.6	278.2	277.7	374.4	374.0	375.9	375.6	409.9	329.3	396.5	387.5
1/15/91	7:30	303.6	319.3	323.9	307.1	307.4	264.2	274.8	296.1	279.1	278.8	323.2	326.0	373.9	373.8	410.7	330.7	397.2	386.0
1/15/91	8:03	304.3	320.4	325.0	308.4	308.5	264.2	273.6	297.2	279.9	279.6	304.7	307.1	343.0	343.7	411.1	332.7	397.3	384.6
1/15/91	8:36	304.9	320.9	325.8	309.1	309.4	264.3	277.2	297.3	280.6	280.3	296.8	298.7	330.4	331.2	411.0	333.0	397.3	383.9
1/15/91	9:10	306.0	321.6	326.7	310.0	310.1	264.0	278.7	298.1	281.2	280.9	293.1	295.1	324.4	325.0	411.6	334.0	398.0	384.0
1/15/91	9:43	307.2	322.2	327.3	310.8	310.9	263.9	280.6	299.4	281.7	281.3	291.6	293.4	321.4	321.8	411.9	334.4	398.2	384.0
1/15/91	10:16	308.0	322.7	327.8	311.4	311.5	263.9	277.2	299.5	282.0	281.5	291.0	292.8	319.8	320.2	411.6	334.8	398.2	384.1
1/15/91	10:49	308.6	322.8	328.1	311.9	311.9	263.7	278.3	299.9	282.2	281.6	290.7	292.5	318.9	319.2	411.5	335.1	397.7	383.9
1/15/91	11:22	309.5	323.0	328.3	312.3	312.3	263.4	276.8	300.2	282.4	281.7	290.7	292.4	318.4	318.8	411.0	334.8	397.8	384.0
1/15/91	11:56	310.4	323.4	328.6	312.8	312.7	263.2	276.5	299.9	282.6	281.8	291.0	292.7	318.2	318.6	411.7	335.3	398.1	384.4
1/15/91	12:29	311.1	323.5	328.8	313.1	313.0	263.0	276.5	301.3	282.7	281.9	291.2	292.7	318.1	318.4	411.0	335.6	397.7	383.9
1/15/91	12:54	311.7	323.8	328.9	313.5	313.3	262.8	277.1	301.1	282.7	281.9	291.3	292.9	318.1	318.5	411.5	336.6	397.8	384.0
1/15/91	13:27	311.2	323.6	329.0	313.6	313.4	262.3	274.4	300.3	282.8	282.0	291.4	292.9	318.0	318.5	412.2	336.7	398.5	384.5
1/15/91	14:00	311.2	324.1	329.7	314.5	314.3	262.2	276.6	301.5	283.2	282.1	291.9	293.3	318.3	318.8	412.7	337.2	398.9	384.8
1/15/91	14:33	311.3	324.4	330.1	315.1	314.8	261.9	278.4	302.3	283.3	282.4	292.2	293.7	318.6	319.2	412.9	338.0	398.8	384.9
1/15/91	15:06	311.2	324.0	330.0	315.0	314.7	261.9	279.8	301.6	283.4	282.4	292.3	293.8	318.8	319.3	412.3	338.2	398.4	384.4
1/15/91	15:40	311.5	323.9	330.2	315.3	314.9	261.6	276.9	302.4	283.3	282.4	292.5	293.9	318.9	319.5	411.1	337.4	397.8	384.4
1/15/91	16:13	312.0	323.7	330.2	315.4	315.0	261.3	271.4	302.9	283.4	282.4	292.6	293.9	319.1	319.7	410.8	337.2	397.7	384.3
1/15/91	16:46	312.5	323.7	330.2	315.6	315.3	261.2	277.7	302.1	283.5	282.5	292.7	294.0	319.2	319.9	411.1	337.1	397.8	384.4
1/15/91	17:19	312.6	323.7	330.5	315.8	315.6	261.1	271.2	302.6	283.5	282.5	293.0	294.3	319.4	320.1	411.0	338.0	397.7	384.4
1/15/91	17:53	312.2	323.7	330.6	316.1	315.8	261.3	278.4	302.9	283.6	282.6	293.2	294.5	319.5	320.4	411.2	337.8	397.8	384.5

Table C-6: Condition 3 String and Casing Temperature Data

TEST CASE C, CONDITION 3 TEMPERATURE DATA																			
		STABLE CASING DATA														STABLE STRING DATA			
DATE	TIME	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT A	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	200FT	250FT	500FT	750FT
1/15/91	18:26	311.6	323.7	330.8	316.3	316.0	266.9	282.6	303.1	283.7	282.6	293.4	294.5	319.5	320.4	410.9	338.5	397.5	384.3
1/15/91	18:59	311.4	323.8	330.9	316.5	316.2	276.4	282.7	303.5	283.7	282.8	293.5	294.6	319.6	320.5	410.9	338.5	397.5	384.2
1/15/91	19:32	311.2	323.9	331.1	316.7	316.5	278.4	282.1	303.7	283.9	282.8	293.6	294.8	319.8	320.7	411.0	338.8	397.8	384.4
1/15/91	20:05	311.2	323.8	331.3	316.9	316.8	281.7	279.8	303.8	283.8	282.8	293.8	295.0	319.9	320.8	411.1	339.5	397.6	384.3
1/15/91	20:39	311.3	323.9	331.3	317.2	316.8	283.6	281.1	303.8	283.9	282.9	294.0	295.0	320.0	320.9	411.3	339.0	397.6	384.4
1/15/91	21:12	311.2	324.0	331.5	317.3	317.1	284.7	282.5	303.7	284.1	283.0	294.0	295.1	320.1	321.1	411.2	339.0	397.6	384.4
1/15/91	21:45	311.6	324.1	331.8	317.6	317.4	284.7	292.0	303.5	284.2	283.1	294.2	295.1	320.3	321.4	411.5	339.7	398.0	384.6
1/15/91	22:18	312.0	324.4	332.1	317.8	317.8	283.8	291.3	303.5	284.2	283.3	294.3	295.3	320.5	321.5	411.5	340.5	397.9	384.5
1/15/91	22:51	312.0	324.0	332.0	317.6	317.6	284.2	292.2	303.3	284.2	283.3	294.2	295.1	320.5	321.5	409.7	338.9	396.6	383.9
1/15/91	23:24	312.2	323.8	331.8	317.4	317.4	284.5	293.5	303.3	284.2	283.3	294.1	295.0	320.5	321.5	409.6	339.4	396.4	383.8
1/15/91	23:58	312.5	323.9	331.7	317.5	317.4	284.9	294.3	303.1	284.2	283.4	294.2	295.1	320.6	321.6	409.8	339.7	396.5	383.8
1/16/91	0:31	312.7	324.0	331.8	317.5	317.6	285.7	294.4	303.0	284.2	283.3	294.2	295.1	320.7	321.7	409.8	340.0	396.5	383.9
1/16/91	1:04	313.1	324.0	332.0	317.7	317.9	285.4	295.4	302.8	284.3	283.4	294.3	295.2	320.9	321.9	409.9	339.8	396.3	383.9
1/16/91	1:37	313.6	324.2	332.1	317.9	317.9	287.3	296.4	302.8	284.2	283.5	294.4	295.3	321.0	322.1	409.9	340.5	396.6	383.9
1/16/91	2:10	313.9	324.3	332.2	318.0	318.1	287.7	297.3	302.7	284.3	283.5	294.5	295.3	321.1	322.1	410.1	340.1	396.5	383.7
1/16/91	2:44	314.3	324.4	332.3	318.1	318.3	288.0	298.2	302.7	284.4	283.6	294.4	295.4	321.1	322.2	410.2	340.8	396.5	383.8
1/16/91	3:17	314.6	324.5	332.5	318.2	318.5	287.9	298.7	302.7	284.4	283.7	294.5	295.4	321.3	322.4	409.8	340.6	396.5	383.9
1/16/91	3:50	314.8	324.6	332.6	318.5	318.7	288.3	299.3	302.6	284.5	283.7	294.6	295.5	321.4	322.4	410.2	340.2	396.4	383.8
1/16/91	4:23	315.1	324.7	332.8	318.6	318.8	289.3	300.1	302.5	284.6	283.8	294.8	295.7	321.5	322.5	410.2	340.6	396.5	383.7
1/16/91	4:56	315.3	324.8	333.0	318.7	319.0	290.0	300.6	302.5	284.6	283.9	294.8	295.7	321.6	322.7	410.1	340.8	396.5	383.7
1/16/91	5:30	315.5	324.8	333.1	318.8	319.1	289.9	300.0	302.5	284.7	284.0	294.8	295.7	321.8	322.8	409.9	341.1	396.5	383.7
1/16/91	6:03	315.8	324.9	333.2	318.9	319.3	290.7	300.8	302.5	284.8	284.1	294.9	295.7	321.8	322.9	410.5	340.9	396.5	383.8

Table C-7: Condition 3 String and Casing Heat Flux Data and Steam Data

TEST CASE C, CONDITION 3 HEAT FLUX AND STEAM DATA													
		WATER	STEAM				CASING HEAT FLUX						STRING
DATE	TIME	LB/HR	LB/HR	QUAL	TEMP		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	250FT
1/15/91	6:13	2070.88	10066.62	82.94	445.66		756.52	617.74	454.83	469.81	1385.80	1287.36	1802.59
1/15/91	6:46	2231.98	11188.61	83.37	453.20		776.33	633.71	462.17	490.35	1403.49	1295.66	1993.01
1/15/91	6:57	2310.88	11462.21	83.22	455.12		788.94	649.82	465.69	495.13	1407.05	1295.79	1607.55
1/15/91	7:30	2260.03	11540.55	83.62	455.72		799.31	656.69	469.34	505.88	798.05	713.67	2255.71
1/15/91	8:03	2172.30	11477.86	84.09	455.52		802.56	655.42	478.25	506.54	654.29	600.20	1837.55
1/15/91	8:36	2077.76	11423.35	84.61	455.22		804.33	653.19	476.09	504.01	617.98	573.35	1882.91
1/15/91	9:10	2200.70	11495.11	83.93	456.05		806.94	653.44	484.23	508.05	611.97	573.45	2016.77
1/15/91	9:43	2100.76	11511.58	84.57	456.12		807.48	654.14	501.91	505.65	616.77	577.51	1918.94
1/15/91	10:16	2195.40	11376.81	83.82	455.73		805.02	647.45	492.45	514.46	621.14	581.89	2163.67
1/15/91	10:49	2336.68	11240.74	82.79	455.36		803.19	640.87	500.99	513.59	623.10	582.20	1979.14
1/15/91	11:22	2377.89	11196.67	82.48	455.21		798.82	638.53	500.37	510.97	628.68	587.38	2177.89
1/15/91	11:56	2333.41	11225.73	82.79	455.48		799.58	637.73	490.50	511.18	633.35	589.56	2247.41
1/15/91	12:29	2352.32	11092.20	82.50	454.58		793.34	630.95	509.57	511.29	633.18	586.73	1878.26
1/15/91	12:54	2186.04	11167.39	83.63	454.72		793.56	629.65	496.66	508.70	634.81	589.05	2009.64
1/15/91	13:27	2090.64	11351.52	84.45	455.64		790.34	626.05	486.40	503.02	632.27	588.61	2259.83
1/15/91	14:00	2083.15	11437.25	84.59	456.09		795.50	632.28	506.54	510.95	640.93	592.65	1711.85
1/15/91	14:33	2073.03	11429.47	84.65	455.91		791.40	630.61	508.59	508.69	641.96	595.38	1992.40
1/15/91	15:06	2275.19	10924.75	82.76	453.07		782.38	624.32	491.06	508.47	638.87	592.90	1736.97
1/15/91	15:40	2391.24	10952.03	82.08	453.83		780.75	614.22	501.81	503.67	639.60	593.13	2223.94
1/15/91	16:13	2366.12	10924.68	82.20	453.69		776.52	613.26	507.03	504.89	638.58	592.02	1690.26
1/15/91	16:46	2433.38	10898.03	81.75	453.71		770.28	609.89	491.32	500.85	638.93	592.74	1382.84
1/15/91	17:19	2447.91	10881.47	81.64	453.76		771.17	607.92	499.00	498.52	641.35	590.52	1670.38
1/15/91	17:53	2393.05	10897.43	81.99	453.71		766.49	608.63	501.46	496.16	641.22	591.52	922.15

Table C-8: Condition 3 String and Casing Heat Flux Data and Steam Data

TEST CASE C, CONDITION 3 HEAT FLUX AND STEAM DATA													
		WATER	STEAM				CASING HEAT FLUX						STRING
DATE	TIME	LB/HR	LB/HR	QUAL	TEMP		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B	250FT
1/15/91	18:26	2305.20	10890.58	82.53	453.42		763.63	602.35	501.12	494.00	641.31	587.99	1906.72
1/15/91	18:59	2387.15	10885.34	82.01	453.49		761.21	600.60	506.48	497.91	640.04	586.79	1955.45
1/15/91	19:32	2343.69	10841.78	82.23	453.34		757.52	599.68	508.36	495.39	639.95	583.41	1517.76
1/15/91	20:05	2327.73	10845.43	82.33	453.22		754.35	595.49	508.03	496.25	639.95	582.21	1574.11
1/15/91	20:39	2407.71	10831.25	81.81	453.23		752.18	593.21	510.64	497.04	635.28	581.86	2197.84
1/15/91	21:12	2424.71	10850.86	81.74	453.37		750.08	592.60	510.28	491.05	637.09	579.94	2237.33
1/15/91	21:45	2399.30	10908.38	81.97	453.79		748.27	594.06	509.05	494.78	637.28	581.89	1850.44
1/15/91	22:18	2346.22	10965.04	82.37	454.11		746.68	590.77	509.52	486.87	637.14	581.54	2203.21
1/15/91	22:51	2708.06	10490.13	79.48	451.98		737.73	580.99	508.69	485.40	633.93	577.63	1783.41
1/15/91	23:24	2720.18	10427.41	79.31	451.64		733.27	576.17	512.06	480.85	632.37	575.29	2141.06
1/15/91	23:58	2492.80	10517.89	80.84	451.76		728.61	575.37	513.81	479.34	634.28	576.69	1720.74
1/16/91	0:31	2620.62	10494.77	80.02	451.84		726.60	572.63	512.18	475.47	635.35	577.34	1517.63
1/16/91	1:04	2655.93	10482.65	79.79	451.89		723.43	574.67	511.93	471.72	634.65	576.38	2000.73
1/16/91	1:37	2669.29	10521.67	79.76	452.02		723.80	573.19	515.23	466.26	637.80	575.44	1611.49
1/16/91	2:10	2750.29	10514.47	79.27	452.05		720.46	570.16	515.21	458.57	637.28	575.94	1483.37
1/16/91	2:44	2711.26	10534.58	79.53	452.00		718.30	571.59	518.04	456.89	637.81	575.93	1884.31
1/16/91	3:17	2702.79	10530.90	79.58	452.09		715.11	568.98	520.62	457.20	638.01	575.61	2302.56
1/16/91	3:50	2726.52	10495.75	79.38	451.91		711.33	564.53	520.06	452.39	638.34	575.47	1940.11
1/16/91	4:23	2754.51	10513.58	79.24	452.01		710.14	566.25	521.56	450.63	640.91	575.29	1812.88
1/16/91	4:56	2713.13	10522.34	79.50	451.99		710.01	564.14	523.67	451.50	639.65	575.84	2104.34
1/16/91	5:30	2736.87	10489.28	79.31	451.83		706.52	563.35	526.99	452.02	641.11	572.95	1403.20
1/16/91	6:03	2798.67	10481.44	78.93	451.94		703.10	562.42	528.78	451.46	640.66	632.45	1114.69

TEST CASE D DATA

APPENDIX D: REDUCED DATA FOR CENTRALIZED BARE TUBING WITH SEALED ANNULUS WITHOUT PACKER

FIGURES

Figure D-1: Layout of Tubular and Casing Sensors

Figure D-2 & D-3: Relationships between Sensor Locations

GRAPHS

Graph D-1: Casing Side A Temperature Vs. Time

Graph D-2: Casing Side B Temperature vs. Time

Graph D-3: Casing Heat Flux vs. Time

Graph D-4: Tubing String Temperature vs. Time

Graph D-5: Steam Mass Flow vs. Time

Graph D-6: Steam Quality vs. Time

Graph D-7: Steam Temperature vs. Time

TABLES

Table D-1 & D-2: Condition 2 String and Casing Temperature Data

Table D-3 & D-4: Condition 2 String and Casing Heat Flux Data and Steam Data

Table D-5 & D-6: Condition 3 String and Casing Temperature Data

Table D-7 & D-8: Condition 3 String and Casing Heat Flux Data and Steam Data

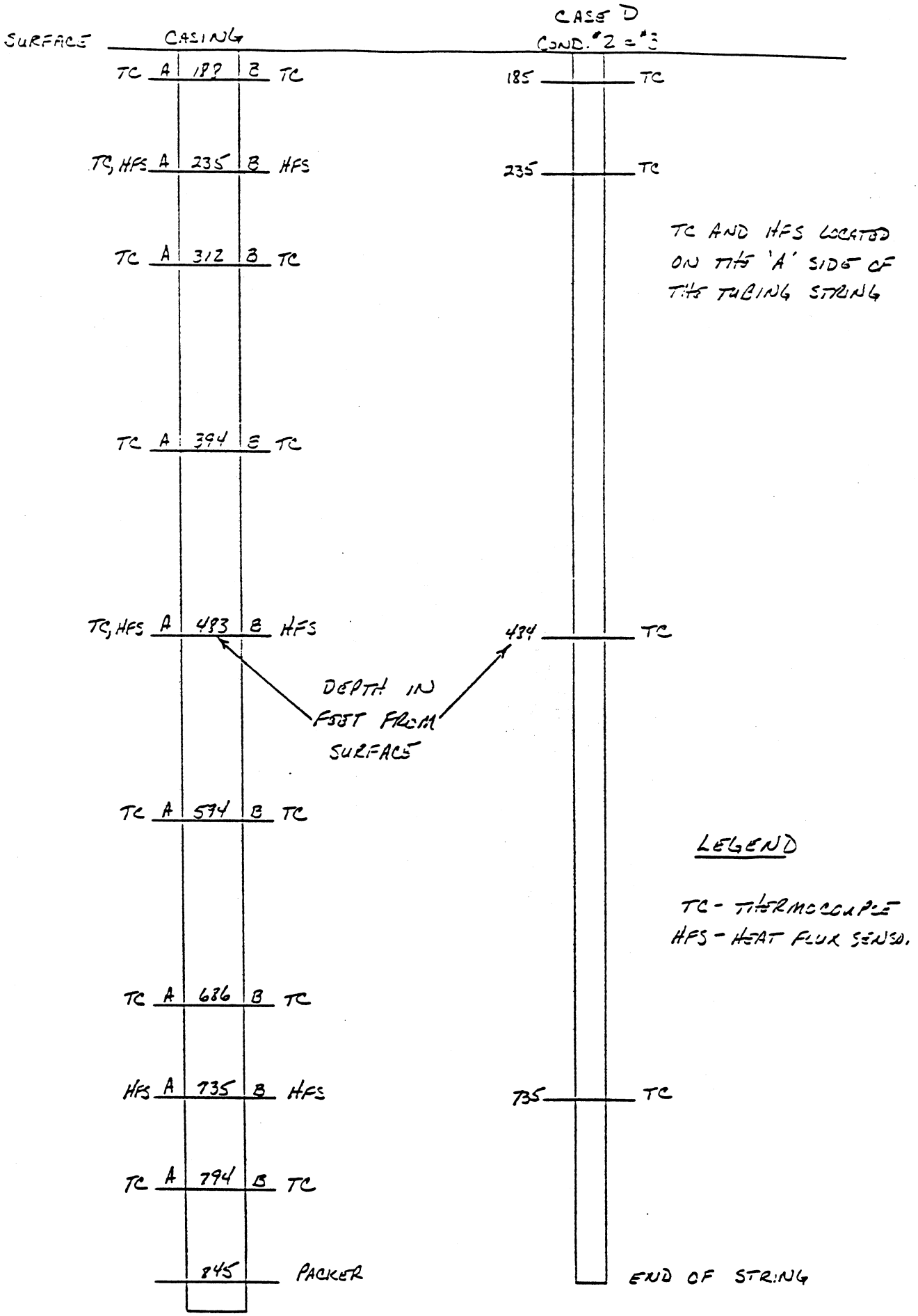


FIGURE D-1: LAYOUT OF TUBULAR AND CASING SENSORS

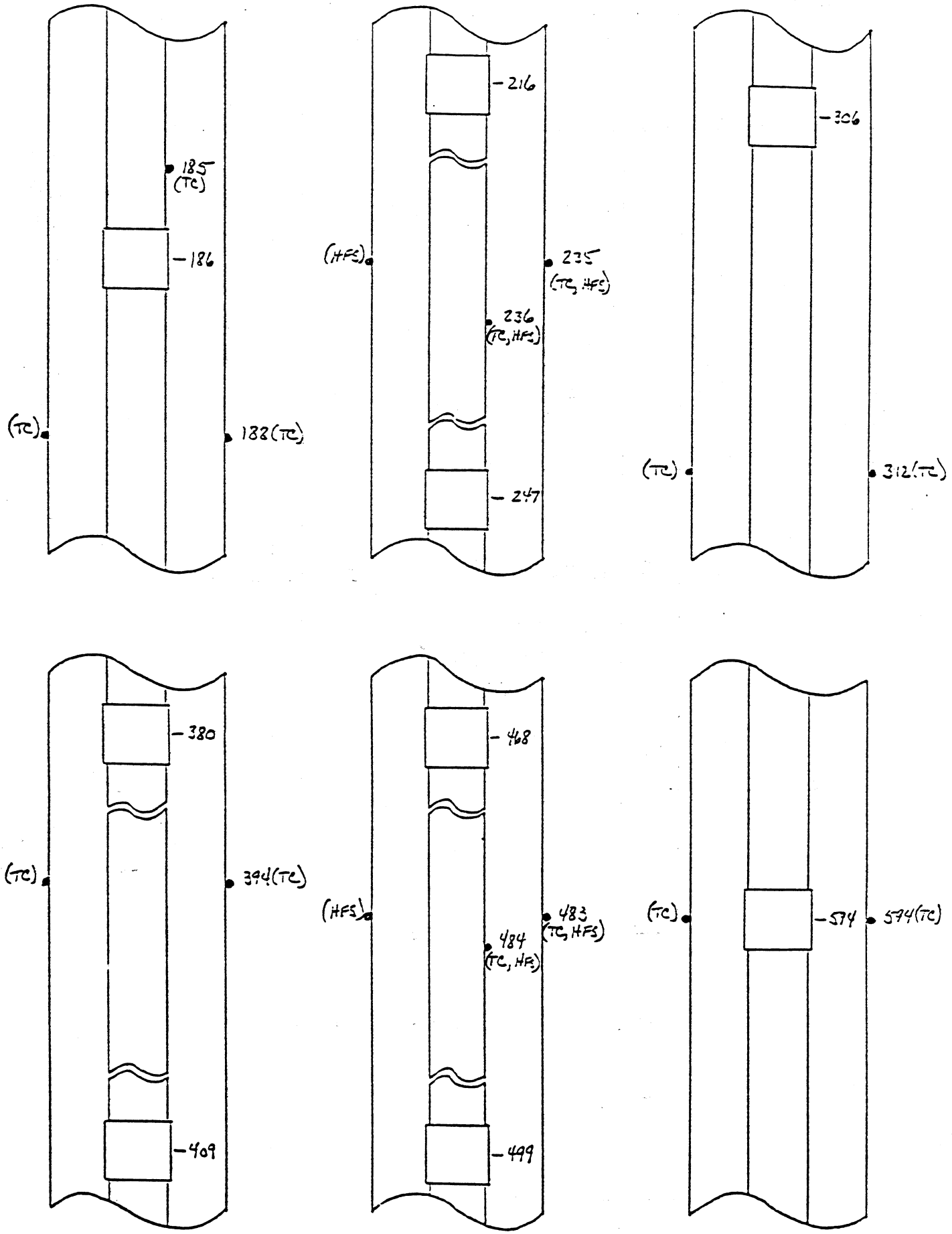


FIGURE D-2: RELATIONSHIP BETWEEN SENSOR LOCATION

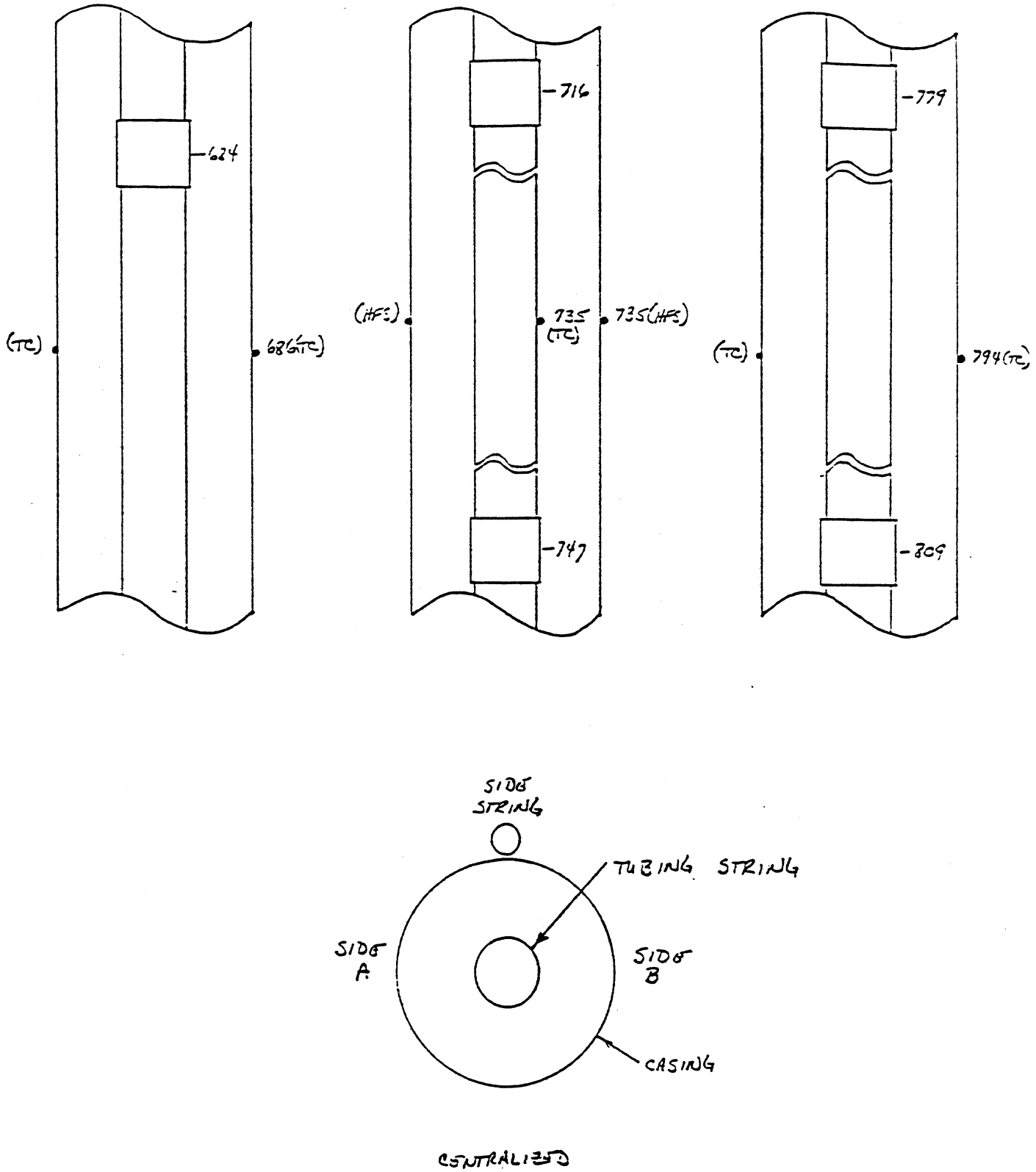
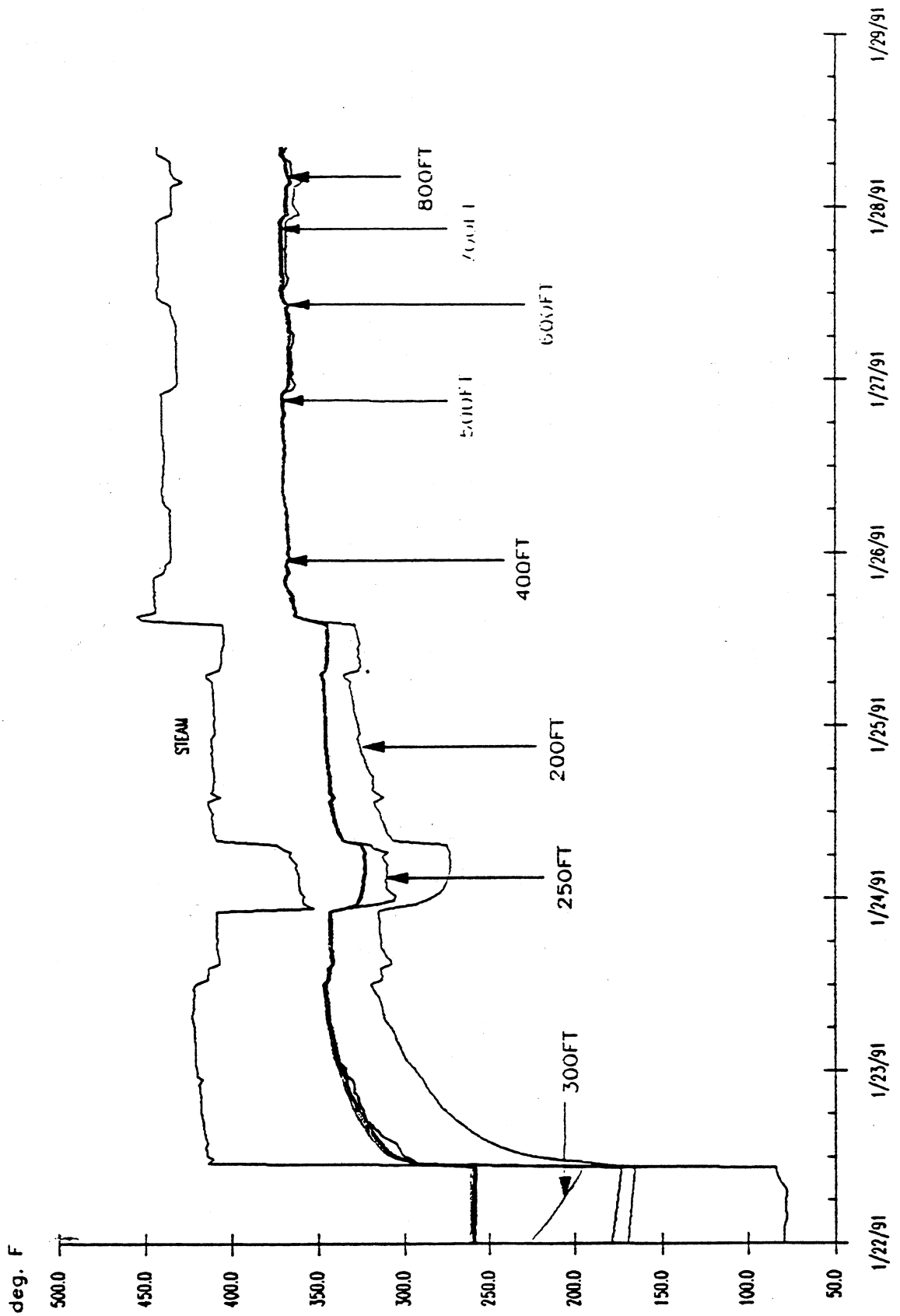
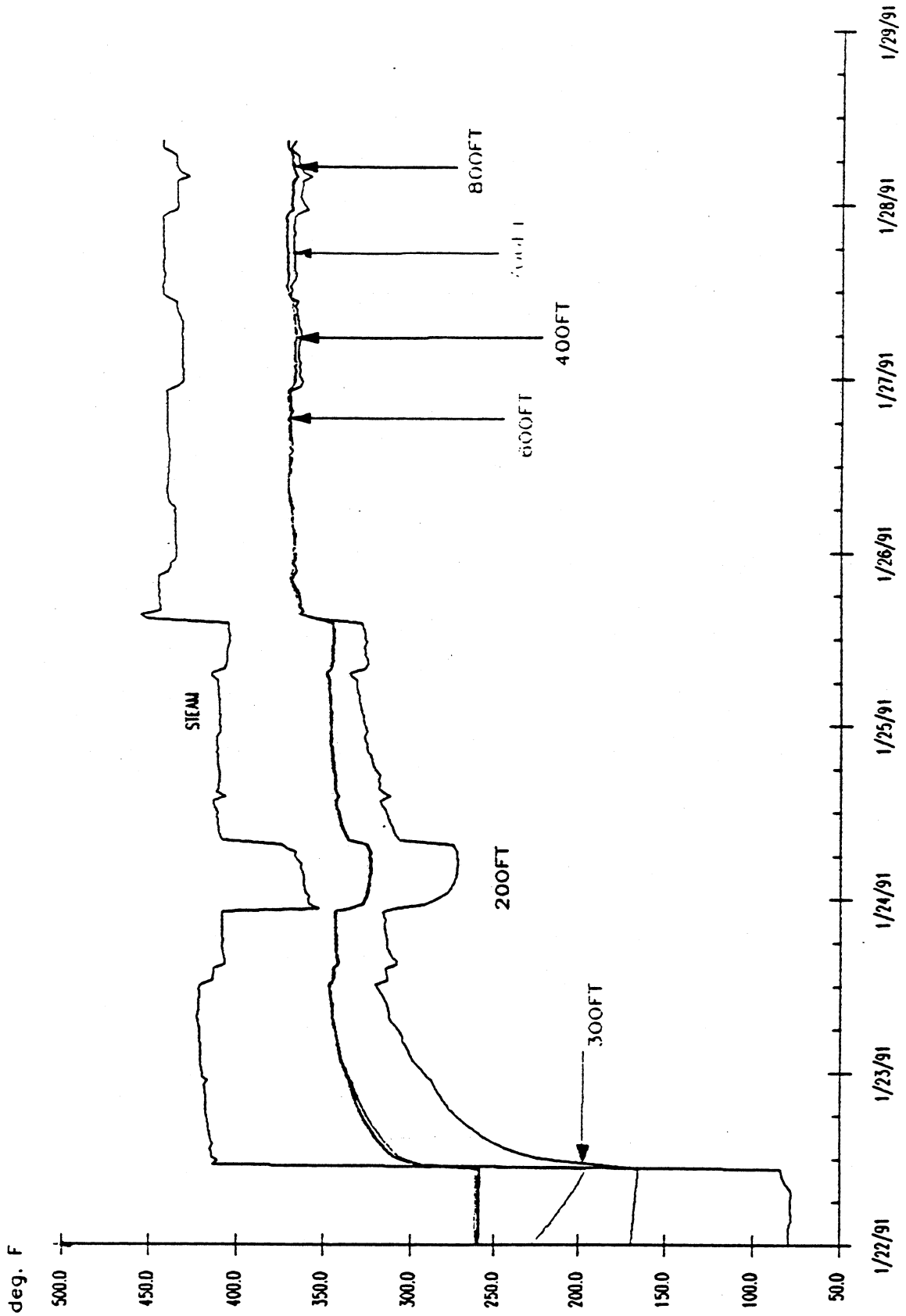


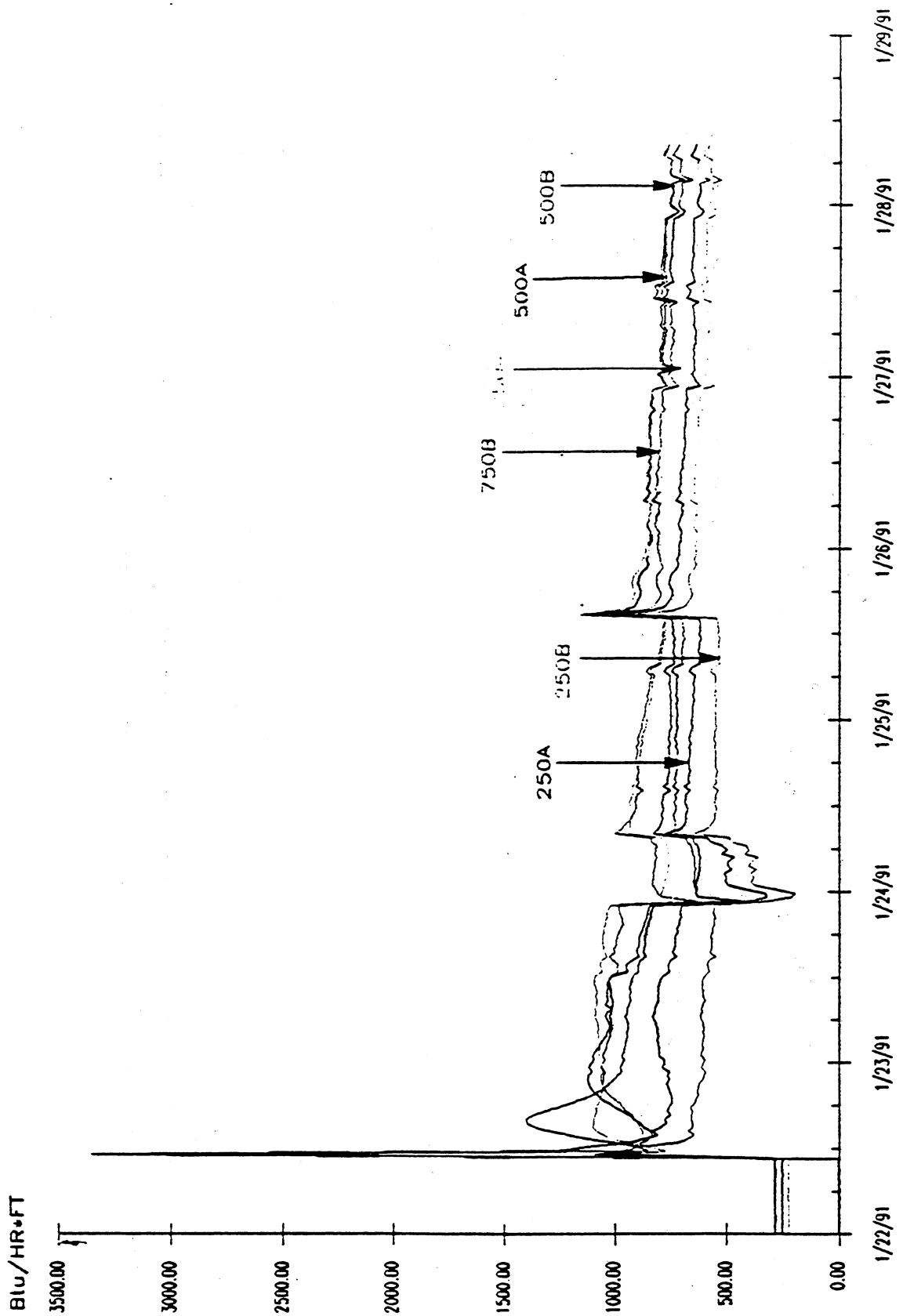
FIGURE D-3: RELATIONSHIP BETWEEN SENSOR LOCATION



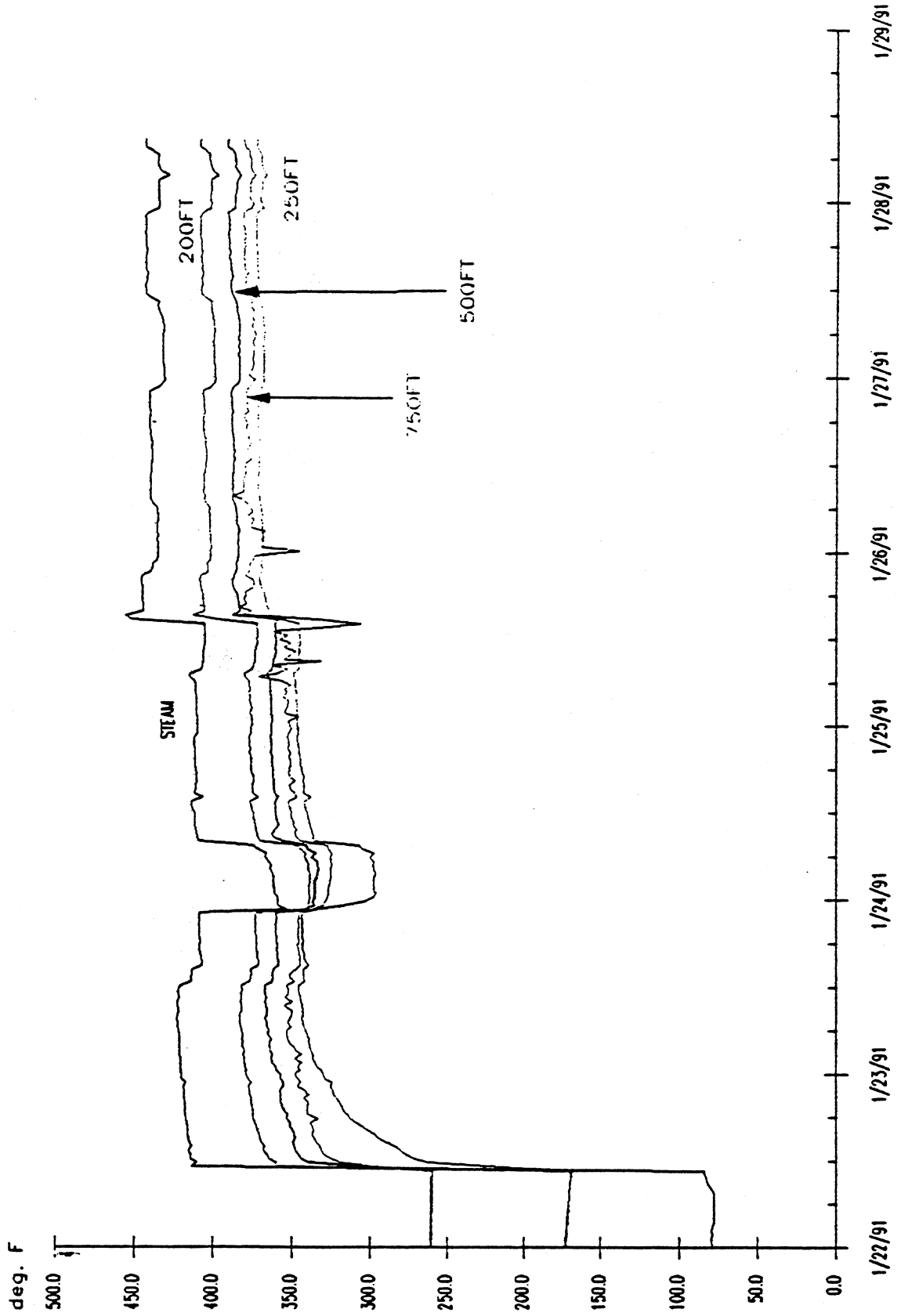
GRAPH D-1: CASING SIDE A TEMPERATURE VS. TIME



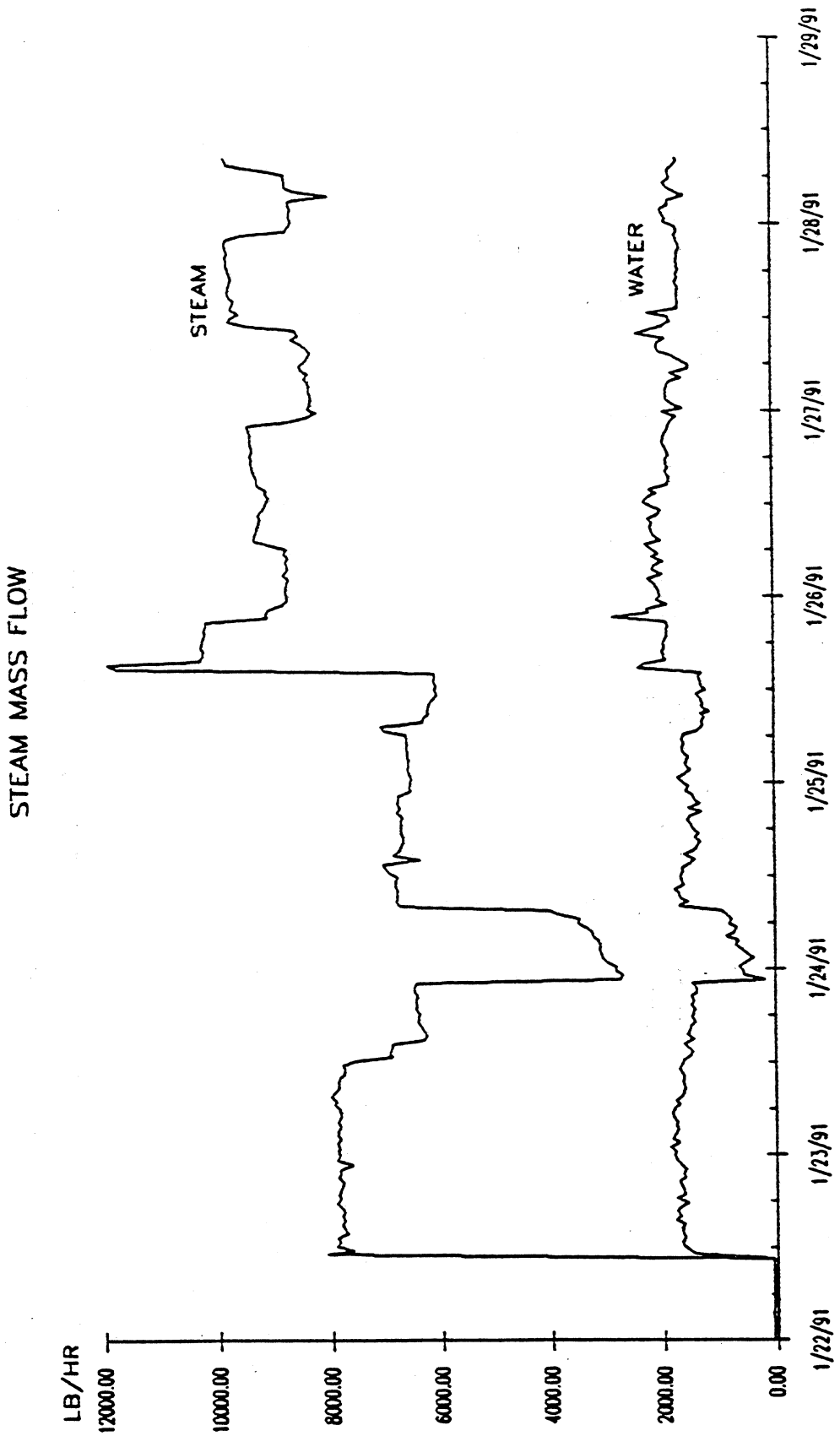
GRAPH D-2: CASING SIDE B TEMPERATURE VS. TIME



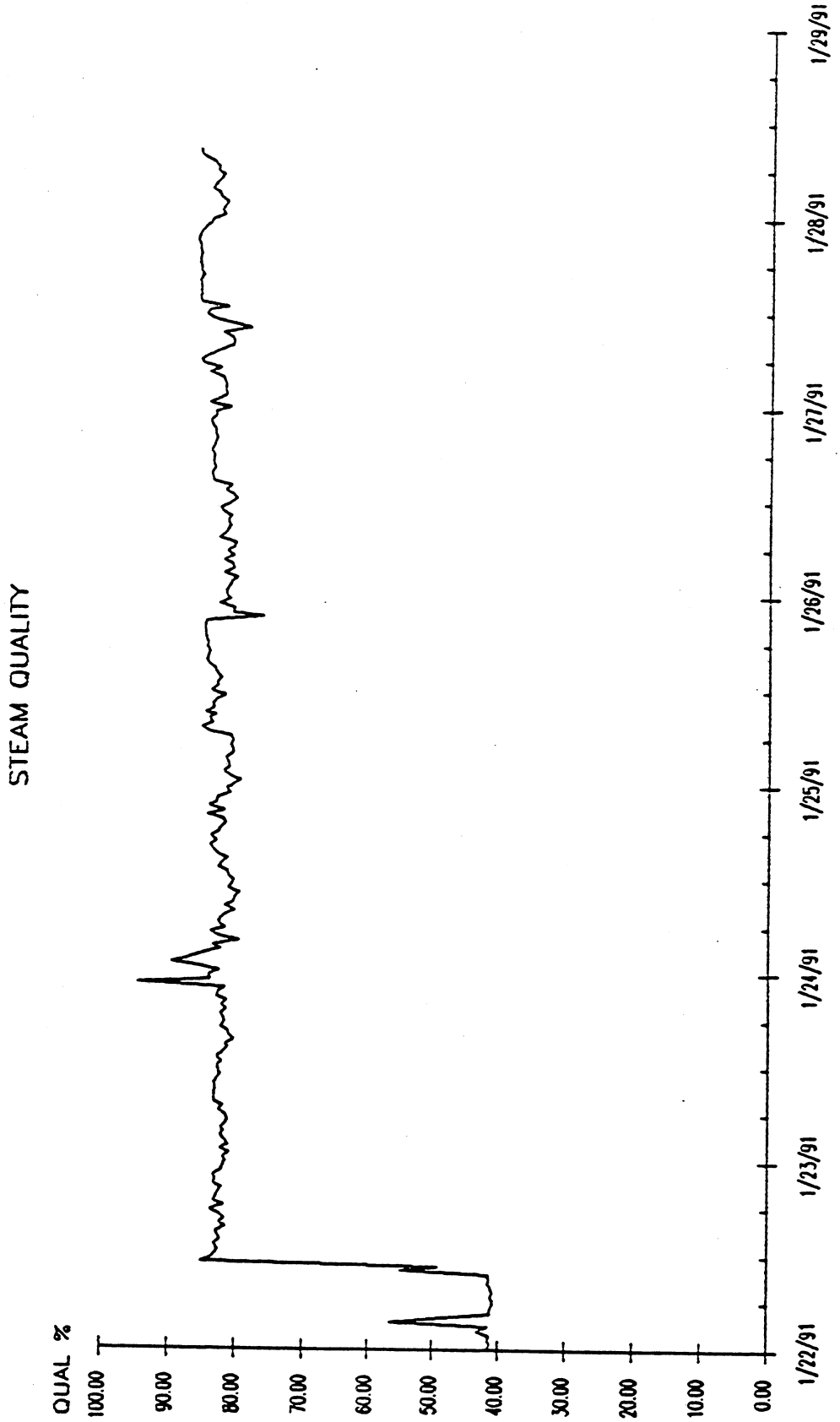
GRAPH D-3: CASING HEAT FLUX VS. TIME



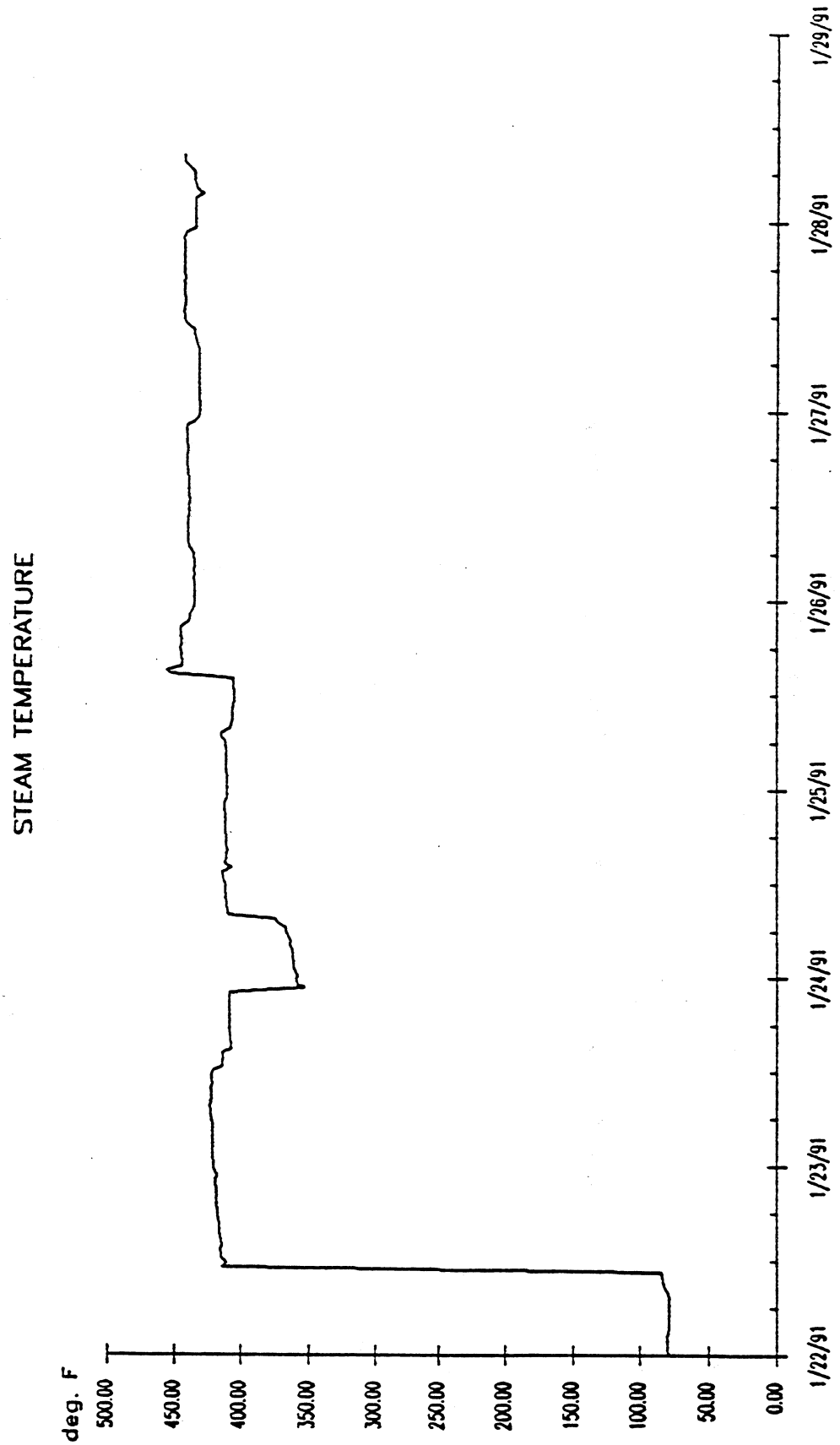
GRAPH D-4: TUBING STRING TEMPERATURE VS. TIME



GRAPH D-5: STEAM MASS FLOW VS. TIME



GRAPH D-6:STEAM QUALITY VS. TIME



GRAPH D-7: STEAM TEMPERATURE VS. TIME

Table D-1: Condition 2 String and Casing Temperature Data

TEST CASE D, CONDITION 2 TEMPERATURE DATA																			
		STABLE CASING DATA														STABLE STRING DATA			
DATE	TIME	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT A	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	200FT	250FT	500FT	750FT
1/24/91	12:27	314.4	314.5	341.8	340.2	340.6	340.9	341.3	341.1	340.0	341.3	340.7	340.9	341.6	341.5	373.8	339.8	358.7	349.5
1/24/91	13:00	315.7	316.0	342.3	340.7	341.0	341.4	341.8	341.6	340.5	341.8	341.2	341.3	342.1	342.0	374.5	340.2	358.9	350.2
1/24/91	13:34	316.5	316.7	342.7	341.0	341.4	341.7	342.1	342.0	340.9	342.1	341.5	341.6	342.4	342.4	374.8	340.6	359.1	350.3
1/24/91	14:07	311.1	311.6	340.5	339.2	339.6	339.9	340.3	340.1	339.1	340.3	339.7	339.8	340.6	340.6	370.1	336.5	357.2	345.7
1/24/91	14:40	315.0	315.1	342.6	340.9	341.2	341.5	341.9	341.8	340.7	342.0	341.3	341.5	342.2	342.2	373.5	341.2	359.4	346.5
1/24/91	15:13	317.3	317.4	342.8	341.2	341.5	341.9	342.2	342.1	341.0	342.3	341.6	341.8	342.6	342.5	373.4	340.6	360.1	349.3
1/24/91	15:46	316.9	317.3	342.9	341.3	341.6	342.0	342.3	342.1	341.1	342.4	341.7	341.9	342.6	342.6	373.4	340.9	360.1	349.8
1/24/91	16:20	317.4	317.6	342.9	341.4	341.8	342.1	342.5	342.2	341.3	342.5	341.9	342.0	342.8	342.7	372.9	341.0	360.3	346.8
1/24/91	16:53	316.9	317.2	342.8	341.3	341.7	342.0	342.4	342.1	341.2	342.5	341.8	341.9	342.7	342.6	373.0	340.8	360.4	349.9
1/24/91	17:26	318.3	318.4	343.2	341.8	342.2	342.5	342.9	342.5	341.7	343.0	342.3	342.4	343.2	343.1	373.8	341.8	360.6	350.4
1/24/91	17:59	319.5	320.1	343.6	342.2	342.5	342.9	343.3	342.9	342.0	343.3	342.6	342.8	343.5	343.5	374.3	342.5	360.6	350.0
1/24/91	18:32	320.6	321.1	343.9	342.6	342.9	343.3	343.6	343.2	342.4	343.6	343.0	343.2	343.8	343.8	374.2	343.1	360.8	349.6
1/24/91	19:06	321.5	321.7	344.1	342.8	343.1	343.5	343.8	343.4	342.6	343.9	343.2	343.4	344.1	344.0	374.4	343.2	361.0	349.4
1/24/91	19:39	322.0	322.2	344.2	342.9	343.2	343.6	344.0	343.5	342.7	344.0	343.3	343.5	344.2	344.2	374.6	343.3	361.2	350.6
1/24/91	20:12	323.3	323.8	344.6	343.4	343.7	344.1	344.4	344.0	343.2	344.4	343.7	343.9	344.6	344.6	375.3	344.2	362.0	349.6
1/24/91	20:45	323.9	324.2	344.7	343.5	343.8	344.2	344.5	344.1	343.3	344.6	343.9	344.1	344.7	344.7	374.9	344.2	361.6	350.9
1/24/91	21:18	324.2	324.5	344.9	343.7	344.0	344.4	344.7	344.3	343.5	344.8	344.1	344.3	344.9	344.9	375.4	344.6	361.8	350.3
1/24/91	21:51	325.5	325.5	345.2	344.0	344.3	344.7	345.0	344.6	343.8	345.1	344.4	344.6	345.2	345.2	375.4	345.0	361.8	350.3
1/24/91	22:25	325.7	326.0	345.2	344.1	344.4	344.8	345.1	344.7	343.9	345.1	344.5	344.6	345.3	345.3	375.7	344.9	361.9	351.5
1/24/91	22:58	324.5	324.5	344.8	343.7	344.0	344.4	344.7	344.3	343.5	344.8	344.1	344.3	344.9	344.9	374.3	344.4	361.4	350.2
1/24/91	23:31	324.9	324.9	344.8	343.7	344.0	344.4	344.7	344.3	343.5	344.8	344.1	344.2	344.9	344.9	374.2	344.6	361.4	348.8
1/25/91	0:04	325.4	325.8	344.9	343.8	344.1	344.5	344.8	344.4	343.6	344.8	344.1	344.3	345.0	344.9	374.1	344.8	361.6	349.7

Table D-2: Condition 2 String and Casing Temperature Data

TEST CASE D, CONDITION 2 TEMPERATURE DATA																			
		STABLE CASING DATA														STABLE STRING DATA			
DATE	TIME	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT A	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	200FT	250FT	500FT	750FT
1/25/91	0:37	325.8	326.1	345.0	343.9	344.2	344.6	344.9	344.4	343.7	344.9	344.2	344.4	345.1	345.0	374.1	344.8	361.3	350.8
1/25/91	1:11	326.1	326.4	345.0	343.9	344.2	344.6	344.9	344.5	343.7	344.9	344.3	344.4	345.1	345.1	374.2	345.0	361.3	344.6
1/25/91	1:44	327.3	327.4	345.2	344.1	344.4	344.8	345.1	344.6	343.9	345.1	344.4	344.6	345.3	345.2	374.8	345.2	361.5	352.9
1/25/91	2:17	327.6	327.8	345.3	344.2	344.5	344.9	345.2	344.8	344.0	345.2	344.6	344.7	345.4	345.3	374.1	345.4	361.5	351.8
1/25/91	2:50	327.8	328.1	345.3	344.2	344.5	344.9	345.2	344.7	344.1	345.3	344.6	344.7	345.4	345.4	374.7	345.3	361.7	351.2
1/25/91	3:23	328.4	328.5	345.5	344.4	344.7	345.1	345.4	344.9	344.2	345.4	344.8	344.9	345.6	345.5	374.8	345.6	361.8	350.6
1/25/91	3:56	328.9	328.9	345.5	344.5	344.7	345.1	345.5	345.0	344.3	345.5	344.8	345.0	345.6	345.6	374.7	345.6	361.8	353.9
1/25/91	4:30	329.4	329.5	345.7	344.7	344.9	345.3	345.6	345.2	344.5	345.7	345.0	345.1	345.8	345.8	375.3	345.8	362.1	351.4
1/25/91	5:03	329.9	330.0	345.9	344.8	345.1	345.5	345.8	345.3	344.6	345.8	345.2	345.3	346.0	345.9	374.9	346.1	362.1	353.2
1/25/91	5:36	330.1	330.2	345.9	344.9	345.2	345.6	345.9	345.4	344.7	345.9	345.2	345.4	346.1	346.0	375.5	346.1	362.4	349.6
1/25/91	6:09	329.9	330.3	345.9	344.9	345.2	345.6	345.9	345.4	344.8	345.9	345.3	345.4	346.1	346.0	375.7	346.1	362.1	355.3
1/25/91	6:42	333.0	333.5	347.0	345.9	346.2	346.6	346.9	346.4	345.8	347.0	346.3	346.4	347.1	347.0	378.0	347.5	363.6	369.8
1/25/91	7:16	333.3	333.9	347.3	346.3	346.6	347.0	347.3	346.8	346.2	347.3	346.6	346.8	347.5	347.4	378.6	347.7	364.2	358.0
1/25/91	7:49	324.9	325.2	344.6	343.7	344.0	344.4	344.7	344.2	343.6	344.7	344.0	344.2	344.9	344.8	373.4	343.9	361.0	351.3
1/25/91	8:22	324.1	324.2	344.4	343.3	343.6	343.9	344.3	343.8	343.2	344.3	343.6	343.8	344.5	344.4	372.6	344.0	360.4	360.8
1/25/91	8:55	324.2	324.2	344.1	343.0	343.3	343.6	344.0	343.6	342.9	343.9	343.3	343.4	344.2	344.1	371.9	343.2	359.7	329.9
1/25/91	9:08	324.0	324.2	344.2	343.0	343.2	343.6	343.9	343.6	342.8	343.9	343.3	343.4	344.2	344.1	371.9	343.7	359.8	353.4
1/25/91	9:41	325.2	325.3	344.2	343.0	343.2	343.6	343.9	343.6	342.9	343.9	343.3	343.4	344.2	344.1	371.8	343.8	359.1	349.8
1/25/91	10:15	325.0	325.2	344.1	342.9	343.1	343.5	343.8	343.5	342.8	343.8	343.3	343.3	344.1	344.0	371.6	343.5	358.6	346.0
1/25/91	10:48	325.4	325.6	344.1	342.8	343.1	343.5	343.8	343.4	342.8	343.8	343.2	343.3	344.1	344.0	371.3	343.7	358.9	353.2
1/25/91	11:21	324.6	324.7	343.8	342.5	342.8	343.1	343.5	343.1	342.5	343.5	342.9	343.0	343.7	343.7	370.3	343.1	358.2	349.3
1/25/91	11:54	325.1	325.2	343.9	342.5	342.8	343.1	343.6	343.2	342.5	343.6	343.0	343.0	343.8	343.7	370.6	343.4	358.4	355.5

Table D-3: Condition 2 String and Casing Heat Flux Data and Steam Data

TEST CASE D, CONDITION 2 HEAT FLUX AND STEAM DATA												
		WATER	STEAM				CASING HEAT FLUX					
DATE	TIME	LB/HR	LB/HR	QUAL	TEMP		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B
1/24/91	12:27	1622.75	6904.35	80.97	411.68		684.31	550.46	765.16	901.81	927.02	731.30
1/24/91	13:00	1607.77	6988.67	81.30	412.44		679.24	546.93	760.15	896.82	919.88	723.77
1/24/91	13:34	1490.39	7028.97	82.51	412.61		679.59	547.31	777.53	895.91	917.59	726.96
1/24/91	14:07	1408.09	6355.23	81.86	405.65		661.81	533.30	749.98	869.75	891.88	712.20
1/24/91	14:40	1588.23	6828.20	81.13	410.90		688.82	558.36	776.54	898.65	915.18	738.50
1/24/91	15:13	1398.06	6710.15	82.76	409.84		667.66	540.52	760.66	886.21	899.54	722.85
1/24/91	15:46	1358.72	6703.08	83.15	409.69		670.75	544.26	761.07	889.18	899.12	725.00
1/24/91	16:20	1297.68	6643.72	83.66	409.04		666.74	541.64	757.39	889.58	893.62	720.95
1/24/91	16:53	1383.85	6648.92	82.77	409.25		663.23	540.10	752.90	888.57	887.47	718.47
1/24/91	17:26	1319.96	6672.59	83.49	409.36		666.30	544.16	755.44	894.69	887.86	712.91
1/24/91	17:59	1423.95	6684.90	82.44	409.84		667.90	546.39	756.31	897.10	886.51	717.85
1/24/91	18:32	1468.53	6683.76	81.99	410.05		666.83	546.79	754.94	897.49	884.08	719.61
1/24/91	19:06	1523.79	6675.73	81.42	410.15		663.17	544.73	752.36	894.11	879.23	713.90
1/24/91	19:39	1483.95	6671.10	81.80	410.06		661.47	544.22	751.01	891.80	875.83	714.54
1/24/91	20:12	1279.85	6757.01	84.08	410.36		667.26	551.21	756.93	896.44	878.90	721.70
1/24/91	20:45	1497.30	6690.36	81.71	410.35		659.71	544.82	750.15	887.04	869.75	716.55
1/24/91	21:18	1311.58	6752.92	83.74	410.60		665.51	551.74	756.17	889.63	873.19	724.95
1/24/91	21:51	1412.72	6735.18	82.66	410.74		662.51	550.34	753.30	885.89	868.70	722.15
1/24/91	22:25	1417.26	6730.33	82.61	410.75		659.52	548.51	750.42	881.03	863.46	720.15
1/24/91	22:58	1554.06	6505.43	80.72	408.88		651.60	542.27	742.72	870.64	853.52	714.56
1/24/91	23:31	1499.27	6514.78	81.29	408.80		654.49	545.91	745.81	870.30	853.18	718.10
1/25/91	0:04	1602.54	6505.65	80.24	408.96		652.82	546.21	745.11	866.54	849.15	717.43

Table D-4: Condition 2 String and Casing Heat Flux Data and Steam Data

TEST CASE D, CONDITION 2 HEAT FLUX AND STEAM DATA												
		WATER	STEAM				CASING HEAT FLUX					
DATE	TIME	LB/HR	LB/HR	QUAL	TEMP		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B
1/25/91	0:37	1698.41	6487.85	79.25	408.92		650.25	544.51	743.73	861.59	844.21	716.04
1/25/91	1:11	1545.88	6513.61	80.82	408.81		649.06	544.21	743.08	857.94	840.98	715.88
1/25/91	1:44	1471.54	6553.05	81.66	409.21		649.98	546.41	745.45	856.76	839.78	717.80
1/25/91	2:17	1545.27	6538.55	80.88	409.32		648.63	546.38	746.46	853.71	837.09	717.80
1/25/91	2:50	1539.44	6532.36	80.93	409.33		644.76	543.38	744.09	847.44	831.63	714.75
1/25/91	3:23	1501.11	6545.94	81.35	409.38		649.31	548.88	749.61	849.50	834.29	720.89
1/25/91	3:56	1601.11	6546.03	80.35	409.46		644.33	544.98	746.31	842.46	827.96	716.76
1/25/91	4:30	1607.39	6571.41	80.35	409.76		644.69	546.21	747.68	840.26	826.32	717.69
1/25/91	5:03	1583.38	6561.48	80.56	409.83		646.18	548.72	750.68	839.48	826.06	720.10
1/25/91	5:36	1616.34	6564.56	80.24	410.01		643.99	547.49	749.93	835.20	822.38	718.47
1/25/91	6:09	1583.72	6578.43	80.60	410.09		640.90	545.02	747.87	829.45	817.51	715.70
1/25/91	6:42	1344.89	6975.25	83.84	413.26		664.73	569.41	773.17	851.96	837.94	741.49
1/25/91	7:16	1248.22	7031.76	84.92	413.62		653.84	558.87	764.49	839.95	826.93	730.25
1/25/91	7:49	1258.91	6272.18	83.28	406.13		619.40	527.28	728.35	798.51	790.42	692.77
1/25/91	8:22	1211.01	6235.03	83.74	405.58		621.73	530.29	732.30	797.97	789.64	695.74
1/25/91	8:55	1271.22	6165.70	82.91	405.06		618.74	528.33	726.95	792.60	783.75	691.37
1/25/91	9:08	1132.52	6178.78	84.51	404.88		623.90	533.96	731.67	796.77	787.64	696.85
1/25/91	9:41	1256.09	6155.58	83.05	404.93		623.85	534.88	732.56	794.69	785.12	696.42
1/25/91	10:15	1236.20	6148.41	83.26	404.79		620.34	532.02	730.42	789.49	779.84	692.22
1/25/91	10:48	1272.78	6073.10	82.67	404.32		619.57	532.13	731.84	787.13	777.34	691.80
1/25/91	11:21	1355.23	5994.29	81.56	403.62		612.34	525.99	727.04	777.90	768.86	684.56
1/25/91	11:54	1198.60	6049.49	83.46	403.65		619.34	533.77	735.52	782.95	773.33	692.41

Table D-5: Condition 3 String and Casing Temperature Data

TEST CASE D, CONDITION 3 TEMPERATURE DATA																			
		STABLE CASING DATA														STABLE STRING DATA			
DATE	TIME	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT A	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	200FT	250FT	500FT	750FT
1/27/91	0:25	363.7	363.7	366.2	365.2	365.5	365.9	366.4	365.6	364.8	366.2	365.9	365.7	366.5	366.3	397.8	366.8	382.0	376.0
1/27/91	0:58	363.1	363.0	365.7	364.8	365.1	365.5	366.0	365.1	364.5	365.8	365.5	365.3	366.0	365.9	397.5	366.3	381.7	373.7
1/27/91	1:31	363.8	363.7	365.9	364.9	365.2	365.6	366.2	365.3	364.6	365.9	365.6	365.5	366.2	366.0	397.7	366.4	381.9	373.4
1/27/91	2:04	363.3	363.2	365.7	364.7	365.1	365.4	366.0	365.1	364.4	365.8	365.5	365.3	366.0	365.8	397.8	366.3	381.8	373.1
1/27/91	2:37	363.6	363.7	366.0	365.0	365.3	365.7	366.2	365.4	364.7	366.0	365.7	365.5	366.3	366.1	397.8	366.6	382.2	373.4
1/27/91	3:10	363.8	363.8	366.0	365.0	365.3	365.7	366.2	365.4	364.7	366.0	365.7	365.5	366.3	366.1	398.0	366.5	382.3	372.8
1/27/91	3:44	364.0	363.9	366.0	365.1	365.4	365.8	366.3	365.5	364.8	366.1	365.8	365.6	366.3	366.2	397.9	366.6	382.2	372.8
1/27/91	4:17	364.2	364.0	366.2	365.2	365.6	365.9	366.5	365.6	365.0	366.2	366.0	365.8	366.5	366.3	398.2	366.8	382.4	372.4
1/27/91	4:50	363.5	363.4	365.9	365.0	365.3	365.7	366.2	365.3	364.7	366.0	365.7	365.5	366.3	366.1	398.3	366.5	382.1	373.4
1/27/91	5:23	362.7	362.5	365.6	364.7	365.0	365.4	365.9	365.0	364.3	365.7	365.4	365.2	365.9	365.8	397.9	366.2	382.2	372.5
1/27/91	5:56	362.7	362.5	365.6	364.7	365.0	365.3	365.9	365.1	364.3	365.7	365.4	365.2	365.9	365.8	397.9	366.2	382.0	372.0
1/27/91	6:30	362.4	362.3	365.5	364.5	364.9	365.2	365.8	364.9	364.1	365.6	365.3	365.1	365.8	365.6	397.7	366.1	381.7	372.8
1/27/91	7:03	364.2	363.9	366.0	365.1	365.4	365.8	366.3	365.4	364.7	366.1	365.8	365.6	366.3	366.1	397.9	366.6	381.9	373.8
1/27/91	7:36	364.2	364.1	366.2	365.2	365.5	365.9	366.4	365.6	364.7	366.2	365.9	365.7	366.4	366.3	397.8	366.7	382.1	372.7
1/27/91	8:09	364.6	364.5	366.4	365.4	365.8	366.1	366.7	365.8	364.9	366.4	366.1	365.9	366.7	366.5	398.6	366.9	382.5	373.6
1/27/91	8:42	364.8	364.8	366.7	365.7	366.0	366.3	366.9	366.1	365.1	366.6	366.4	366.2	366.9	366.7	399.2	367.2	382.9	373.5
1/27/91	9:15	365.1	364.9	367.0	365.9	366.3	366.5	367.2	366.4	365.3	366.9	366.7	366.4	367.2	367.0	399.5	367.4	383.5	372.7
1/27/91	9:49	366.1	366.1	367.8	366.6	367.0	367.3	367.9	367.1	365.9	367.6	367.4	367.1	367.9	367.7	399.8	368.1	383.8	375.6
1/27/91	10:22	364.7	364.5	367.2	366.1	366.5	366.8	367.4	366.5	365.2	367.2	366.9	366.6	367.4	367.3	399.5	367.5	384.1	373.6
1/27/91	10:55	368.3	368.1	369.2	368.0	368.4	368.7	369.3	368.6	367.3	369.0	368.8	368.5	369.4	369.1	403.9	369.6	385.9	376.6
1/27/91	11:28	368.6	368.5	370.1	368.9	369.3	369.6	370.2	369.4	368.2	370.0	369.7	369.5	370.3	370.1	406.2	370.4	387.0	378.2
1/27/91	12:01	368.2	368.0	370.3	369.0	369.5	369.8	370.3	369.6	368.0	370.1	369.9	369.6	370.4	370.2	406.1	370.5	387.1	378.8

Table D-6: Condition 3 String and Casing Temperature Data

TEST CASE D, CONDITION 3 TEMPERATURE DATA																			
		STABLE CASING DATA														STABLE STRING DATA			
DATE	TIME	200FT A	200FT B	250FT A	300FT A	300FT B	400FT A	400FT B	500FT A	600FT A	600FT B	700FT A	700FT B	800FT A	800FT B	200FT	250FT	500FT	750FT
1/27/91	12:35	368.8	368.8	371.0	369.6	370.0	370.3	370.9	370.3	368.6	370.6	370.5	370.2	371.0	370.8	405.7	371.2	387.3	379.0
1/27/91	13:08	367.0	366.8	370.3	369.0	369.4	369.7	370.3	369.6	368.2	369.8	369.8	369.6	370.4	370.2	405.6	370.5	387.5	377.5
1/27/91	13:41	365.8	365.7	370.0	368.6	369.0	369.3	369.9	369.2	367.8	369.5	369.5	369.2	370.0	369.8	405.3	370.0	386.5	378.4
1/27/91	14:14	365.6	365.4	369.9	368.6	369.0	369.3	369.9	369.2	367.8	369.6	369.4	369.2	370.0	369.8	405.2	370.0	386.5	376.2
1/27/91	14:47	366.7	366.4	370.4	369.1	369.5	369.8	370.4	369.7	368.4	370.0	369.9	369.7	370.5	370.3	405.6	370.6	387.5	378.7
1/27/91	15:21	366.6	366.4	370.5	369.2	369.6	369.9	370.5	369.8	368.6	370.2	370.1	369.8	370.6	370.5	405.7	370.7	387.1	378.7
1/27/91	15:54	366.7	366.5	370.6	369.4	369.8	370.1	370.7	369.9	368.7	370.3	370.2	369.9	370.8	370.6	405.8	370.9	388.0	378.7
1/27/91	16:27	366.8	366.4	370.6	369.4	369.8	370.1	370.7	369.9	368.6	370.2	370.2	369.9	370.8	370.6	406.0	370.9	388.2	379.0
1/27/91	17:00	366.8	366.6	370.6	369.4	369.8	370.1	370.7	369.8	368.5	370.2	370.2	370.0	370.8	370.6	405.7	370.9	388.0	379.0
1/27/91	17:33	366.8	366.7	370.6	369.4	369.9	370.2	370.8	369.9	368.7	370.2	370.2	370.0	370.8	370.6	405.9	371.0	388.1	379.0
1/27/91	18:07	367.1	366.8	370.6	369.6	370.0	370.2	370.9	370.0	368.8	370.3	370.3	370.1	370.9	370.7	406.2	371.1	388.3	378.5
1/27/91	18:40	367.0	366.8	370.7	369.6	370.0	370.3	370.9	370.0	368.8	370.3	370.4	370.2	371.0	370.8	406.2	371.1	388.3	379.1
1/27/91	19:13	366.9	366.7	370.7	369.7	370.1	370.3	371.0	370.1	369.0	370.4	370.5	370.3	371.0	370.8	406.4	371.2	389.1	377.5
1/27/91	19:46	366.6	366.5	370.8	369.8	370.2	370.4	371.1	370.1	369.1	370.5	370.6	370.4	371.1	370.9	406.4	371.3	388.9	378.9
1/27/91	20:19	366.8	366.6	370.9	369.9	370.3	370.6	371.2	370.3	369.2	370.5	370.7	370.5	371.2	371.0	406.3	371.4	388.4	378.7
1/27/91	20:53	366.9	366.7	370.9	370.0	370.4	370.6	371.3	370.3	369.0	370.6	370.7	370.5	371.3	371.1	406.4	371.4	388.2	379.8
1/27/91	21:26	366.7	366.4	370.9	370.0	370.4	370.6	371.3	370.4	369.3	370.7	370.7	370.6	371.3	371.1	406.7	371.4	388.6	379.6
1/27/91	21:59	366.8	366.5	371.1	370.1	370.5	370.8	371.4	370.5	369.4	370.8	370.9	370.7	371.5	371.2	406.6	371.6	388.8	379.1
1/27/91	22:32	364.7	364.5	370.2	369.3	369.7	370.0	370.6	369.6	368.5	370.0	370.1	369.9	370.7	370.4	405.1	370.5	389.3	379.1
1/27/91	23:05	358.9	358.7	367.4	366.6	367.0	367.3	367.9	366.9	365.5	367.1	367.3	367.2	367.9	367.7	400.2	367.0	384.8	374.3
1/27/91	23:38	360.6	360.4	367.7	366.8	367.2	367.4	368.1	367.2	365.7	367.2	367.5	367.4	368.1	367.9	399.8	368.0	384.6	373.0

Table D-7: Condition 3 String and Casing Heat Flux Data and Steam Data

TEST CASE D, CONDITION 3 HEAT FLUX AND STEAM DATA												
		WATER	STEAM				CASING HEAT FLUX					
DATE	TIME	LB/HR	LB/HR	QUAL	TEMP		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B
1/27/91	0:25	1573.67	8294.38	84.05	430.02		659.99	600.94	806.64	800.26	698.05	760.39
1/27/91	0:58	1754.76	8252.28	82.46	429.95		644.35	585.84	790.40	783.36	681.10	742.07
1/27/91	1:31	1863.55	8236.23	81.55	430.27		646.41	588.14	791.94	784.07	681.72	744.49
1/27/91	2:04	1859.99	8244.99	81.59	430.44		646.61	588.50	792.74	783.32	680.90	744.87
1/27/91	2:37	1854.41	8263.83	81.67	430.53		652.38	594.34	798.11	788.52	685.23	751.43
1/27/91	3:10	1838.83	8267.26	81.80	430.52		646.31	588.08	791.77	782.02	678.44	744.51
1/27/91	3:44	1797.34	8286.23	82.18	430.58		650.78	592.86	795.46	786.57	681.61	749.14
1/27/91	4:17	1583.66	8351.17	84.06	430.56		646.76	588.14	791.56	782.71	676.90	745.13
1/27/91	4:50	1769.77	8286.77	82.40	430.48		637.82	579.53	781.81	772.94	667.37	734.41
1/27/91	5:23	1462.53	8419.42	85.20	430.59		642.26	584.31	786.32	776.04	671.11	739.70
1/27/91	5:56	1451.33	8430.01	85.31	430.63		640.14	582.14	782.62	770.83	667.87	737.13
1/27/91	6:30	1600.32	8333.85	83.89	430.18		638.34	580.45	780.23	767.23	665.22	734.67
1/27/91	7:03	1761.33	8275.57	82.45	430.38		652.71	594.98	795.99	781.37	677.99	750.60
1/27/91	7:36	1981.76	8232.52	80.60	430.48		648.45	590.55	790.59	776.44	672.83	745.55
1/27/91	8:09	2024.94	8325.13	80.44	431.41		647.59	589.69	787.69	773.47	670.91	744.33
1/27/91	8:42	2009.14	8436.01	80.76	432.43		650.79	592.74	791.71	775.33	673.21	747.73
1/27/91	9:15	1872.11	8571.22	82.07	433.30		651.84	593.64	792.40	776.08	673.39	748.91
1/27/91	9:49	2391.88	8443.88	77.93	433.71		657.18	598.55	798.68	780.16	677.39	754.73
1/27/91	10:22	2139.56	8521.32	79.93	433.56		631.67	572.79	772.00	752.59	651.96	725.22
1/27/91	10:55	1902.25	9332.68	83.07	439.10		684.31	625.60	827.77	807.03	701.68	785.16
1/27/91	11:28	1773.73	9699.05	84.54	441.53		669.29	609.92	811.21	791.27	684.90	766.86
1/27/91	12:01	1811.10	9661.36	84.21	441.50		666.03	606.53	806.84	784.12	681.66	763.59

*U.S.GPO:1992-661-026/60013

Table D-8: Condition 3 String and Casing Heat Flux Data and Steam Data

TEST CASE D, CONDITION 3 HEAT FLUX AND STEAM DATA												
		WATER	STEAM				CASING HEAT FLUX					
DATE	TIME	LB/HR	LB/HR	QUAL	TEMP		250FT A	250FT B	500FT A	500FT B	750FT A	750FT B
1/27/91	12:35	2183.03	9522.97	81.35	441.76		683.40	623.87	823.84	803.22	697.52	782.57
1/27/91	13:08	1644.35	9669.83	85.47	441.09		647.85	587.39	785.66	766.42	662.52	742.08
1/27/91	13:41	1624.21	9630.30	85.57	440.77		650.69	590.69	787.63	769.15	665.56	745.50
1/27/91	14:14	1642.39	9606.63	85.40	440.56		652.81	592.40	788.32	771.85	666.84	747.31
1/27/91	14:47	1647.56	9705.84	85.49	441.29		661.23	600.94	794.67	780.62	673.80	756.46
1/27/91	15:21	1651.65	9708.47	85.46	441.34		658.58	598.12	791.72	779.32	670.33	752.81
1/27/91	15:54	1636.96	9701.14	85.56	441.32		657.39	597.02	789.52	778.37	668.65	751.13
1/27/91	16:27	1695.15	9665.10	85.08	441.12		654.37	593.91	785.23	774.15	665.01	747.21
1/27/91	17:00	1654.57	9649.75	85.36	440.93		652.56	591.87	780.69	770.71	662.60	744.71
1/27/91	17:33	1660.79	9680.17	85.36	441.03		652.97	592.47	780.36	773.11	662.50	744.86
1/27/91	18:07	1646.83	9707.71	85.57	441.23		653.41	592.88	780.18	775.06	662.21	744.85
1/27/91	18:40	1643.69	9732.74	85.55	441.43		652.15	591.77	777.54	774.61	660.23	742.85
1/27/91	19:13	1661.80	9731.63	85.41	441.49		652.03	591.75	777.08	774.86	659.64	742.40
1/27/91	19:46	1652.35	9753.01	85.51	441.67		652.72	592.23	776.84	774.25	659.56	742.65
1/27/91	20:19	1647.34	9721.83	85.51	441.39		651.47	591.09	773.58	773.82	657.62	740.82
1/27/91	20:53	1599.97	9753.36	85.91	441.41		652.50	592.11	772.87	776.14	657.91	741.18
1/27/91	21:26	1626.17	9767.07	85.73	441.62		650.95	590.61	770.61	775.89	655.87	738.80
1/27/91	21:59	1663.45	9756.79	85.43	441.87		650.66	590.40	769.64	776.72	655.10	738.00
1/27/91	22:32	1695.81	9450.63	84.79	439.77		619.04	557.79	737.78	744.86	624.36	702.29
1/27/91	23:05	1653.97	8681.00	84.00	433.45		605.97	546.98	714.45	727.80	613.26	686.72
1/27/91	23:38	1685.03	8616.47	83.64	432.99		629.12	569.18	740.55	751.72	634.20	711.17