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ERDA 10MW_e SOLAR PILOT PLANT SUBSYSTEM RESEARCH
EXPERIMENTS, STEAM GENERATOR TESTS AT NORTHERN STATES
POWER RIVERSIDE STATION

Volume II: Test Number 17

April 13, 1977

Work Performed Under Contract No. EY-76-C-03-1109

Honeywell, Inc.
Energy Resources Center
Minneapolis, Minnesota



U.S. Department of Energy



Solar Energy

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ERDA 10 MWe SOLAR PILOT PLANT
SUBSYSTEM RESEARCH EXPERIMENTS

VOLUME II
STEAM GENERATOR TEST NO. 17
NORTHERN STATES POWER RIVERSIDE STATION

APRIL 13, 1977

ERDA CONTRACT E(04-3)-1109

Honeywell
Energy Resources Center
2600 RIDGWAY PARKWAY,
MINNEAPOLIS, MINNESOTA 55413

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SECTION 1
EXPLANATORY SHEETS

Summary of SRE Steam Generator Testing

TEST NUMBER	DATE 1977	DURATION (HOURS)	OBJECTIVE	PEAK POWER (Mw) IN/OUT*	MANUFACTURER'S OPERATING MANUAL REFERENCE	DIFFICULTIES**
1	3/11	7.25	INITIAL STEAMING		3.0	RECIRCULATION PUMP INSTABILITY
2	3/14	4.95	RELIEF VALVE SETTING		3.0	DAC P-T OUTPUT
3	3/16	9.87	RELIEF VALVE SETTING		3.0	480-V CIRCUIT BREAKER TRIPS
4	3/17	4.55	SATURATION CHECK OF T/C RECIRCULATION VERSUS DRUM LEVEL COOLING WATER INSTRUMENTATION		3.0	- DAC INTERMITTENT - COOLING WATER PLUGGING
5	3/18	12.93	STEADY STATE AT HIGHER POWER TUNE AUTOMATIC CONTROLS		3.0	- ZONE 3 CIRCUIT BREAKER TRIP - ATTEMPERATOR AUTO CONTROL
6	3/19	9.93	TUNE AUTOMATIC CONTROLS		3.0	ZONE 3 CIRCUIT BREAKER TRIP
7	3/21	13.83	TUNE AUTOMATIC CONTROLS		3.0	ZONE 3 CIRCUIT BREAKER TRIP
8	3/22	10.00	CALIBRATE SIMULATOR AND CHECK FULL RANGE OPERATION		3.0	FAILED MANY LAMPS IN ARRAY
9	3/28	7.93	CHECK R/A AFTER RE-LAMPING STEADY STATE CHECKS; AUTO CONTROL TUNING	2.07/1.4	4.0	ZONE 3 TRIP PROBLEM
10	3/29	3.83	DETERMINE CAUSE OF ZONE 3 TRIP; STEADY STATE DATA		4.0	ZONE 3 TRIP; NO STEADY STATE DATA
11	3/30	6.25	CONFIRM CORRECTION OF ZONE 3 TRIP REPAIR; TAKE STEADY STATE DATA	2.07/1.4	4.0	ZONE 3 TRIP PROBLEM
12	3/31	3.04	ZONE 3 TRIP INVESTIGATION; STEADY STATE DATA	3.84/2.76	4.0	ZONE 3 TRIP 18 LAMPS FAILED
13	4/2	2.5	TAKE HEAT BALANCE DATA		4.0	NSP FEEDWATER FAILURE
14	4/4	5.5	CALIBRATE R/A POWER DELIVERY			ZONE 1 CIRCUIT BREAKER FAILED
15	4/7	5.0	R/A POWER DELIVERY CALIBRATION AND INSTALL 420V LIMITING			ZONE 3 POWER CONTROL CIRCUITRY
16	4/11	6.5	REPEAT TESTS 11 AND 12 TO NOTE EFFECT OF BOILER PAINTING	2.07/1.4	4.0	35 LAMPS FAILED

Summary of SRE Steam Generator Testing -- Concluded

TEST NUMBER	DATE 1977	DURATION (HOURS)	OBJECTIVE	PEAK POWER (Mw) IN/OUT*	MANUFACTURER'S OPERATING MANUAL REFERENCE	DIFFICULTIES**
17	4/13	10.7	TRANSIENT: MAIN STEAM TRANSIENT: RADIANT ARRAY	4.1/3.0	5.1.1 5.1.3	- 100 LAMPS FAILED - DAC RECORDING STOPPED
18	4/15	10.5	TRANSIENT: DRUM SHRINK-SWELL TRANSIENT: POWER RAMP CLOUD OBSTRUCTION ATTEMPERATOR POWER		5.1.4 5.1.5 5.1.6 5.1.2 5.1.7	- 154 LAMPS FAILED - DAC REMOTE CABINET OUTAGES
19	4/18	6.7	TRIP: RECIRCULATION PUMP FEEDWATER PUMP RECIRCULATION PUMP STABILITY STEADY STATE		6.1.2 6.1.4 --- ---	NONE NONE
20	4/19	10.5	TRANSIENT: POWER STEP INCREASE TRIP: HELIOSTAT - 800°F TRIP: HELIOSTAT - 700°F TRIP: HELIOSTAT - 595°F TRANSIENT: SHRINK-SWELL (REPEAT) TUNE ATTEMPERATOR CONTROL		6.1.1 6.1.1 6.1.1 5.1.4 ---	LOW NSP WATER RESERVES
21	4/21 4/22	29.5	ASYMMETRIC HEAT INPUT	3.8/2.7	7.1.1 7.1.2	20 LAMPS FAILED DAC INTERMITTENT LOW NSP WATER SUPPLY SCR COOLING WATER PLUGGED SIMULATOR ZONE 1
22	4/26	11.75	STEADY STATE AND TRANSIENT TESTS - WITH AUTOMATIC ATTEMPERATION		4.0 5.0	FAILED 31 LAMPS LEAKAGE AT ATTEMPERATOR WATER SUPPLY FLANGE
23	4/28	4.5	MAXIMUM POWER STEADY STATE HEAT BALANCE	5.0/3.85	4.0	FAILED 350 LAMPS

*PEAK POWER ENTRIES ARE FROM THE TEST LOG FOR PERIODS WHEN HEAT BALANCE DATA WERE BEING TAKEN.

**DIFFICULTIES SHOWN DID NOT NECESSARILY PREVENT THE TAKING OF DATA.

TEST NO. 17

DATE: April 13, 1977

Test Objectives

1. To achieve steady state operating conditions with outlet steam at 960^oF, at approximately 10,000 PPH steam flow.
2. To perform the following transient tests (Refer to Appendix A):
 - a) Main steam step.
 - b) Radiant array step (5.1.3).
 - c) Drum level shrink-and-swell.
3. To perform a power trip under automatic control.

Description

This test went nearly flawlessly.

Difficulties Encountered

1. Approximately 100 bulbs became non-functional during the test.
2. The Data Acquisition System (DAC) data recording tape quit during the drum level shrink and swell transient; thus, no digital data is available for that test.

Code Sheet for Recorder Charts

Recorder Number	Pen or Point Number	Process Variable	Data Source	Scale Range
RCD-1	1, Red	Main Steam Flow	FT-3	0-18,000 lb/hr*
	2, Blue	Drum Inlet Feedwater Flow	FT-1	0-18,000 lb/hr**
	3, Green	Attemperator Spraywater Flow	FT-480	0-2,000 lb/hr**
RCD-4	1, Red	Drum Water Level	LT-211	0-55 Inches †
	2, Blue	Main Steam Pressure	PT-590	0-2,100 psig
	3, Green	Trend Panel PV-1: Water Conductivity	Beckman solu-meter®	0-100 †† micromhos/cm
RCD-3	1	Feedwater Temperature (F)	TE-1	0-1,000°F (K)
	2	Attemperator Inlet Temperature (F)	TE-475	0-1,000°F (K)
	3	Attemperator Outlet Temperature (F)	TE-500	0-1,000°F (K)
	4	Main Steam Temperature (F)	TE-591	
	5	Lower 1st Stage Superheater (M)	TE-405	0-1,000°F (K)
	6	Upper 1st Stage Superheater (M)	TE-452	0-1,000°F (K)
	7-10	Recirculation Pump Inlet Water Temperature (F)	TE-301	0-1,000°F (K)
	11	Lower 2nd Stage Superheater (M)	TE-507	0-1,000°F (K)
12	Upper 2nd Stage Superheater (M)	TE-550	0-1,000°F (K)	

*lb/hr. at 955°F, $\rho = 2.06 \text{ lb}_m/\text{ft}^3$

**lb/hr. at 440°F, $\rho = 52.52 \text{ lb}_m/\text{ft}^3$

(F): Fluid Temperature

(M): Metal Temperature

†Datum is centerline of lower pipe;
transmitter output is for 80°F water;
alarm and trips set for 620°F water.

††Specific conductance at 25°C.

Parameter Identification Legend:
Operator and Performance Summaries

LABEL	PARAMETER	UNITS	SOURCE (5)
<u>OPERATOR SUMMARY</u>			
<u>BOILER DRUM</u>			
P-D	Pressure, drum	psig	PT-230
T-D	Temperature, drum	°F	CALC.
L-D	Level, drum	Inches above-55" reference	LT-210
W-FW	Flow, feedwater	Lbs /Hour	FT-1
W-BD	Flow, blowdown	Lbs ^m /Hour	FT-260
<u>PUMP</u>			
W-B	Flow, boiler recirculation	Lbs /Hour	FT-310
T-DC	Temperature, downcomer	°F ^m	TE-300
T-SUB	Temperature, pump suction subcooling	°F	CALC.
T-PC	Temperature, pump coolant	°F	TE-306
<u>SUPERHEATER 1</u>			
TE-	Temperature, thermocouples	°F	TE-420-440; 406-409; 450-454; 455-466
T-S1I	Temperature, steam, superheater inlet	°F	TE-400-402
W-ATT	Flow, attemperator water	Lbs ^m /Hour	FT-480
<u>SUPERHEATER 2</u>			
TE-	Temperature, thermocouples	°F	TE-520-540; 506-509; 550-554; 555-566
T-S20	Temperature, steam, superheater outlet	°F	TT-590
P-S20	Pressure, steam, superheater outlet	psig	PT-590
W-S2	Flow, superheater	Lbs ^m /Hour	FT-3
<u>POWER</u>			
BOILER ABS	Absorbed power, boiler	Kilowatts	CALC.
S.H. #1 ABS	Absorbed power, superheater	Kilowatts	CALC.
S.H. #2 ABS	Absorbed power, superheater	Kilowatts	CALC.
TOTAL INPUT	Net power input (1)	Kilowatts	CALC.
TOTAL ABSORBED	Absorbed power, steam generator	Kilowatts	CALC.
POWER RATIO	$\frac{\text{Total Absorbed}}{\text{Total Input}}$	Dimensionless	CALC.

- (1) Electrical power to Radiant Array minus cooling water heat absorbed.
- (2) Recirculation flow divided by Superheater #1 flow.
- (3) Reciprocal of recirculation ratio (N-CR).
- (4) Electrical power to Radiant Array minus cooling water heat absorbed.
- (5) Sources are cited by transmitter or thermocouple designations as indicated in the P & ID Diagrams, or as calculated (Calc.) by the Data Acquisition System (DAC) (i.e., enthalpies, power). Transmitter and thermocouple raw outputs are modified by the DAC to provide readouts in engineering units.

Parameter Identification Legend:
Operator and Performance Summaries--Continued

LABEL	PARAMETER	UNITS	SOURCE (5)
<u>PERFORMANCE SUMMARY</u> <u>BOILER DRUM</u>			
P-D	Pressure, drum	psig	PT-230
T-D	Temperature, drum	°F	CALC.
H-GD	Enthalpy, drum steam	BTU/Lb _m	CALC.
H-FD	Enthalpy, drum water	BTU/Lb _m	CALC.
N-CR	Recirculation ratio (2)	Dimensionless	CALC.
<u>FEEDWATER</u>			
P-FW	Pressure, feedwater	psig	PT-1
T-FW	Temperature, feedwater	°F	TE-19
W-FW	Flow, feedwater	Lb /Hour	FT-1
H-FW	Enthalpy, feedwater	BTU/Lb _m	CALC.
<u>FLOW CIRCUITS</u>			
T-DC	Temperature, downcomer	°F	TE-300
T-SUB	Temperature, pump suction subcooling	°F	CALC.
W-B	Flow, boiler recirculation	Lbs _m /Hour	FT-310
W-BC1	Flow, boiler circuit (Transmitter #1)	Lb _m /Hour	FT-350
W-BC2	Flow, boiler circuit (Transmitter #2)	Lb _m /Hour	FT-351
W-BC3	Flow, boiler circuit (Transmitter #3)	Lb _m /Hour	FT-352
X-B	Quality, boiler steam (3)	Dimensionless	CALC.
<u>SUPERHEATERS</u> <u>S.H. Stage 1</u>			
W-SI	Flow, superheater #1	Lb _m /Hour	WS2-WATT
T-SII	Temperature, steam, superheater inlet	°F	TE-400-402
T-S10	Temperature, steam, superheater outlet	°F	TE-476
P-S10	Pressure, steam, superheater outlet	psig	PT-475
H-S10	Enthalpy, steam, superheater outlet	BTU/Lb _m	CALC.

- (1) Electrical power to Radiant Array minus cooling water heat absorbed.
- (2) Recirculation flow divided by Superheater #1 flow.
- (3) Reciprocal of recirculation ratio (N-CR).
- (4) Electrical power to Radiant Array minus cooling water heat absorbed.
- (5) Sources are cited by transmitter or thermocouple designations as indicated in the P & ID Diagrams, or as calculated (Calc.) by the Data Acquisition System (DAC) (i.e., enthalpies, power). Transmitter and thermocouple raw outputs are modified by the DAC to provide readouts in engineering units.

Parameter Identification Legend:
Operator and Performance Summaries--Concluded

LABEL	PARAMETER	UNITS	SOURCE (5)
<u>ATTEMPERATOR</u>			
P-ATT	Pressure, attemperator water inlet	psig	PT-1
T-ATT	Temperature, attemperator water inlet	°F	TE-480
W-ATT	Flow, attemperator water	Lb _m /Hour	FT-480
H-ATT	Enthalpy, attemperator water	BTU/Lb _m	CALC.
<u>S.H. Stage 2</u>			
W-S2	Flow, superheater #2	Lb _m /Hour	FT-3
T-S2I	Temperature, superheater #2 inlet	°F	TE-500,501
T-S2O	Temperature, steam, superheater outlet	°F	TT 590
P-S2O	Pressure, steam, superheater outlet	°F	PT 590
H-S2O	Enthalpy, steam, superheater outlet	BTU/Lb _m	CALC.
<u>BOILER</u>			
L-D	Level, drum	Inches above-55" reference	LT 210
T-BI	Temperature, boiler inlet	°F	TE-310, 311
H-BI	Enthalpy, boiler inlet	BTU/Lb	CALC.
R-BI	Density, boiler inlet	Lb _m /Ft ^m	CALC.
R-GD	Density, drum steam	Lb _m /Ft	CALC.
R-FD	Density, drum water	Lb _m /Ft	CALC.
<u>POWER</u>			
Boiler ABS	Absorbed power, boiler	Kilowatts	CALC.
S.H. #1 ABS	Absorbed power, superheater	Kilowatts	CALC.
S.H. #2, ABS	Absorbed power, superheater	Kilowatts	CALC.
Total Input	Net power input (4)		CALC.
Total Absorbed	Absorbed power, steam generator	Kilowatts	CALC.
Power Ratio	Total Absorbed Total Input	Dimensionless	CALC.

- (1) Electrical power to Radiant Array minus cooling water heat absorbed.
- (2) Recirculation flow divided by Superheater #1 flow.
- (3) Reciprocal of recirculation ratio (N-CR).
- (4) Electrical power to Radiant Array minus cooling water heat absorbed.
- (5) Sources are cited by transmitter or thermocouple designations as indicated in the P & ID Diagrams, or as calculated (Calc.) by the Data Acquisition System (DAC) (i.e., enthalpies, power). Transmitter and thermocouple raw outputs are modified by the DAC to provide readouts in engineering units.

SRE Steam Generator Thermocouple Identifications/Locations

	AZIMUTH	#1 SUPERHEATER				#2 SUPERHEATER			
SUPERHEATER OUTSIDE* OF TUBES									
ROW 6	345	420	426	432	438	520	526	532	538
ROW 5	30	425	431	437		525	531	537	
ROW 4	120	424	430	436		524	530	536	
ROW 3	210	423	429	435		523	529	535	
ROW 2	240	422	428	434	440	522	528	534	540
ROW 1 (HOT SPOT)	300	421	427	433	439	521	527	533	539
SUPERHEATER INSIDE* OF TUBES AT BEGINNING OF THE HEATED LENGTH									
NEAR ROW 1		406				506			
NEAR ROW 3		407				507			
NEAR ROW 4		408				508			
NEAR ROW 5		409				509			
SUPERHEATER INSIDE* OF TUBES AT BEGINNING OF THE HEATED LENGTH									
NEAR ROW 1		450				550			
NEAR ROW 2		451				551			
NEAR ROW 3		452				552			
NEAR ROW 4		453				553			
NEAR ROW 5		454				554			
SUPERHEATER OUTSIDE* OF TUBES NEAR FLOW EXIT									
	330	455				555			
	300	456				556			
	270	457				557			
	240	458				558			
	210	459				559			
	180	460				560			
	150	461				561			
	120	462				562			
	90	463				563			
	60	464				564			
	30	465				565			
	0	466				566			

SRE Steam Generator Thermocouple Identifications/Locations--Concluded

BOILER	AZIMUTH	←-----→							
		LOWER TANGENT**			NEAR UPPER TANGENT**				
ROW 1	~ 10		333		332		331		330
ROW 2	~ 45		337		336		335		334
ROW 3	90		341		340		339		338
ROW 4	~140	349	348	347	346	345	344	343	342
ROW 5	~187½		353		352		351		350
ROW 6	~235	361	360	359	358	357	356	355	354
ROW 7	270	369	368	367	366	365	364	363	362
ROW 8	~295	377	376	375	374	373	372	371	370
HOT SPOT (300°)									
ROW 9	~305	385	384	383	382	381	380	379	378
ROW 10	330		389		388		387		386

DRUM

T/C#

- 210 DRUM SURFACE: ADJACENT TO FEEDWATER (FW) INLET
 211 DRUM SURFACE: FW INLET PLANE AT 270° AZIMUTH
 212 DRUM SURFACE: 11" BELOW UPPER TANGENT AT 270° AZIMUTH
 213 DRUM SUPPORT: ~240° AZIMUTH
 214 DRUM GUSSET 1" FROM DRUM SURFACE: ~240° AZIMUTH
 215 DRUM SURFACE 1" FROM T/C #214
 216 FW INLET PIPE ~1/2" FROM WELD
 217 DRUM SURFACE ~1/2" FROM DOWNCOMER PIPE AT 0° AZIMUTH

* WITH RESPECT TO STEAM GENERATOR CAVITY.

** WITH RESPECT TO VERTICAL SECTION OF BOILER TUBE.

Explanation of Array Flux Map

INCIDENT FLUX SENSOR	LOCATION	
IF 1	4 INCHES ABOVE TOP OF BOTTOM REFLECTOR	} THERE IS 15.5 IN. OF VERTICAL SEPARATION BETWEEN ADJACENT SENSORS IF 1 THROUGH IF 10.
IF 10	6 INCHES FROM CEILING	
IF 11	40 INCHES FROM CENTER OF CEILING AT CEILING	
IF 12	20 INCHES FROM CENTER OF CEILING AT CEILING	
IF 1 THROUGH IF 4 ARE IN THE BOILER REGION IF 5 IS ON THE LINE BETWEEN THE BOILER AND S.H. NO. 1 IF 6 THROUGH IF 7 ARE IN THE S.H. NO. 1 REGION IF 8 THROUGH IF 10 ARE IN THE S.H. NO. 2 REGION IF 11 THROUGH IF 12 ARE IN THE CEILING REGION		
BOOM POSITION	AZIMUTH	COMMENTS
1	20°	
2	30°	
.	.	
.	.	
8	90°	East
.	.	
.	.	
17	180°	South
.	.	
.	.	
26	270°	West
.	.	
.	.	
34	350°	
35	360° (0°)	North - not read.
36	10°	Not read.

Each incident flux sensor measures the incident flux over azimuthal positions 1 through 34. Positions 35 and 36 cannot be read due to the design of the flux boom which switches its direction of angular motion before revolving a full 360°.

The boom positions correspond to the center positions of each of the 18 boiler panels and to their intersections.

The unit of flux for each sensor is [hundreds of watts per square meter]

Data Acquisition System Real Time Plot Format

1. PLOT HEADERS

- NUMBER OF RECORDS - TOTAL VARIABLES PLOTTED (ARGUMENT PLUS FUNCTIONS)
- ARGUMENT SELECTED - INDEPENDENT VARIABLE - (1 THROUGH 4 IS TIME)
- FUNCTION NUMBERS - DEPENDENT VARIABLES PLOTTED, NUMBERS SHOWN ON GROUP LIST BELOW
- SEARCH MODE - SOFTWARE FUNCTION
- PLOT START TIME - TIME OF DAY IN SECONDS (I.E., 8 AM = 28,800 SEC.)
- (NO.) POINTS SKIPPED - RECORD SKIP FACTOR (PLOT ONLY Nth POINTS OF ALL DATA TAKEN)
- POINTS PLOTTED

2. PLOT GROUPING AND IDENTIFIERS

2.1 FLOWS - LBM/HR.

- 8 - WFW
- 10 - WS2
- 17 - WS1 SECTION 4.14 (PAGE 14)
- 9 - WATT (*)
- 11 - WBD (*)

2.2 PRESSURES - PSIG

- 18 - PD
- 19 - PFW SECTION 4.15 (PAGE 15)
- 20 - PS10
- 21 - PS20

2.3 FLUID TEMPS. DEG. F.

- 22 - TBI
- 24 - TFW
- 26 - TS10 SECTION 4.16 (PAGE 16)
- 27 - TS11
- 28 - TS20
- 29 - TS21

2.4 METAL TEMPS. DEG. F.

- 12 - TE400
- 13 - TE401
- 14 - TE402 SECTION 4.17 (PAGE 17)
- 23 - TDC
- 32 - TAS1
- 33 - TAS2

2.5 DRUM LEVEL - INCHES (*)

- 30 - LD SECTION 4.18 (PAGE 18)

2.6 RECIRC. FLOW (*)

- 31 - WB SECTION 4.19 (PAGE 19)

2.7 POWER LEVELS -

- 6 - QABS
- 7 - QIN SECTION 4.20 (PAGE 20)
- 15 - QB
- 16 - QS2

(*) OPTIONAL VARIABLES/PLOTS

0 = ZERO

Plot Labels and Descriptors

NUMBER	LABEL	DESCRIPTOR	WHERE USED
1-4	time		
5	year		
6	QABS	Total Absorbed Power	A-series, B-series, F-series, G1-1
7	QIN	Total Input Power	E1-1, G16-1, G16-2
8	WFW	Feedwater Flow	A1-4, G2-3, E2-1
9	WATT	Attenuator Flow	A1-2, E2-1, G3-1
10	WS2	Steam Flow	A1-1, E2-1, G2-1, B1b-2
11	WBD	Blowdown Flow	A1-3, E2-1
12	TE400		
13	TE401	Superheater #1 Inlet Temperature	
14	TE402		
15	QB	Boiler Absorbed Power	A6-1, F5-1, F6-1, G1-1
16	QS2	Second Stage Superheater Absorbed Power	A6-3, F5-3, F6-3, G1-4
17	WS-1	First Stage Superheater Flow	G2-1
18	PD	Drum Pressure	G4-1
19	PFW	Feedwater Pressure	G4-2
20	PS10	First Stage Superheater Outlet Pressure	A3-2, G5-1
21	PS20	Second Stage Superheater Outlet Pressure	A3-3, G5-2
22	TBI	Boiler Inlet Temperature	A5-2, G6-2
23	TDC	Downcomer Temperature	A5-1, G6-3
24	TFW	Feedwater Temperature	A2-1, G6-4

Plot Labels and Descriptors--Concluded

NUMBER	LABEL	DESCRIPTOR	WHERE USED
25	TATT	Attemperator Supply Temperature	A2-2, G6-5
26	TS1)	First Stage Superheater Outlet Temperature	A2-4, G7-1
27	TS1I	First Stage Superheater Inlet Temperature	
28	TS20	Second Stage Superheater Outlet Temperature	A2-6, G7-3
29	TS2I	Second Stage Superheater Inlet Temperature	A2-5, G7-2
30	LD	Drum Level	G-12
31	WB	Boiler Flow	A4-1, G13-1
32	TAS1	First Stage Superheater Average Metal Temp.	G15-1
33	TAS2	2nd Stage Superheater Average Metal Temp.	G15-2
51	QABS/QIN	Power Ratio	E-1
52	$\frac{(WFW + WATT)}{(WS2 + WBD)}$	Flow Ratio - Mass Balance	E-2
53	(WS2 + WBD)	Outlet Flows	E-2
54	(TD-TE400)	Drum-to-Superheater Temp. Loss	E-3.3
55	(TD-TE401)	Drum-to-Superheater Temp. Loss	E-3.3
56	(TD-TE402)	Drum-to-Superheater Temp. Loss	E-3.3
57	HS10	Steam Enthalpy, S.H. 1 Outlet	G-8.1
58	HS2I	Steam Enthalpy, S.H. 2 Inlet	G-8.2
59	HS20	Steam Enthalpy, S.H. 2 Outlet	G-8.3
60	H-GD	Drum - Steam Enthalpy	G-9.2
61	H-FD	Drum - Water Enthalpy	G-9.1
62	H-BI	Boiler Inlet Water Enthalpy	G-9.3
63	X-B	Boiler Outlet (Drum) Steam Quality	G-14

Radiant Array Calibration

POWER SETTING%	ZONE 1			ZONE 2			ZONE 3			ZONE 4		
	KW	LAMP VOLTS	CONTROL VOLTS	KW	LAMP VOLTS	CONTROL VOLTS	KW	LAMP VOLTS	CONTROL VOLTS	KW	LAMP VOLTS	CONTROL VOLTS
0												
10	210.5	134.5	0.44	224.4	138.7	0.47	229.5		0.45	230.4		0.45
20	420	209.3	0.89	445.5	217.3	0.97	460.8		0.90	459		0.90
30	633	270	1.34	682.5	284.3	1.47	679.5		1.35	670.5		1.35
40	849	322.7	1.79	922.5	340.3	1.97	909		1.80	900		1.79
50	1065	367.3	2.25	1155	396	2.48	1120.5		2.25	1120.5		2.24
60	1278	420	2.70	1287(2)	420.7	2.76	1350		2.71	1341		2.70
70							1575		3.16	1566		3.15
80							1809		3.60	1800		3.60
90												
100												
KW/Volt (1) 473				464.8			500.9			499		

(1) Based on averages in which 10% values were omitted for Zones 1 and 2;
10% to 20% values were omitted for Zones 3 and 4.

(2) Apparently erroneous

Data Acquisition System Printout Listing

PAGE NUMBER	TITLE
1	Operator Summary
2	Performance Summary
3	Base Data Report -- Metal Temperatures
4	Base Data Report -- Fluid
5	Cooling Water Temperature
6	First Stage Superheater Metal Temperatures
7	Second Stage Superheater Metal Temperatures
8	Boiler Temperature Profile
9	First Stage Superheater Temperature Profile
10	Second Stage Superheater Temperature Profile
11	Warnings and Alarms Report
12	Alarm Conditions
13	Array Flux Map
14	Flows, Plots
15	Pressures, Plots
16	Fluids Temperatures, Plots
17	Metal Temperatures, Plots
18	Drum Level, Plots
19	Recirculation Flow, Plots
20	Power Levels, Plots
21	Enthalpy
22	Ratios

SECTION 2

DATA SHEETS: TEST RUN LOG BOOK PAGES

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DATE 13 APR 77

TEST NO. 17
DEV. NO. _____
PAGE 1 OF 6

Time	OPERATOR ACTION	Comments
0730	START Recirc. Pump	
0731	20% Power To Zones 3 & 4	
0742	Open Superheater DRAINS Open WATER Sample	
0820	Open Valve 22 ECU-10 Close WATER Sample Close Superheater DRAINS	
0830	BOTTLED up BLK	
0907	CU 1 OPEN TO 90%	
0912	INCREASE Power To: Zone 1 32.5% Nom Zone 2 30% Nom Zone 3 50.7% Nom Zone 4 50% Nom	0.74 MW 0.74 MW 1.14 MW 1.14 MW
0940	INCREASE Power To Zones 1 & 2 Zone 1 : 37% Zone 2 : 33.6%	0.85 MW 0.85 MW
0951	INCREASE POWER TO ZONES 1 & 2 ZONE 1 - 39% ZONE 2 - 35.3%	0.90 MW 0.90 MW
1002	INCREASE Power To ZONES 1 & 2 ZONE 1 43.2% ZONE 2 39.3%	1.0 MW 1.0 MW
1030	Log SINE DATA	TT-22 55°F TT-16 87°F TT-25 84°F FT-13 2636 RPM

TEST NO. 17
 DEV. NO. _____
 PAGE 2 OF 6

71

DATE 13 APR 77

TIME	OPERATIONAL ACTION	COMMENTS
1120	RAISED DRUM LEVEL ABOVE 40%	checking to see if BWR will STAKE OUT
1136	TAKE ANALOG DATA TAKE DAC DATA Power Zone1 1.950 v Zone2 1.975 v Zone3 2.30 v Zone4 2.24 v Recirc 80,000 PPH	TT-22 59 1/2 °F TT-16 87 °F TT-25 84 °F PT-16: 40 PSIG Drum Press: 1150 psig Steam Press: 1575 psig Drum Temp: 599 °F FW Flow 10150 PPH ATtemp Zero Blowdown Zero Steam Temp: 959 °F SH #1 out 891 °F SH #2 in 889 °F Drum Level 42 %
1145	Perform Steam Transient Step Change (Steam valve on manual - opened 10%)	28.5% STEAM FLOW STEP INCREASE - Going into Transient, everything was in automatic For the Transient the Steam Valve (CV-1) was switched to manual and opened.
1208	End Transient Test Close CV-1 about 10%	
1212	Added ATtempater Water To Cool Steam Outlet	Steam Temp over 980 °F
1214		Temp 990 °F - Unit Would have Tripped if AR116 had been armed.

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 TEST NO. 17
 DEV. NO. _____
 PAGE 5 OF 6
DATE 13 Apr 77

TIME	OPERATOR ACTION	COMMENTS
1215		ATTENUATOR STARTING TO TAKE EFFECT.
1217	CLOSE ATTENUATOR WATER	
1240	10% STEAM FLOW INCREASE	All controls in auto except steam valve.
1300	Close CV-1 To INCREASE PRESSURE BACK TO Normal	TRANSIENT TEST #2 Complete
1302	Open ATTENUATOR	To LIMIT STEAM TEMPERATURE.
1306	CHO ATTEMP	
1318	Increased Recirc Rate To 105,000 PPH	Drum LVL Increased STEAM FLOW DECREASED. INTERESTING.
1320	Reset Recirc AT 80,000 PPH	
1338	START 23% STEAM FLOW TRANSIENT.	Steam Transient #3
1358	TAKE DAC SUMMARY	
1402	Return CV-1 To Normal POSITION. Add ATTENUATOR FLOW.	
1407	Close ATTENUATOR	
1410	Added 4 minutes Phosphate	Phosphate Was 1ppm.
1436	Increase Recirc Rate To 108,000 PPH	Recirc Rate Step Change (From 80,000 pph To 108,000 AND BACK) Recirc Pump on Auto during Transient Valve 69% open AT 108,000 pph.

TEST NO. 17
 DEV. NO. _____
 PAGE 4 OF 6

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DATE 13 APR 77

TIME	OPERATOR ACTION	COMMENTS
1444	Return Recirc Rate To 20,000 PPH	
1503	10% Step Change IN Power	EVERYTHING IN AUTO EXCEPT THE CV-1, WHICH IS IN MANUAL. <u>Power AT Start:</u> Zone 1 1.87 V 2 1.95 V 3 2.30 V 4 2.24 V <u>Power AFTER 10% Change:</u> 1 1.76 V 2 1.75 V 3 2.07 V 4 2.01 V
1522	Return To Previous Power	
1526	ADD ATTENUATION	
1533	CLOSE ATTENUATOR.	
1535	CV-1 ON AUTOMATIC	
1539	CHANGED DRUM LVL SET POINT TO 44%	SYSTEM APPEARS TO GO WILD WHEN LVL FALLS BELOW 40%.
1605	CV-1 ON MANUAL Reduced Power To 30% Step Change	Reduced Power Zone 1 1.373 V Zone 2 1.360 V Zone 3 1.61 V Zone 4 1.566 V

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DATE 13 APR 77

TEST NO. 17
DEV. NO.
PAGE 5 OF 6

Time	OPERATOR ACTION	COMMENTS										
1636	Increase Power To Normal	(43% Step Change Up)										
1638	Add ATTEMPERATION											
1645	Stop ATTEMPERATION											
1647	Switched CV-1 To AUTO											
1717	Put Steam Valve on Manual Put Feedwater Valve on Manual Reduced Power 20% Switched FW Valve To AUTO AFTER 100 seconds	CV-1 CV-2 The DAC HAD AN I/O ERROR which caused all but one minute										
1734	CV-2 on Manual											
1735	Power back To normal CV-2 To AUTO AFTER 100 sec											
1738	Add ATTEMPERATION											
1745	CV-1 on AUTOMATIC Close ATTEMPERATOR											
1811	TRIP SIMULATOR	All Controls in AUTOMATIC It Worked Amazingly Well.										
1825	Switched Controls To MANUAL											
1930	RAN ARRAY DOWN Lit all 4 Zones To Equal Intensity Orange GLOW Power Seems Too Hi	<table border="1"> <thead> <tr> <th>Nom. Pwr Level</th> <th>Pwr Ppt</th> </tr> </thead> <tbody> <tr> <td>Zone 1 6%</td> <td>.025</td> </tr> <tr> <td>Zone 2 12%</td> <td>.025</td> </tr> <tr> <td>Zone 3 7%</td> <td>.025</td> </tr> <tr> <td>Zone 4 12%</td> <td>.025</td> </tr> </tbody> </table>	Nom. Pwr Level	Pwr Ppt	Zone 1 6%	.025	Zone 2 12%	.025	Zone 3 7%	.025	Zone 4 12%	.025
Nom. Pwr Level	Pwr Ppt											
Zone 1 6%	.025											
Zone 2 12%	.025											
Zone 3 7%	.025											
Zone 4 12%	.025											

TEST NO. 17
 DEV. NO. _____
 PAGE 6 OF 6

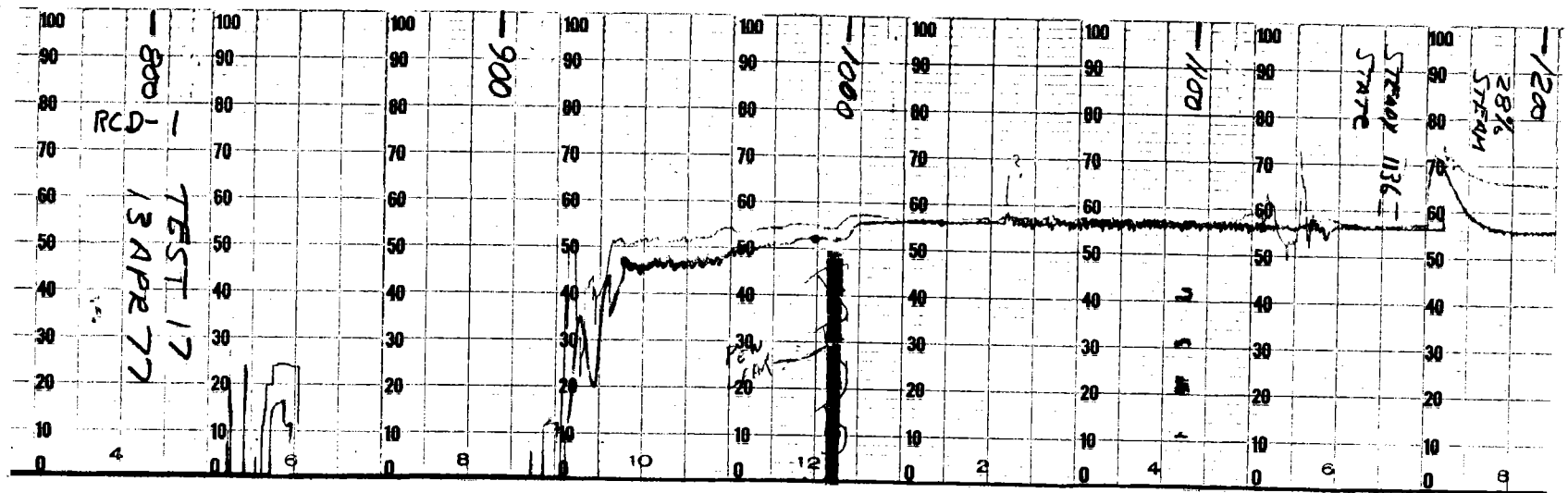
75

DATE 13 APR 77

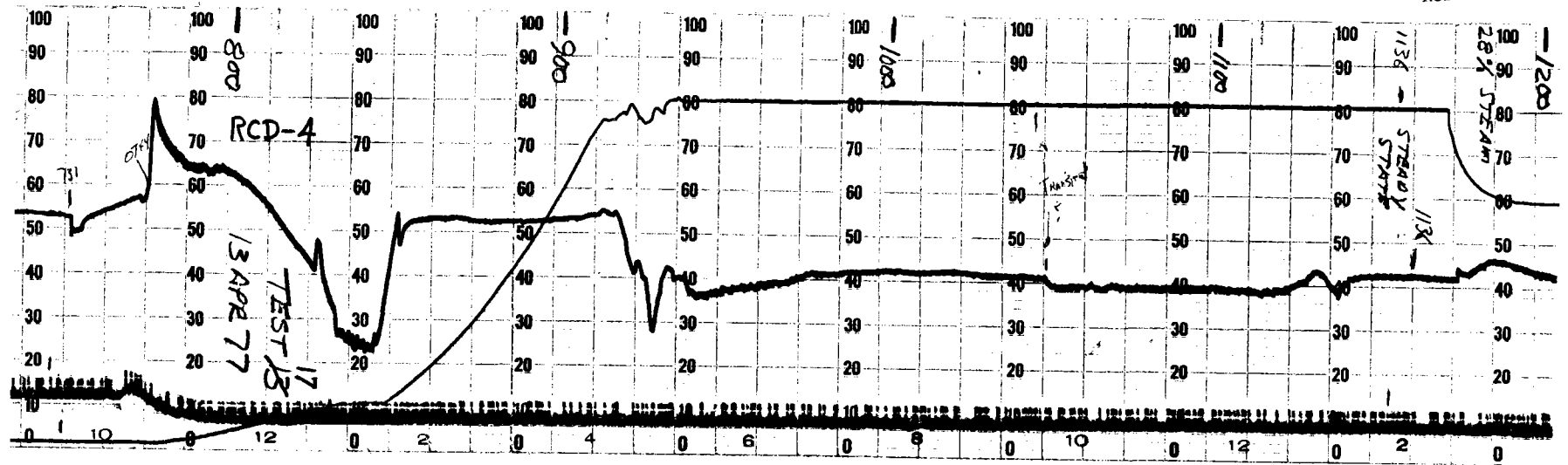
Time	OPERATOR ACTION	Comments
		98 Bulbs were burned out. See attached listing
1952	Bring Unit Down open CV-1 to 50%	
1955	Unpower Recirc Pump Execute Normal Start	AT 2017 the DAC quit recording DATA ON TAPE
2107	Unpower Analog Panel.	

SECTION 3

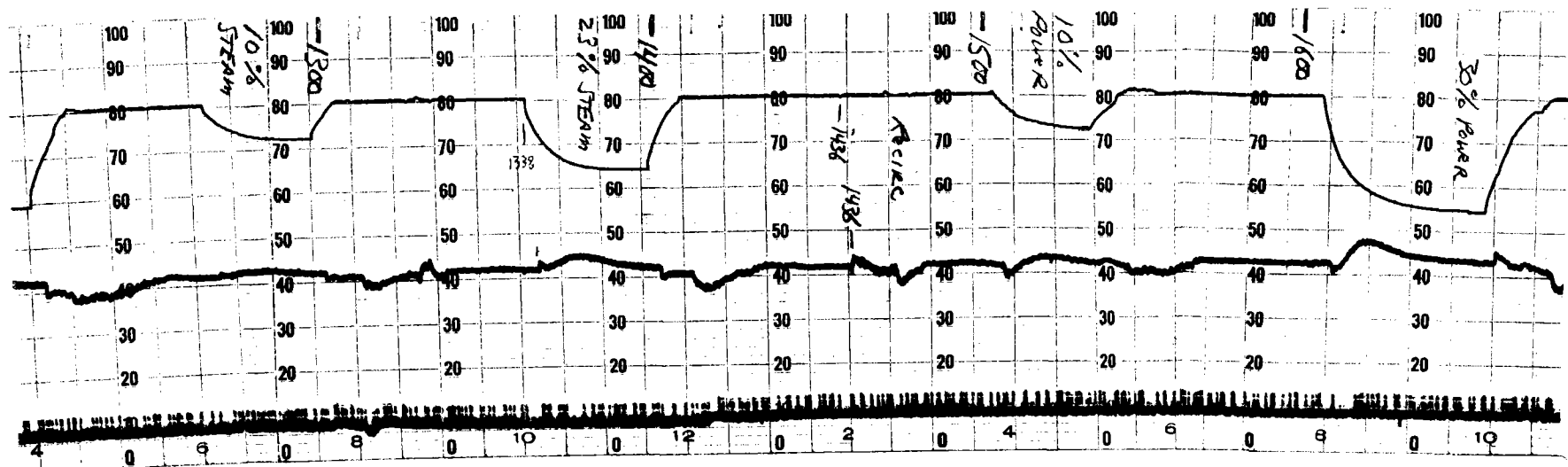
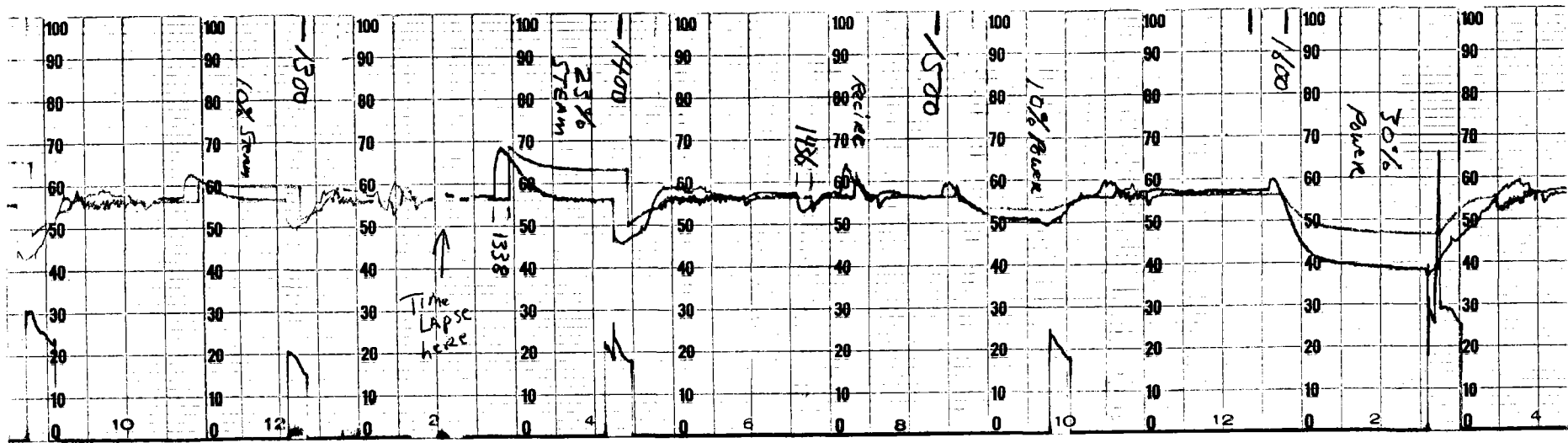
DATA SHEETS: RECORDER CHARTS

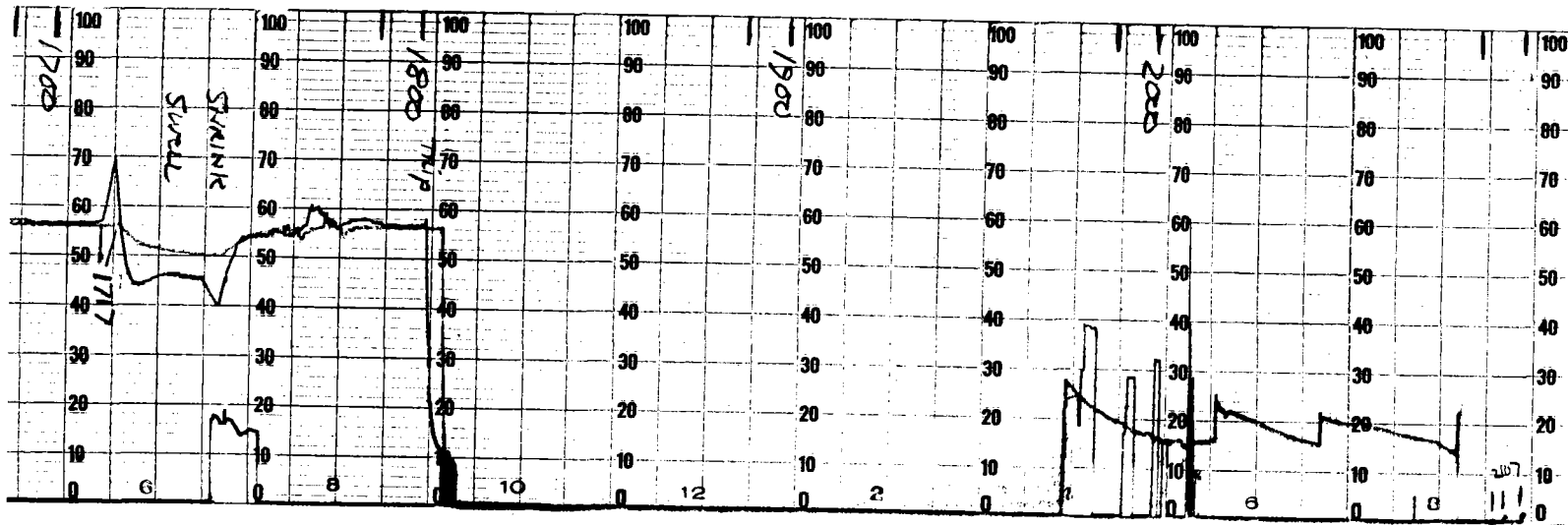


RCD-1

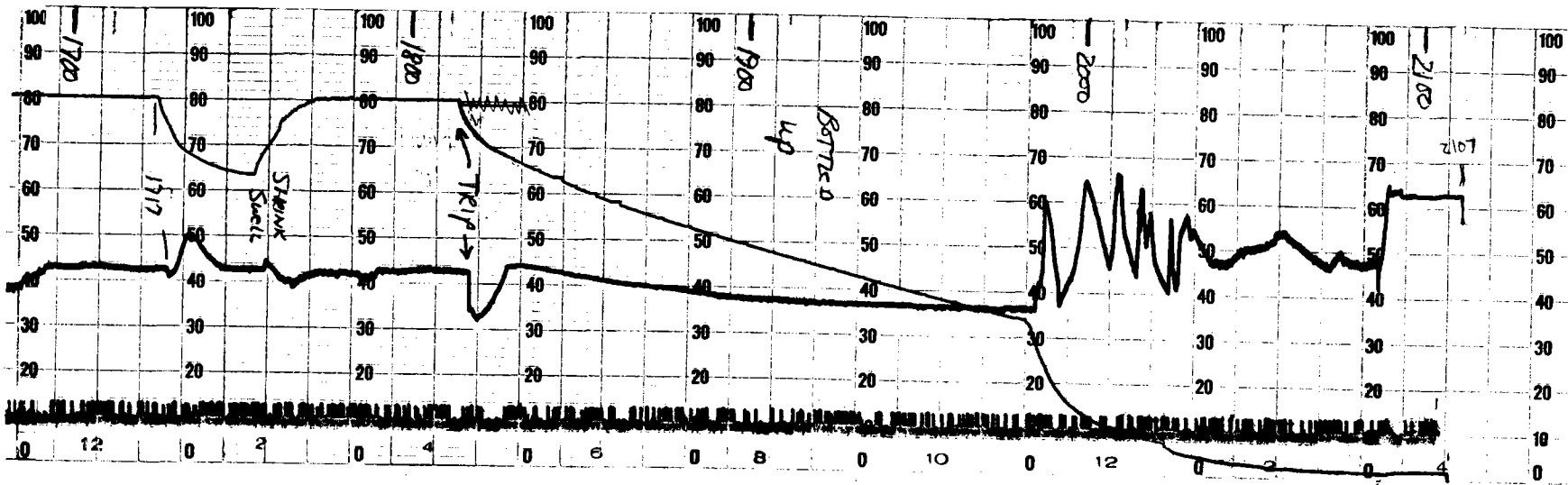


RCD-4

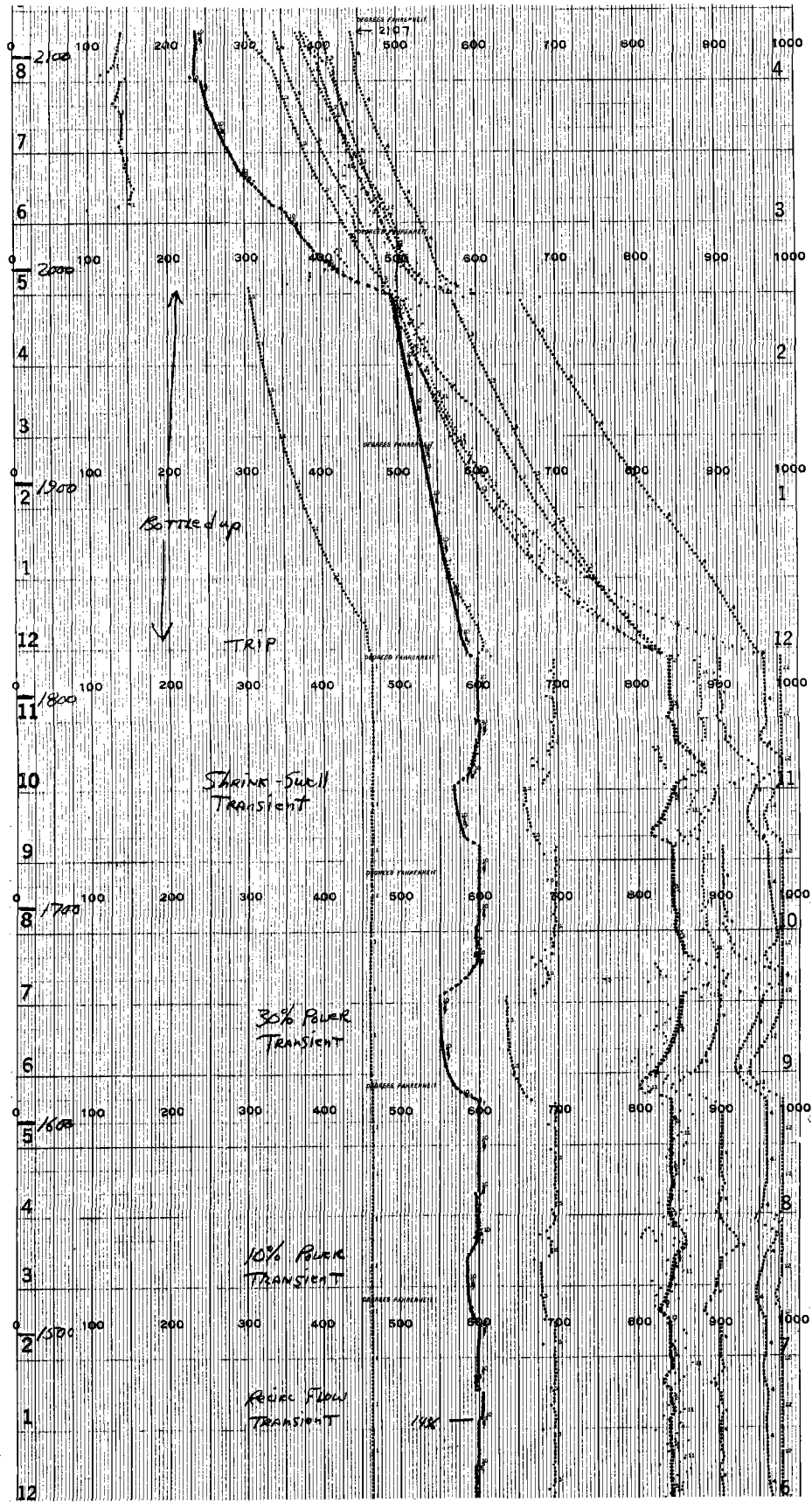




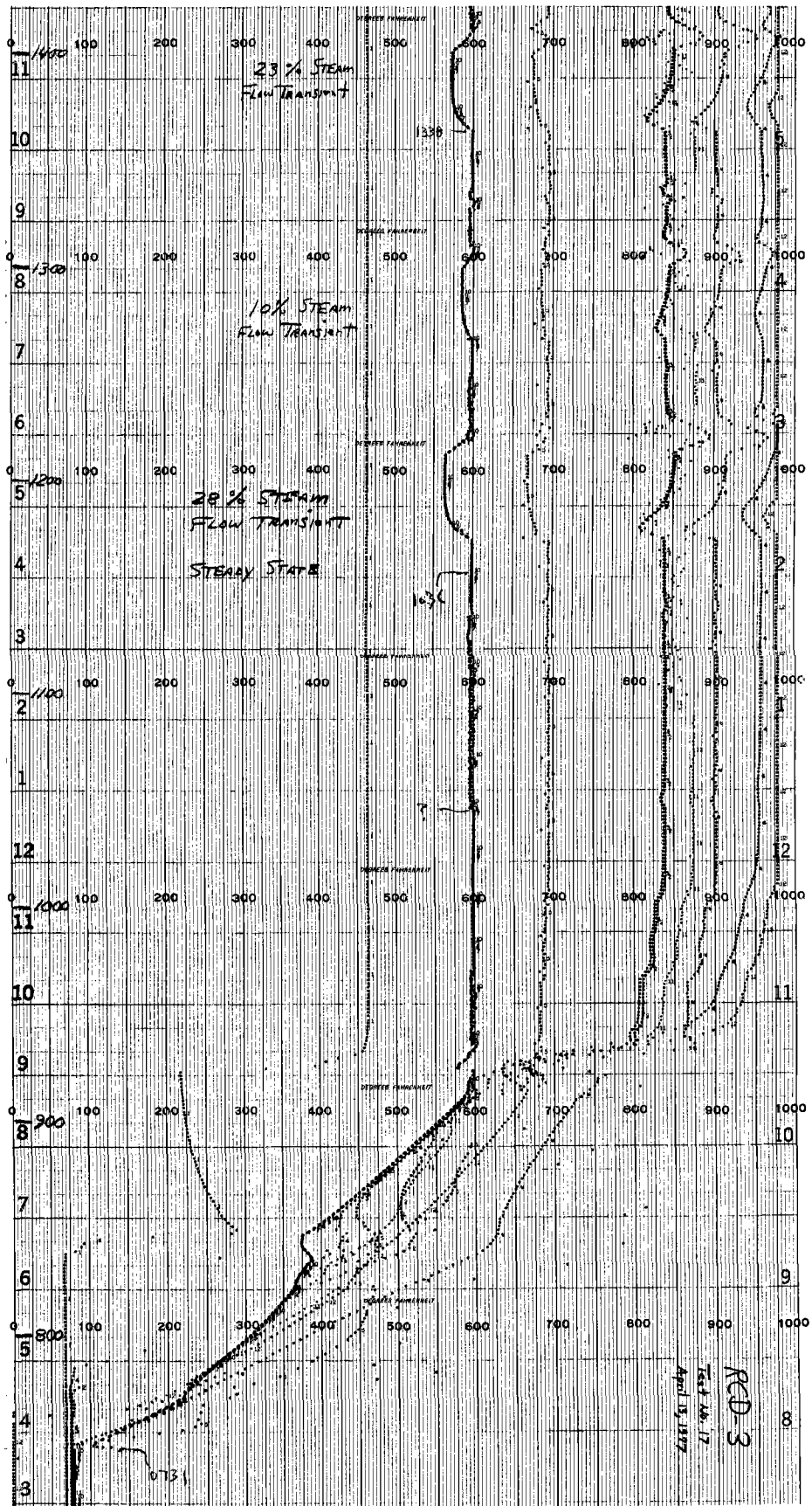
RCD-1



RCD-4



RCD-3



RCD-3

RCD-3
Test No. 17
April 15, 1977

SECTION 4
DATA SHEETS: DATA ACQUISITION SYSTEM TABULATION
AND PLOT PRINTOUTS

PAGE 1
OPERATOR SUMMARY

 OPERATOR SUMMARY 1977 103 11 37 17

BOILER

DRUM

P-D 1655
 T-D 610
 L-D 30
 W-FW 8850
 W-BD 0

PUMP

W-B 86900
 T-DC 603
 T-SUB -7
 T-PC 63

SUPERHEATER 1

INLET METAL	OUTLET METAL
TE405 699	TE450 149
TE406 671	TE451 905
TE407 702	TE452 905
TE408 682	TE453 -19
TE409 708	TE454 704

T-S11 610

W-ATT 0

SUPERHEATER 2

INLET METAL	OUTLET METAL
TE505 892	TE550 987
TE506 150	TE551 149
TE507 869	TE552 976
TE508 150	TE553 577
TE509 893	TE554 333

T-S20 958

P-S20 1586

W-S2 8866

POWER

BOILER ABS.	1831	NET INPUT	3197
S.H. *1 ABS.	597	TOTAL ABSORBED	2624
S.H. *2 ABS.	194	POWER RATIO	.8208

 OPERATOR SUMMARY 1977 103 13 59 17

BOILER

DRUM

P-D 1353
 T-D 584
 L-D 29
 W-FW 8703
 W-BD 0

PUMP

W-B 90250
 T-DC 579
 T-SUB -5
 T-PC 65

SUPERHEATER 1

INLET METAL

TE405 679
 TE406 648
 TE407 681
 TE408 660
 TE409 688

OUTLET METAL

TE450 149
 TE451 916
 TE452 914
 TE453 156
 TE454 730

T-S11 584

W-ATT 0

SUPERHEATER 2

INLET METAL

TE505 896
 TE506 150
 TE507 869
 TE508 150
 TE509 901

OUTLET METAL

TE550 997
 TE551 149
 TE552 985
 TE553 533
 TE554 318

T-S20 965

P-S20 1261

W-S2 8768

POWER

BOILER ABS.	1864	NET INPUT	3278
S.H. *1 ABS.	593	TOTAL ABSORBED	2637
S.H. *2 ABS.	179	POWER RATIO	.8045

 OPERATOR SUMMARY 1977 103 16 18 17

BOILER

DRUM		PUMP	
P-D	1182	W-B	89390
T-D	566	T-DC	562
L-D	31	T-SUB	-4
W-FW	6195	T-PC	65
W-BD	0		

SUPERHEATER 1

INLET METAL		OUTLET METAL	
TE405	645	TE450	149
TE406	617	TE451	883
TE407	647	TE452	881
TE408	631	TE453	309
TE409	654	TE454	577

T-S11 569

W-ATT 0

SUPERHEATER 2

INLET METAL		OUTLET METAL	
TE505	859	TE550	941
TE506	150	TE551	149
TE507	813	TE552	931
TE508	150	TE553	511
TE509	867	TE554	396

T-S20 920

P-S20 1124

W-S2 6372

POWER

BOILER ABS.	1399	NET INPUT	2292
S.H. *1 ABS.	401	TOTAL ABSORBED	1900
S.H. *2 ABS.	98	POWER RATIO	.8290

 OPERATOR SUMMARY 1977 103 16 49 17

BOILER

DRUM
 P-D 1650
 T-D 610
 L-D 26
 W-FW 8287
 W-BD 0

PUMP
 W-B 87830
 T-DC 602
 T-SUB -8
 T-PC 66

SUPERHEATER 1

INLET METAL		OUTLET METAL	
TE405	691	TE450	149
TE406	672	TE451	919
TE407	705	TE452	922
TE408	683	TE453	400
TE409	689	TE454	617

SUPERHEATER 2

INLET METAL		OUTLET METAL	
TE505	893	TE550	989
TE506	150	TE551	149
TE507	896	TE552	980
TE508	150	TE553	570
TE509	911	TE554	341

T-S11 610

T-S20 960

W-ATT 0

P-S20 1534

W-S2 8461

POWER

BOILER ABS.	1778	NET INPUT	3225
S.H. *1 ABS.	595	TOTAL ABSORBED	2535
S.H. *2 ABS.	161	POWER RATIO	.7060

PAGE 2
PERFORMANCE SUMMARY

 PERFORMANCE SUMMARY 1977 103 11 37 17

BOILER

DRUM
 P-D 1655
 T-D 610
 H-GD 1156
 H-FD 631
 N-CR .9801

FEEDWATER

P-FW 1900
 T-FW 469
 W-FW 8850
 H-FW 452

FLOW CIRCUITS

T-DC 603
 T-SUB -7
 W-B 86900
 W-BC1 9987
 W-BC2 9792
 W-BC3 9693
 X-B 19.615

POWER

BOILER ABS. 1831
 S.H. *1 ABS. 597
 S.H. *2 ABS. 194

SUPERHEATERS

S.H. STAGE 1
 W-S1 8866
 T-S1I 610
 T-S1O 843
 P-S1O 1626
 H-S1O 1386
 ATTEMPERATOR
 P-ATT 1900
 T-ATT 73
 W-ATT 0
 H-ATT 33

S.H. STAGE 2

W-S2 8866
 T-S2I 842
 T S2O 958
 P-S2O 1586
 H-S2O 1461

BOILER

L-D 30
 T-BI 603
 H-BI 639
 R-BI 38.871
 R-GD 4.1680
 R-FD 41.485

ARRAY - KW

ZONE 1 927
 ZONE 2 909
 ZONE 3 1147
 ZONE 4 1117
 TOTAL 4100

NET INPUT 3197
 TOTAL ABSORBED 2624
 POWER RATIO .8208

PERFORMANCE SUMMARY		1977	103	13	59	17		
BOILER		SUPERHEATERS					BOILER	
DRUM		S.H. STAGE 1					L-D 29	
P-D	1353	W-S1	8768	T-BI	577	H-BI	594	
T-D	584	T-S1I	584	R-BI	42.319	R-GD	3.2293	
H-GD	1175	T-S10	852	R-FD	43.590			
H-FD	594	P-S10	1316					
N-CR	1.0293	H-S10	1406					
FEEDWATER		ATTEMPERATOR						
P-FW	1894	P-ATT	1894					
T-FW	470	T-ATT	239					
W-FW	8703	W-ATT	0					
H-FW	453	H-ATT	209					
FLOW CIRCUITS		S.H. STAGE 2					ARRAY - KW	
T-DC	579	W-S2	8768	ZONE 1	929	ZONE 2	906	
T-SUB	-5	T-S2I	851	ZONE 3	1149	ZONE 4	1117	
W-B	90250	T S20	965	TOTAL	4101			
W-BC1	10395	P-S20	1261					
W-BC2	10086	H-S20	1476					
W-BC3	10129							
X-B	19.355							
POWER								
BOILER ABS.	1864	NET INPUT	3278					
S.H. *1 ABS.	593	TOTAL ABSORBED	2637					
S.H. *2 ABS.	179	POWER RATIO	.8045					

Normal

Power Step Change

PERFORMANCE SUMMARY

1977 103 14 59 17

BOILER

DRUM
P-D 1655
T-D 510
H-GD 1156
H-FD 231
N-DR 19779

FEEDWATER

P-FW 1897
T-FW 489
W-FW 3742
H-FW 452

FLOW CIRCUITS

T-DC 225
T-SUB 5
W-B 36740
W-BC1 9905
W-BC2 9772
W-BC3 9617
X-B 19.624

SUPERHEATERS

S.H. STAGE 1
W-S1 8870
T-S1I 210
T-S1O 843
P-S1O 1625
H-S1O 1386
ATTEMPERATOR
P-ATT 1897
T-ATT 253
W-ATT 0
H-ATT 223

S.H. STAGE 2

W-S2 8870
T-S2I 842
T-S2O 957
P-S2O 1584
H-S2O 1460

BOILER

C-D 30
T-BI 605
H-BI 643
R-BI 38.446
R-GD 4.1680
R-FD 41.485

ARRAY - KW

ZONE 1 929
ZONE 2 909
ZONE 3 1149
ZONE 4 1120
TOTAL 4107

POWER

BOILER ABS.	1847	NET INPUT	3213
S.H. #1 ABS.	597	TOTAL ABSORBED	2637
S.H. #2 ABS.	192	POWER RATIO	.8207

AFTER ~10% STEP *Power Step Change*

 PERFORMANCE SUMMARY 1577 103 15 6 17

BOILER

W-DP
 P-D 1811
 T-D 807
 H-D 1160
 H-FD 827
 H-GR 1.0079
 FEEDWATER
 P-FW 1903
 T-FW 429
 W-FW 9033
 H-FW 452

SUPERHEATERS

S.H. STAGE 1
 W-S1 3560
 T-S11 807
 T-S10 835
 P-S10 1583
 H-S10 1382
 AT OPERATOR
 P-A1T 1903
 T-A1T 241
 W-A1T 0
 H-A1T 211

BOILER

L-D 28
 T-BI 599
 H-BI 632
 R-BI 39.439
 R-GD 4.0102
 R-FD 41.735

FLOW CIRCUITS

T-DC 820
 T-SUB -7
 W-B 36280
 W-BC1 9971
 W-BC2 9746
 W-BC3 9732
 X-B 18.938

S.H. STAGE 2

W-S2 8560
 T-S21 835
 T-S20 955
 P-S20 1546
 H-S20 1461

ARRAY - KW

ZONE 1 839
 ZONE 2 820
 ZONE 3 1034
 ZONE 4 1005
 TOTAL 3698

POWER

BOILER ABS. 1687 NET INPUT 2897
 S.H. #1 ABS. 556 TOTAL ABSORBED 2442
 S.H. #2 ABS. 198 POWER RATIO .8429

 PERFORMANCE SUMMARY 1977 103 16 18 17

BOILER

DRUM
 P-D 1177
 T-D 566
 H-GD 1183
 H-FD 570
 N-CR 1.4145
 FEEDWATER
 P-FW 1908
 T-FW 467
 W-FW 6170
 H-FW 449

SUPERHEATERS

S.H. STAGE 1
 W-S1 6354
 T-S1I 568
 T-S1O 830
 P-S1O 1152
 H-S1O 1399
 ATTEMPERATOR
 P-ATT 1908
 T-ATT 251
 W-ATT 0
 H-ATT 221

BOILER

L-D 31
 T-BI 561
 H-BI 569
 R-BI 44.021
 R-GD 2.7452
 R-FD 44.896

FLOW CIRCUITS

T-DC 562
 T-SUB -4
 W-B 89880
 W-BC1 10359
 W-BC2 10216
 W-BC3 10056
 X-B 14.151

S.H. STAGE 2

W-S2 6354
 T-S2I 832
 T S2O 921
 P-S2O 1124
 H-S2O 1455

ARRAY - KW

ZONE 1 652
 ZONE 2 634
 ZONE 3 809
 ZONE 4 783
 TOTAL 2878

POWER

 BOILER ABS. 1396 NET INPUT 2327
 S.H. *1 ABS. 396 TOTAL ABSORBED 1897
 S.H. *2 ABS. 104 POWER RATIO .8153

 PERFORMANCE SUMMARY 1977 103 16 49 17

 BOILER

 DRUM
 P-D 1650
 T-D 610
 H-GD 1157
 H-FD 631
 N-CR 1.0381
 FEEDWATER
 P-FW 1883
 T-FW 467
 W-FW 8287
 H-FW 449

FLOW CIRCUITS

T-DC 602
 T-SUB -8
 W-B 87830
 W-BC1 10042
 W-BC2 9876
 W-BC3 9806
 X-B 18.844

POWER

 BOILER ABS. 1778 NET INPUT 3225
 S.H. *1 ABS. 595 TOTAL ABSORBED 2535
 S.H. *2 ABS. 161 POWER RATIO .7860

SUPERHEATERS

 S.H. STAGE 1
 W-S1 8461
 T-S1I 610
 T-S10 859
 P-S10 1621
 H-S10 1397
 ATTEMPERATOR
 P-ATT 1883
 T-ATT 409
 W-ATT 0
 H-ATT 386

S.H. STAGE 2

W-S2 8461
 T-S2I 857
 T S20 960
 P-S20 1584
 H-S20 1462

BOILER

 L-D 26
 T-BI 603
 H-BI 636
 R-BI 39.068
 R-GD 4.1417
 R-FD 41.478

ARRAY - KW

ZONE 1 929
 ZONE 2 911
 ZONE 3 1149
 ZONE 4 1120
 TOTAL 4109

PAGE 3

BASE DATA REPORT -- METAL TEMPERATURES

 BASE DATA REPORT - METAL TEMPERATURES

1977 103 11 37 17

TE 210-217	592	602	612	241	546	598	466	599		
TE 330-339	646	528	650	647	647	654	648	649	643	647
TE 340-349	650	647	648	647	648	648	648	648	645	613
TE 350-359	646	651	652	644	640	644	647	647	646	646
TE 360-369	642	617	644	644	644	646	648	646	643	627
TE 370-379	529	645	648	649	648	646	638	630	642	643
TE 380-389	645	645	644	643	643	629	644	645	648	643
TE 405-409	699	671	702	682	703					
TE 450-459	149	905	905	-19	704	856	829	299	839	843
TE 460-466	150	852	851	851	847	840	844			
TE 420-429	633	268	630	636	713	671	679	688	697	707
TE 430-439	727	746	758	764	775	785	803	817	828	832
TE 440	832									
TE 505-509	892	150	869	150	893					
TE 550-554	987	149	976	577	333					
TE 555-560	954	959	149	965	959	958				
TE 561-566	963	961	970	962	839	958				
TE 520-529	-1579	853	857	862	873	150	889	895	895	902
TE 530-539	912	918	923	929	932	937	943	951	956	560
TE 540	149									
TE 470-471	825	830		TE 570-571	919	960				
TE 601-606	801	658	535	822	805	791				
TE 607-612	598	590	582	950	946	944				

 BASE DATA REPORT - METAL TEMPERATURES

	1977	103	13	59	17					
TE 210-217	570	578	592	244	529	575	466	576		
TE 330-339	619	453	624	619	619	629	623	623	616	619
TE 340-349	623	619	619	619	619	620	621	619	617	588
TE 350-359	619	624	624	617	614	616	620	620	618	618
TE 360-369	617	591	617	618	617	620	621	620	617	601
TE 370-379	536	620	622	624	622	620	611	604	617	618
TE 380-389	620	620	618	618	617	603	619	622	624	617
TE 405-409	679	648	681	660	688					
TE 450-459	149	916	914	156	730	864	839	277	850	854
TE 460-466	150	862	869	858	854	853	856			
TE 420-429	610	270	610	618	816	659	669	679	690	702
TE 430-439	725	747	761	767	780	790	809	825	836	842
TE 440	842									
TE 505-509	896	150	869	150	901					
TE 550-554	997	149	985	533	318					
TE 555-560	962	968	149	974	970	965				
TE 561-566	971	970	978	971	833	966				
TE 520-529	-1002	862	867	872	884	150	900	905	905	913
TE 530-539	923	929	933	957	943	949	954	961	965	564
TE 540	149									
TE 470-471	830	830				TE 570-571	930	960		
TE 601-606	801	660	540	828	809	795				
TE 607-612	577	571	568	947	942	941				

 BASE DATA REPORT - METAL TEMPERATURES 1977 103 16 18 17

TE 210-217	563	572	598	249	526	571	462	564		
TE 330-339	591	401	595	591	592	604	595	595	590	591
TE 340-349	593	591	592	592	593	593	593	593	591	568
TE 350-359	591	594	595	590	586	588	590	590	589	590
TE 360-369	587	571	590	591	591	591	592	592	589	578
TE 370-379	526	592	594	594	594	592	586	581	591	591
TE 380-389	592	592	591	591	591	580	592	593	595	591
TE 405-409	645	620	647	630	654					
TE 450-459	149	882	881	308	575	847	827	276	836	839
TE 460-466	150	844	852	842	839	840	842			
TE 420-429	593	310	598	607	928	651	662	673	685	697
TE 430-439	720	742	756	761	773	783	801	816	825	829
TE 440	829									
TE 505-509	861	150	832	150	868					
TE 550-554	943	149	929	509	398					
TE 555-560	917	922	149	924	921	919				
TE 561-566	924	923	928	922	814	921				
TE 520-529	-545	839	843	847	857	150	871	875	875	880
TE 530-539	888	892	896	902	903	908	910	916	920	541
TE 540	149									
TE 470-471	810	815		TE 570-571	925	928				
TE 601-606	786	655	540	811	796	785				
TE 607-612	571	570	567	933	936	937				

 BASE DATA REPORT - METAL TEMPERATURES

1977 103 16 49 17

TE 210-217	584	592	604	244	530	587	462	599		
TE 330-339	644	452	650	645	645	657	648	648	642	645
TE 340-349	648	645	647	646	647	647	647	647	643	610
TE 350-359	644	650	650	642	639	643	645	645	644	644
TE 360-369	641	614	643	644	643	646	648	646	642	625
TE 370-379	535	646	648	649	648	646	636	628	641	642
TE 380-389	644	644	643	643	642	627	643	646	647	642
TE 405-409	691	672	705	683	689					
TE 450-459	149	919	922	400	617	869	844	297	850	856
TE 460-466	150	867	856	866	859	847	853			
TE 420-429	624	283	629	635	951	673	681	690	701	712
TE 430-439	733	753	766	773	784	794	812	828	838	843
TE 440	843									
TE 505-509	893	150	896	150	911					
TE 550-554	989	149	980	570	341					
TE 555-560	956	963	149	968	963	960				
TE 561-566	965	963	970	965	843	961				
TE 520-529	-405	870	876	881	895	150	911	916	916	923
TE 530-539	932	937	940	955	947	948	954	959	962	563
TE 540	149									
TE 470-471	858	856				TE 570-571	943	965		
TE 601-606	806	661	538	846	829	812				
TE 607-612	585	575	564	950	944	940				

PAGE 4
BASE DATA REPORT -- FLUID

 BASE DATA REPORT - FLUID 1977 103 11 37 17

TEMPERATURES - FLUID

TE 19	469
TE 260	493
TE 300	603
TE 301	603
TE 306	63
TE 310	603
TE 311	603
TE 400	610
TE 401	610
TE 402	610
TE 476	843
TE 480	73
TE 501	842
TT 590	958

LEVELS

LT 210	30
LT 211	32

PRESSURES

PT 1	1900
PT 2	1586
PT 3	143
PT 230	1655
PT 475	1626
PT 590	1586

FLOWS

FT 1	8850
FT 3	8866
FT 260	0
FT 310	86900
FT 350	9987
FT 351	9792
FT 352	9693
FT 480	0

FT 13	132830
PUMP JACKET	63

 BASE DATA REPORT - FLUID 1977 103 13 59 17

TEMPERATURES - FLUID

TE 19	470
TE 260	345
TE 300	579
TE 301	577
TE 306	65
TE 310	577
TE 311	577
TE 400	584
TE 401	584
TE 402	584
TE 476	852
TE 480	239
TE 501	851
TT 590	965

LEVELS

LT 210	29
LT 211	30

PRESSURES

PT 1	1894
PT 2	1265
PT 3	144
PT 230	1353
PT 475	1316
PT 590	1261

FLOWS

FT 1	8703
FT 3	8768
FT 260	0
FT 310	90250
FT 350	10395
FT 351	10086
FT 352	10129
FT 400	0

FT 13	131150
PUMP JACKET	63

 BASE DATA REPORT - FLUID 1977 103 16 18 17

TEMPERATURES - FLUID

TE 19	467
TE 260	188
TE 300	562
TE 301	561
TE 306	66
TE 310	561
TE 311	562
TE 400	569
TE 401	569
TE 402	567
TE 476	830
TE 480	251
TE 501	832
TT 590	921

PRESSURES

PT 1	1908
PT 2	1130
PT 3	143
PT 230	1177
PT 475	1152
PT 590	1124

FLOWS

FT 1	6170
FT 3	6354
FT 260	0
FT 310	89880
FT 350	10359
FT 351	10216
FT 352	10056
FT 480	0

LEVELS

LT 210	31
LT 211	32

FT 13	131520
PUMP JACKET	65

 BASE DATA REPORT - FLUID 1977 103 16 49 17

TEMPERATURES - FLUID

TE 19	467
TE 260	167
TE 300	602
TE 301	601
TE 306	66
TE 310	603
TE 311	603
TE 400	610
TE 401	610
TE 402	610
TE 476	859
TE 480	409
TE 501	857
TT 590	960

LEVELS

LT 210	26
LT 211	27

PRESSURES

PT 1	1883
PT 2	1586
PT 3	148
PT 230	1650
PT 475	1621
PT 590	1584

FLOWS

FT 1	8287
FT 3	8461
FT 260	0
FT 310	87830
FT 350	10042
FT 351	9876
FT 352	9806
FT 480	0

FT 13	130210
PUMP JACKET	65

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COOLING WATER TEMPERATURE

 COOLING WATER TEMPERATURES 1977 103 11 37 17

INLET TEMPERATURE TE 26 59

OUTLET TEMPERATURES

RECIRCULATION PUMP TT 306 63
 PUMP JACKET TE 613 63

FLUX BOOM TT 16 88

POWER CONTROLLERS TT 23 64

ARRAY POINTS

FACET 12		FACET 3		FACET 6		FACET 9	
BUSBAR COOLERS							
TE 700	102	TE 701	106	TE 702	106	TE 703	103

REFLECTOR COOLERS

TE 704	78	TE 705	82	TE 706	85	TE 707	96
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UPPER SKIRT	LOWER SKIRT	AMBIENT AIR
TE 708 70	TE 709 80	TE 710 122

ARRAY & FLUX BOOM OUTLET TE 24 83

 COOLING WATER TEMPERATURES 1977 103 13 59 17

INLET TEMPERATURE TE 26 61

OUTLET TEMPERATURES

RECIRCULATION PUMP TT 306 65
 PUMP JACKET TE 613 63

FLUX BOOM TT 16 89

POWER CONTROLLERS TT 23 65

ARRAY POINTS

FACET 12		FACET 3		FACET 6		FACET 9	
BUSBAR COOLERS							
TE 700	105	TE 701	104	TE 702	94	TE 703	102

REFLECTOR COOLERS

TE 704	83	TE 705	88	TE 706	86	TE 707	98
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UPPER SKIRT	LOWER SKIRT	AMBIENT AIR
TE 708 70	TE 709 78	TE 710 129

ARRAY & FLUX BOOM OUTLET TE 24 83

 COOLING WATER TEMPERATURES 1977 103 16 10 17

INLET TEMPERATURE TE 26 63

OUTLET TEMPERATURES

RECIRCULATION PUMP TT 306 66
 PUMP JACKET TE 613 65

FLUX BOOM TT 16 84

POWER CONTROLLERS TT 23 65

ARRAY POINTS

FACET 12	FACET 3	FACET 6	FACET 9
BUSBAR COOLERS			
TE 700 95	TE 701 97	TE 702 95	TE 703 94

REFLECTOR COOLERS

TE 704 75	TE 705 79	TE 706 81	TE 707 92
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UPPER SKIRT	LOWER SKIRT	AMBIENT AIR
TE 708 69	TE 709 78	TE 710 120

ARRAY & FLUX BOOM OUTLET TE 24 77

 COOLING WATER TEMPERATURES 1977 103 16 49 17

INLET TEMPERATURE	TE 26	62					
OUTLET TEMPERATURES							
RECIRCULATION PUMP	TT 306	66					
PUMP JACKET	TE 613	65					
FLUX BOOM	TT 16	90					
POWER CONTROLLERS	TT 23	67					
ARRAY POINTS							
FACET 12			FACET 3		FACET 6		FACET 9
BUSBAR COOLERS							
TE 700	107	TE 701	106	TE 702	95	TE 703	103
REFLECTOR COOLERS							
TE 704	85	TE 705	89	TE 706	90	TE 707	99
UPPER SKIRT		LOWER SKIRT		AMBIENT AIR			
TE 708	70	TE 709	79	TE 710	127		
ARRAY & FLUX BOOM OUTLET	TE 24	85					

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FIRST STAGE SUPERHEATER METAL TEMPERATURES

FIRST STAGE SUPERHEATER METAL TEMPERATURES					1977	103	11	37	17

TUBE OUTLET METAL TEMPERATURES									
TUBE NUMBER	2	5	4	11	8				
ANGLE REF-N	300	210	240	30	120				
	149	905	905	704	-19				
TUBE INLET METAL TEMPERATURES									
TUBE NUMBER	6	9	4	3	12				
ANGLE REF-N	300	210	0	30	120				
	671	702	699	708	682				
TUBE-TO-TUBE OUTLET TEMPERATURES									
TUBE NUMBER	1	2	3	4	5	6			
	829	299	839	843	150	852			
TUBE NUMBER	7	8	9	10	11	12			
	851	851	847	840	844	856			
HEADER TEMPERATURES									
METAL	856	830	FLUID	843					
DRUM TEMPERATURES									
GUSSET PLATE	DRUM	598	STEAM LEVEL	612					
	BRACKET	546	WATER LEVEL	592					
	BASE	241	DRUM AT FEED	602					
			FEED LINE	466					
			DOWNCOMER	599					

 FIRST STAGE SUPERHEATER METAL TEMPERATURES 1977 103 13 59 17

TUBE OUTLET METAL TEMPERATURES

TUBE NUMBER	2	5	4	11	8
ANGLE REF-N	300	210	240	30	120
	149	914	916	730	156

TUBE INLET METAL TEMPERATURES

TUBE NUMBER	6	9	4	3	12
ANGLE REF-N	300	210	0	30	120
	648	681	679	688	660

TUBE-TO-TUBE OUTLET TEMPERATURES

TUBE NUMBER	1	2	3	4	5	6
	839	277	850	854	150	862
TUBE NUMBER	7	8	9	10	11	12
	869	858	854	853	856	864

HEADER TEMPERATURES

METAL	864	830	FLUID	852
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DRUM TEMPERATURES

GUSSET PLATE	DRUM	575	STEAM LEVEL	592
	BRACKET	529	WATER LEVEL	570
	BASE	244	DRUM AT FEED	578
			FEED LINE	466
			DOWNCOMER	576

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FIRST STAGE SUPERHEATER METAL TEMPERATURES      1977 103 16 18 17
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TUBE OUTLET METAL TEMPERATURES
TUBE NUMBER      2      5      4      11      8
ANGLE REF-N      300    210    240    30     120
                  149    881    882    575    308

TUBE INLET METAL TEMPERATURES
TUBE NUMBER      6      9      4      3      12
ANGLE REF-N      300    210    0      30     120
                  620    647    645    654    630

TUBE-TO-TUBE OUTLET TEMPERATURES
TUBE NUMBER      1      2      3      4      5      6
                  828    281    837    840    150    845
TUBE NUMBER      7      8      9      10     11     12
                  851    843    840    840    842    811

HEADER TEMPERATURES
METAL      847    815    FLUID    830

DRUM TEMPERATURES
GUSSET PLATE  DRUM      571    STEAM LEVEL    598
                BRACKET   526    WATER LEVEL    563
                BASE     249    DRUM AT FEED   572
                                   FEED LINE     462
                                   DOWNCOMER     564

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 FIRST STAGE SUPERHEATER METAL TEMPERATURES 1977 103 16 49 17

TUBE OUTLET METAL TEMPERATURES

TUBE NUMBER	2	5	4	11	8
ANGLE REF-N	300	210	240	30	120
	149	922	919	617	400

TUBE INLET METAL TEMPERATURES

TUBE NUMBER	6	9	4	3	12
ANGLE REF-N	300	210	0	30	120
	672	705	691	689	683

TUBE-TO-TUBE OUTLET TEMPERATURES

TUBE NUMBER	1	2	3	4	5	6
	844	297	850	856	150	867
TUBE NUMBER	7	8	9	10	11	12
	856	866	859	847	853	869

HEADER TEMPERATURES

METAL	869	856	FLUID	859
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DRUM TEMPERATURES

GUSSET PLATE	DRUM	587	STEAM LEVEL	604
	BRACKET	530	WATER LEVEL	584
	BASE	244	DRUM AT FEED	592
			FEED LINE	462
			DOWNCOMER	599

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SECOND STAGE SUPERHEATER METAL TEMPERATURES

 SECOND STAGE SUPERHEATER METAL TEMPERATURES 1977 103 11 37 17

TUBE OUTLET METAL TEMPERATURES

TUBE NUMBER	2	5	4	11	8
ANGLE REF-N	300	210	240	30	120
	987	976	149	333	577

TUBE INLET METAL TEMPERATURES

TUBE NUMBER	6	9	4	3	12
ANGLE REF-N	300	210	0	30	120
	150	869	892	893	150

TUBE-TO-TUBE OUTLET TEMPERATURES

TUBE NUMBER	1	2	3	4	5	6
	959	149	965	959	958	963
TUBE NUMBER	7	8	9	10	11	12
	961	970	962	839	958	954

HEADER TEMPERATURES

METAL	954	960	FLUID	958
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LUG TEMPERATURES

HEADER DISTANCE (INCHES)

	.875	2.125	3.375
BOILER OUTLET SUPRT	801	658	535
S.H.1 OUTLET SUPRT	822	805	791
S.H.2 SNUBBER PLATE	598	590	582
S.H.2 SNUBBER BRAKT	950	945	944

 SECOND STAGE SUPERHEATER METAL TEMPERATURES 1977 103 13 59 17

TUBE OUTLET METAL TEMPERATURES

TUBE NUMBER	2	5	4	11	8
ANGLE REF-N	300	210	240	30	120
	997	985	149	318	533

TUBE INLET METAL TEMPERATURES

TUBE NUMBER	6	9	4	3	12
ANGLE REF-N	300	210	0	30	120
	150	869	896	901	150

TUBE-TO-TUBE OUTLET TEMPERATURES

TUBE NUMBER	1	2	3	4	5	6
	968	149	974	970	965	971
TUBE NUMBER	7	8	9	10	11	12
	970	978	971	833	966	962

HEADER TEMPERATURES

METAL	962	960	FLUID	965
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LUG TEMPERATURES

	HEADER DISTANCE (INCHES)		
	.875	2.125	3.375
BOILER OUTLET SUPRT	801	660	540
S.H.1 OUTLET SUPRT	828	809	795
S.H.2 SNUBBER PLATE	577	571	568
S.H.2 SNUBBER BRKT	947	942	941

 SECOND STAGE SUPERHEATER METAL TEMPERATURES 1977 103 15 30 17

TUBE OUTLET METAL TEMPERATURES

TUBE NUMBER	2	5	4	11	8
ANGLE REF-N	300	210	240	30	120
	997	986	149	344	542

TUBE INLET METAL TEMPERATURES

TUBE NUMBER	6	9	4	3	12
ANGLE REF-N	300	210	0	30	120
	150	847	856	864	150

TUBE-TO-TUBE OUTLET TEMPERATURES

TUBE NUMBER	1	2	3	4	5	6
	966	149	973	970	965	973
TUBE NUMBER	7	8	9	10	11	12
	970	979	971	845	965	941

HEADER TEMPERATURES

METAL	965	967	FLUID	969
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LUG TEMPERATURES

HEADER DISTANCE (INCHES)

	.875	2.125	3.375
BOILER OUTLET SUPRT	805	662	542
S.H.1 OUTLET SUPRT	834	815	799
S.H.2 SNUBBER PLATE	594	584	578
S.H.2 SNUBBER BRAKT	950	945	943

 SECOND STAGE SUPERHEATER METAL TEMPERATURES 1977 103 16 19 17

TUBE OUTLET METAL TEMPERATURES

TUBE NUMBER	2	5	4	11	8
ANGLE REF-N	300	210	240	30	120
	944	932	149	403	523

TUBE INLET METAL TEMPERATURES

TUBE NUMBER	6	9	4	3	12
ANGLE REF-N	300	210	0	30	120
	150	841	862	869	150

TUBE-TO-TUBE OUTLET TEMPERATURES

TUBE NUMBER	1	2	3	4	5	6
	924	149	926	922	919	926
TUBE NUMBER	7	8	9	10	11	12
	924	929	923	807	921	919

HEADER TEMPERATURES

METAL	919	927	FLUID	921
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LUG TEMPERATURES

HEADER DISTANCE (INCHES)

	.875	2.125	3.375
BOILER OUTLET SUPRT	786	655	540
S.H.1 OUTLET SUPRT	811	796	786
S.H.2 SNUBBER PLATE	570	569	566
S.H.2 SNUBBER BRAKT	933	935	937

 SECOND STAGE SUPERHEATER METAL TEMPERATURES 1977 103 16 49 17

TUBE OUTLET METAL TEMPERATURES

TUBE NUMBER	2	5	4	11	8
ANGLE REF-N	300	210	240	30	120
	989	980	149	341	570

TUBE INLET METAL TEMPERATURES

TUBE NUMBER	6	9	4	3	12
ANGLE REF-N	300	210	0	30	120
	150	896	893	911	150

TUBE-TO-TUBE OUTLET TEMPERATURES

TUBE NUMBER	1	2	3	4	5	6
	963	149	968	963	960	965
TUBE NUMBER	7	8	9	10	11	12
	963	970	965	843	961	956

HEADER TEMPERATURES

METAL	956	965	FLUID	960
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LUG TEMPERATURES

HEADER DISTANCE (INCHES)

	.875	2.125	3.375
BOILER OUTLET SUPRT	806	661	538
S.H.1 OUTLET SUPRT	846	829	812
S.H.2 SNUBBER PLATE	585	575	564
S.H.2 SNUBBER BRAKT	950	944	940

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BOILER TEMPERATURE PROFILE

 BOILER TEMPERATURE PROFILE 1977 103 11 37 17

DRUM T-SAT 610

LEVEL	COLUMN									
	1	2	3	4	5	6	7	8	9	10
8 66.0	646 T-81	647 T-82	643 T-83	648 T-84	646 T-85	640 T-86	644 T-87	529 T-88	642 T-89	644 T-810
7 57.2				647 T-74		644 T-76	644 T-77	645 T-78	643 T-79	
6 48.5	528 T-61	654 T-62	647 T-63	648 T-64	651 T-65	647 T-66	644 T-67	648 T-68	645 T-69	646 T-610
5 38.8				648 T-54		647 T-56	646 T-57	649 T-58	645 T-59	
4 29.0	650 T-41	648 T-42	650 T-43	648 T-44	652 T-45	646 T-46	648 T-47	648 T-48	644 T-49	648 T-410
3 19.2				648 T-34		646 T-36	646 T-37	646 T-38	643 T-39	
2 9.50	647 T-21	648 T-22	647 T-23	645 T-24	644 T-25	642 T-26	643 T-27	638 T-28	643 T-29	643 T-210
1 -.2				613 T-14		617 T-16	627 T-17	630 T-18	629 T-19	

 BOILER TEMPERATURE PROFILE 1977 103 13 59 17

DRUM T-SAT 584

LEVEL	COLUMN									
	1	2	3	4	5	6	7	8	9	10
8 66.0	619 T-81	619 T-82	616 T-83	619 T-84	619 T-85	614 T-86	617 T-87	536 T-88	617 T-89	619 T-810
7 57.2				619 T-74		616 T-76	618 T-77	620 T-78	618 T-79	
6 48.5	453 T-61	629 T-62	619 T-63	619 T-64	624 T-65	620 T-66	617 T-67	622 T-68	620 T-69	622 T-610
5 38.8				620 T-54		620 T-56	620 T-57	624 T-58	620 T-59	
4 29.0	624 T-41	623 T-42	623 T-43	621 T-44	624 T-45	618 T-46	621 T-47	622 T-48	618 T-49	624 T-410
3 19.2				619 T-34		618 T-36	620 T-37	620 T-38	618 T-39	
2 9.50	619 T-21	623 T-22	619 T-23	617 T-24	617 T-25	617 T-26	617 T-27	611 T-28	617 T-29	617 T-210
1 -.2				588 T-14		591 T-16	601 T-17	604 T-18	603 T-19	

 BOILER TEMPERATURE PROFILE 1977 103 16 19 17

DRUM T-SAT 565

LEVEL	COLUMN									
	1	2	3	4	5	6	7	8	9	10
8 66.0	591 T-81	591 T-82	589 T-83	591 T-84	590 T-85	588 T-86	591 T-87	524 T-88	591 T-89	591 T-810
7 57.2				591 T-74		590 T-76	591 T-77	592 T-78	591 T-79	
6 48.5	408 T-61	603 T-62	591 T-63	593 T-64	593 T-65	591 T-66	590 T-67	594 T-68	592 T-69	593 T-610
5 38.8				593 T-54		591 T-56	592 T-57	594 T-58	592 T-59	
4 29.0	595 T-41	593 T-42	594 T-43	593 T-44	593 T-45	590 T-46	592 T-47	594 T-48	591 T-49	594 T-410
3 19.2				592 T-34		591 T-36	592 T-37	592 T-38	591 T-39	
2 9.50	591 T-21	593 T-22	591 T-23	590 T-24	589 T-25	589 T-26	590 T-27	586 T-28	591 T-29	590 T-210
1 -.2				569 T-14		570 T-16	578 T-17	580 T-18	580 T-19	

 BOILER TEMPERATURE PROFILE 1977 103 16 49 17

DRUM T-SAT 610

LEVEL	COLUMN									
	1	2	3	4	5	6	7	8	9	10
8	644	645	642	647	644	639	643	535	641	643
66.0	T-81	T-82	T-83	T-84	T-85	T-86	T-87	T-88	T-89	T-810
7				646		643	644	646	642	
57.2				T-74		T-76	T-77	T-78	T-79	
6	452	657	645	647	650	645	643	648	644	646
48.5	T-61	T-62	T-63	T-64	T-65	T-66	T-67	T-68	T-69	T-610
5				647		645	646	649	644	
38.8				T-54		T-56	T-57	T-58	T-59	
4	650	648	648	647	650	644	648	648	643	647
29.0	T-41	T-42	T-43	T-44	T-45	T-46	T-47	T-48	T-49	T-410
3				647		644	646	646	643	
19.2				T-34		T-36	T-37	T-38	T-39	
2	645	648	645	643	642	641	642	636	642	642
9.50	T-21	T-22	T-23	T-24	T-25	T-26	T-27	T-28	T-29	T-210
1				610		614	625	628	627	
-.2				T-14		T-16	T-17	T-18	T-19	

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FIRST STAGE SUPERHEATER TEMPERATURE PROFILE

 FIRST STAGE SUPERHEATER TEMPERATURE PROFILE 1977 103 11 37 17

TUBE * 4
 INLET TS11 TE400 610
 TE401 610
 TE402 610
 OUTLET TS10 TE476 843
 LEG TE459 843

TURN	COLUMN					
	6	1	2	3	4	5
	345	300	255	210	120	30
4	828 T-46	832 T-41	832 T-42			
3	758 T-36	764 T-31	775 T-32	785 T-33	803 T-34	817 T-35
2	679 T-26	688 T-21	697 T-22	707 T-23	727 T-24	746 T-25
1	633 T-16	268 T-11	630 T-12	636 T-13	713 T-14	671 T-15

 FIRST STAGE SUPERHEATER TEMPERATURE PROFILE 1977 103 13 59 17

TUBE * 4

INLET	TS11	TE400	584
		TE401	584
		TE402	584
OUTLET	TS10	TE476	852
	LEG	TE459	854

TURN	COLUMN					
	6	1	2	3	4	5
	345	300	255	210	120	30
4	836 T-46	842 T-41	842 T-42			
3	761 T-36	767 T-31	780 T-32	790 T-33	809 T-34	825 T-35
2	669 T-26	679 T-21	690 T-22	702 T-23	725 T-24	747 T-25
1	610 T-16	270 T-11	610 T-12	618 T-13	816 T-14	659 T-15

 FIRST STAGE SUPERHEATER TEMPERATURE PROFILE 1977 103 16 19 17

TUBE * 4
 INLET TS11 TE400 568
 TE401 568
 TE402 568
 OUTLET TS10 TE476 835
 LEG TE459 840

TURN	COLUMN					
	6	1	2	3	4	5
	345	300	255	210	120	30
4	826 T-46	831 T-41	831 T-42			
3	757 T-36	763 T-31	774 T-32	783 T-33	802 T-34	816 T-35
2	663 T-26	674 T-21	686 T-22	698 T-23	721 T-24	742 T-25
1	593 T-16	307 T-11	598 T-12	607 T-13	929 T-14	653 T-15

 FIRST STAGE SUPERHEATER TEMPERATURE PROFILE 1977 103 16 49 17

TUBE * 4

INLET	TS11	TE400	610
		TE401	610
		TE402	610
OUTLET	TS10	TE476	859
	LEG	TE459	856

TURN	COLUMN					
	6	1	2	3	4	5
	345	300	255	210	120	30
4	838 T-46	843 T-41	843 T-42			
3	766 T-36	773 T-31	784 T-32	794 T-33	812 T-34	828 T-35
2	681 T-26	690 T-21	701 T-22	712 T-23	733 T-24	753 T-25
1	624 T-16	283 T-11	629 T-12	635 T-13	951 T-14	673 T-15

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SECOND STAGE SUPERHEATER TEMPERATURE PROFILE

 SECOND STAGE SUPERHEATER TEMPERATURE PROFILE 1977 103 11 37 17

TUBE * 4
 INLET TS2I TE501 842
 OUTLET TS20 TT590 958
 LEG TE559 959

TURN	COLUMN					
	6	1	2	3	4	5
	345	300	255	210	120	30
4	956 T-45	560 T-41	149 T-42			
3	923 T-36	929 T-31	932 T-32	937 T-33	943 T-34	951 T-35
2	889 T-26	895 T-21	895 T-22	902 T-23	912 T-24	918 T-25
1	-1579 T-16	853 T-11	857 T-12	862 T-13	873 T-14	150 T-15

 SECOND STAGE SUPERHEATER TEMPERATURE PROFILE 1977 103 13 59 17

TUBE * 4

INLET TS21 TE501 851

 OUTLET TS20 TT590 965
 LEG TE559 970

TURN	COLUMN					
	6	1	2	3	4	5
	345	300	255	210	120	30
4	965 T-46	564 T-41	149 T-42			
3	933 T-36	957 T-31	943 T-32	949 T-33	954 T-34	961 T-35
2	900 T-26	905 T-21	905 T-22	913 T-23	923 T-24	929 T-25
1	-1002 T-16	862 T-11	867 T-12	872 T-13	894 T-14	150 T-15

 SECOND STAGE SUPERHEATER TEMPERATURE PROFILE 1977 103 16 19 17

TUBE * 4
 INLET TS2I TE501 832

OUTLET TS20 TT590 921
 LEG TE559 922

TURN	COLUMN					
	6	1	2	3	4	5
	345	300	255	210	120	30
4	921 T-46	541 T-41	149 T-42			
3	898 T-36	903 T-31	905 T-32	909 T-33	912 T-34	917 T-35
2	873 T-26	877 T-21	877 T-22	892 T-23	889 T-24	894 T-25
1	-548 T-16	840 T-11	844 T-12	849 T-13	859 T-14	150 T-15

 SECOND STAGE SUPERHEATER TEMPERATURE PROFILE 1977 103 16 49 17

TUBE * 4
 INLET TS2I TE501 857
 OUTLET TS20 TT590 960
 LEG TE559 963

TURN	COLUMN					
	6	1	2	3	4	5
	345	300	255	210	120	30
4	962 T-46	563 T-41	149 T-42			
3	940 T-36	955 T-31	947 T-32	948 T-33	954 T-34	959 T-35
2	911 T-26	916 T-21	916 T-22	923 T-23	932 T-24	937 T-25
1	-405 T-16	870 T-11	876 T-12	881 T-13	895 T-14	150 T-15

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PAGE 11
WARNINGS AND ALARMS REPORT

 WARNINGS AND ALARMS REPORT 1977 103 8 26 17

HIGH WARNINGS			HIGH WARNINGS			HIGH ALARMS			HIGH ALARMS		
LT211	44	0	TE552	1040	0	LT211	47	0	TE505	1060	0
TE300	610	0	TE553	1040	0	LT211	50	0	TE506	1060	0
PT230	1775	0	TE554	1040	0	TE300	615	0	TE507	1060	0
PT590	1600	0	DT215	40	0	TE300	620	0	TE500	1060	0
TT590	970	0	TT306	95	0	PT230	1000	0	TE509	1060	0
TE501	285	0	TT 23	160	0	PT230	1025	0	TE550	1060	0
TE476	950	0	TE 24	160	0	PT590	1640	0	TE551	1060	0
TE405	1040	0	TT 16	160	0	PT590	1650	0	TE552	1060	0
TE406	1040	0	TS230	18000	0	TT590	980	0	TE553	1060	0
TE407	1040	0	TS310	200	0	TT590	990	0	TE554	1060	0
TE408	1040	0	TS476	200	0	TE501	895	0	DT215	60	0
TE409	1040	0	TS559	200	0	TE501	905	0	TT306	100	0
TE450	1040	0				TE476	955	0	TT306	120	0
TE451	1040	0				TE476	960	0	TT 23	175	0
TE452	1040	0				TE405	1060	0	TT 23	195	0
TE453	1040	0				TE406	1060	0	TT 24	175	0
TE454	1040	0				TE407	1060	0	TT 24	195	0
TE505	1040	0				TE408	1060	0	TT 16	175	0
TE506	1040	0				TE409	1060	0	TT 16	195	0
TE507	1040	0				TE450	1060	0	TS230	20000	0
TE508	1040	0				TE451	1060	0	TS310	400	0
TE509	1040	0				TE452	1060	0	TS476	400	0
TE550	1040	0				TE453	1060	0	TS559	400	0
TE551	1040	0				TE454	1060	0			

LOW WARNINGS			LOW ALARMS			LOW ALARMS		
LT211	17	0	LT211	14	0	FT 13	9664	0
FT310	7500	0	LT211	11	0	FT 13	8512	0
FT 13	10020	0	FT310	700	0	DT301	-100	0
DT301	-100	0	FT310	460	0			

WARNINGS AND ALARMS REPORT											
1977 103 11 37 17											
HIGH WARNINGS			HIGH WARNINGS			HIGH ALARMS			HIGH ALARMS		
LT211	44	0	TE552	1040	0	LT211	47	0	TE505	1060	0
TE300	610	0	TE553	1040	0	LT211	50	0	TE506	1060	0
PT230	1775	0	TE554	1040	0	TE300	615	0	TE507	1060	0
PT590	1600	0	DT215	40	64	TE300	620	0	TE508	1060	0
TT590	970	0	TT306	95	0	PT230	1800	0	TE509	1060	0
TE501	885	0	TT 23	160	0	PT230	1825	0	TE550	1060	0
TE476	950	0	TE 24	160	0	PT590	1640	0	TE551	1060	0
TE405	1040	0	TT 16	160	0	PT590	1650	0	TE552	1060	0
TE406	1040	0	TS230	18000	0	TT590	980	0	TE553	1060	0
TE407	1040	0	TS310	200	0	TT590	990	0	TE554	1060	0
TE408	1040	0	TS476	200	0	TE501	895	0	DT215	60	64
TE409	1040	0	TS559	200	0	TE501	905	0	TT306	100	0
TE450	1040	0				TE476	955	0	TT306	120	0
TE451	1040	0				TE476	960	0	TT 23	175	0
TE452	1040	0				TE405	1060	0	TT 23	195	0
TE453	1040	0				TE406	1060	0	TT 24	175	0
TE454	1040	0				TE407	1060	0	TT 24	195	0
TE505	1040	0				TE408	1060	0	TT 16	175	0
TE506	1040	0				TE409	1060	0	TT 16	195	0
TE507	1040	0				TE450	1060	0	TS230	20000	0
TE508	1040	0				TE451	1060	0	TS310	400	0
TE509	1040	0				TE452	1060	0	TS476	400	0
TE550	1040	0				TE453	1060	0	TS559	400	0
TE551	1040	0				TE454	1060	0			

LOW WARNINGS			LOW ALARMS			LOW ALARMS			LOW ALARMS		
LT211	17	0				LT211	14	0	FT 13	9664	0
FT310	7500	0				LT211	11	0	FT 13	8512	0
FT 13	10020	0				FT310	700	0	DT301	-100	0
DT301	-100	0				FT310	460	0			

 WARNINGS AND ALARMS REPORT 1977 103 13 59 17

HIGH WARNINGS			HIGH WARNINGS			HIGH ALARMS			HIGH ALARMS		
LT211	44	0	TE552	1040	0	LT211	47	0	TE505	1060	0
TE300	610	0	TE553	1040	0	LT211	50	0	TE506	1060	0
PT230	1775	0	TE554	1040	0	TE300	615	0	TE507	1060	0
PT590	1600	0	DT215	40	380	TE300	620	0	TE508	1060	0
TT590	970	0	TT306	95	0	PT230	1800	0	TE509	1060	0
TE501	885	0	TT 23	160	0	PT230	1825	0	TE550	1060	0
TE476	950	0	TE 24	160	0	PT590	1640	0	TE551	1060	0
TE405	1040	0	TT 16	160	0	PT590	1650	0	TE552	1060	0
TE406	1040	0	TS230	18000	0	TT590	980	0	TE553	1060	0
TE407	1040	0	TS310	200	0	TT590	990	0	TE554	1060	0
TE408	1040	0	TS476	200	0	TE501	895	0	DT215	60	380
TE409	1040	0	TS559	200	0	TE501	905	0	TT306	100	0
TE450	1040	0				TE476	955	0	TT306	120	0
TE451	1040	0				TE476	960	0	TT 23	175	0
TE452	1040	0				TE405	1060	0	TT 23	195	0
TE453	1040	0				TE406	1060	0	TT 24	175	0
TE454	1040	0				TE407	1060	0	TT 24	195	0
TE505	1040	0				TE408	1060	0	TT 16	175	0
TE506	1040	0				TE409	1060	0	TT 16	195	0
TE507	1040	0				TE450	1060	0	TS230	20000	0
TE508	1040	0				TE451	1060	0	TS310	400	0
TE509	1040	0				TE452	1060	0	TS476	400	0
TE550	1040	0				TE453	1060	0	TS559	400	0
TE551	1040	0				TE454	1060	0			

LOW WARNINGS			LOW ALARMS			LOW ALARMS		
LT211	17	0	LT211	14	0	FT 13	9664	0
FT310	7500	0	LT211	11	0	FT 13	8512	0
FT 13	10020	0	FT310	700	0	DT301	-100	0
DT301	-100	0	FT310	460	0			

WARNINGS AND ALARMS REPORT											
1977 103 16 19 17											
HIGH WARNINGS			HIGH WARNINGS			HIGH ALARMS			HIGH ALARMS		
LT211	44	0	TE552	1040	0	LT211	47	0	TE505	1060	0
TE300	610	0	TE553	1040	0	LT211	50	0	TE506	1060	0
PT230	1775	0	TE554	1040	0	TE300	615	0	TE507	1060	0
PT590	1600	0	DT215	40	657	TE300	620	0	TE508	1060	0
TT590	970	0	TT306	95	0	PT230	1800	0	TE509	1060	0
TE501	885	0	TT 23	160	0	PT230	1825	0	TE550	1060	0
TE476	950	0	TE 24	160	0	PT590	1640	0	TE551	1060	0
TE405	1040	0	TT 16	160	0	PT590	1650	0	TE552	1060	0
TE406	1040	0	TS230	18000	0	TT590	980	0	TE553	1060	0
TE407	1040	0	TS310	200	0	TT590	990	0	TE554	1060	0
TE408	1040	0	TS476	200	0	TE501	895	0	DT215	60	657
TE409	1040	0	TS559	200	0	TE501	905	0	TT306	100	0
TE450	1040	0				TE476	955	0	TT306	120	0
TE451	1040	0				TE476	960	0	TT 23	175	0
TE452	1040	0				TE405	1060	0	TT 23	195	0
TE453	1040	0				TE406	1060	0	TT 24	175	0
TE454	1040	0				TE407	1060	0	TT 24	195	0
TE505	1040	0				TE408	1060	0	TT 16	175	0
TE506	1040	0				TE409	1060	0	TT 16	195	0
TE507	1040	0				TE450	1060	0	TS230	20000	0
TE508	1040	0				TE451	1060	0	TS310	400	0
TE509	1040	0				TE452	1060	0	TS476	400	0
TE550	1040	0				TE453	1060	0	TS559	400	0
TE551	1040	0				TE454	1060	0			

LOW WARNINGS			LOW ALARMS			LOW ALARMS					
LT211	17	0				LT211	14	0	FT 13	9664	0
FT310	7500	0				LT211	11	0	FT 13	8512	0
FT 13	10020	0				FT310	700	0	DT301	-100	0
DT301	-100	0				FT310	460	0			

 WARNINGS AND ALARMS REPORT 1977 103 16 49 17

HIGH WARNINGS			HIGH WARNINGS			HIGH ALARMS			HIGH ALARMS		
LT211	44	0	TE552	1040	0	LT211	47	0	TE505	1060	0
TE300	619	0	TE553	1040	0	LT211	50	0	TE506	1060	0
PT230	1775	0	TE554	1040	0	TE300	615	0	TE507	1060	0
PT590	1600	0	DT215	40	729	TE300	620	0	TE508	1060	0
TT590	970	0	TT306	95	0	PT230	1800	0	TE509	1060	0
TE501	885	0	TT 23	160	0	PT230	1825	0	TE550	1060	0
TE476	950	0	TE 24	160	0	PT590	1640	0	TE551	1060	0
TE405	1040	0	TT 16	160	0	PT590	1650	0	TE552	1060	0
TE406	1040	0	TS230	18000	0	TT590	980	0	TE553	1060	0
TE407	1040	0	TS310	200	0	TT590	990	0	TE554	1060	0
TE408	1040	0	TS476	200	0	TE501	895	0	DT215	60	729
TE409	1040	0	TS559	200	0	TE501	905	0	TT306	100	0
TE450	1040	0				TE476	955	0	TT306	120	0
TE451	1040	0				TE476	960	0	TT 23	175	0
TE452	1040	0				TE405	1060	0	TT 23	195	0
TE453	1040	0				TE406	1060	0	TT 24	175	0
TE454	1040	0				TE407	1060	0	TT 24	195	0
TE505	1040	0				TE408	1060	0	TT 16	175	0
TE506	1040	0				TE409	1060	0	TT 16	195	0
TE507	1040	0				TE450	1060	0	TS230	20000	0
TE508	1040	0				TE451	1060	0	TS310	400	0
TE509	1040	0				TE452	1060	0	TS476	400	0
TE550	1040	0				TE453	1060	0	TS559	400	0
TE551	1040	0				TE454	1060	0			

LOW WARNINGS			LOW ALARMS			LOW ALARMS		
LT211	17	0	LT211	14	0	FT 13	9664	0
FT310	7500	0	LT211	11	0	FT 13	8512	0
FT 13	10020	0	FT310	700	0	DT301	-100	0
DT301	-100	0	FT310	460	0			

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ALARM CONDITIONS

```

*****
ALARM CONDITIONS      YEAR  DAY  HR  MIN  SEC  TEST
                      1977  103  8  12  37  17

ALARM  INPUT  CURRENT  ALARM  CURRENT  HI-LO
NUMBER DEVICE  VALUE    VALUE    COUNT
    35  DT215    107      60      1      HI
*****

```

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*****
ALARM CONDITIONS      YEAR  DAY  HR  MIN  SEC  TEST
                      1977  103  8  19  7  17

ALARM  INPUT  CURRENT  ALARM  CURRENT  HI-LO
NUMBER DEVICE  VALUE    VALUE    COUNT
    1   LT211    14      14      1      LO
*****

```

```

*****
ALARM CONDITIONS      YEAR  DAY  HR  MIN  SEC  TEST
                      1977  103  8  21  7  17

ALARM  INPUT  CURRENT  ALARM  CURRENT  HI-LO
NUMBER DEVICE  VALUE    VALUE    COUNT
    35  DT215    60      60      1      HI
*****

```

ALARM CONDITIONS YEAR DAY HR MIN SEC TEST
 1977 103 8 26 37 17

ALARM NUMBER	INPUT DEVICE	CURRENT VALUE	ALARM VALUE	CURRENT COUNT	HI-LO
35	DT215	289	60	1	HI
1	LT211	14	14	1	LO
7	DT301	-320	-100	1	LO

ALARM CONDITIONS YEAR DAY HR MIN SEC TEST
 1977 103 16 41 47 17

ALARM NUMBER	INPUT DEVICE	CURRENT VALUE	ALARM VALUE	CURRENT COUNT	HI-LO
9	TT590	985	980	1	HI

ALARM CONDITIONS YEAR DAY HR MIN SEC TEST
 1977 103 19 57 55 17

ALARM NUMBER	INPUT DEVICE	CURRENT VALUE	ALARM VALUE	CURRENT COUNT	HI-LO
7	DT301	-454	-100	1	LO

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ARRAY FLUX MAP

ARRAY FLUX MAP

YEAR DAY HR MIN TEST
1977 103 11 39 17

TOTAL BOILER INCIDENT FLUX 256
TOTAL S.H.#1 INCIDENT FLUX 98
TOTAL S.H.#2 INCIDENT FLUX 47
TOTAL SRE INCIDENT FLUX 400

ARRAY INPUT POWER
SECTION # 1 927
SECTION # 2 909
SECTION # 3 1147
SECTION # 4 1117

TOTAL INPUT POWER 4100

BOOM	IF 1	IF 2	IF 3	IF 4	IF 5	IF 6	IF 7	IF 8	IF 9	IF10	IF11	IF12
1	1395	1586	1724	1525	1399	1029	798	597	509	376	247	262
2	1414	1615	1733	1562	1424	1040	806	597	501	364	262	262
3	1407	1586	1708	1516	1408	1026	810	597	509	368	258	262
4	1446	1639	1758	1567	1437	1058	806	586	497	388	254	283
5	1456	1639	1758	1583	1433	1044	798	597	497	376	269	296
6	1460	1631	1741	1550	1416	1051	798	594	484	372	277	283
7	1475	1656	1770	1600	1441	1051	798	582	497	380	258	275
8	1429	1615	1724	1558	1408	1029	810	566	488	376	277	322
9	1414	1590	1691	1529	1399	1026	783	563	471	368	288	305
10	1422	1602	1716	1558	1424	1040	798	574	492	376	269	313
11	1376	1561	1674	1495	1387	1008	783	566	463	356	262	322
12	1416	1598	1724	1550	1408	1036	787	566	476	376	262	296
13	1407	1586	1716	1558	1416	1044	806	574	480	376	269	279
14	1399	1573	1699	1512	1399	1029	783	563	480	380	284	283
15	1410	1594	1720	1537	1416	1044	798	578	488	400	254	279
16	1422	1606	1741	1550	1416	1036	798	578	480	392	262	283
17	1353	1532	1658	1474	1349	1008	768	578	488	376	277	275
18	1399	1573	1699	1508	1370	1008	779	582	492	392	254	275
19	1369	1540	1666	1483	1341	986	764	563	488	376	277	266
20	1346	1524	1645	1466	1328	972	760	563	488	372	254	279
21	1342	1524	1641	1466	1324	972	752	566	492	376	254	266
22	1353	1524	1658	1474	1345	982	768	582	497	376	258	279
23	1300	1470	1599	1428	1308	957	760	559	480	376	262	288
24	1331	1507	1641	1449	1324	972	760	566	476	360	247	271
25	1315	1499	1641	1466	1333	986	768	582	497	376	262	279
26	1308	1479	1591	1432	1316	968	749	566	488	368	269	292
27	1323	1507	1637	1466	1345	979	768	566	497	376	262	296
28	1346	1516	1641	1458	1337	979	768	582	501	384	277	279
29	1312	1491	1608	1424	1324	964	760	566	480	372	269	262
30	1369	1540	1658	1483	1358	986	775	590	488	384	243	271
31	1342	1520	1637	1458	1345	986	768	566	476	392	277	279
32	1323	1524	1641	1453	1337	993	764	570	484	384	277	279
33	1327	1549	1687	1508	1374	1018	798	582	505	372	247	275
34	1327	1536	1658	1470	1358	1000	791	597	509	396	265	296

ARRAY FLUX MAP

YEAR DAY HR MIN TEST
1977 103 14 0 17

TOTAL BOILER INCIDENT FLUX 255
TOTAL S.H.#1 INCIDENT FLUX 97
TOTAL S.H.#2 INCIDENT FLUX 47
TOTAL SRE INCIDENT FLUX 390

ARRAY INPUT POWER

SECTION # 1 929
SECTION # 2 906
SECTION # 3 1149
SECTION # 4 1117

TOTAL INPUT POWER 4100

BOOM	IF 1	IF 2	IF 3	IF 4	IF 5	IF 6	IF 7	IF 8	IF 9	IF10	IF11	IF12
1	1407	1590	1716	1525	1399	1040	794	594	497	368	269	275
2	1418	1615	1724	1525	1420	1029	806	582	488	384	277	258
3	1407	1598	1708	1512	1399	1022	783	566	480	380	262	279
4	1452	1635	1758	1562	1428	1058	810	582	484	388	269	275
5	1433	1623	1741	1533	1412	1022	798	578	509	368	258	275
6	1433	1619	1733	1529	1408	1036	806	592	488	372	262	288
7	1445	1635	1758	1583	1437	1040	813	586	497	384	273	296
8	1407	1590	1708	1525	1408	1029	783	574	488	376	262	296
9	1418	1602	1720	1537	1408	1026	794	582	492	372	250	271
10	1418	1590	1720	1558	1424	1036	806	590	505	376	262	279
11	1369	1549	1658	1500	1391	1026	798	574	484	368	273	271
12	1429	1598	1733	1567	1420	1044	802	605	501	376	254	262
13	1407	1590	1720	1537	1416	1040	798	578	497	376	262	296
14	1407	1573	1695	1525	1391	1022	794	570	497	376	269	279
15	1414	1602	1728	1546	1408	1036	806	590	497	400	250	279
16	1414	1599	1716	1537	1403	1022	794	586	505	404	269	279
17	1361	1532	1658	1466	1353	997	775	597	492	376	269	288
18	1391	1573	1699	1512	1370	993	783	582	497	368	247	288
19	1350	1532	1653	1474	1333	975	772	574	488	376	254	279
20	1353	1532	1658	1466	1333	972	752	566	480	372	254	271
21	1342	1520	1641	1453	1316	961	752	566	480	360	269	279
22	1338	1516	1641	1479	1341	972	760	566	480	372	269	271
23	1281	1458	1591	1424	1291	950	749	555	492	368	265	292
24	1323	1507	1628	1449	1333	993	772	566	488	376	269	317
25	1300	1483	1616	1432	1316	964	752	559	480	400	262	275
26	1315	1491	1599	1428	1320	979	760	566	488	392	262	271
27	1323	1507	1624	1449	1328	986	775	566	480	392	269	279
28	1331	1503	1620	1441	1333	975	760	566	476	368	284	279
29	1323	1503	1608	1437	1324	982	760	566	480	376	262	266
30	1361	1532	1653	1462	1349	997	775	582	492	364	280	292
31	1338	1503	1624	1441	1328	982	760	566	497	392	273	288
32	1323	1507	1633	1441	1328	979	772	566	492	384	258	275
33	1331	1557	1674	1500	1370	1022	794	594	501	388	247	288
34	1331	1536	1653	1474	1349	997	783	578	497	368	265	279

ARRAY FLUX MAP

YEAR DAY HR MIN TEST
1977 103 16 19 17

TOTAL BOILER INCIDENT FLUX 182
TOTAL S.H.#1 INCIDENT FLUX 71
TOTAL S.H.#2 INCIDENT FLUX 36
TOTAL SRE INCIDENT FLUX 280

ARRAY INPUT POWER
SECTION # 1 655
SECTION # 2 634
SECTION # 3 806
SECTION # 4 783

TOTAL INPUT POWER 2880

BOCM	IF 1	IF 2	IF 3	IF 4	IF 5	IF 6	IF 7	IF 8	IF 9	IF10	IF11	IF12
1	1042	1170	1253	1106	1004	748	585	450	379	304	209	220
2	1049	1178	1245	1089	1004	741	585	427	379	304	217	224
3	1057	1186	1262	1114	1020	741	585	442	370	296	202	228
4	1057	1203	1299	1122	1033	756	593	454	370	296	232	228
5	1042	1186	1262	1114	1024	756	589	438	370	280	224	220
6	1034	1174	1241	1093	1004	741	585	431	374	304	217	279
7	1057	1186	1258	1122	1024	748	585	438	379	296	217	241
8	1026	1161	1233	1097	1008	748	600	431	370	308	220	266
9	1023	1145	1220	1089	1008	741	581	423	370	296	220	241
10	1023	1153	1233	1093	1024	756	581	434	379	296	209	228
11	988	1124	1199	1072	991	734	585	454	370	296	217	237
12	992	1120	1208	1089	999	734	574	458	370	296	209	254
13	1003	1141	1241	1093	1016	748	589	434	374	304	220	228
14	973	1120	1216	1068	999	741	578	423	370	300	220	228
15	996	1137	1224	1081	999	741	585	431	366	304	217	228
16	984	1128	1233	1076	991	734	593	442	374	280	220	220
17	965	1095	1187	1060	966	723	562	427	362	304	209	224
18	965	1095	1191	1060	958	716	570	450	370	296	213	220
19	962	1095	1199	1055	954	723	578	427	374	280	205	220
20	943	1071	1158	1039	949	698	562	419	362	296	202	216
21	943	1071	1170	1030	954	705	555	427	379	304	235	220
22	935	1062	1162	1030	949	702	562	434	374	300	213	220
23	912	1042	1124	1001	924	691	547	423	362	296	202	228
24	931	1062	1149	1022	933	709	570	419	374	320	224	211
25	943	1071	1158	1030	954	705	570	434	379	296	217	233
26	931	1050	1133	1009	937	698	555	434	374	288	213	237
27	958	1087	1166	1047	949	712	559	423	383	296	194	224
28	969	1095	1183	1034	958	723	570	434	391	292	228	233
29	962	1079	1158	1026	941	698	555	427	370	292	209	220
30	984	1108	1187	1047	966	709	570	438	370	296	217	220
31	981	1100	1183	1030	958	712	570	427	387	300	228	228
32	965	1095	1170	1026	966	705	562	431	379	296	202	237
33	973	1128	1208	1064	974	748	581	434	391	312	220	220
34	977	1128	1199	1047	958	720	566	434	396	304	217	220

ARRAY FLUX MAP

YEAR	DAY	HR	MIN	TEST
1977	103	16	50	17

TOTAL BOILER INCIDENT FLUX	250
TOTAL S.H.#1 INCIDENT FLUX	97
TOTAL S.H.#2 INCIDENT FLUX	47
TOTAL SRE INCIDENT FLUX	390

ARRAY INPUT POWER

SECTION # 1	929
SECTION # 2	911
SECTION # 3	1149
SECTION # 4	1120

TOTAL INPUT POWER	4110
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ROOM	IF 1	IF 2	IF 3	IF 4	IF 5	IF 6	IF 7	IF 8	IF 9	IF 10	IF 11	IF 12
1	1407	1590	1703	1516	1378	1029	779	582	488	368	254	296
2	1410	1598	1716	1525	1399	1018	798	582	488	372	262	262
3	1384	1557	1683	1483	1374	993	768	566	488	376	273	279
4	1407	1598	1733	1541	1408	1029	798	578	488	392	258	279
5	1384	1565	1703	1533	1399	1018	798	590	488	360	284	288
6	1361	1536	1645	1495	1383	1015	779	555	488	368	262	271
7	1384	1565	1683	1533	1416	1026	791	574	488	376	247	309
8	1346	1524	1633	1500	1374	1026	783	590	476	368	269	288
9	1338	1503	1633	1474	1383	1022	779	566	480	376	273	292
10	1342	1507	1637	1491	1391	1036	798	574	480	384	269	275
11	1293	1458	1591	1458	1366	1015	783	574	480	364	258	279
12	1315	1491	1641	1495	1391	1026	779	566	471	376	280	296
13	1315	1495	1637	1491	1391	1029	794	566	471	388	262	279
14	1285	1474	1616	1462	1358	997	779	559	471	364	269	279
15	1293	1491	1645	1483	1370	1011	775	574	476	392	262	305
16	1300	1503	1649	1491	1370	1026	791	566	480	376	269	309
17	1285	1470	1603	1441	1324	982	760	559	480	372	269	279
18	1369	1544	1691	1508	1374	1000	783	574	497	384	239	288
19	1308	1491	1624	1458	1341	972	752	566	488	360	262	279
20	1315	1495	1616	1453	1316	954	745	551	463	368	254	262
21	1319	1499	1633	1474	1324	968	764	566	480	360	247	262
22	1319	1499	1641	1470	1333	982	768	590	492	376	262	271
23	1281	1450	1583	1416	1291	957	749	559	480	360	258	265
24	1308	1491	1608	1441	1324	993	752	566	488	376	247	279
25	1304	1466	1608	1441	1320	972	772	574	492	384	269	279
26	1300	1470	1583	1424	1308	957	752	566	480	384	258	279
27	1323	1499	1620	1453	1341	972	775	582	497	376	247	275
28	1331	1507	1616	1449	1320	972	768	559	476	372	284	279
29	1315	1491	1599	1424	1320	964	764	566	484	380	262	283
30	1376	1544	1662	1479	1358	993	779	566	492	376	258	266
31	1353	1524	1641	1462	1341	982	775	582	509	376	292	279
32	1338	1516	1633	1466	1337	982	760	566	480	376	269	271
33	1342	1549	1678	1495	1366	1008	791	605	497	376	269	279
34	1346	1549	1666	1487	1358	997	794	590	488	372	299	279

PAGE 14
FLOWS, PLOTS

NUMBER OF RECORDS = 4

ARGUMENT SELECTED : 1

FIRST FUNCTION # 8 OPEN BOX WFW

SECOND FUNCTION #10 TRIANGLE WSZ

THIRD FUNCTION #17 CROSS-CIRCLE WSI

SEARCH MODE 2

PLOT START TIME = 39600.0 - Test 103 day

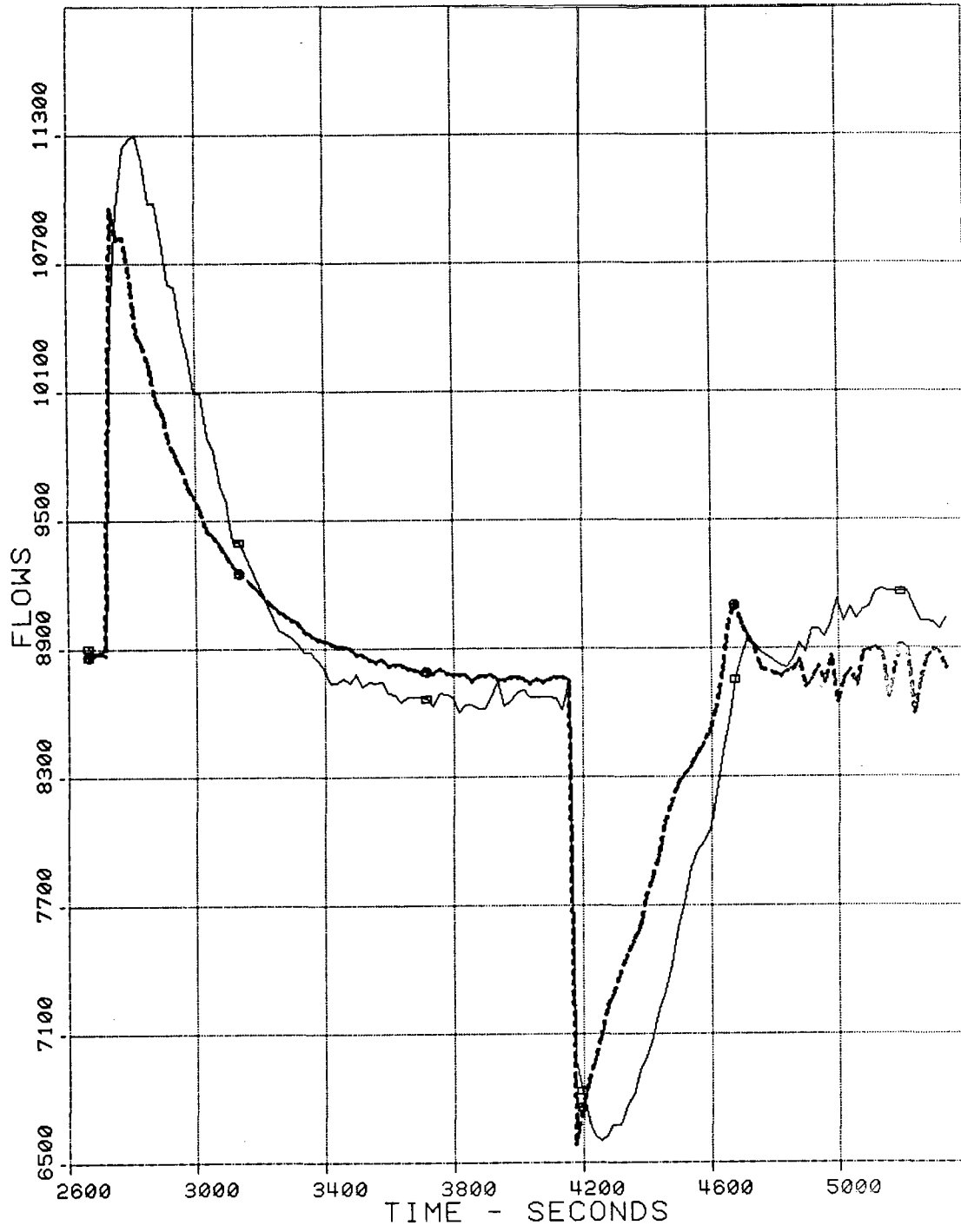
EACH 1TH POINT IS PLOTTED

LINE PLOT HAS 128 POINTS PER FUNCTION

SCATTER PLOT HAS 64 POINTS PER FUNCTION

28% Stm. Transient

Test 17
4/13/77



SEARCH START
DAY #103 1977 TIME 11: 0
NUMBER OF RECORDS = 3

ARGUMENT SELECTED : 1

FIRST FUNCTION * 9 OPEN BOX

SECOND FUNCTION *30 TRIANGLE

SEARCH MODE 2

PLOT START TIME = 29600.0

EACH 1TH POINT IS PLOTTED

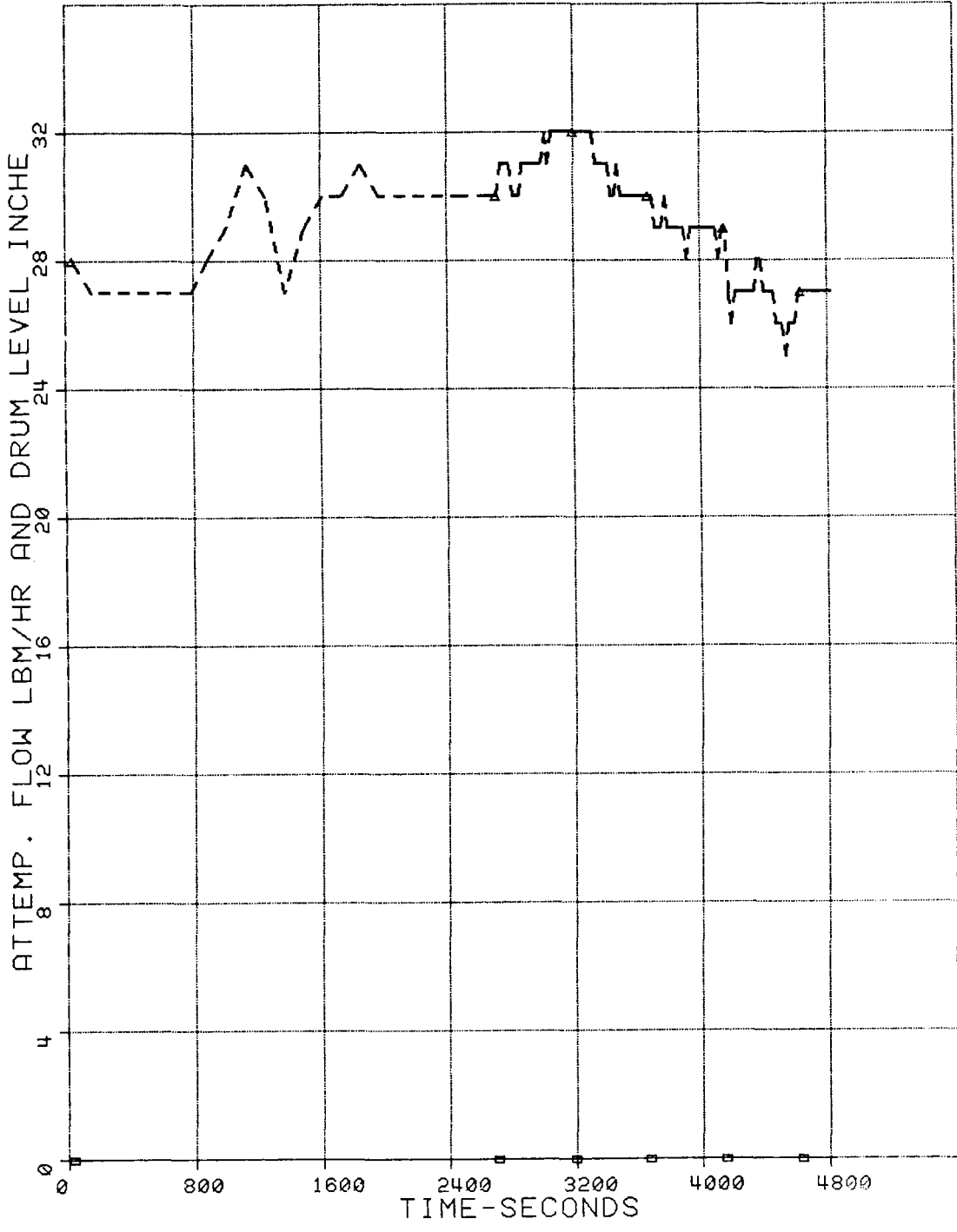
LINE PLOT HAS 128 POINTS PER FUNCTION

Test No. 17

Replot 4/25/77

14 -

18 -



NUMBER OF RECORDS = 4

ARGUMENT SELECTED : 1

FIRST FUNCTION # 8 OPEN BOX

SECOND FUNCTION #10 TRIANGLE

THIRD FUNCTION #17 CROSS-CIRCLE

SEARCH MODE 2

PLOT START TIME = 45300.0

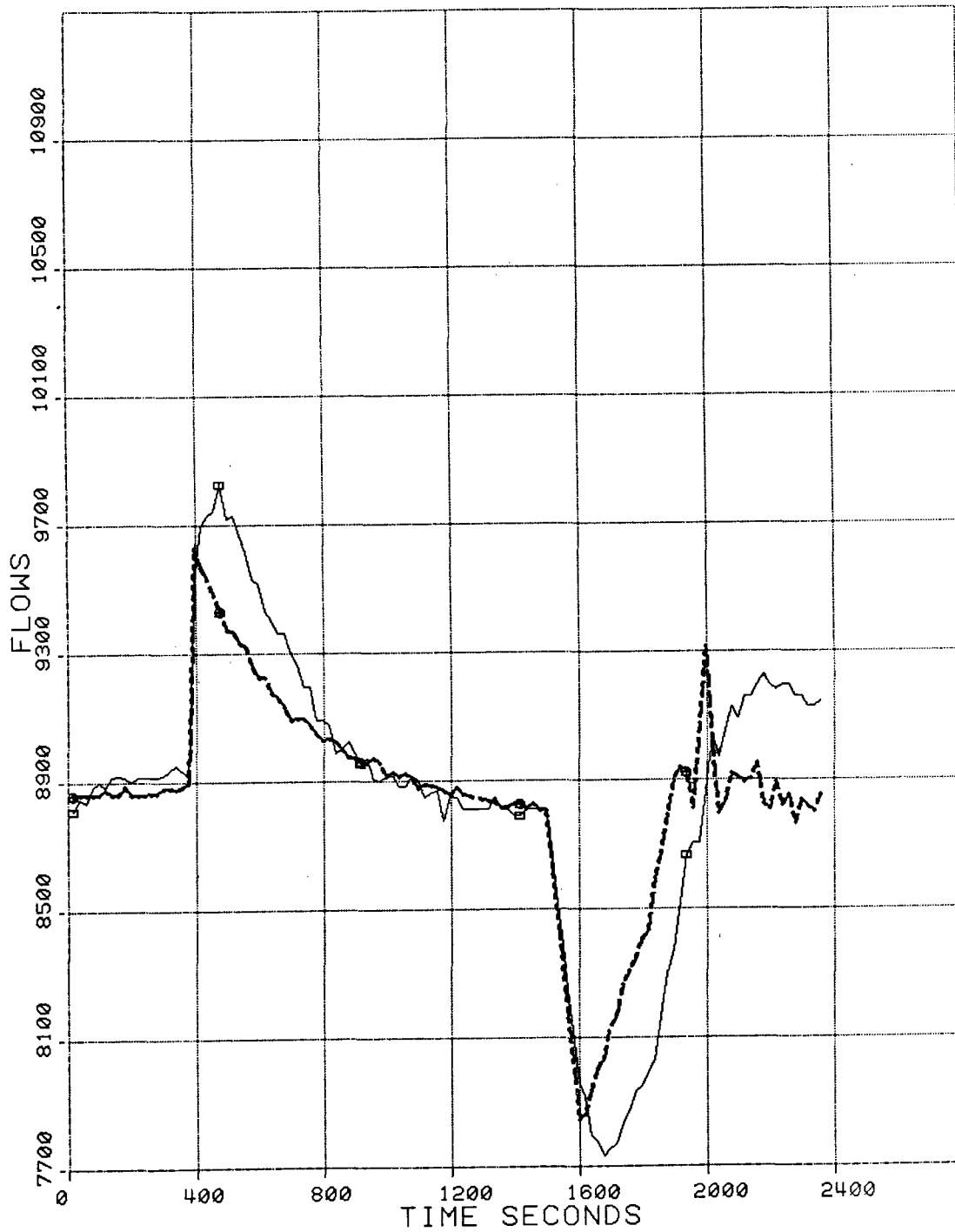
EACH 1TH POINT IS PLOTTED

LINE PLOT HAS 110 POINTS PER FUNCTION
SCATTER PLOT HAS 55 POINTS PER FUNCTION

12:35 110 pts

Test No. 17

10,90 Stm Transient April 13, 1977



SEARCH START
DAY #103 1977 TIME 12:35
NUMBER OF RECORDS = 3

ARGUMENT SELECTED : 1

FIRST FUNCTION * 9 OPEN BOX
SECOND FUNCTION *30 TRIANGLE
SEARCH MODE 2

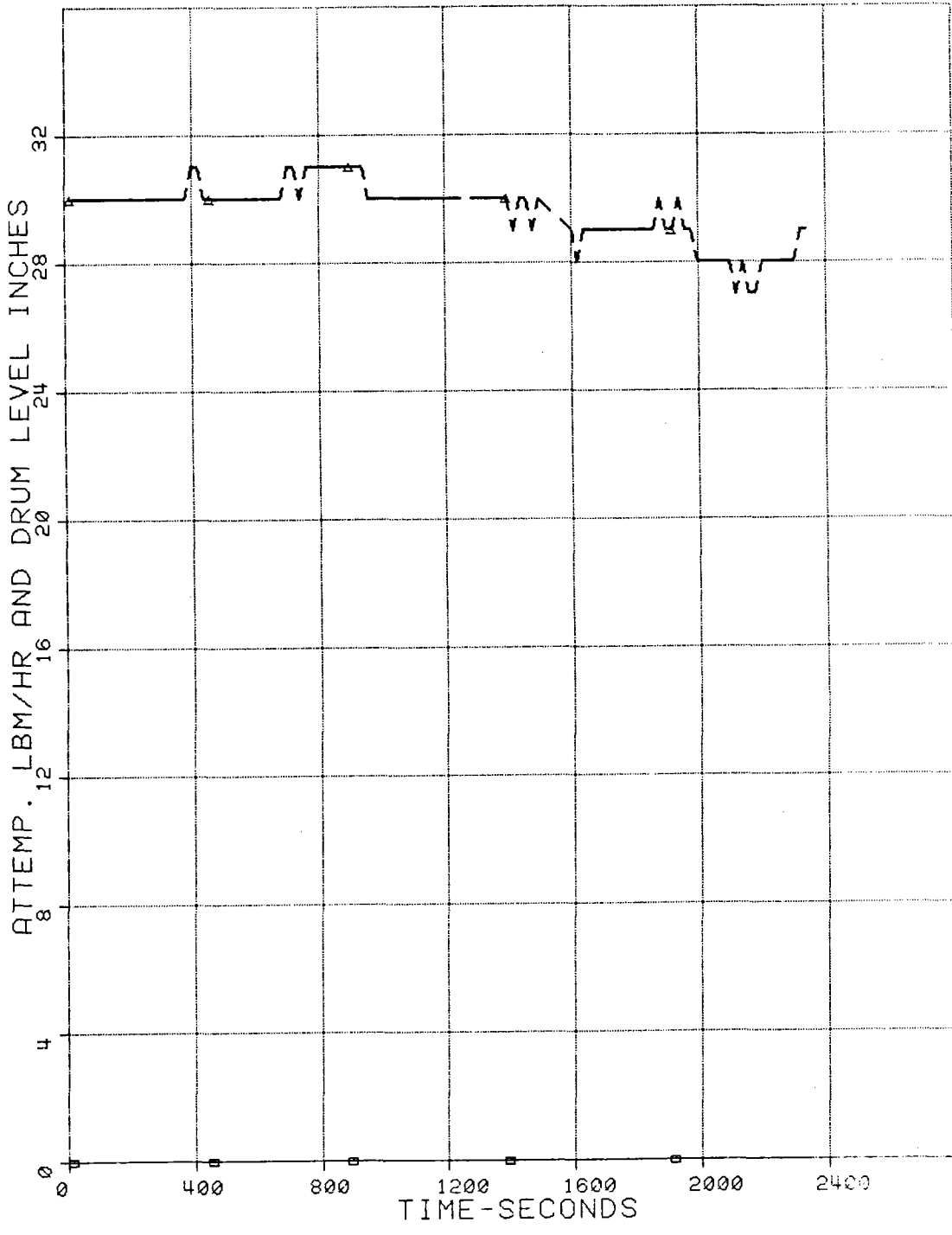
PLOT START TIME = 45300.0
EACH 1TH POINT IS PLOTTED

LINE PLOT HAS 110 POINTS PER FUNCTION

Replot 4/25/77

Test No. 17

14 -
18 -



NUMBER OF RECORDS = 4

ARGUMENT SELECTED : 1

FIRST FUNCTION # 8 OPEN BOX

SECOND FUNCTION #10 TRIANGLE

THIRD FUNCTION #17 CROSS-CIRCLE

SEARCH MODE 2

PLOT START TIME = 48900.0

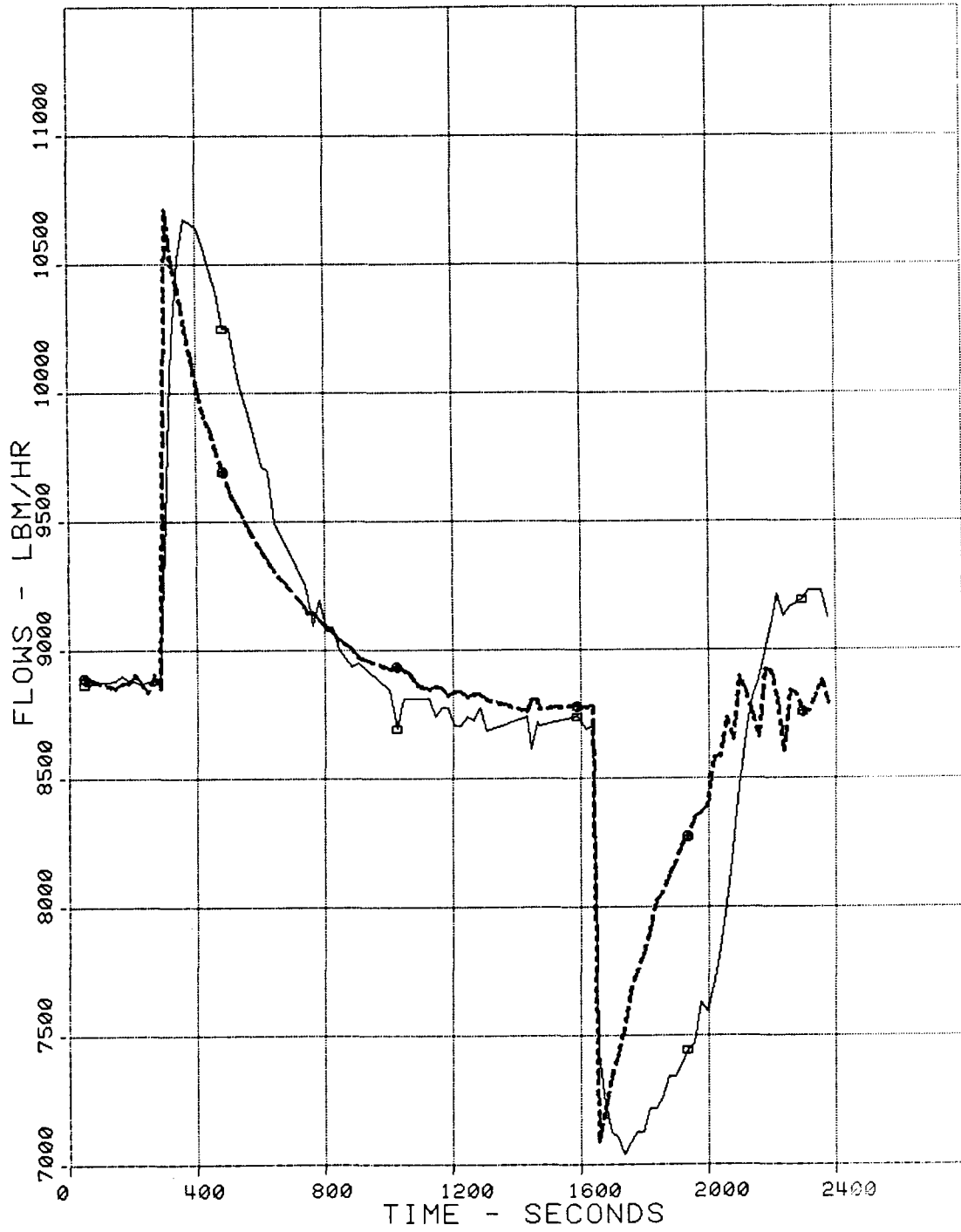
EACH 1TH POINT IS PLOTTED

LINE PLOT HAS 95 POINTS PER FUNCTION

SCATTER PLOT HAS 47 POINTS PER FUNCTION

Stm Flow 23.9% Transient

13:35
Test #17
April 13, 1977



SEARCH START
DAY #103 1977 TIME 13:35
NUMBER OF RECORDS = 3

ARGUMENT SELECTED : 1

FIRST FUNCTION * 9 OPEN BOX
SECOND FUNCTION *30 TRIANGLE
SEARCH MODE 2

PLOT START TIME = 48900.0
EACH 1TH POINT IS PLOTTED

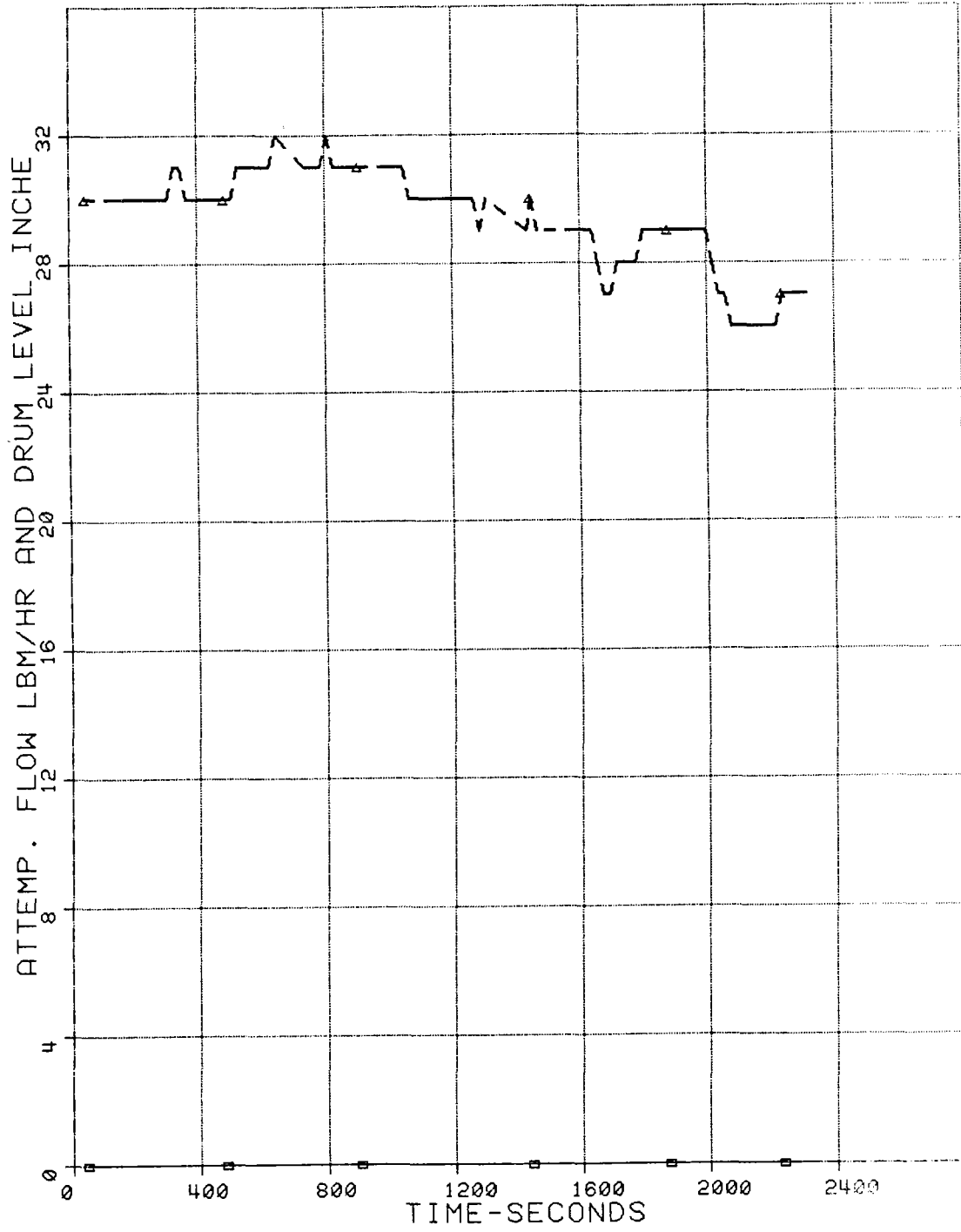
LINE PLOT HAS 95 POINTS PER FUNCTION

Replot 4/25/77

Test No. 17

14-

18-



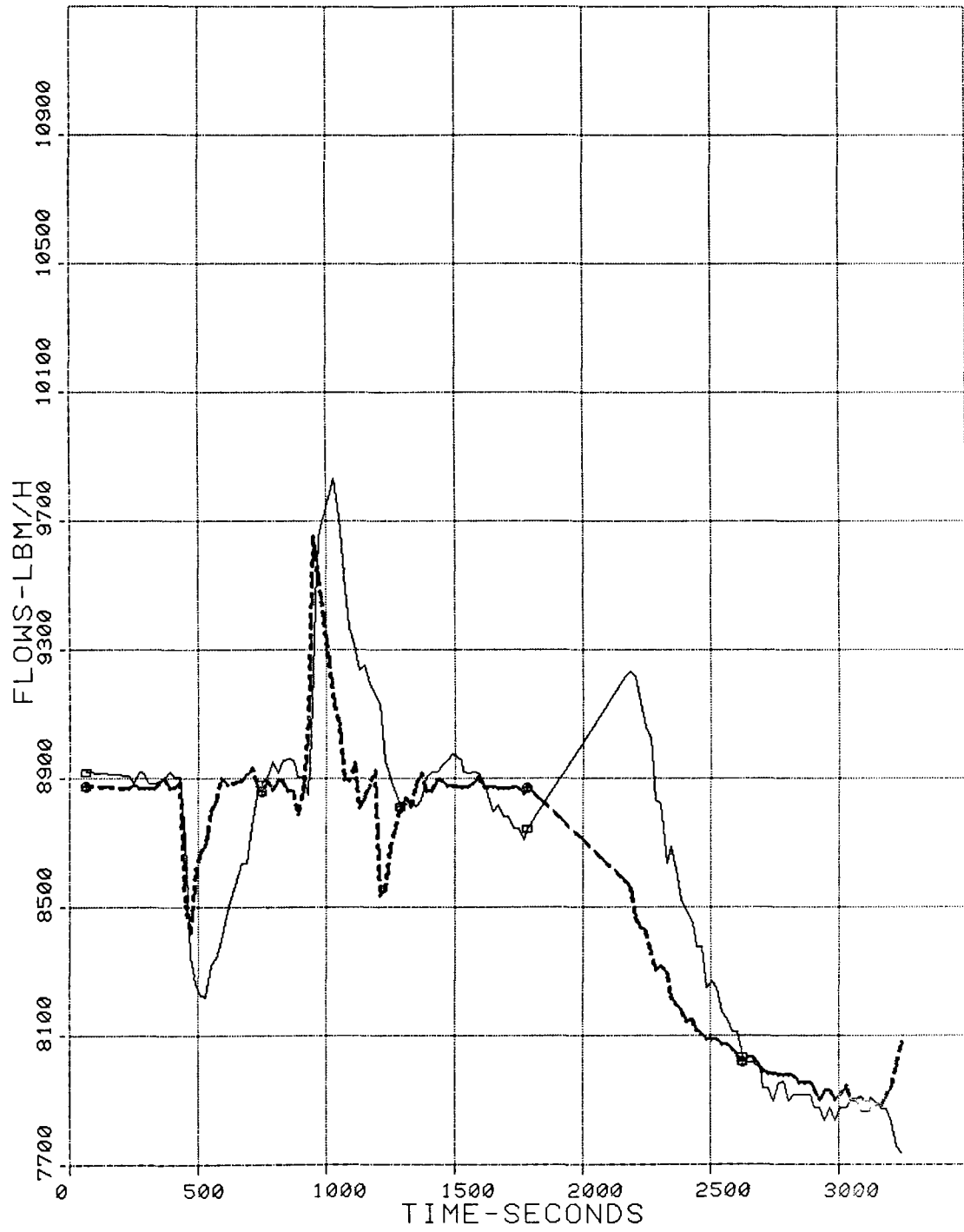
NUMBER OF RECORDS = 4
ARGUMENT SELECTED : 1
FIRST FUNCTION # 8 OPEN BOX
SECOND FUNCTION #10 TRIANGLE
THIRD FUNCTION #17 CROSS-CIRCLE
SEARCH MODE 2
PLOT START TIME = 52200.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

Recirc, Rate Transient

80K #/hr → 108K → 80K

14-4
~~4-1~~

Test No. 17
April 13, 1977



SEARCH START
DAY #103 1977 TIME 14:30
NUMBER OF RECORDS = 3

ARGUMENT SELECTED : 1

FIRST FUNCTION * 9 OPEN BOX

SECOND FUNCTION *30 TRIANGLE

SEARCH MODE 2

PLOT START TIME = 52200.0

EACH 1TH POINT IS PLOTTED

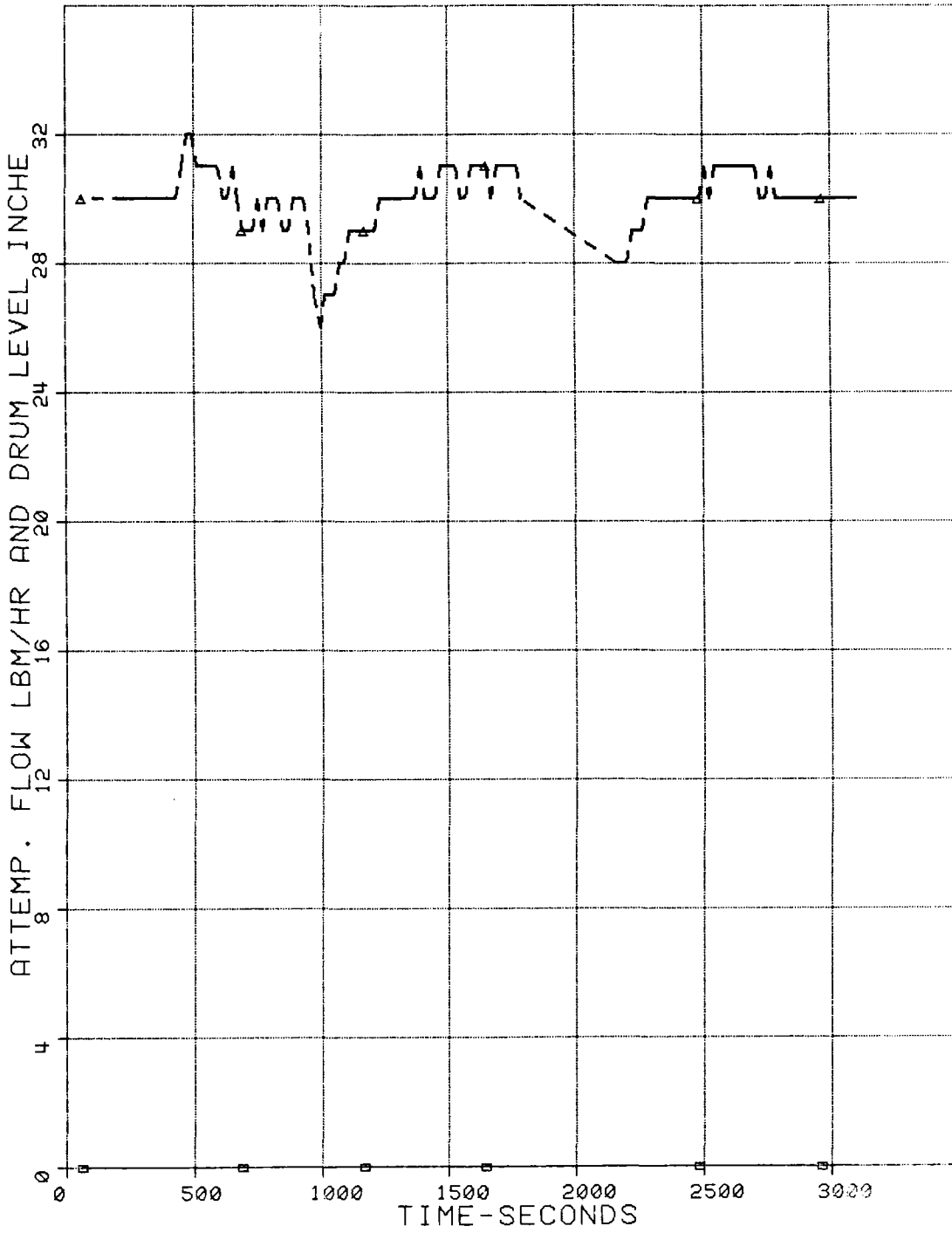
LINE PLOT HAS 128 POINTS PER FUNCTION

Replot 4/25/77

Test No. 17

14-

18-



NUMBER OF RECORDS = 4

ARGUMENT SELECTED : 1

FIRST FUNCTION # 8 OPEN BOX

SECOND FUNCTION #10 TRIANGLE

THIRD FUNCTION #17 CROSS-CIRCLE

SEARCH MODE 2

PLOT START TIME = 53640.0

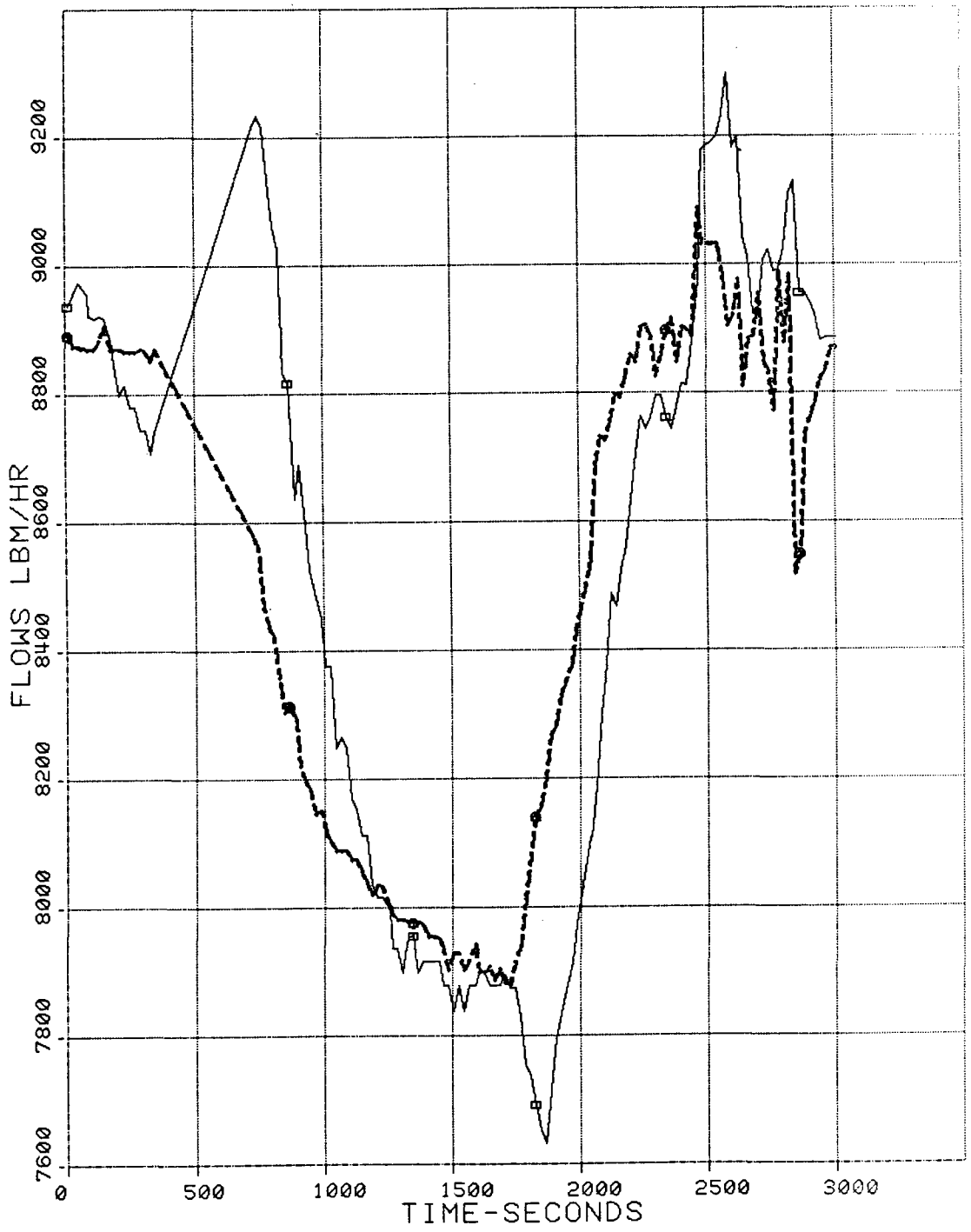
EACH 1TH POINT IS PLOTTED

LINE PLOT HAS 128 POINTS PER FUNCTION

SCATTER PLOT HAS 64 POINTS PER FUNCTION

Test No. 17
Day 103
April 13, 1977

-10% Power Step
(All Four zones)



SEARCH START
DAY #103 1977 TIME 14:54
NUMBER OF RECORDS = 3

ARGUMENT SELECTED : 1

FIRST FUNCTION * 9 OPEN BOX

SECOND FUNCTION *30 TRIANGLE

SEARCH MODE 2

PLOT START TIME = 53640.0

EACH 1TH POINT IS PLOTTED

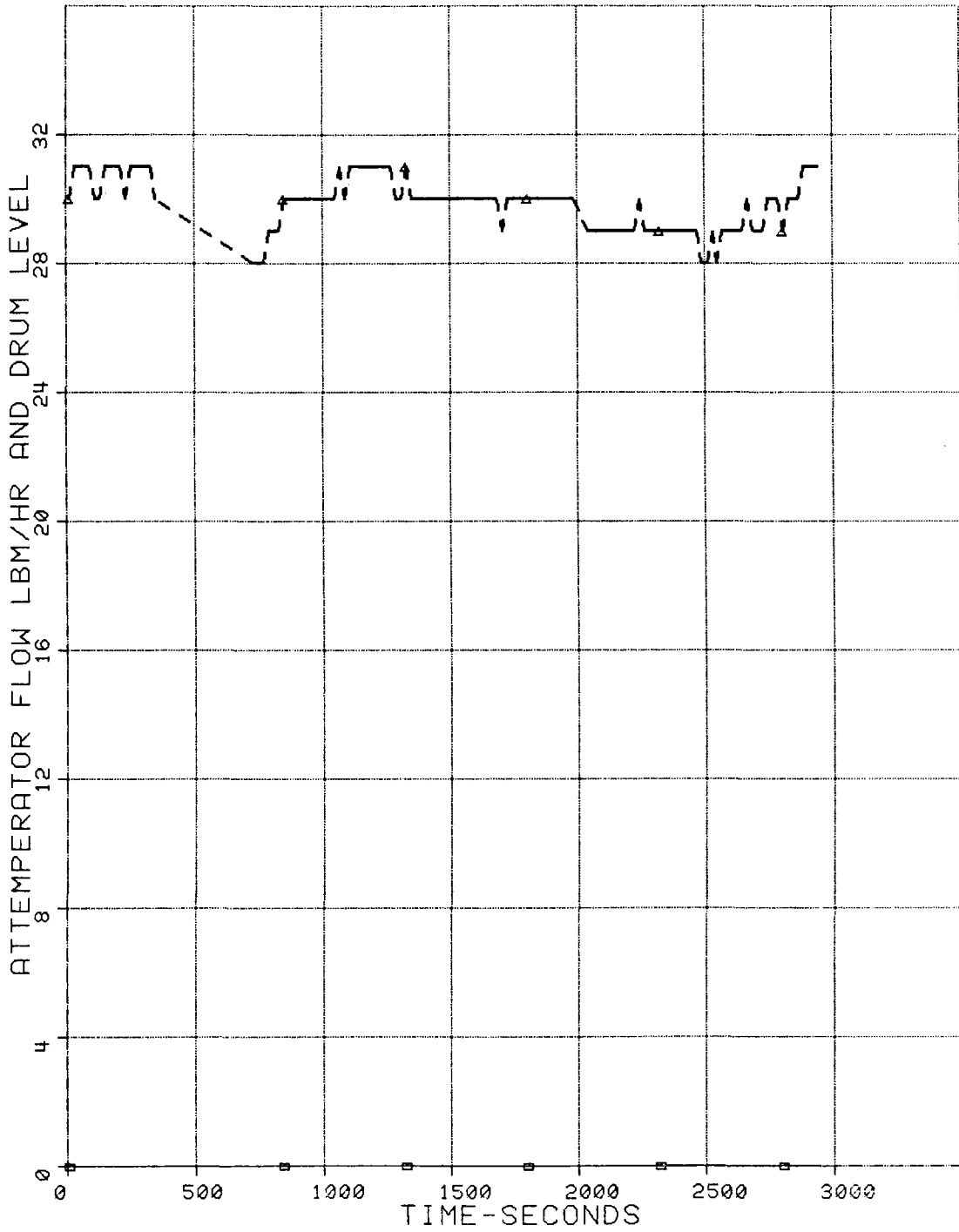
LINE PLOT HAS 128 POINTS PER FUNCTION

Test No. 17

Replot 4/25/77

14-

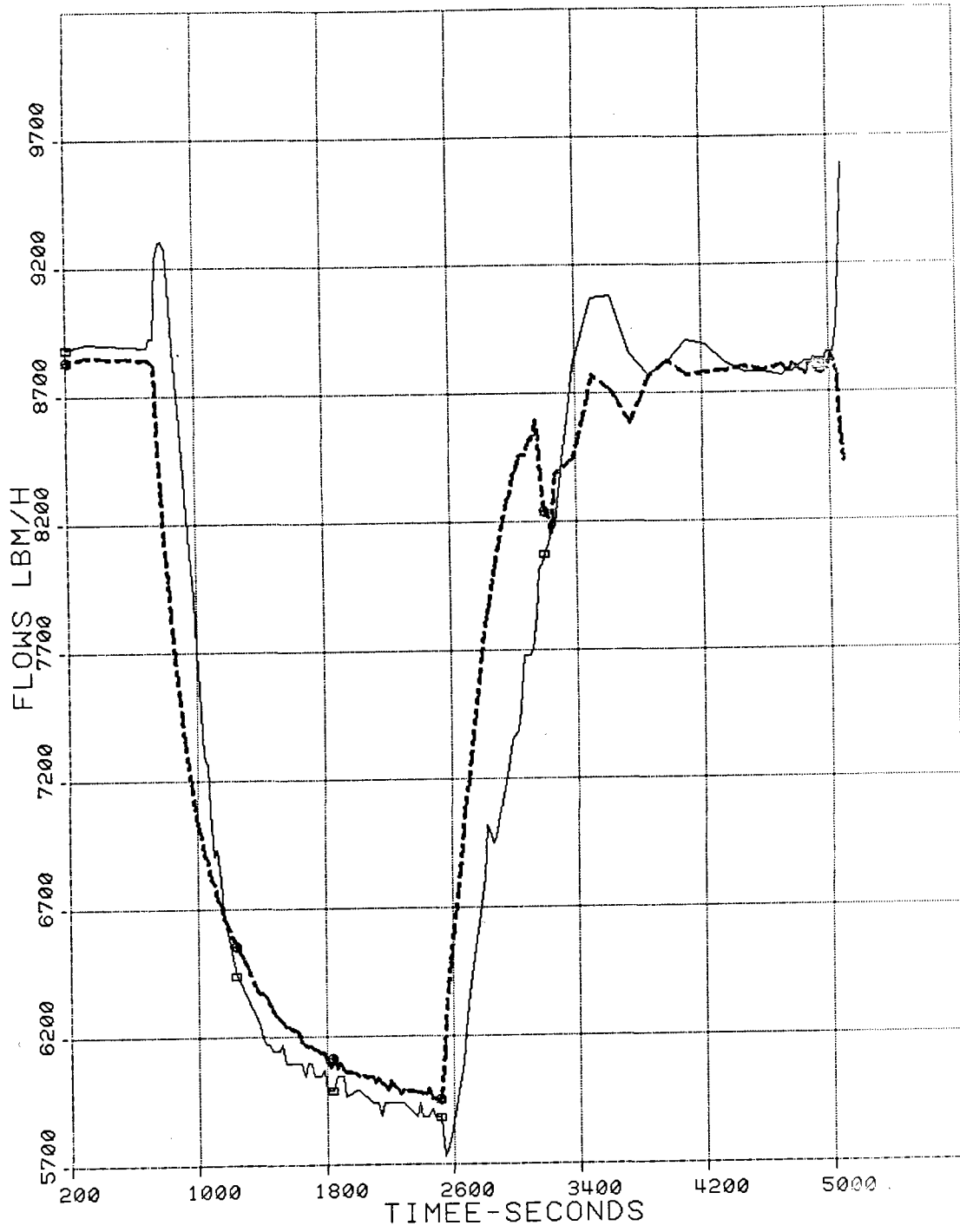
18-



NUMBER OF RECORDS = 4
ARGUMENT SELECTED : 1
FIRST FUNCTION # 8 OPEN BOX
SECOND FUNCTION #10 TRIANGLE
THIRD FUNCTION #17 CROSS-CIRCLE
SEARCH MODE 2
PLOT START TIME = 57300.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

-30. % → + 43. %
Power Input

Test No. 17
April 13, 1977



SEARCH START
DAY #103 1977 TIME 15:55
NUMBER OF RECORDS = 3

ARGUMENT SELECTED : 1

FIRST FUNCTION * 9 OPEN BOX

SECOND FUNCTION *30 TRIANGLE

SEARCH MODE 2

PLOT START TIME = 57300.0

EACH 1TH POINT IS PLOTTED

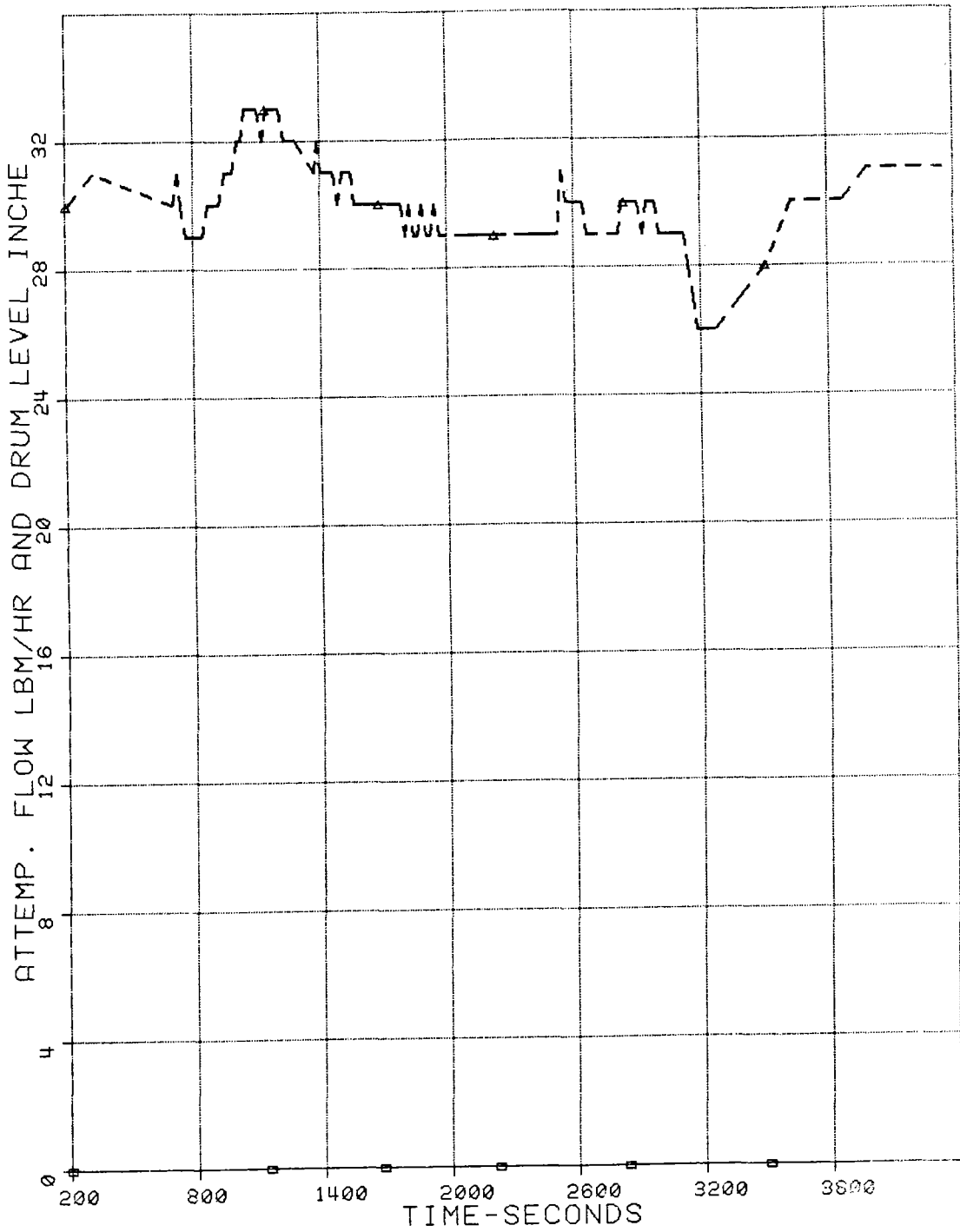
LINE PLOT HAS 128 POINTS PER FUNCTION

Replot 4/25/77

Test No. 17

14-

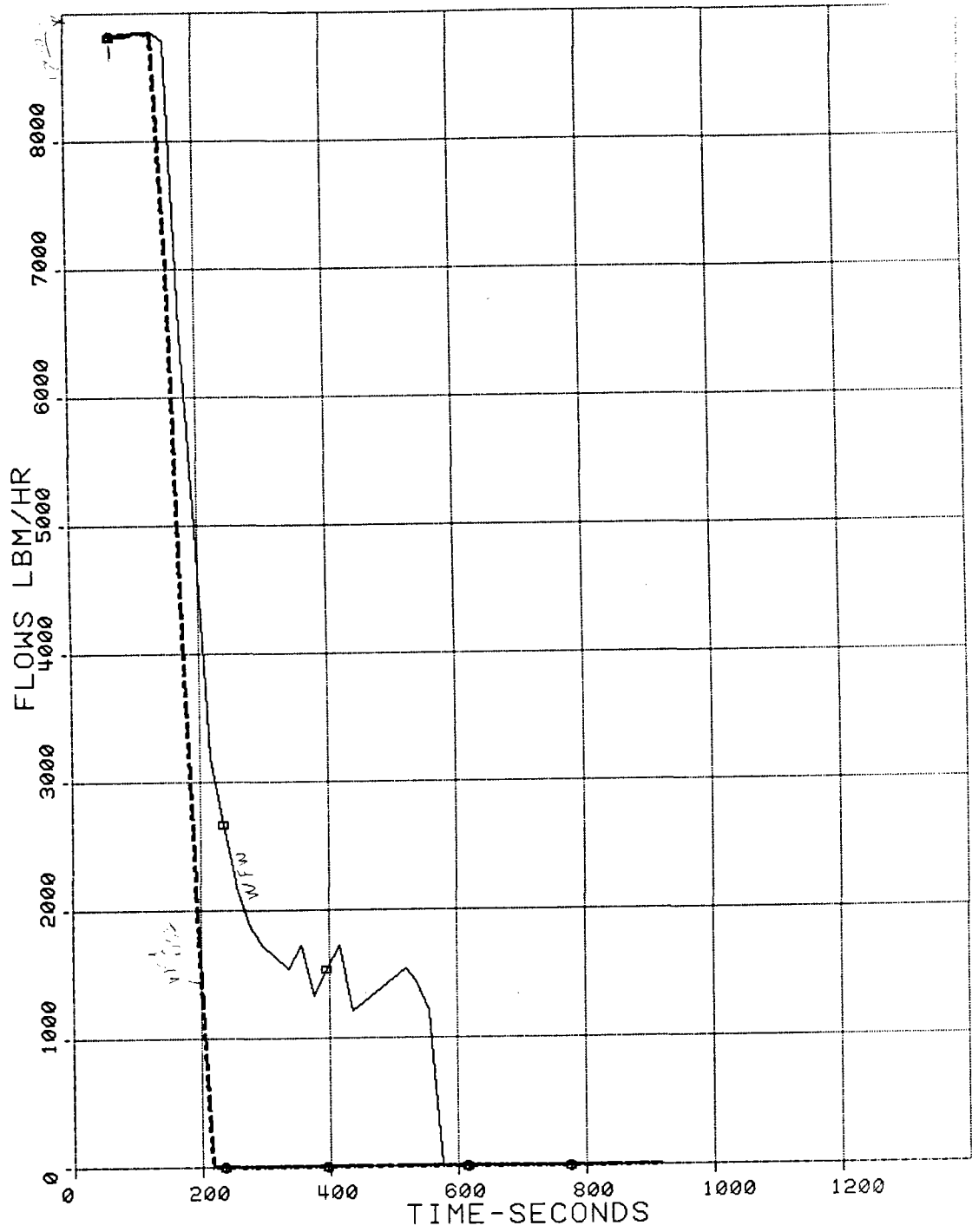
18-



NUMBER OF RECORDS = 4
ARGUMENT SELECTED : 1
FIRST FUNCTION # 8 OPEN BOX
SECOND FUNCTION #10 TRIANGLE
THIRD FUNCTION #17 CROSS-CIRCLE
SEARCH MODE 2
PLOT START TIME = 65400.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 40 POINTS PER FUNCTION
SCATTER PLOT HAS 20 POINTS PER FUNCTION

Array Trip
10. and 40. Min Spans

Test No. 17
April 13, '77



SEARCH START
DAY #103 1977 TIME 18:10
NUMBER OF RECORDS = 3

ARGUMENT SELECTED : 1

FIRST FUNCTION * 9 OPEN BOX
SECOND FUNCTION *30 TRIANGLE
SEARCH MODE 2

PLOT START TIME = 65400.0
EACH 1TH POINT IS PLOTTED

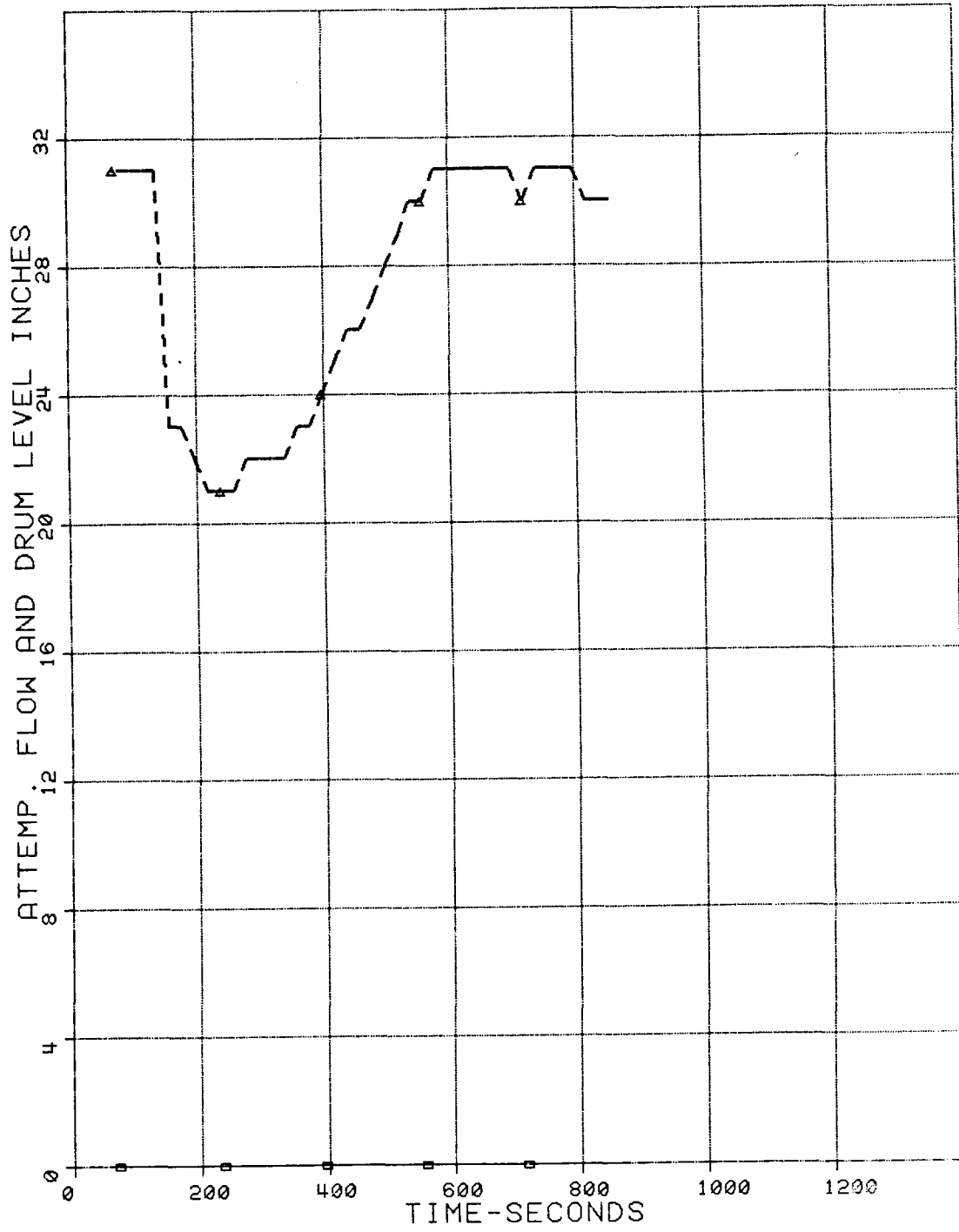
LINE PLOT HAS 40 POINTS PER FUNCTION

Replot 4/25/77

Test No. 17

14-

18-



PAGE 15
PRESSURES, PLOTS

NUMBER OF RECORDS = 5

ARGUMENT SELECTED : 1

FIRST FUNCTION #18 OPEN BOX PD

SECOND FUNCTION #19 TRIANGLE PFW

THIRD FUNCTION #20 CROSS-CIRCLE PS10

FOURTH FUNCTION #21 CROSS-BOX PS20

SEARCH MODE 2

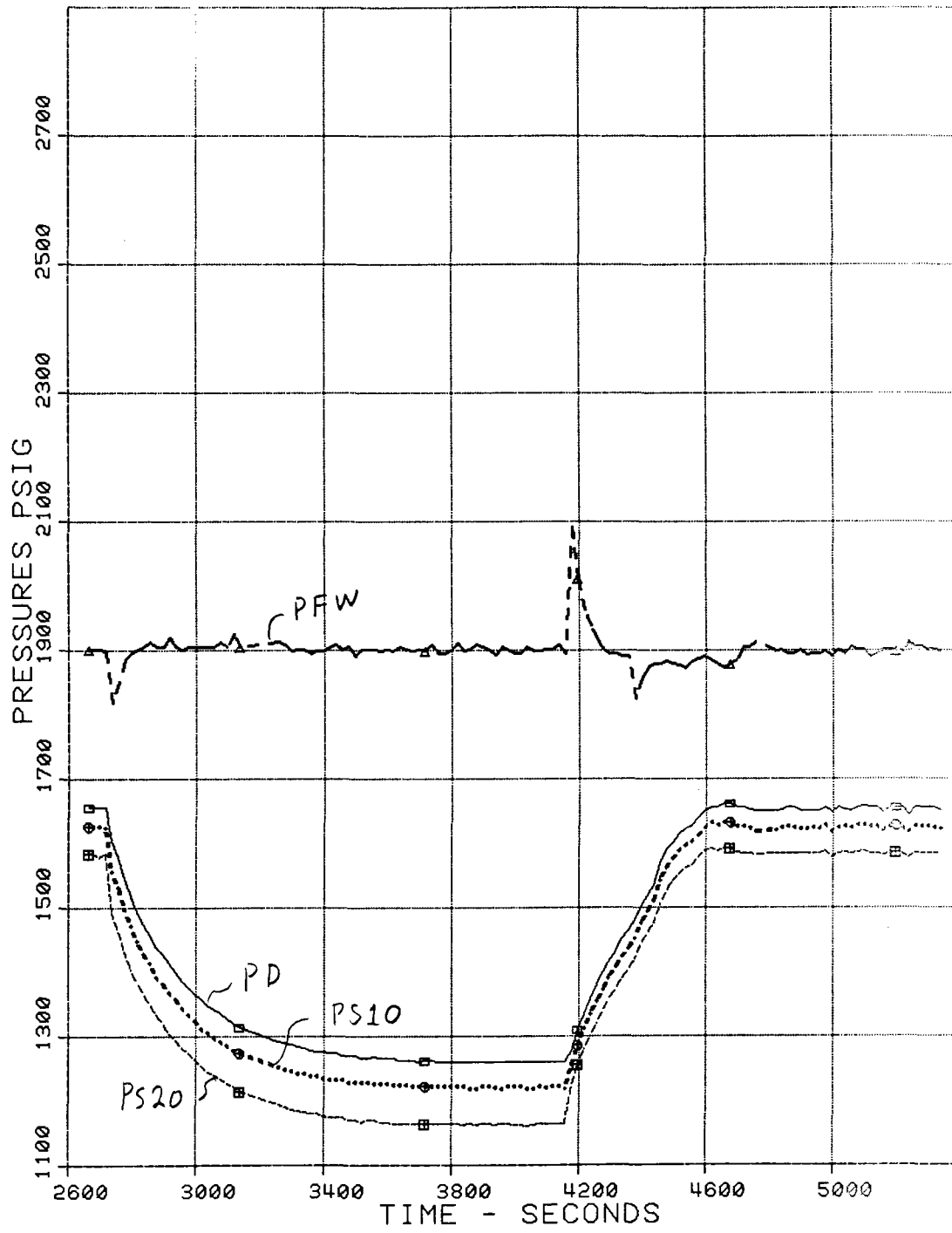
PLOT START TIME = 39600.0 Day 103

EACH 1TH POINT IS PLOTTED

LINE PLOT HAS 128 POINTS PER FUNCTION

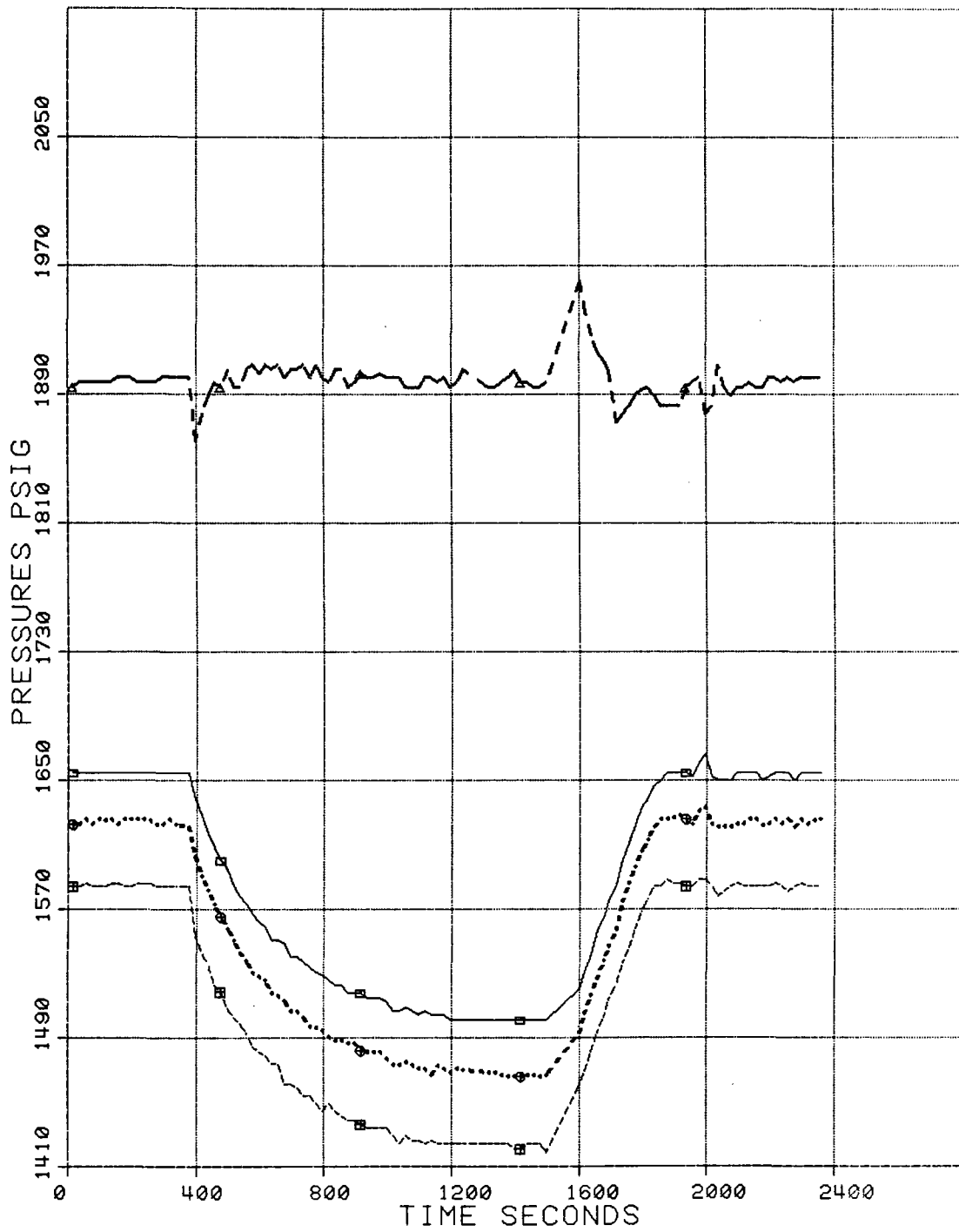
SCATTER PLOT HAS 64 POINTS PER FUNCTION

28. % Stm. Transient Test 17
April 13, 1977



NUMBER OF RECORDS = 5
ARGUMENT SELECTED : 1
FIRST FUNCTION #18 OPEN BOX
SECOND FUNCTION #19 TRIANGLE
THIRD FUNCTION #20 CROSS-CIRCLE
FOURTH FUNCTION #21 CROSS-BOX
SEARCH MODE 2
PLOT START TIME = 45300.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 110 POINTS PER FUNCTION
SCATTER PLOT HAS 55 POINTS PER FUNCTION

10% Sin Transient Test No. 17
April 13, 1977



NUMBER OF RECORDS = 5

ARGUMENT SELECTED : 1

FIRST FUNCTION #18 OPEN BOX

SECOND FUNCTION #19 TRIANGLE

THIRD FUNCTION #20 CROSS-CIRCLE

FOURTH FUNCTION #21 CROSS-BOX

SEARCH MODE 2

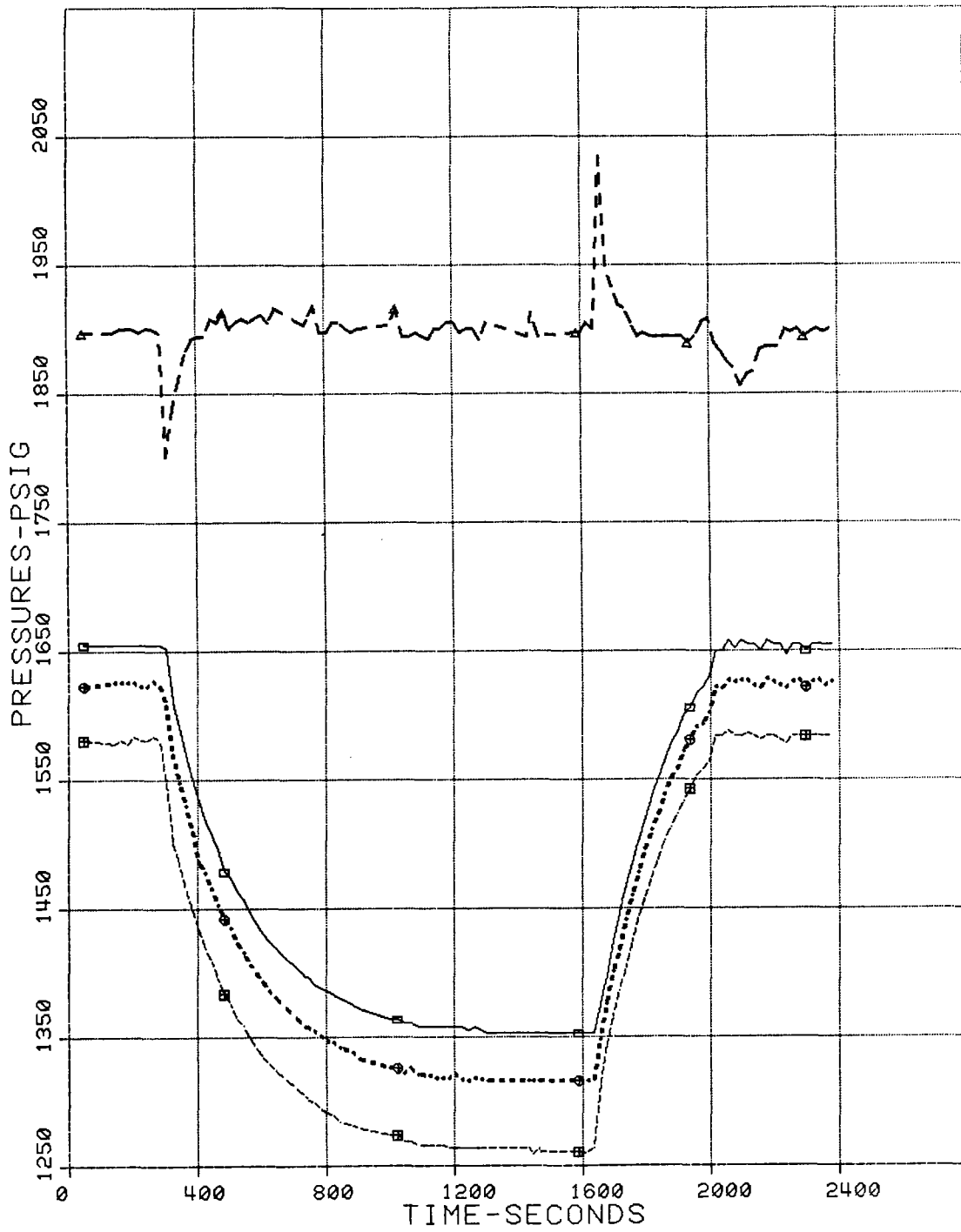
PLOT START TIME = 48900.0

EACH 1TH POINT IS PLOTTED

LINE PLOT HAS 95 POINTS PER FUNCTION

SCATTER PLOT HAS 47 POINTS PER FUNCTION

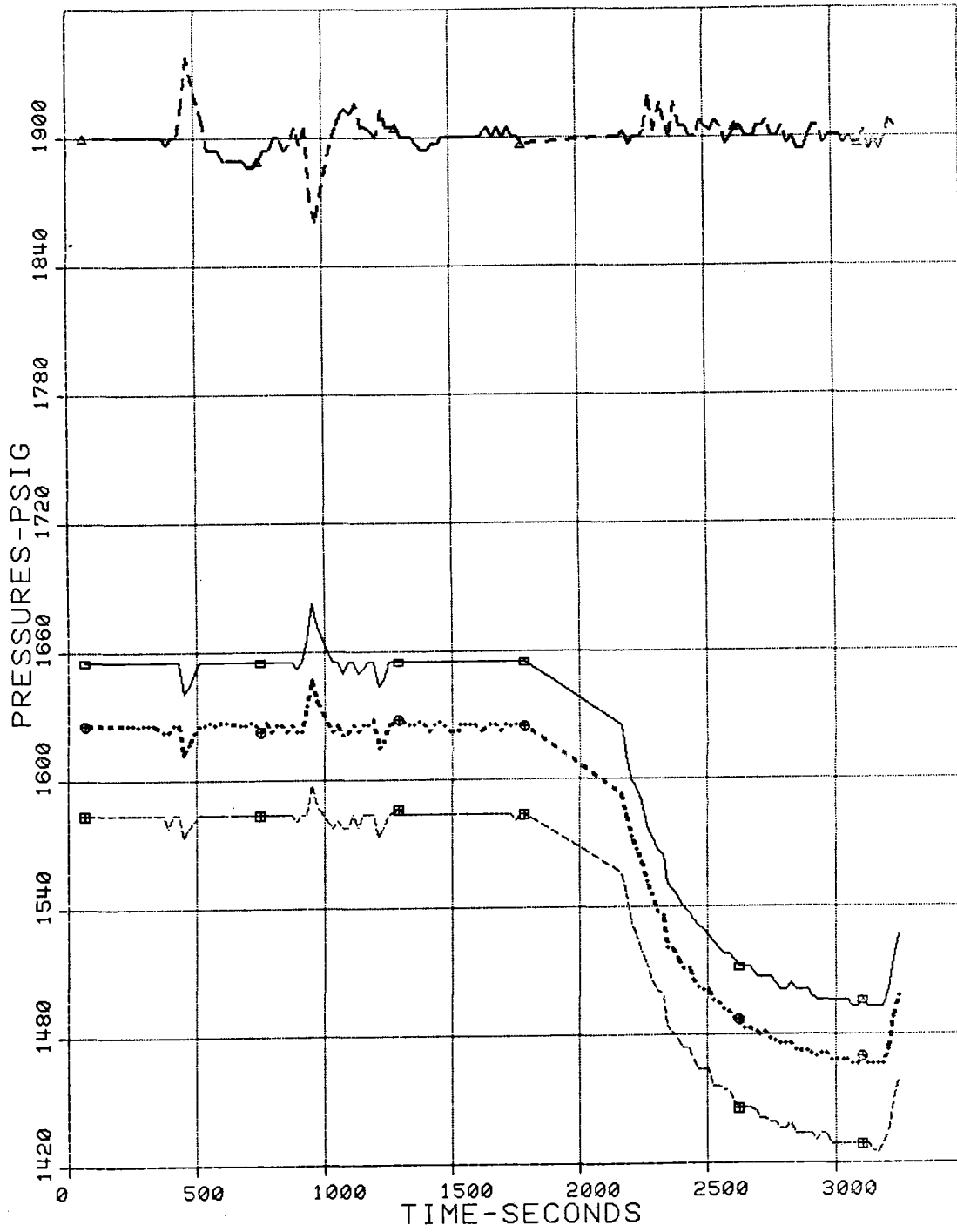
Stm Flow 23.7% Transient



NUMBER OF RECORDS = 5
ARGUMENT SELECTED : 1
FIRST FUNCTION #18 OPEN BOX
SECOND FUNCTION #19 TRIANGLE
THIRD FUNCTION #20 CROSS-CIRCLE
FOURTH FUNCTION #21 CROSS-BOX
SEARCH MODE 2
PLOT START TIME = 52200.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

Recirc Rate Transient
80K #/hr → 108K → 80K

Test No. 17
April 13, 1977

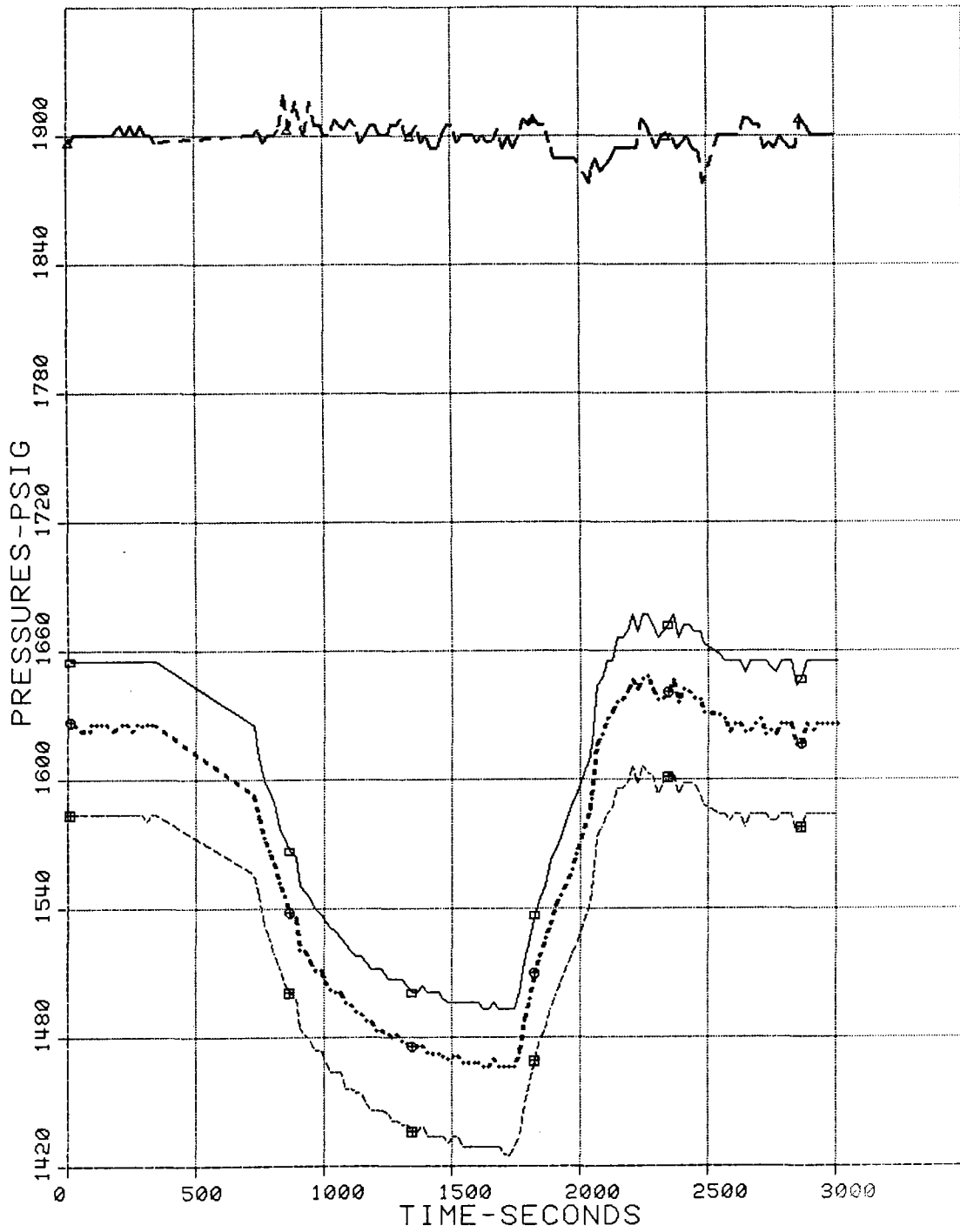


NUMBER OF RECORDS = 5
ARGUMENT SELECTED : 1
FIRST FUNCTION #18 OPEN BOX
SECOND FUNCTION #19 TRIANGLE
THIRD FUNCTION #20 CROSS-CIRCLE
FOURTH FUNCTION #21 CROSS-BOX
SEARCH MODE 2
PLOT START TIME = 53640.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

*-10.7% Power Step
(All 4 zones)*

Test No. 17

April 13, 77



NUMBER OF RECORDS = 5

ARGUMENT SELECTED : 1

FIRST FUNCTION #18 OPEN BOX

SECOND FUNCTION #19 TRIANGLE

THIRD FUNCTION #20 CROSS-CIRCLE

FOURTH FUNCTION #21 CROSS-BOX

SEARCH MODE 2

PLOT START TIME = 57300.0

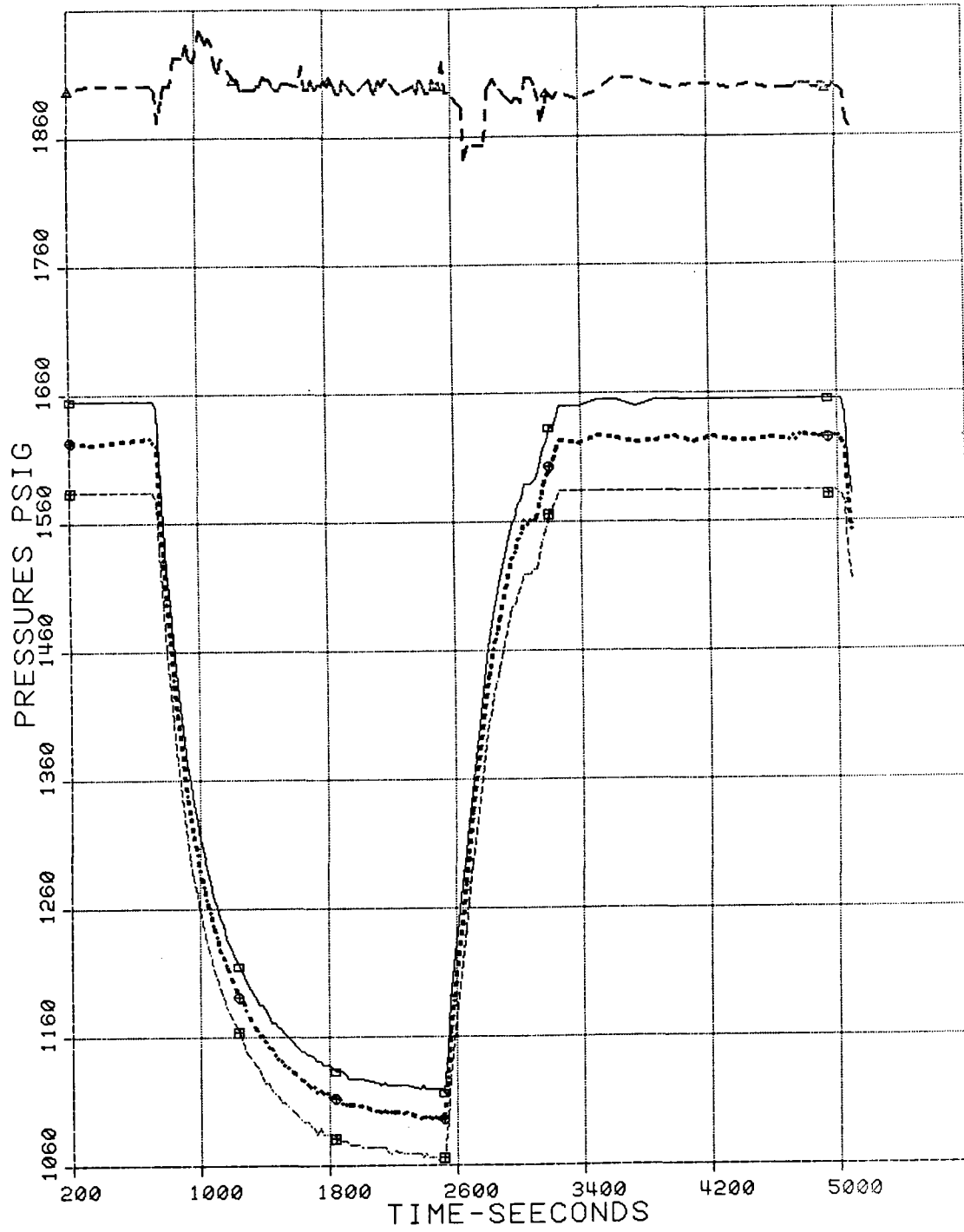
EACH 1TH POINT IS PLOTTED

LINE PLOT HAS 128 POINTS PER FUNCTION

SCATTER PLOT HAS 64 POINTS PER FUNCTION

-30.7% → +43.7%
Power Input

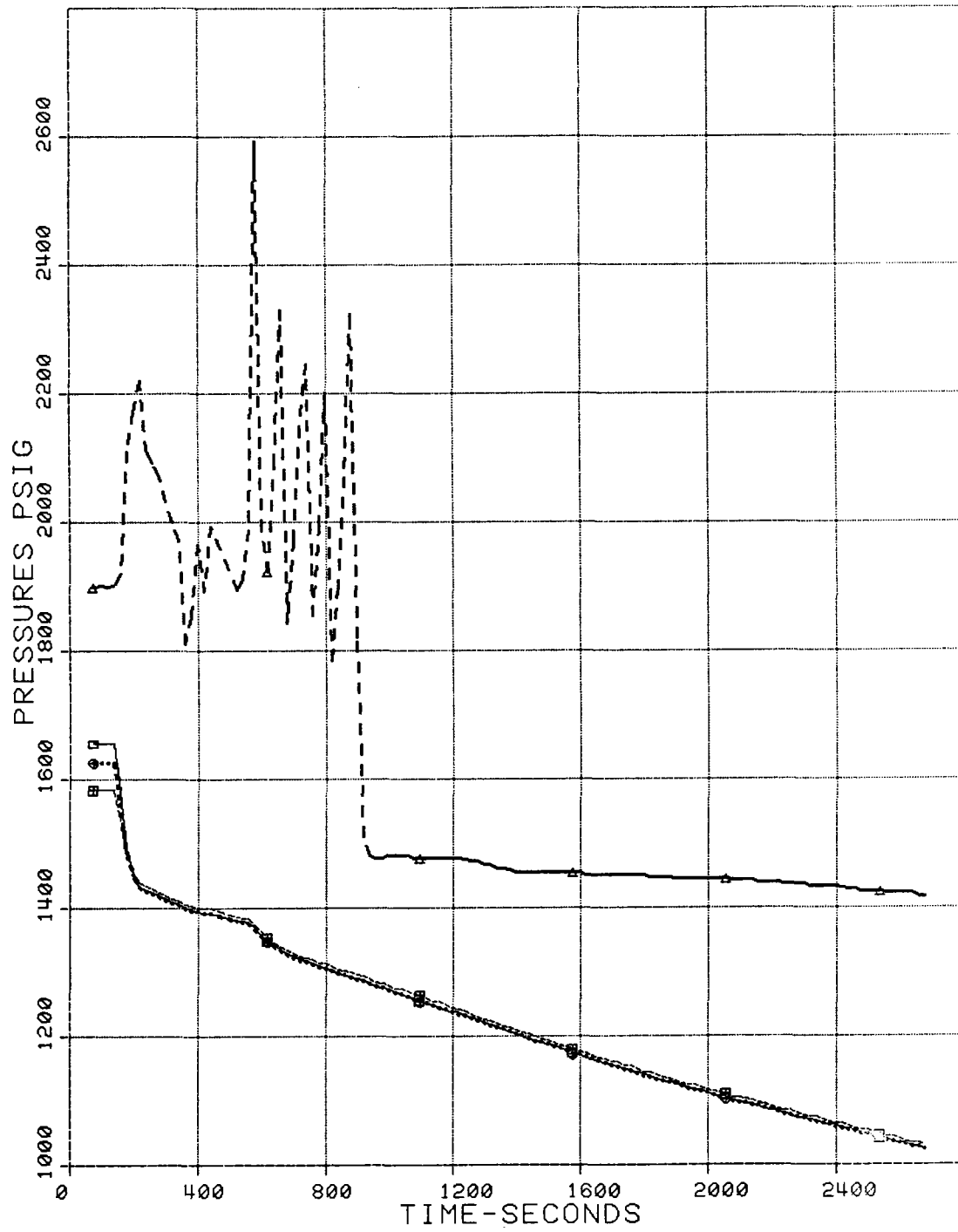
Test No. 17
April 13, 1977



NUMBER OF RECORDS = 5
ARGUMENT SELECTED : 1
FIRST FUNCTION #18 OPEN BOX
SECOND FUNCTION #19 TRIANGLE
THIRD FUNCTION #20 CROSS-CIRCLE
FOURTH FUNCTION #21 CROSS-BOX
SEARCH MODE 2
PLOT START TIME = 65400.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

Array Trips
10.740. Min Spans

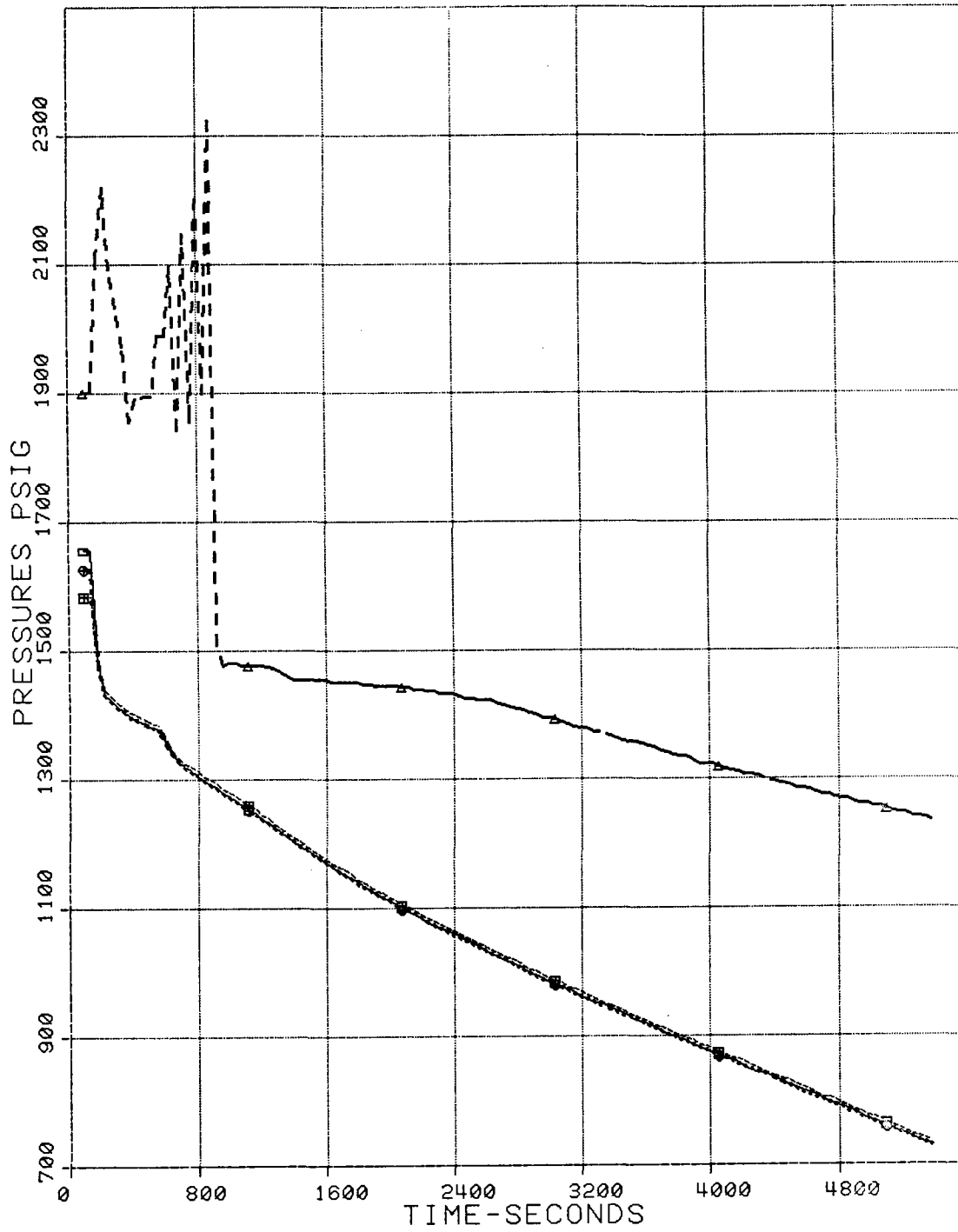
Test No. 17
April 13, '77



NUMBER OF RECORDS = 5
ARGUMENT SELECTED : 1
FIRST FUNCTION #18 OPEN BOX
SECOND FUNCTION #19 TRIANGLE
THIRD FUNCTION #20 CROSS-CIRCLE
FOURTH FUNCTION #21 CROSS-BOX
SEARCH MODE 2
PLOT START TIME = 65400.0
EACH 2TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

Array Trips
80 Minute Span

Test No.17
April 13, '77



PAGE 16
FLUIDS TEMPERATURES, PLOTS

NUMBER OF RECORDS = 7

ARGUMENT SELECTED : 1

FIRST FUNCTION #22 OPEN BOX TBI

SECOND FUNCTION #24 TRIANGLE TFW

THIRD FUNCTION #26 CROSS-CIRCLE TS10

FOURTH FUNCTION #27 CROSS-BOX TS1I

FIFTH FUNCTION #28 CROSS-DIAMOND TS20

SIXTH FUNCTION #29 ASTERISK TS2I

SEARCH MODE 2

PLOT START TIME = 39600.0

Day 103

EACH 1TH POINT IS PLOTTED

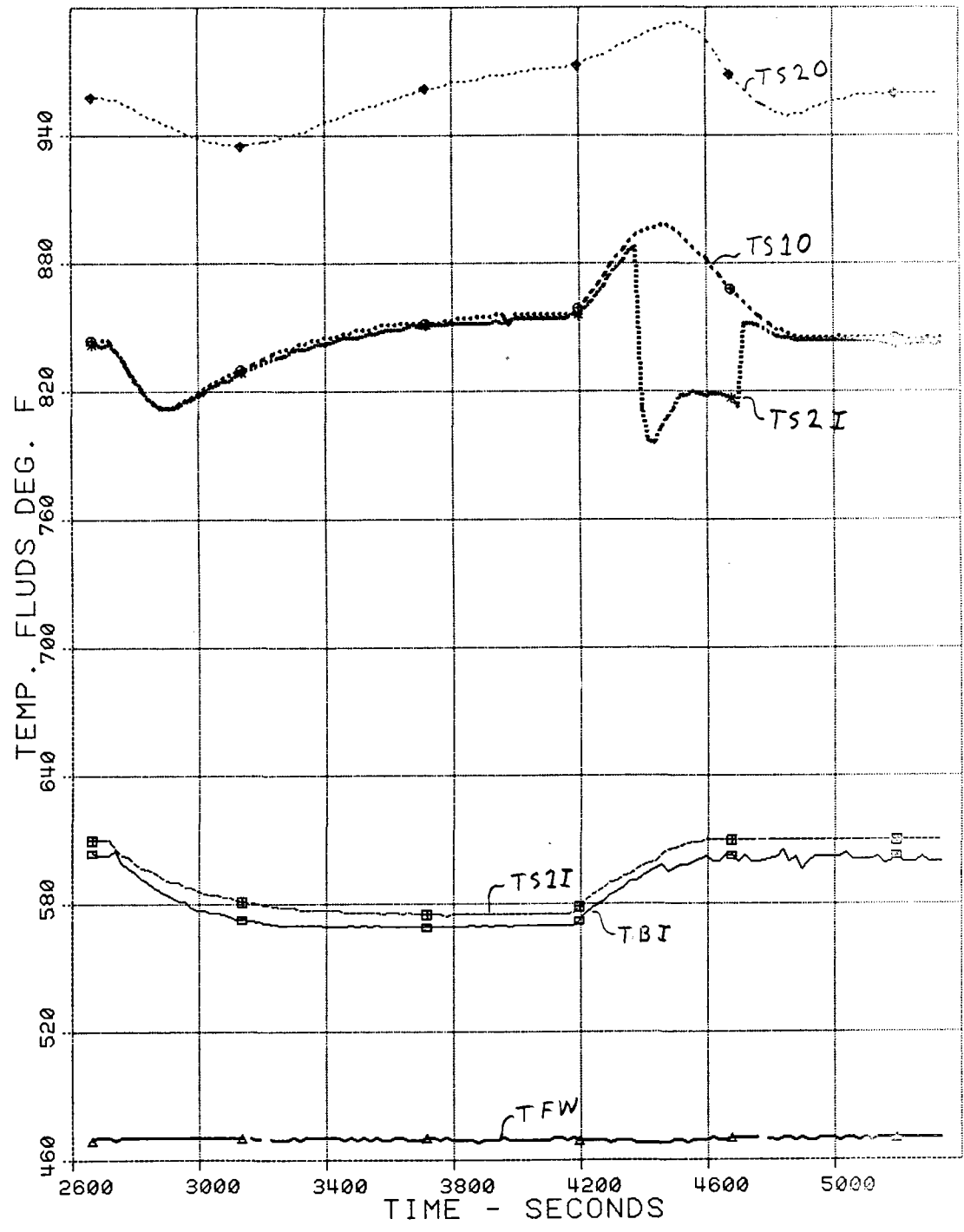
LINE PLOT HAS 128 POINTS PER FUNCTION

SCATTER PLOT HAS 64 POINTS PER FUNCTION

28.9% Stm. Transient

Test No. 17

April 13, 1977

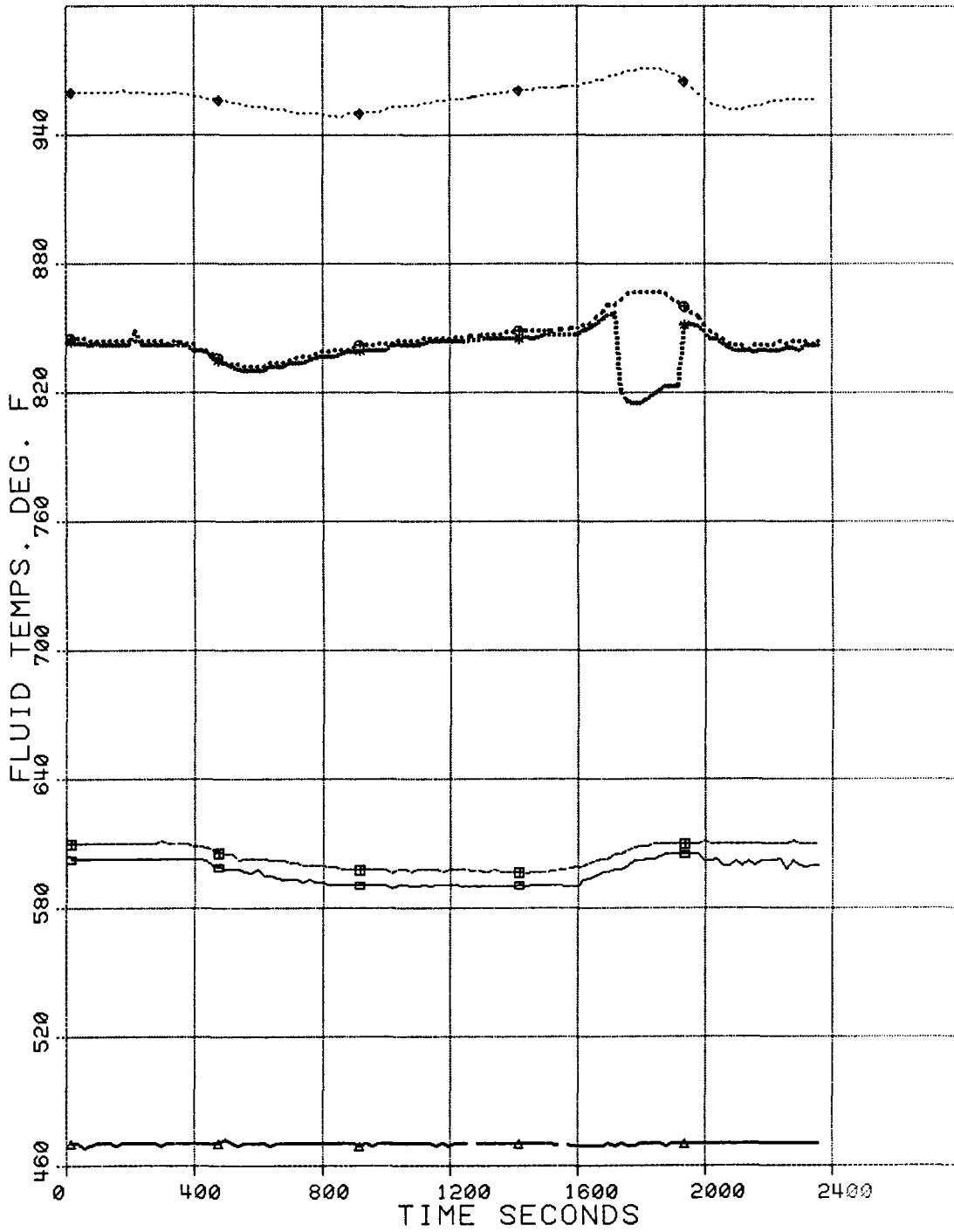


NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #22 OPEN BOX
SECOND FUNCTION #24 TRIANGLE
THIRD FUNCTION #26 CROSS-CIRCLE
FOURTH FUNCTION #27 CROSS-BOX
FIFTH FUNCTION #28 CROSS-DIAMOND
SIXTH FUNCTION #29 ASTERISK
SEARCH MODE 2
PLOT START TIME = 45300.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 110 POINTS PER FUNCTION
SCATTER PLOT HAS 55 POINTS PER FUNCTION

10.7% Stm Transient

Test No.17

April 13, 1977



NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #22 OPEN BOX
SECOND FUNCTION #24 TRIANGLE
THIRD FUNCTION #26 CROSS-CIRCLE
FOURTH FUNCTION #27 CROSS-BOX
FIFTH FUNCTION #28 CROSS-DIAMOND
SIXTH FUNCTION #29 ASTERISK
SEARCH MODE 2
PLOT START TIME = 48900.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 95 POINTS PER FUNCTION
SCATTER PLOT HAS 47 POINTS PER FUNCTION

stem flow

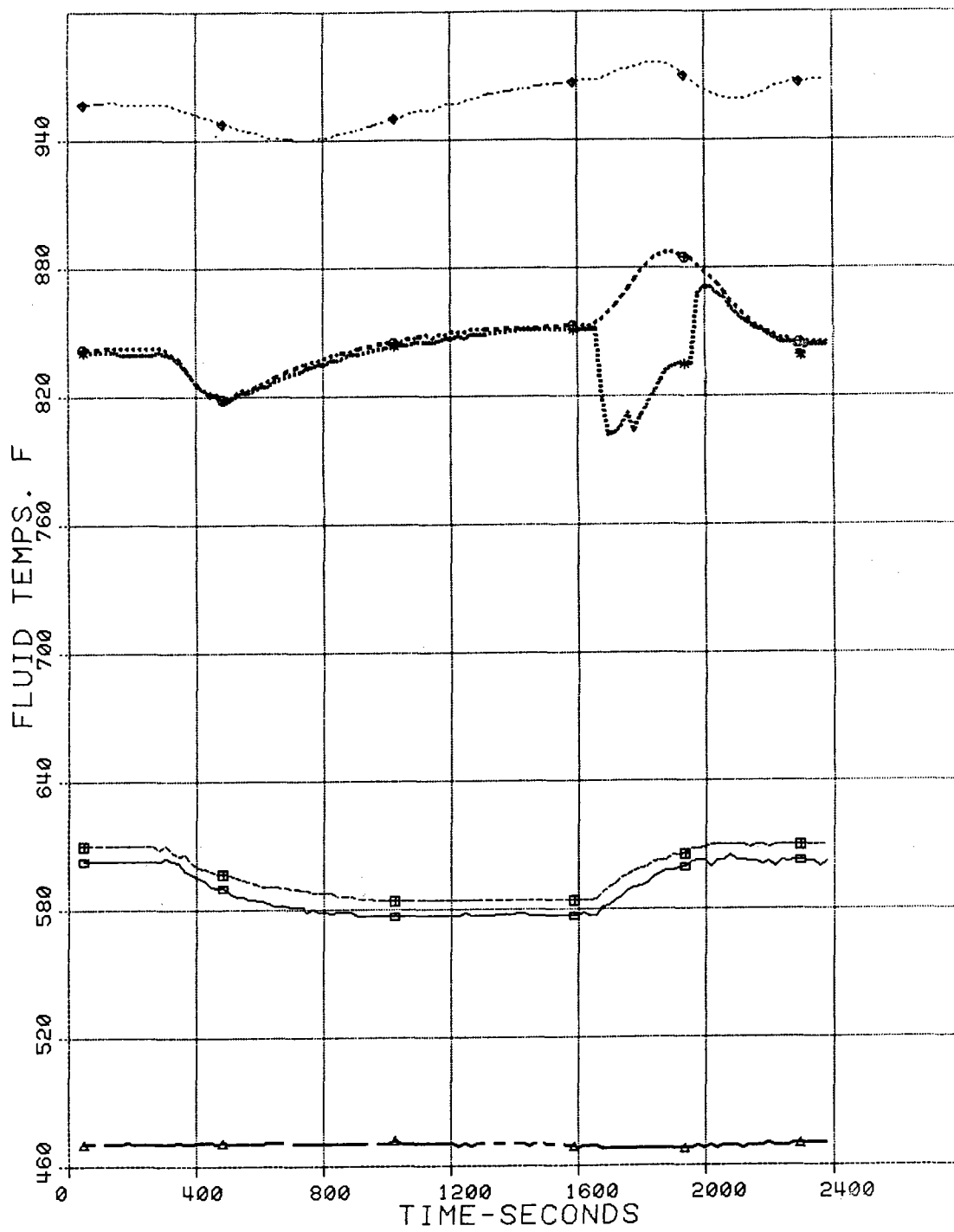
23%

Transient

13:35

#17

*Test No. 17
April 13, 1977*

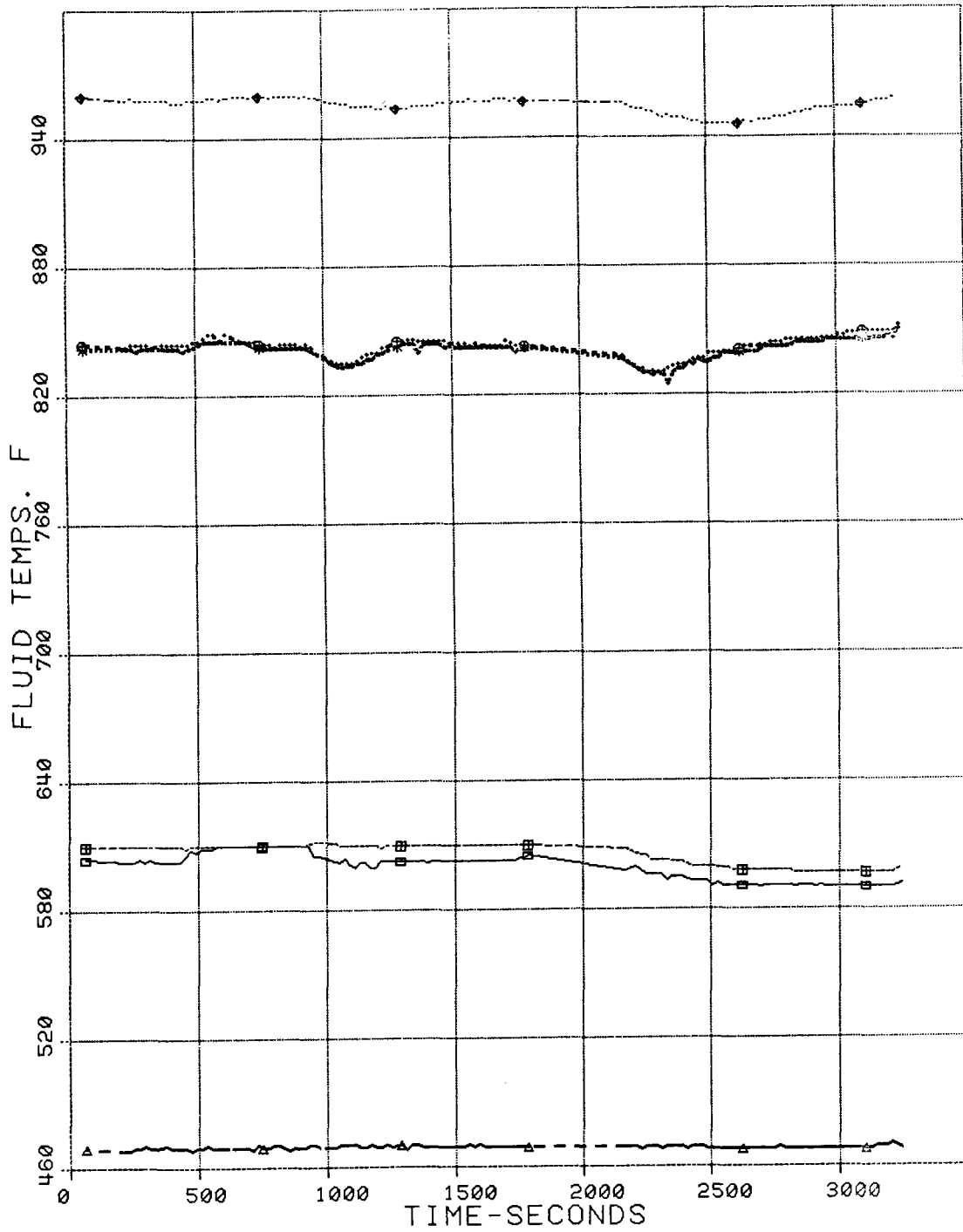


NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #22 OPEN BOX
SECOND FUNCTION #24 TRIANGLE
THIRD FUNCTION #26 CROSS-CIRCLE
FOURTH FUNCTION #27 CROSS-BOX
FIFTH FUNCTION #28 CROSS-DIAMOND
SIXTH FUNCTION #29 ASTERISK
SEARCH MODE 2
PLOT START TIME = 52200.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

Recirc. Rate Transient

80K #/hr \Rightarrow 108.K \rightarrow 80.K

Test No. 17
April 13, 1977

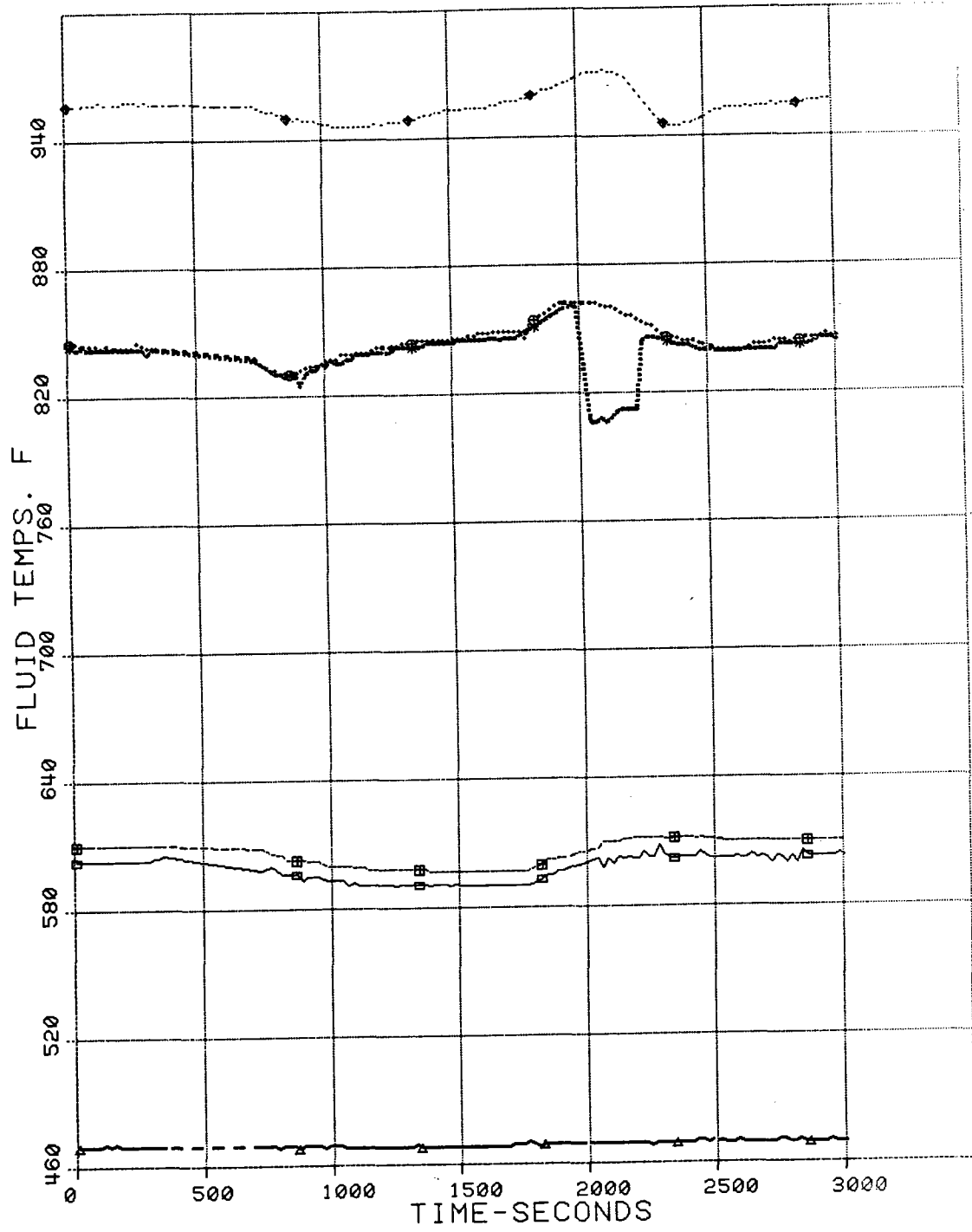


NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #22 OPEN BOX
SECOND FUNCTION #24 TRIANGLE
THIRD FUNCTION #26 CROSS-CIRCLE
FOURTH FUNCTION #27 CROSS-BOX
FIFTH FUNCTION #28 CROSS-DIAMOND
SIXTH FUNCTION #29 ASTERISK
SEARCH MODE 2
PLOT START TIME = 53640.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

*-10.9% Power Step
(All 4 zones)*

*Test No. 17
April 13, 1977*

*~~5-4~~
16-5*

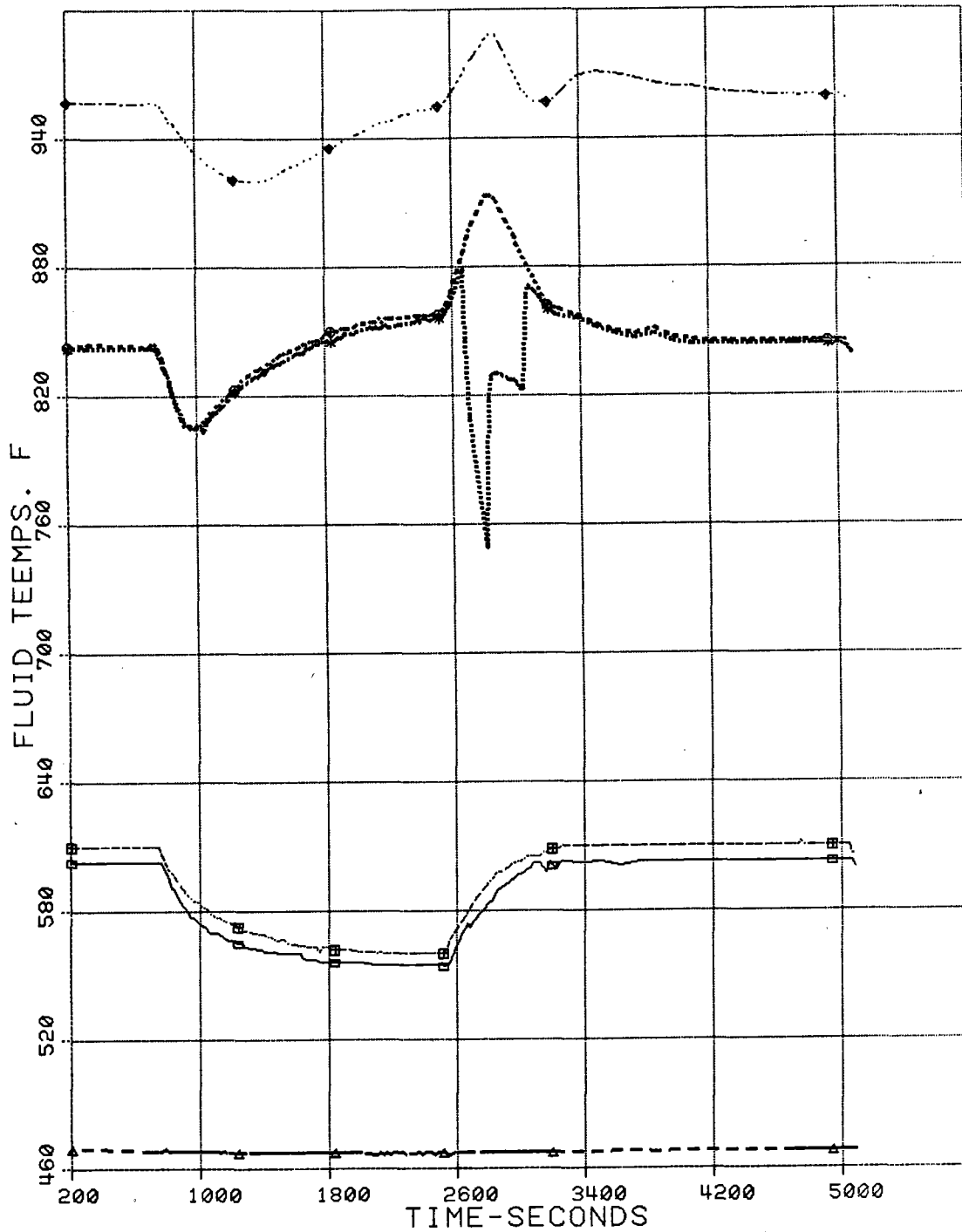


NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #22 OPEN BOX
SECOND FUNCTION #24 TRIANGLE
THIRD FUNCTION #26 CROSS-CIRCLE
FOURTH FUNCTION #27 CROSS-BOX
FIFTH FUNCTION #28 CROSS-DIAMOND
SIXTH FUNCTION #29 ASTERISK
SEARCH MODE 2
PLOT START TIME = 57300.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

-30.9% → +43.9%
Power Input

~~6-4~~
16-6

Test No. 17
April 13, 1977

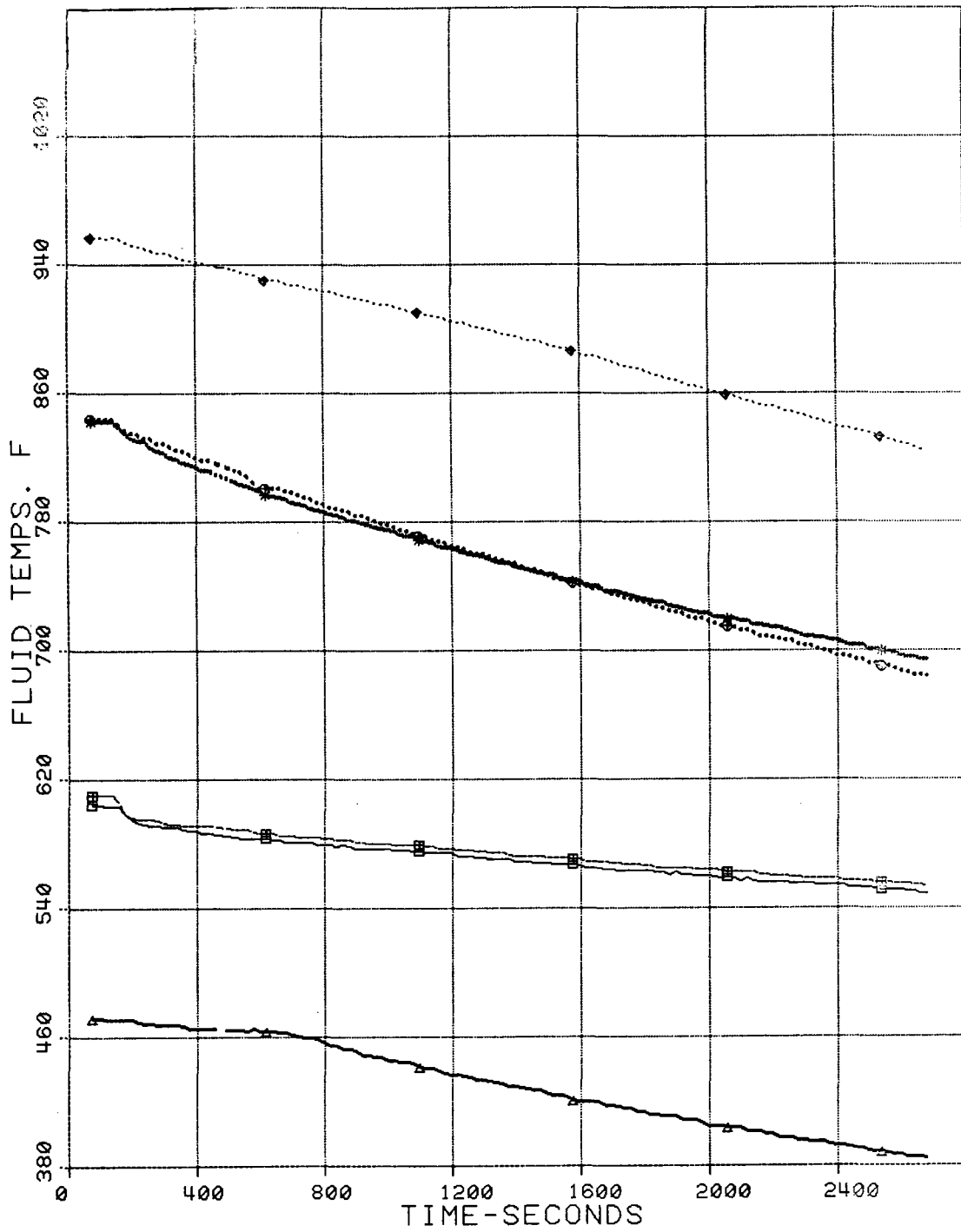


NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #22 OPEN BOX
SECOND FUNCTION #24 TRIANGLE
THIRD FUNCTION #26 CROSS-CIRCLE
FOURTH FUNCTION #27 CROSS-BOX
FIFTH FUNCTION #28 CROSS-DIAMOND
SIXTH FUNCTION #29 ASTERISK
SEARCH MODE 2
PLOT START TIME = 65400.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

*Array Trips
10. + 40. Min Spans*

*Test No. 17
April 13, '77*

*~~7-A~~
16-7*

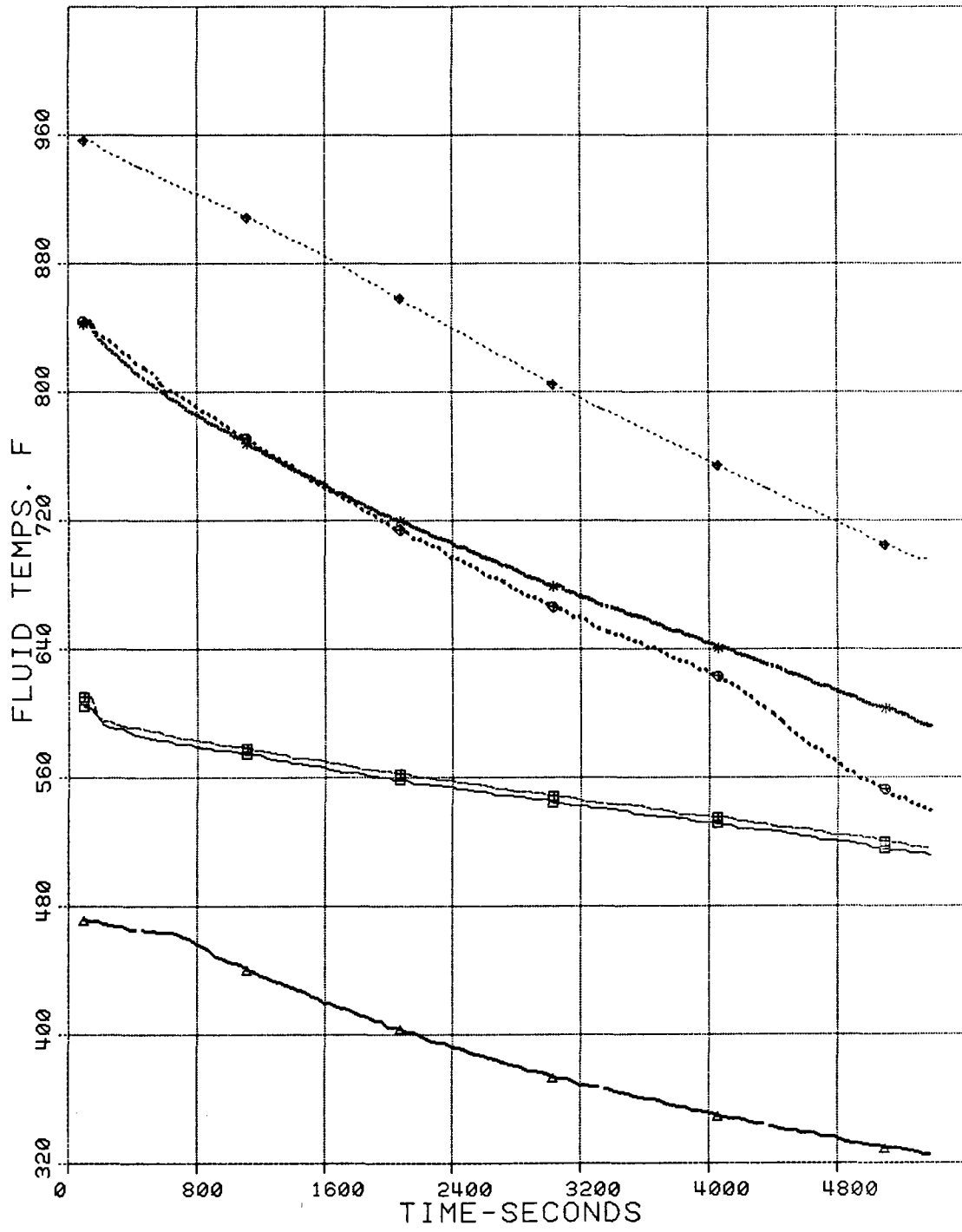


NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #22 OPEN BOX
SECOND FUNCTION #24 TRIANGLE
THIRD FUNCTION #26 CROSS-CIRCLE
FOURTH FUNCTION #27 CROSS-BOX
FIFTH FUNCTION #28 CROSS-DIAMOND
SIXTH FUNCTION #29 ASTERISK
SEARCH MODE 2
PLOT START TIME = 65400.0
EACH 2TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

Array Trips
80 Min Span

Test No. 17
April 13, 1977

~~7-4~~
16-7



4-151

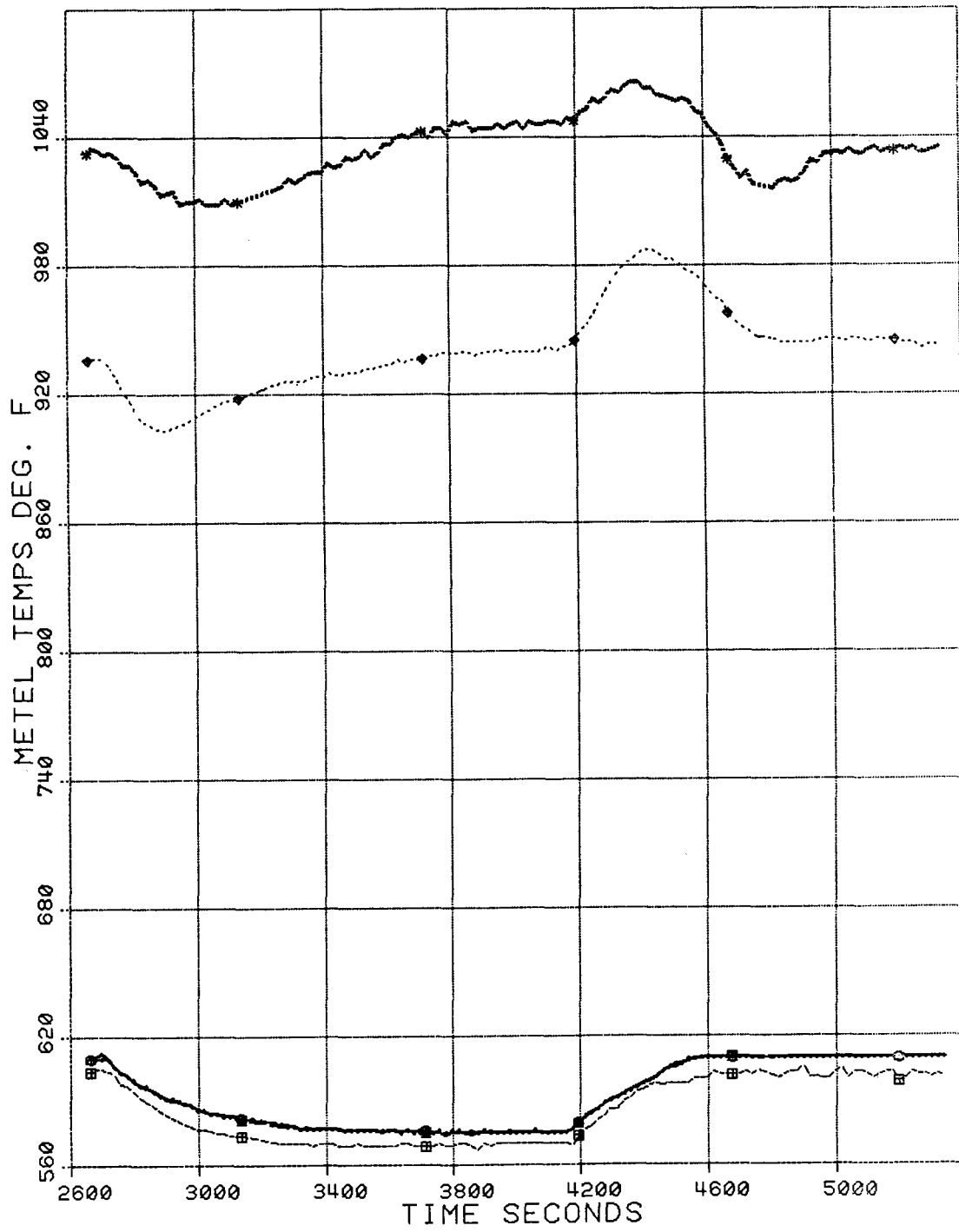
PAGE 17
METAL TEMPERATURES, PLOTS

NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #12 OPEN BOX
SECOND FUNCTION #13 TRIANGLE
THIRD FUNCTION #14 CROSS-CIRCLE
FOURTH FUNCTION #23 CROSS-BOX
FIFTH FUNCTION #32 CROSS-DIAMOND
SIXTH FUNCTION #33 ASTERISK
SEARCH MODE 2
PLOT START TIME = 39600.0 *Day 103*
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

~~1-2~~
17-1

28% Stm, Transient

*Test 17
4/13/77*

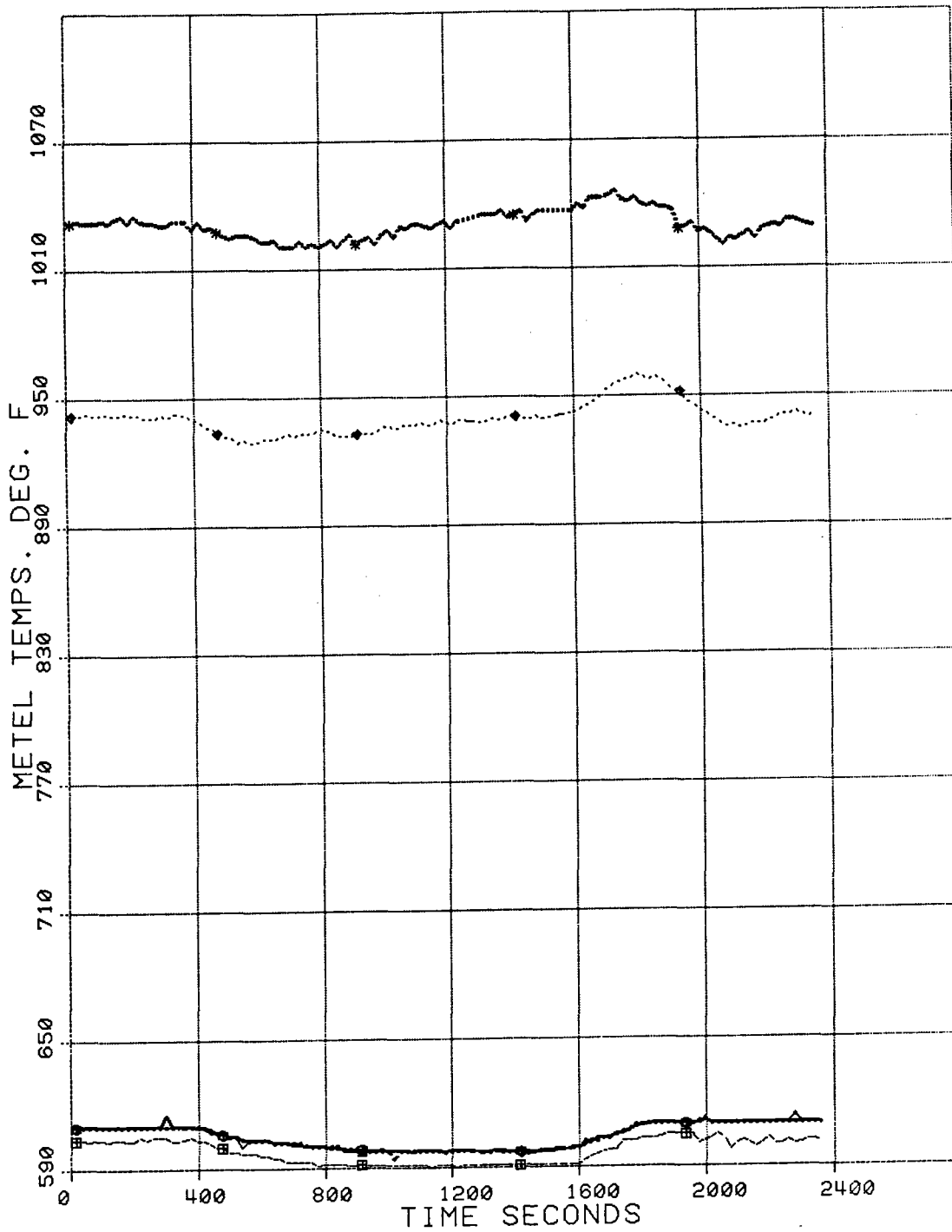


NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #12 OPEN BOX
SECOND FUNCTION #13 TRIANGLE
THIRD FUNCTION #14 CROSS-CIRCLE
FOURTH FUNCTION #23 CROSS-BOX
FIFTH FUNCTION #32 CROSS-DIAMOND
SIXTH FUNCTION #33 ASTERISK
SEARCH MODE 2
PLOT START TIME = 45300.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 110 POINTS PER FUNCTION
SCATTER PLOT HAS 55 POINTS PER FUNCTION

17-2

10.7% Stim Transient

Test No. 17
April 13, 1977



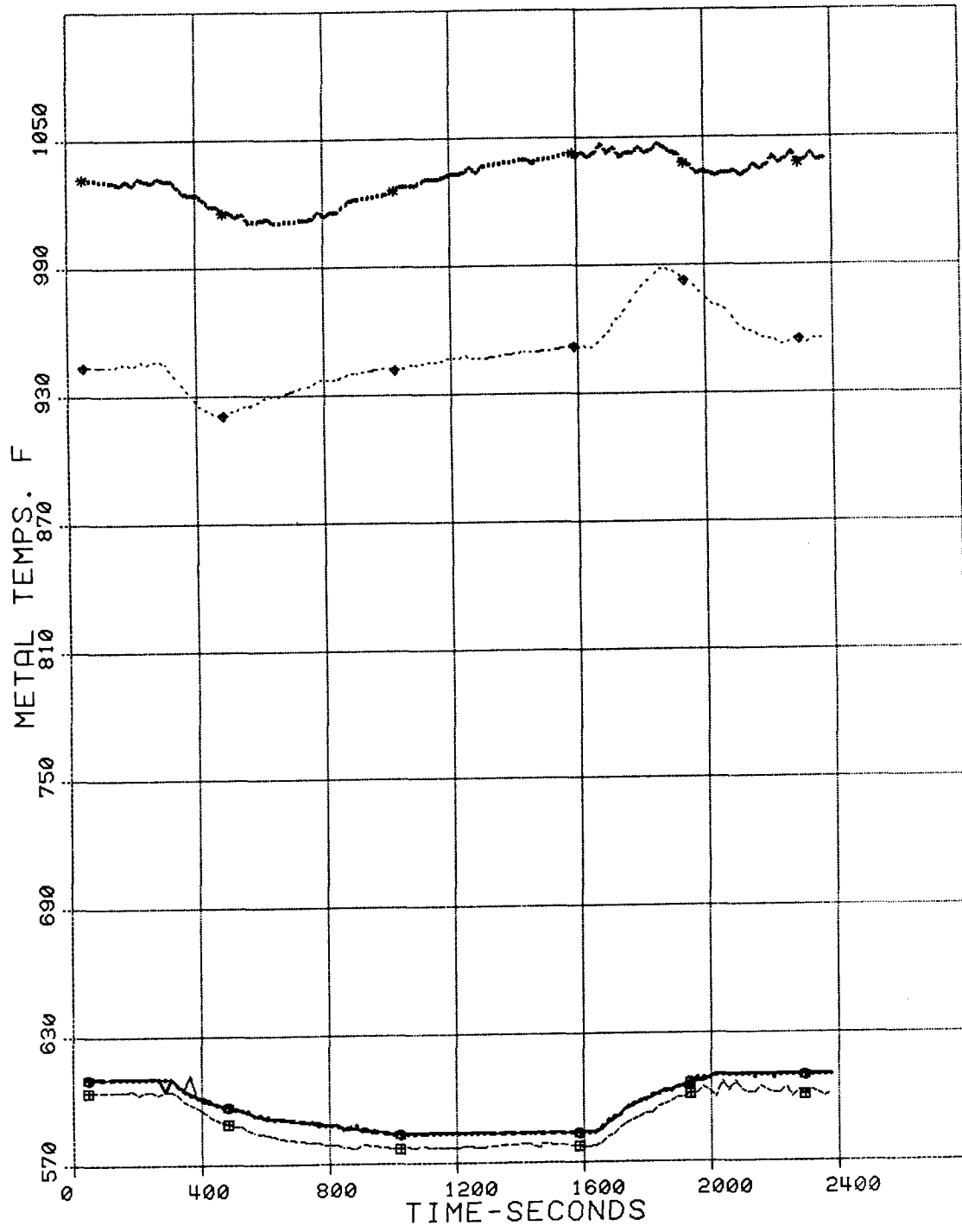
NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #12 OPEN BOX
SECOND FUNCTION #13 TRIANGLE
THIRD FUNCTION #14 CROSS-CIRCLE
FOURTH FUNCTION #23 CROSS-BOX
FIFTH FUNCTION #32 CROSS-DIAMOND
SIXTH FUNCTION #33 ASTERISK
SEARCH MODE 2
PLOT START TIME = 48900.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 95 POINTS PER FUNCTION
SCATTER PLOT HAS 47 POINTS PER FUNCTION

Stm Flow 23.7% Transient

*13:35
Test #17*

April 13, 1977

*~~3-2~~
17-3*



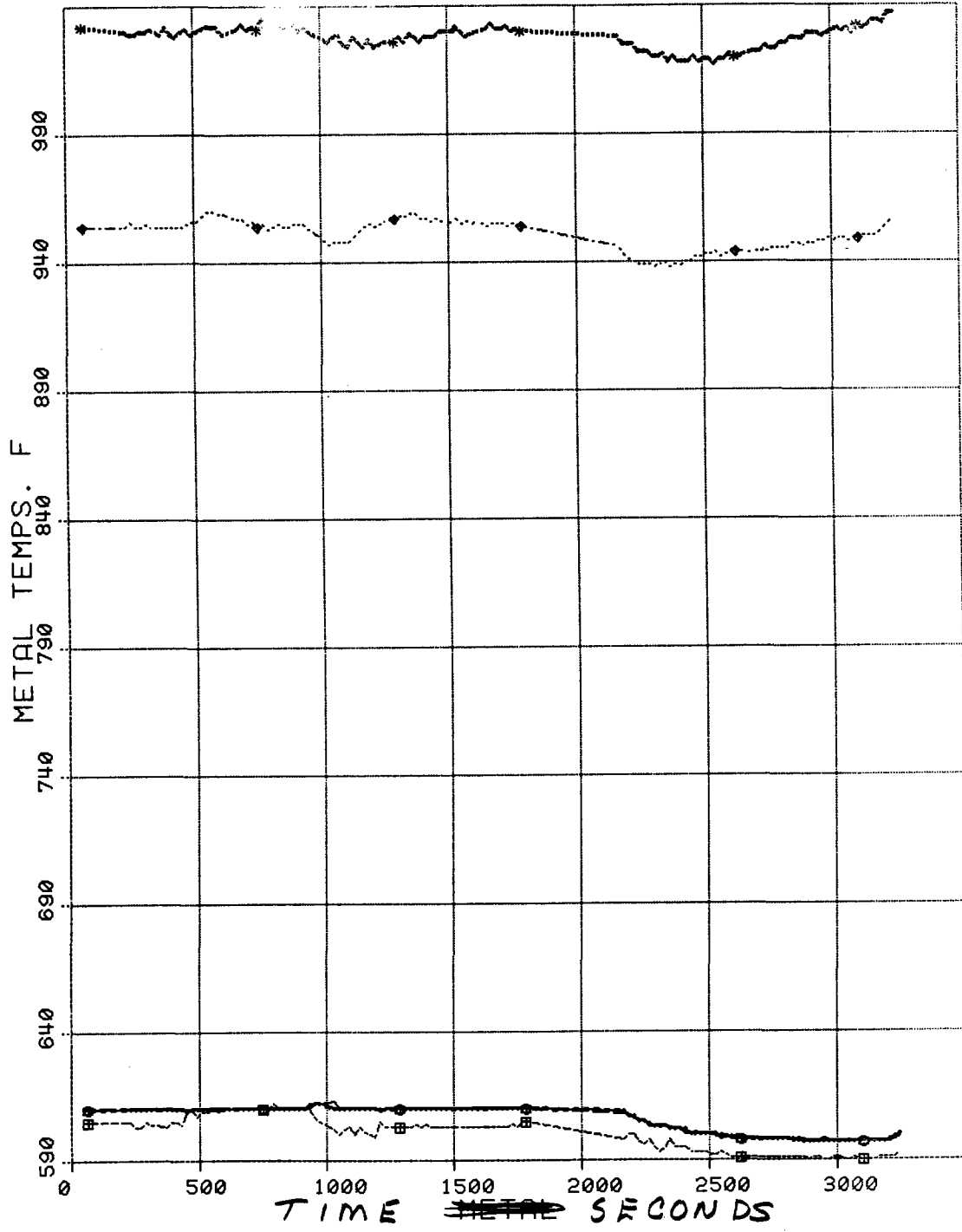
NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #12 OPEN BOX
SECOND FUNCTION #13 TRIANGLE
THIRD FUNCTION #14 CROSS-CIRCLE
FOURTH FUNCTION #23 CROSS-BOX
FIFTH FUNCTION #32 CROSS-DIAMOND
SIXTH FUNCTION #33 ASTERISK
SEARCH MODE 2
PLOT START TIME = 52200.0
EACH 1TH POINT IS PLOTTED
FINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

Recirc. Rate Transient

80. K #/hr \rightarrow 108. K \rightarrow 80. K

Test No. 17
April 13, 1977

~~4-2~~
17-4



4-161

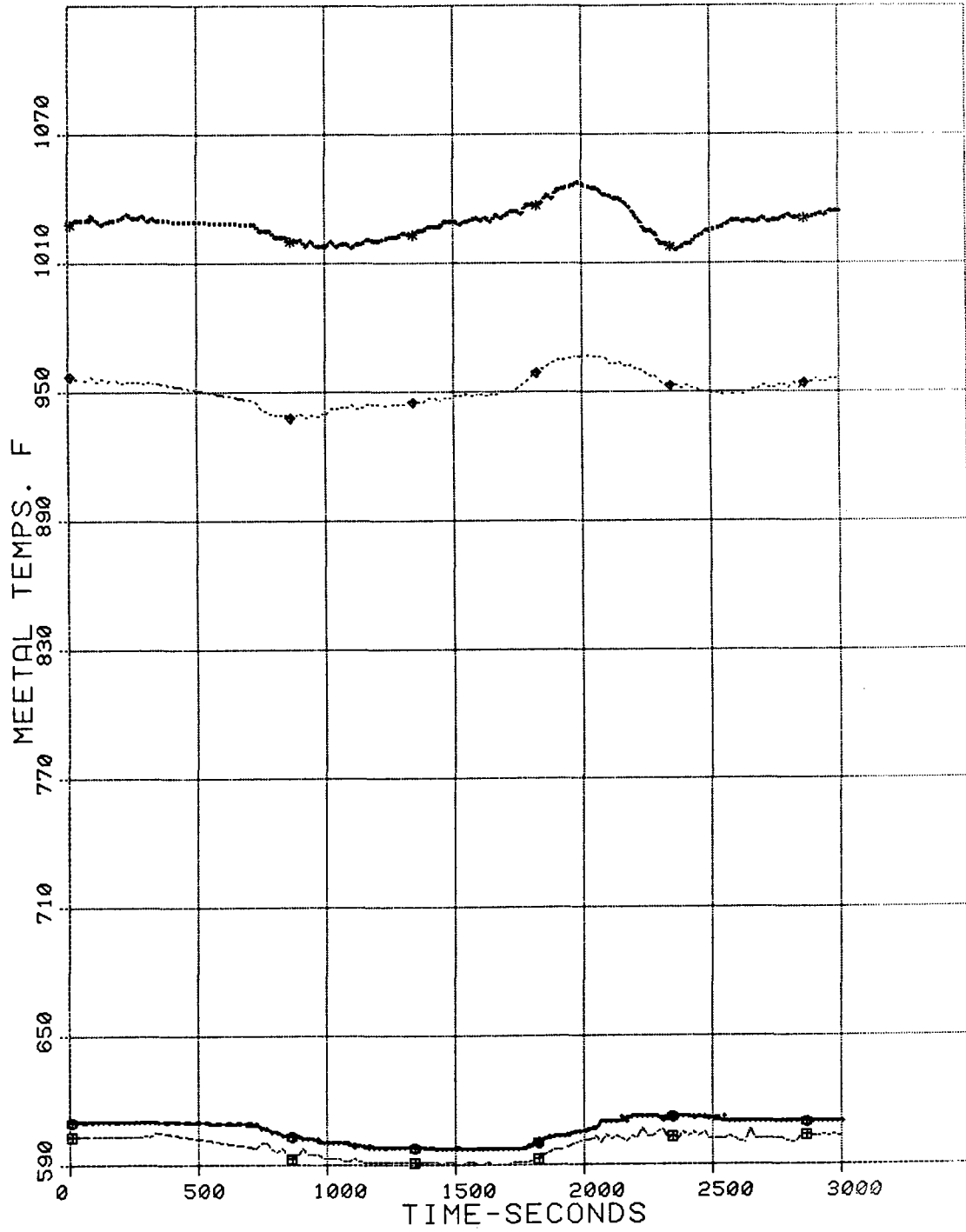
PAGE 18
DRUM LEVEL, PLOTS

NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #12 OPEN BOX
SECOND FUNCTION #13 TRIANGLE
THIRD FUNCTION #14 CROSS-CIRCLE
FOURTH FUNCTION #23 CROSS-BOX
FIFTH FUNCTION #32 CROSS-DIAMOND
SIXTH FUNCTION #33 ASTERISK
SEARCH MODE 2
PLOT START TIME = 53640.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

*-10.9% Power Step
(All 4 zones)*

*Test No. 17
April 13, 77*

~~5-2~~
17-5

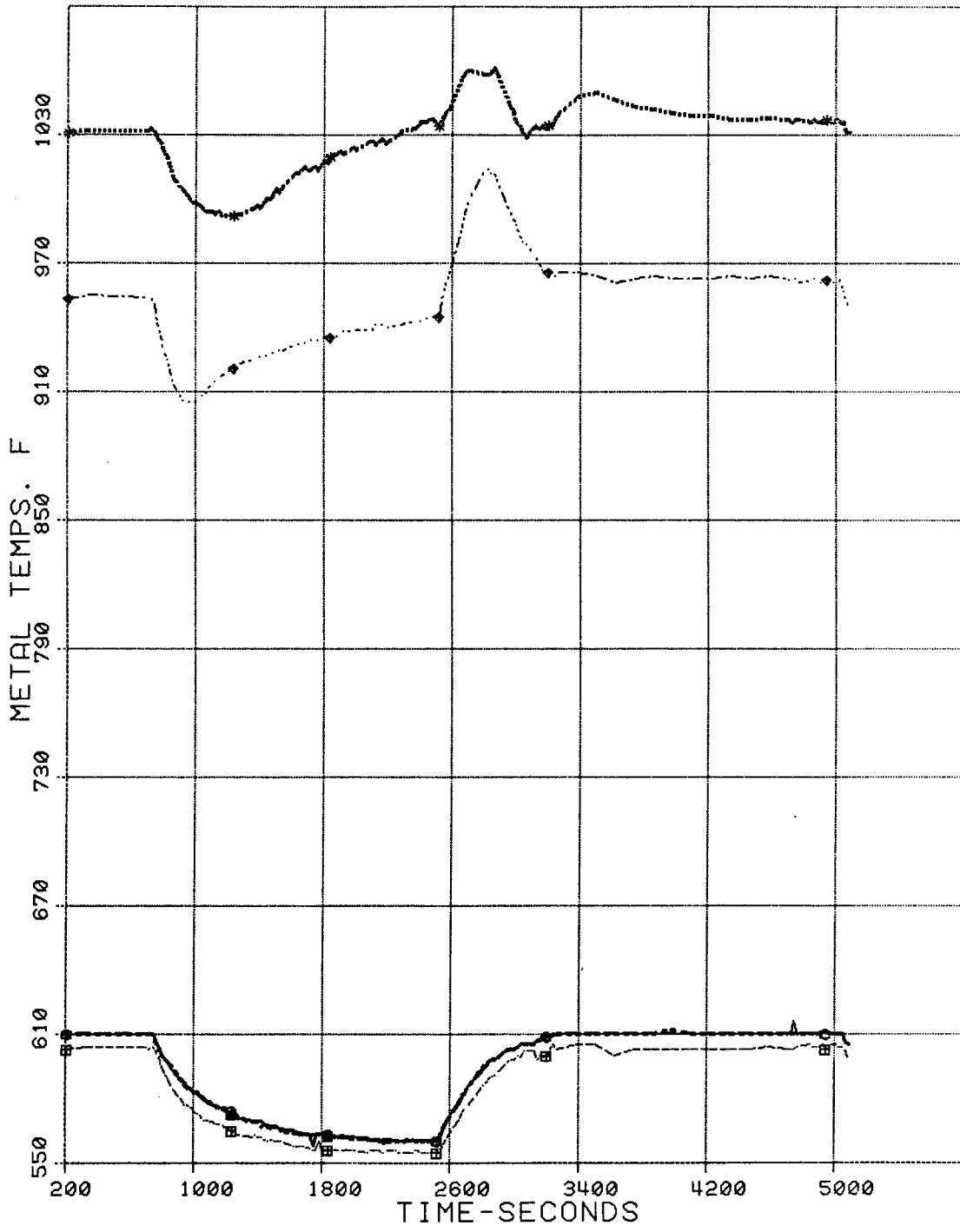


NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #12 OPEN BOX
SECOND FUNCTION #13 TRIANGLE
THIRD FUNCTION #14 CROSS-CIRCLE
FOURTH FUNCTION #23 CROSS-BOX
FIFTH FUNCTION #32 CROSS-DIAMOND
SIXTH FUNCTION #33 ASTERISK
SEARCH MODE 2
PLOT START TIME = 57300.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

-30.9% \rightarrow +43.9%
Power Input

Test No. 17
April 13, 1977

~~6-2~~
17-6

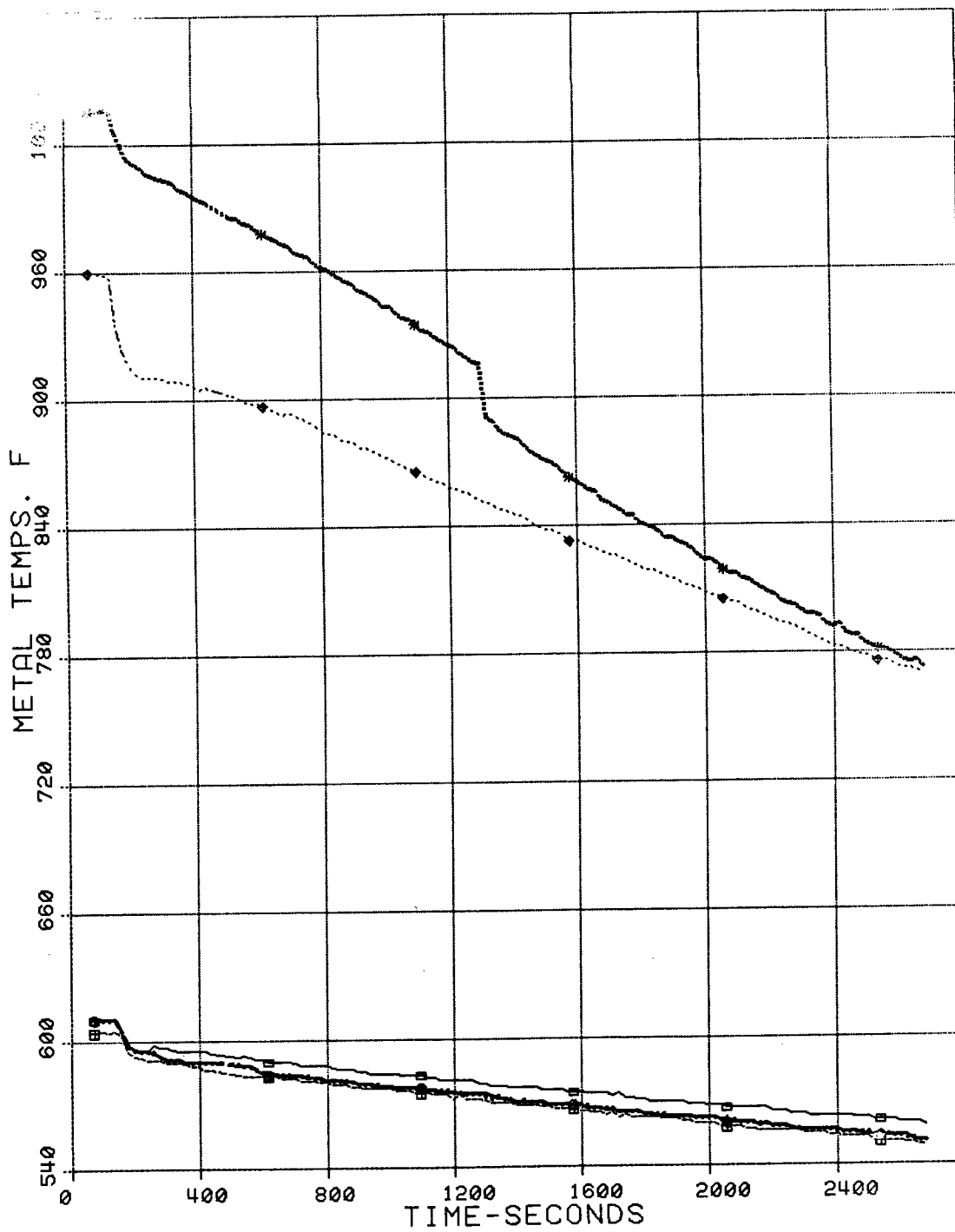


NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #12 OPEN BOX
SECOND FUNCTION #13 TRIANGLE
THIRD FUNCTION #14 CROSS-CIRCLE
FOURTH FUNCTION #23 CROSS-BOX
FIFTH FUNCTION #32 CROSS-DIAMOND
SIXTH FUNCTION #33 ASTERISK
SEARCH MODE 2
PLOT START TIME = 65400.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

Array Trip
10. + 40. Min Span

Test No. 17
April 13, 1977

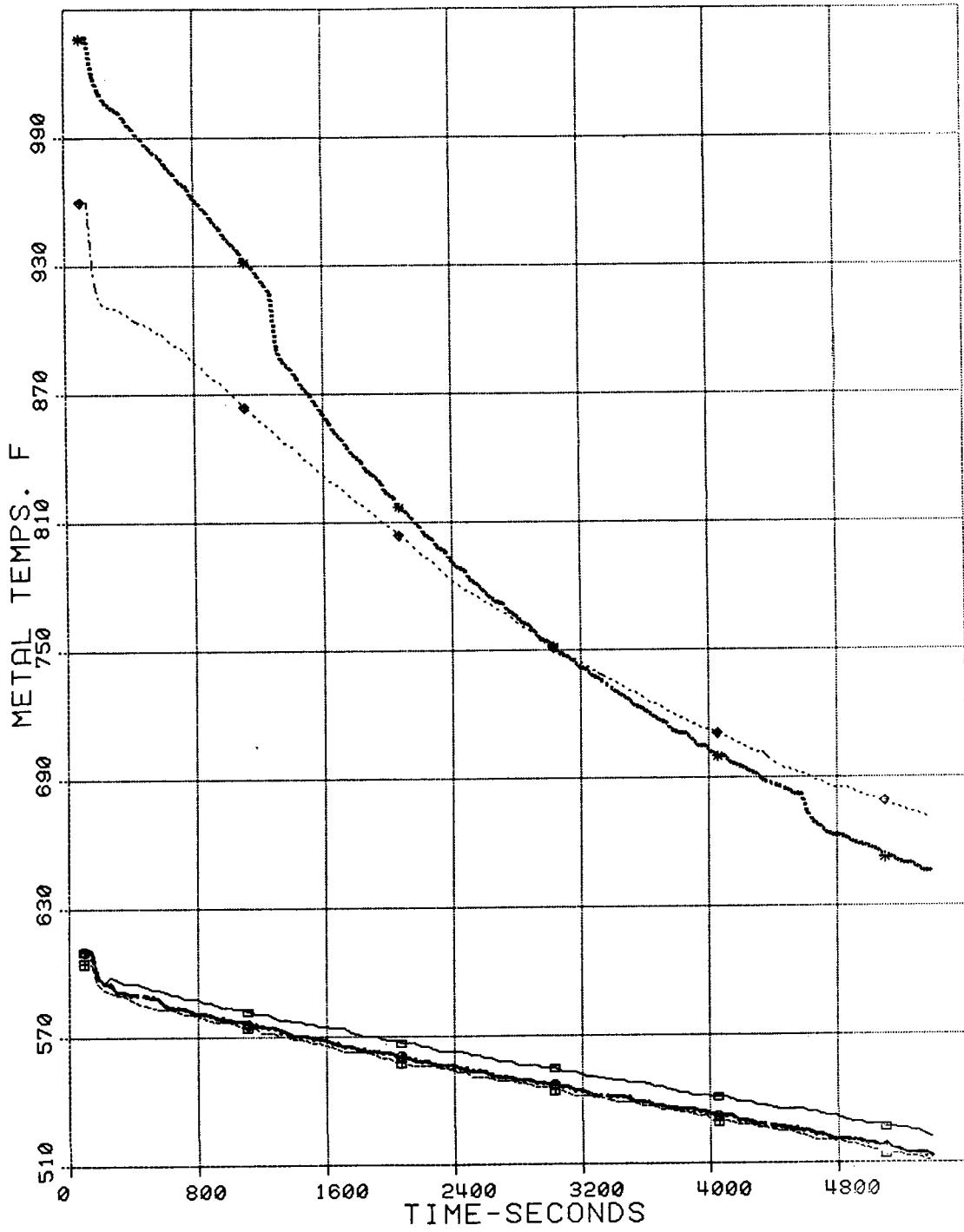
~~7-2~~
17-7



NUMBER OF RECORDS = 7
ARGUMENT SELECTED : 1
FIRST FUNCTION #12 OPEN BOX
SECOND FUNCTION #13 TRIANGLE
THIRD FUNCTION #14 CROSS-CIRCLE
FOURTH FUNCTION #23 CROSS-BOX
FIFTH FUNCTION #32 CROSS-DIAMOND
SIXTH FUNCTION #33 ASTERISK
SEARCH MODE 2
PLOT START TIME = 65400.0
EACH 2TH POINT IS PLOTTED
LINE PLOT HAS 128 POINTS PER FUNCTION
SCATTER PLOT HAS 64 POINTS PER FUNCTION

*Array Trips
80 Min Span*

*Test No. 17
April 13, '77*



4-171

PAGE 19
RECIRCULATION FLOW, PLOTS

SEARCH START
DAY *103 1977 TIME 11: 0
NUMBER OF RECORDS = 3

ARGUMENT SELECTED : 1

FIRST FUNCTION * 9 OPEN BOX

SECOND FUNCTION *30 TRIANGLE

SEARCH MODE 2

PLOT START TIME = 39600.0

EACH 1TH POINT IS PLOTTED

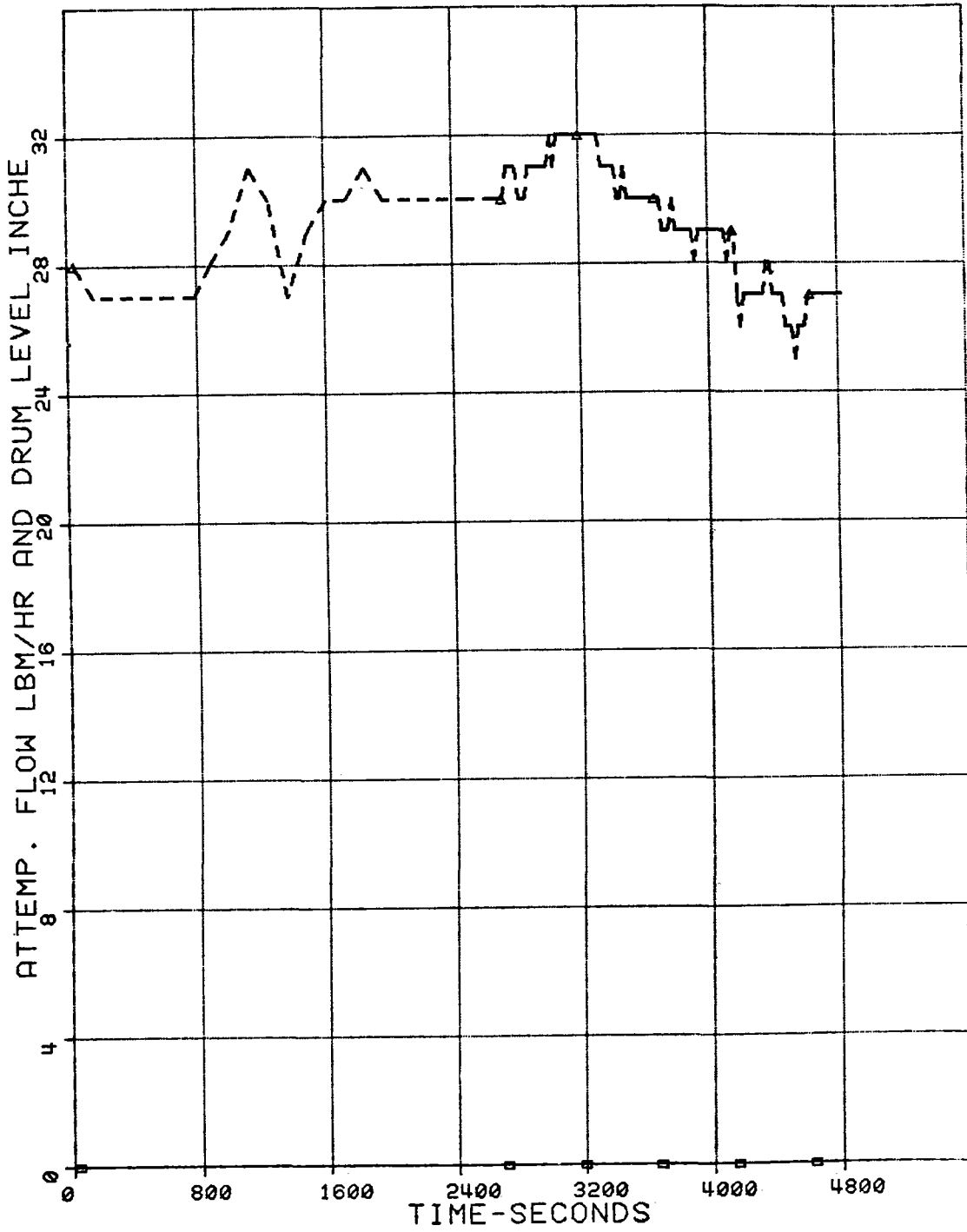
LINE PLOT HAS 128 POINTS PER FUNCTION

Test No. 17

Replot 1/25/77

14 -

18 -



SEARCH START
DAY *103 1977 TIME 12:35
NUMBER OF RECORDS... 3

ARGUMENT SELECTED : 1

FIRST FUNCTION * 9 OPEN BOX

SECOND FUNCTION *30 TRIANGLE

SEARCH MODE 2

PLOT START TIME = 45300.0

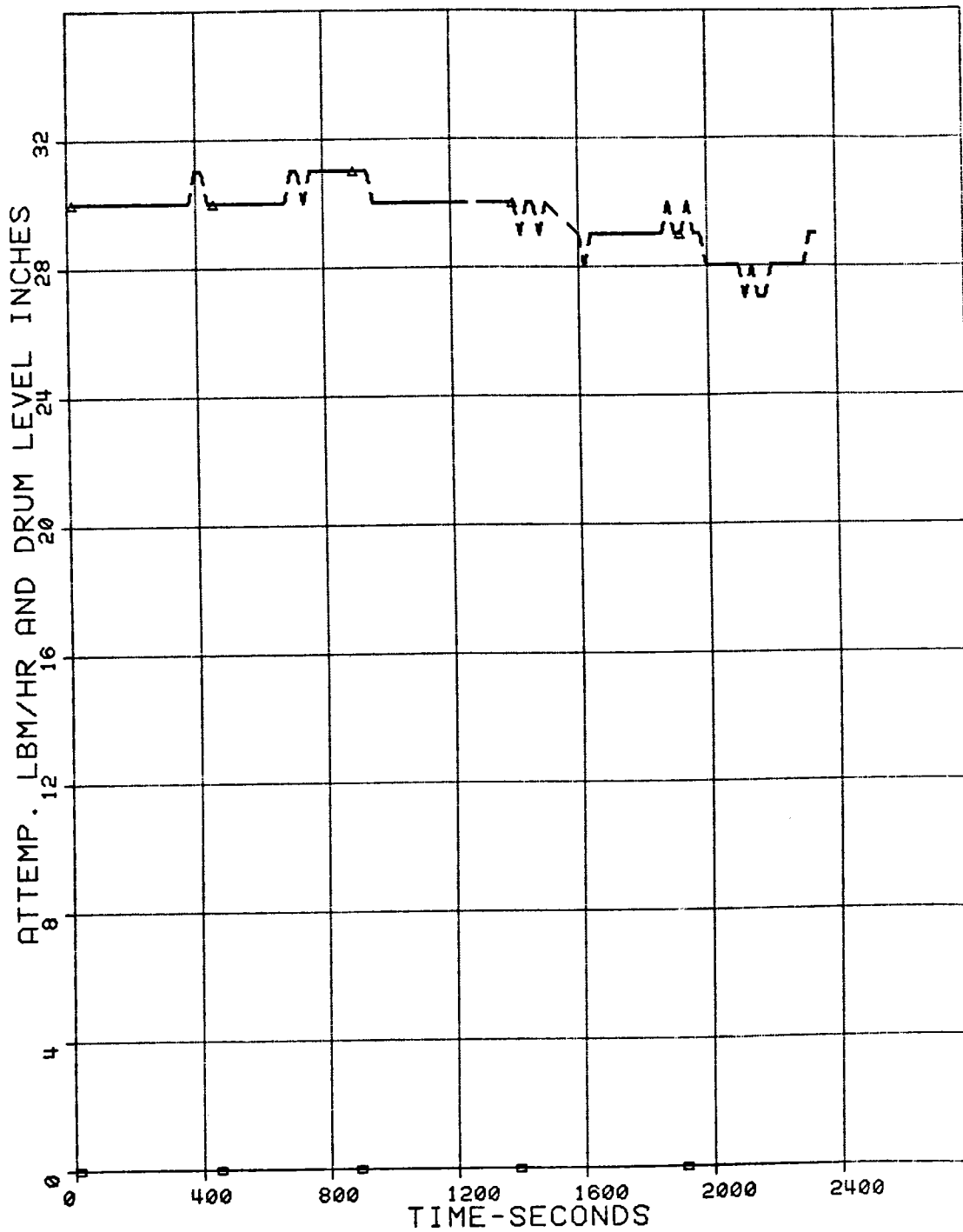
EACH 1TH POINT IS PLOTTED

LINE PLOT HAS 110 POINTS PER FUNCTION

Test No. 17

Replot 4/25/77

14-
18-



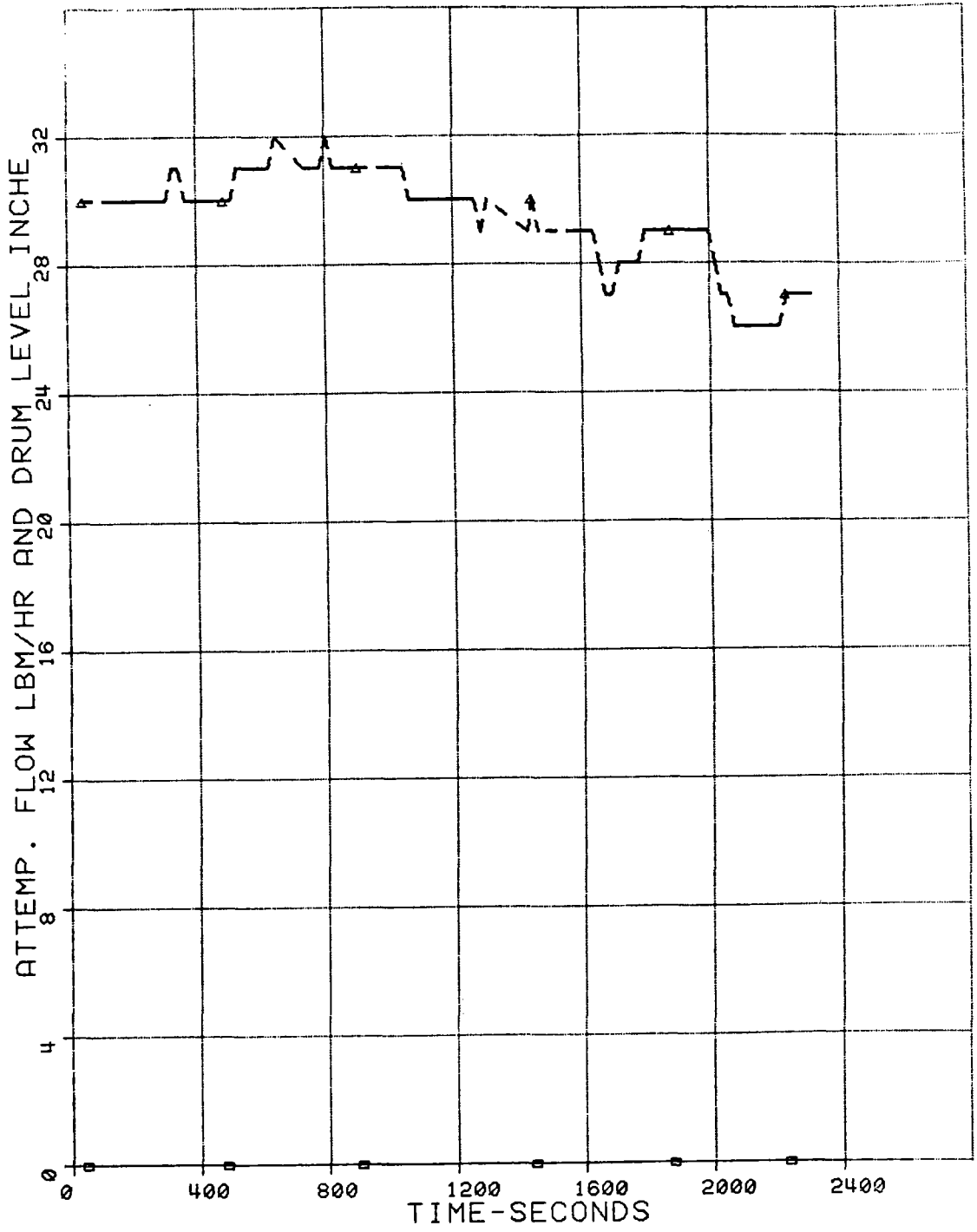
SEARCH START
DAY #103 1977 TIME 13:35
NUMBER OF RECORDS = 3
ARGUMENT SELECTED : 1
FIRST FUNCTION * 9 OPEN BOX
SECOND FUNCTION *30 TRIANGLE
SEARCH MODE 2
PLOT START TIME = 48900.0
EACH 1TH POINT IS PLOTTED
LINE PLOT HAS 95 POINTS PER FUNCTION

Replot 4/25/77

Test No. 17

14-

18-



SEARCH START
DAY #103 1977 TIME 14:30
NUMBER OF RECORDS = 3

ARGUMENT SELECTED : 1

FIRST FUNCTION * 9 OPEN BOX

SECOND FUNCTION *30 TRIANGLE

SEARCH MODE 2

PLOT START TIME = 52200.0

EACH 1TH POINT IS PLOTTED

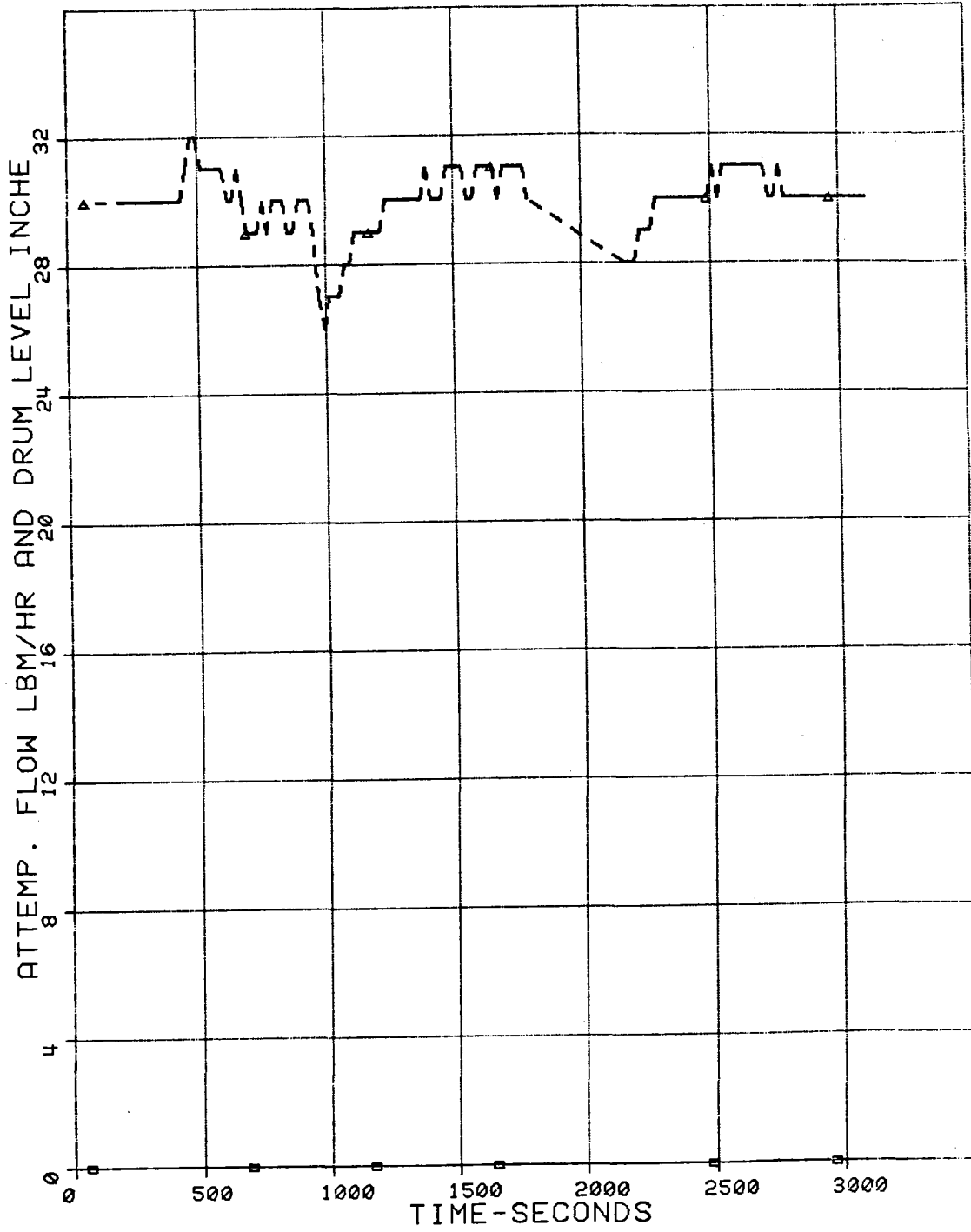
LINE PLOT HAS 128 POINTS PER FUNCTION

Replot 4/25/77

Test No. 17

14-

18-



SEARCH START
DAY #103 1977 TIME 14:54
NUMBER OF RECORDS - 3

ARGUMENT SELECTED : 1

FIRST FUNCTION * 9 OPEN BOX

SECOND FUNCTION *30 TRIANGLE

SEARCH MODE 2

PLOT START TIME - 53640.0

EACH 1TH POINT IS PLOTTED

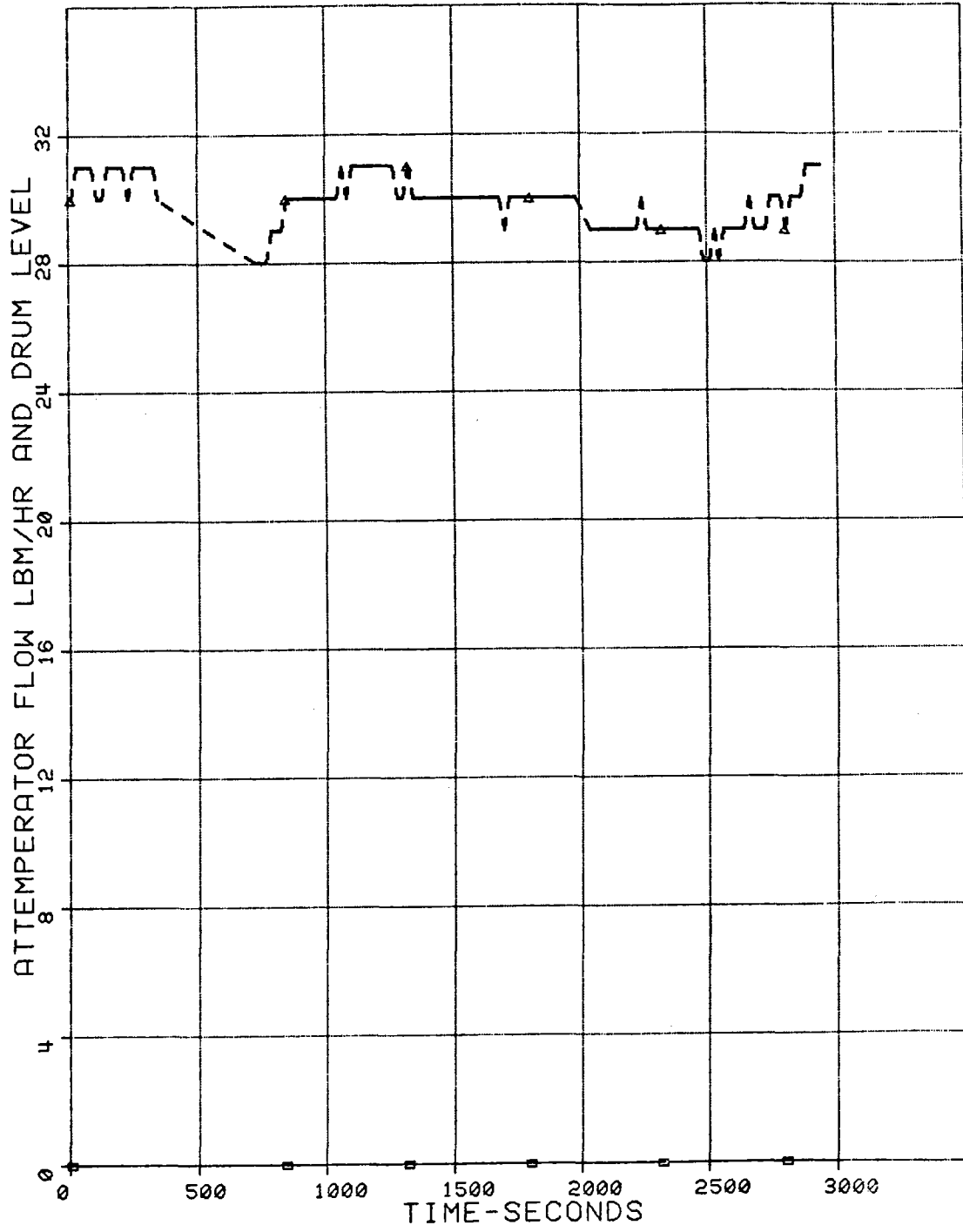
LINE PLOT HAS 120 POINTS PER FUNCTION

Test No. 17

Replot 4/25/77

14-

18-



SEARCH START
DAY *103 1977 TIME 15:55
NUMBER OF RECORDS = 3

ARGUMENT SELECTED : 1

FIRST FUNCTION * 9 OPEN BOX

SECOND FUNCTION *30 TRIANGLE

SEARCH MODE 2

PLOT START TIME = 57300.0

EACH 1TH POINT IS PLOTTED

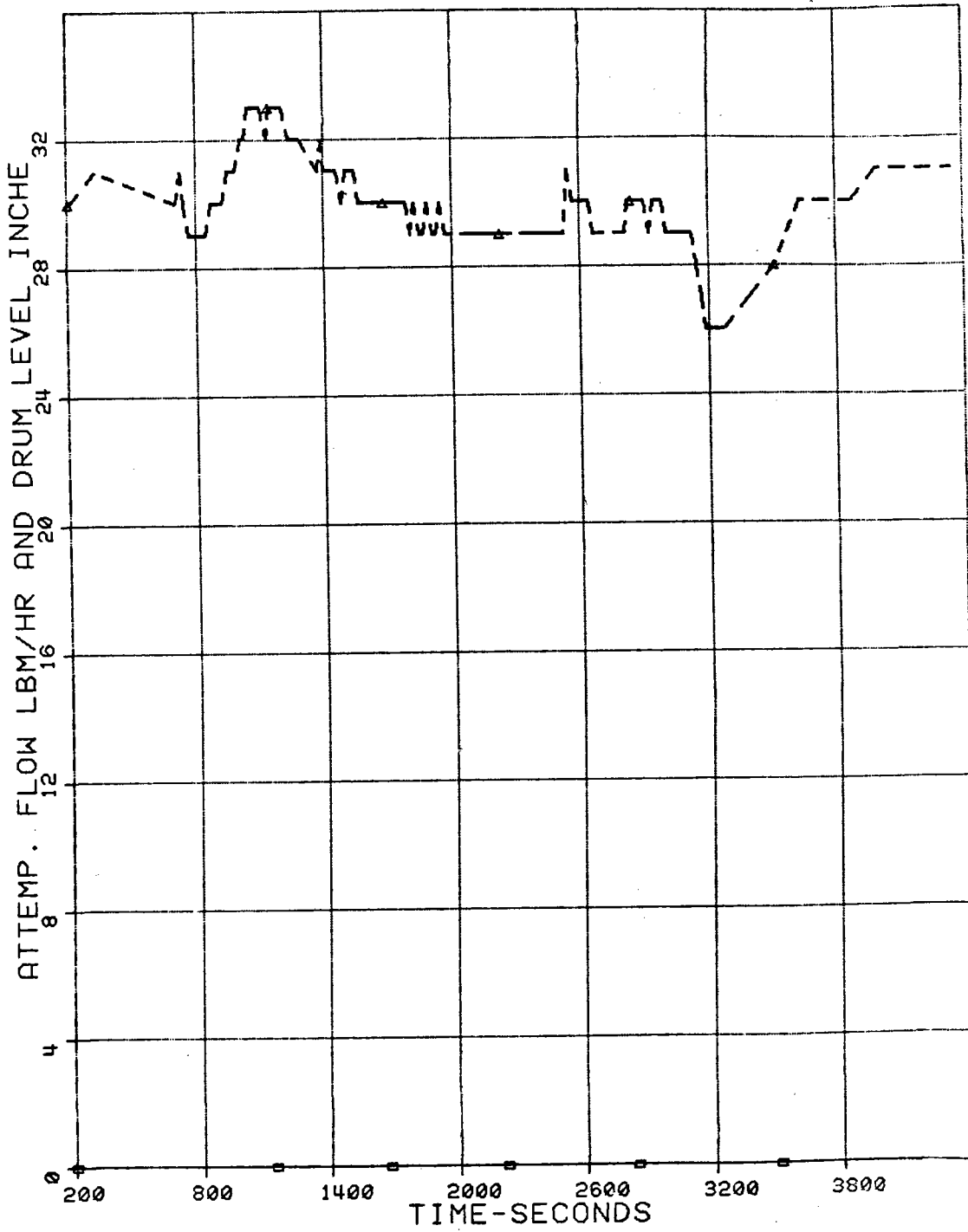
LINE PLOT HAS 128 POINTS PER FUNCTION

Test No. 17

14-

18-

Replot 4/25/77



SEARCH START
DAY #103 1977 TIME 18:10
NUMBER OF RECORDS = 3

ARGUMENT SELECTED : 1

FIRST FUNCTION # 9 OPEN BOX

SECOND FUNCTION #30 TRIANGLE

SEARCH MODE 2

PLOT START TIME = 65400.0

EACH 1TH POINT IS PLOTTED

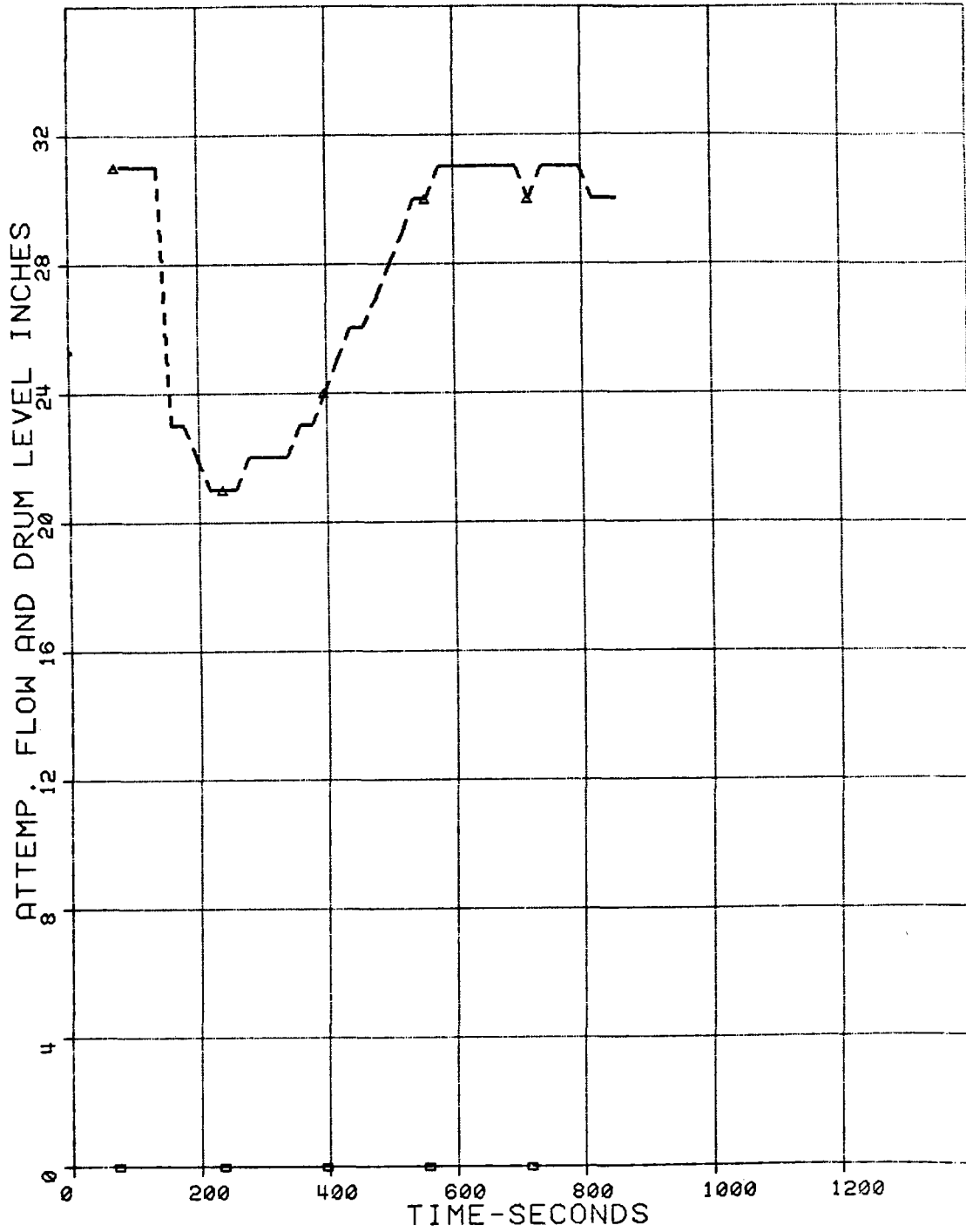
LINE PLOT HAS 40 POINTS PER FUNCTION

Replot 4/25/77

Test No. 17

14-

18-



PAGE 20
POWER LEVELS, PLOTS

NUMBER OF RECORDS = 5

ARGUMENT SELECTED : 1

FIRST FUNCTION # 6 OPEN BOX

SECOND FUNCTION # 7 TRIANGLE

THIRD FUNCTION #15 CROSS-CIRCLE

FOURTH FUNCTION #16 CROSS-BOX

SEARCH MODE 2

PLOT START TIME = 45300.0

EACH 1TH POINT IS PLOTTED

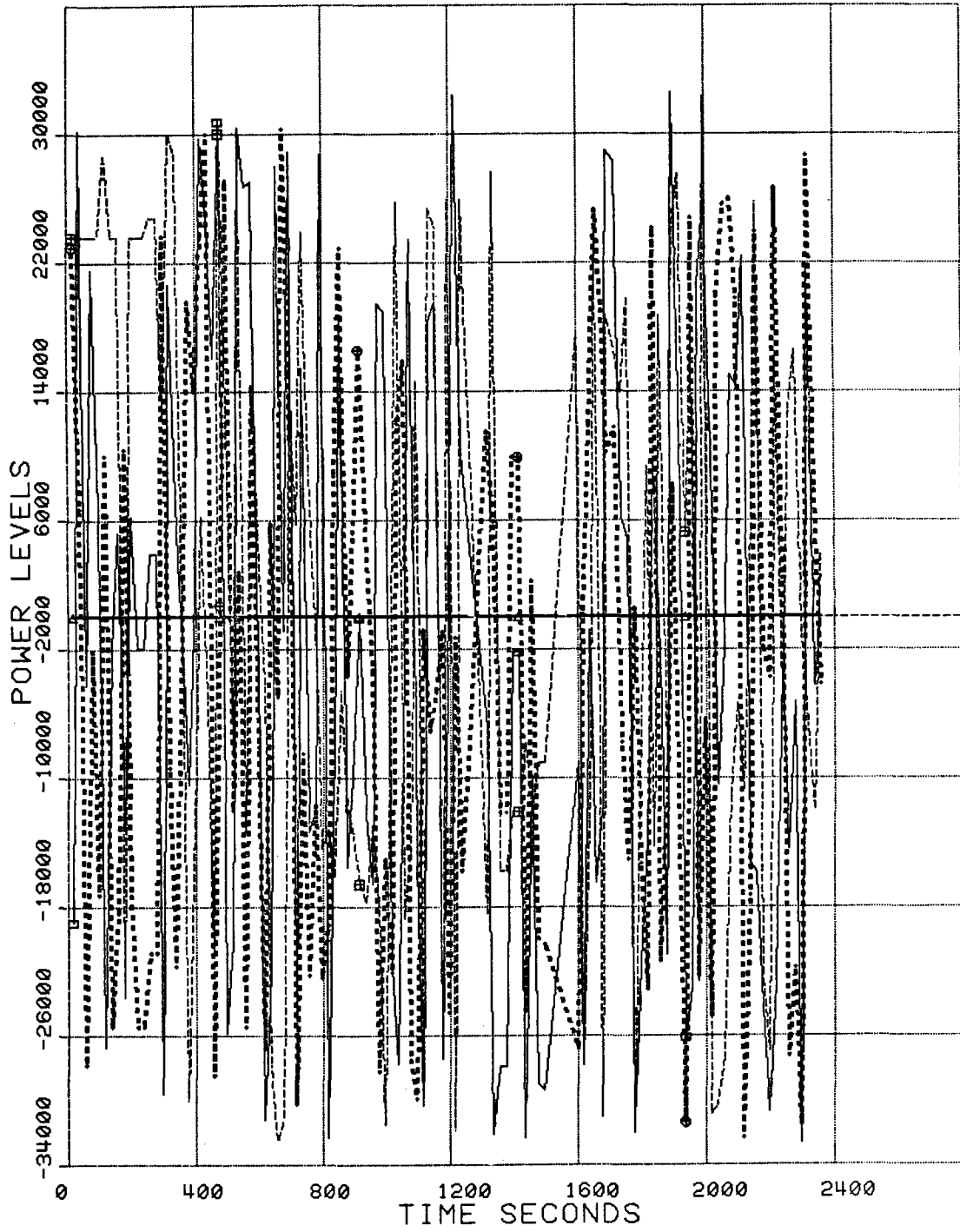
LINE PLOT HAS 110 POINTS PER FUNCTION

SCATTER PLOT HAS 55 POINTS PER FUNCTION

~~2-5~~

20-2

10.9% Stm. Transient Test No. 17
April 13, 1977



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PAGE 21
ENTHALPY

4-193

PAGE 22

RATIOS