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1	/	J.E. Geary Cog. Mgr.	[signature]	12-1-95	S5-??						
		Safety									
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TANK 241-AZ-101 STEAM BUMPING AND SETTLING PROCESS TEST REPORT

C. M. Winkler
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

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Abstract: This report summarizes the Process Test in which the airlift circulators in Tank 241-AZ-101 were shutdown. The test was successful, in that no extreme temperature excursions occurred. Only general data was obtained through the use of a gamma energy probe.

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TANK 241-AZ-101 STEAM BUMPING AND SETTLING PROCESS TEST REPORT

C. M. Winkler

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TANK 241-AZ-101 STEAM BUMPING AND SETTLING PROCESS TEST REPORT

C. M. Winkler

ABSTRACT

This report summarizes the Process Test in which the airlift circulators in Tank 241-AZ-101 were shutdown. The test was successful, in that no extreme temperature excursions occurred. Only general settling data was obtained through the use of a gamma energy probe.

1.0 INTRODUCTION

The current baseline Tank Waste Remediation System flowsheet specifies that waste sludges will be pretreated in the double shell tanks using a sludge washing process as a minimum. The sludge washing process involves simple settle/decant as the means for initial solids liquid separation. In order to perform the settle/decant, the sludges in the tank must be allowed to settle undisturbed. Since the Aging Waste Tanks have Airlift Circulators (ALCs) operating, which are designed to prevent an uncontrolled steam bump by keeping the solids in the waste suspended, a test was required to ensure the solids would settle properly without causing an extreme temperature excursion in the tank.

A Process Test was performed in waste tank 241-AZ-101 on August 5, 1993 through November 23, 1993. The test involved shutting down the ALCs while monitoring tank temperatures, sludge levels and the ventilation system. The test was sponsored by Pretreatment Engineering (7E822) and supported by East Tank Farms Plant Engineering (71710) and Tank Farm Operations (7C300). The test was completed per the requirements outlined in the Process Test Plan (WHC-SD-WM-PTP-025), the Process Test Procedure (PTP-T-995-00011), Waste Tank Project Administration Manual (WHC-IP-0842) and the Standard Engineering Practices Manual (WHC-CM-6-1). All requirements outlined in the Safety Analysis Report (WHC-SD-HS-SAR-010) and Operation Specification Document (OSD-T-151-00017) were strictly adhered to.

2.0 DESCRIPTION OF TEST, TEST METHOD AND EQUIPMENT

The test was performed in the Aging Waste Tank Complex, specifically Tank 241-AZ-101, and involved shutting down the Airlift Circulators (ALCs). There are 22 ALCs in the tank that are used to prevent excessive temperature excursions by slowly mixing the tank and keeping the solids in suspension. Approximately, 50-100 scfm of process air is pumped into the ALCs when the system is operating normally. The annulus exhauster is also used to provide cooling for the tank and was shutdown during the test to examine the temperature changes in 241-AZ-101 during a near "worst case" scenario from a tank cooling perspective. A detailed description of the Aging Waste Facility and 241-AZ-101 can be found in the Aging Waste Tank Facility Description Manual (FDM-T-200-00003).

2.1 Test Method

The test was broken down into three stages: 1) Prestart conditions with ALCs ON and the annulus exhauster ON; 2) ALCs OFF with the annulus exhauster ON; 3) ALCs OFF with the annulus exhauster OFF. Temperature, pressure, liquid level and sludge level data was taken prior to initiating the test, then taken at specific intervals throughout the duration of the test. Below is a Chronology of the events which occurred before and during the test.

Date	Event
May 6, 1993	Issued Process Test Plan WHC-SD-WM-PTP-025.
June 16, 1993	USQ Screening determines Process Test in within the bounds of the existing Safety Analysis.
July 7, 1993	Completed temporary TMACs installation.
August 3, 1993	Issued Process Test Procedure PTP-T-995-00011. Completed pretest drywell scans in AZ-101.
August 4, 1993	Initiated Process Test at 2000 hrs. Airlift circulators off, AZ annulus exhauster operating. Maximum temperature 174° F.
August 5, 1993	Completed second drywell scans in AZ-101.
August 6, 1993	Completed third drywell scans in AZ-101.
August 9, 1993	Completed fourth drywell scans in AZ-101.
August 12, 1993	Administrative Hold declared. Process Test allowed to continue.
September 3, 1993	Issued Process Memo 93-107 to shutdown AZ annulus exhauster.
October 1, 1993	Shutdown AZ annulus exhauster. Maximum temperature 177° F.
November 17, 1993	Completed fifth drywell scans of AZ-101.
November 22, 1993	Maximum temperature remains steady at 187° F. Recommendation that test be terminated.
November 23, 1993	AZ annulus exhauster restarted, test officially terminated.
February 8, 1994	Completed sixth drywell scans in AZ-101.

2.2 Equipment

Tank 241-AZ-101 is equipped with 94 thermocouples that are located in the waste sludge, supernatant, vapor space, insulating concrete and foundation. During the test, all 94 points were monitored once per shift while a data logger was used to monitor 48 key points every 15 minutes.

The ventilation system was monitored during the test. Specific parameters were tank pressure and HEPA filter differential pressure.

The aging waste catch tanks were also monitored during the test in order to observe if changes in condensate generation rates from AZ-101 occur while the ALCs are off.

Sludge measurements were taken of 101-AZ throughout the test by raising a gamma probe in the drywell to obtain a radiological profile of the tank which was used to calculate sludge level. A detailed description of the process can be found in Reference 2.

3.0 TEST RESULTS

3.1 Test Objectives

The test had three primary objectives which are documented in the Process Test Plan (Reference 1) and outlined below:

1. To demonstrate that the operation of the ALCs in AZ-101 can be terminated without experiencing an over pressurization, or "steam bump" (<-.25" Water Gauge) in the tank vapor space.

2. To demonstrate that the operation of the ALCs in AZ-101 can be terminated without exceeding the structural temperature and temperature gradient limits. To also obtain field data of the temperature profile of the tank with the ALCs off.

3. To obtain sludge level measurements of the tank at various stages of the test to provide information of the solids settling behavior while the ALCs are off.

All of these objectives were met or exceeded during the test and are discussed in detail in Section 3.2.

3.2 Results

General Temperature Results

The temperatures increased as expected when the ALCs were initially turned off. Table 1 shows temperatures for specific dates during the test. The September 30 temperatures were taken after the temperatures had stabilized with the ALCs OFF and the annulus exhauster ON. The November 23 temperatures were taken after the temperatures had stabilized with both the ALCs and annulus exhauster OFF.

Table 1

	Initial Aug. 4	Sept. 30		Final Nov. 23	
	Temp.	Temp.	Diff.	Temp.	Diff
Average Solution	136.3	141.3	5	146.7	10.4
Average Sludge	141.1	148.1	7	153.3	12.2
Maximum Temperature	173	177	4	187	15

It is interesting to note that the maximum temperature in the tank was found at thermocouple TE-101-AZ-10 through the first phase of the test, then TE-101-AZ-2 was the hottest after the annulus exhauster was shutdown. Both of these thermocouples are located in the insulating concrete but TE-101-AZ-2 is located in the center of the tank, near where the annulus air flow first enters the air grid (See Figures F1-F8 for thermocouple locations).

Temperatures Profiles and Contours

Figures F13-F24 show profile and contour temperature plots for specific levels of the tank. There are three contours presented for each level: 1) August 4, 1994 Initial Test Conditions; 2) September 30, 1993 after the temperatures have stabilized with the ALCs off and the annulus exhauster on; 3) November 23, 1994 after the temperatures have stabilized with the ALCs off and the annulus exhauster off.

Insulating Concrete
The insulating concrete thermocouples are located underneath the tank, just touching the metal bottom. These thermocouples showed small temperature increases from turning off the ALCs (3-5° F). The highest temperature occurred at TE-101-AZ-10 which climbed to 179° F on September 30, 1993. This small temperature increase can be explained by the fact that little solids settling occurred over the thermocouples. If a thick blanket of sludge would have settled over the thermocouples, an insulating effect would have caused the temperatures to rise even more. The small temperature increase observed was caused from the lack of the cooling effect the ALCs provided from simple heat transfer from cool dry air bubbling through the warmer liquid.

Much larger temperature increases were observed (8-10° F) in the insulating concrete after the annulus exhauster was shutdown. TE-101-AZ-20 showed a substantial increase from 170° F to 189° F after the annulus was shutdown. This was also expected because the annulus exhauster is designed to route air underneath the tank to provide cooling of the insulating concrete and sludge. The test simply verified the effectiveness of the system.

Airlift Circulator Temperatures
The ALC temperatures increased (8-10° F) when the ALCs were turned off. This is due to the thermocouples being in close proximity to the cool air being injected through the ALC. The ALC thermocouples are 4 inches above the bottom of the tank while the bottom of the ALC is 30 inches from the floor of the tank. It is believed that the ALCs have carved out an area in the sludge under each ALC giving the sludge a topography similar to an egg carton. With this crater under the ALC the thermocouple is more susceptible to changes from the ALCs.

The ALC thermocouples also showed significant effects when the annulus exhauster was shutdown. Temperature increases from 163° F to 173° F were observed. This is because the thermocouples are only 4" from the tank bottom and are influenced from changes in the annulus exhaust system.

Solution Temperatures

The solution temperatures showed moderate temperature increases (138° F-144° F) when the ALCs were shutdown. As would be expected in a liquid solution, the temperatures are fairly consistent. The changes that did occur are due to the lack of simple heat transfer the ALCs provided when the cool ALC air is bubbled through the warmer solution.

Tank Pressures

The tank never experienced an over pressurization throughout the testing period. Pressures remained steady between -1.0 and -2.0 inches W.G. This is, of course, because the temperatures never approached boiling anywhere in the tank. Any fluctuation in the vacuums are due to changes in the general plant status (i. e. inlet air flow, switching exhaust fans). The absence of a "steam bump" is further supported by the consistency of the catch tank level. A steam bump would have generated a great deal of steam which would have shown noticeable rises in the catch tank liquid levels. The catch tank liquid increases are discussed in the following section.

Catch Tank Liquid Levels

The three 702-A ventilation system catch tanks (151-AZ, 152-AX and A-417) and Tank 241-AZ-101 liquid level were closely monitored throughout the test. The plots of these results are shown in Figures F25-F28. The data is not conclusive as to whether there is any change in condensate generation rate before and after the test as shown in Table 2.

Table 2

Tank	Before Test (gallons/day)	After Test (gallons/day)	ALCs Effect On Generation Rate
101-AZ	-195	-217	increase
A-417	+595	+490	decrease
151-AZ	+84	+84	unchanged
152-AX	poor data*	poor data*	N/A

*152-AX data is poor from a trending stand point. Erratic readings were observed and periodic flushes of the system were completed making a reliable trend difficult.

The effect the ALCs have on condensate generation rate was not a primary objective of the test, however, the data was compiled in order to show any significant effects. From the data obtained, it does not appear there is any.

Suspended Solids

An attempt was made to determine settling behavior by monitoring changes in suspended solids concentration at various levels in the tank. A probe was lowered down drywells 13-01-68 and 13-01-76 at six different times during the test. The probe was slowly raised while counts were taken and collected on a multi-channel analyzer, then plotted. Two techniques were used:

The first technique used is called Total Gamma Above Cesium (TGAC). It involves measurements with a cadmium telluride (CdTe) detector of the total gamma interactions that are more energetic than the gamma-ray emitted from Cs-137. A region of interest (above the Cs-137 photopeak) was collected and plotted to generate activity profiles.

The second technique was used as a check of the first and it involves measuring a gross neutron count. A boron trifluoride detector is used to detect neutrons in the waste. Since the TRU isotopes emit neutrons and the TRU isotopes are solid, a profile of the neutrons detected can be plotted versus height.

The activity profiles of both detectors are similar as can be seen in Figures 29 and 36. Both profiles show that the sludge level remained steady at 18-20 inches. Unfortunately, specific settling behavior of the solids could not be determined using either probe.

CONCLUSIONS

The process test to shut down the ALCs in 241-AZ-101 was successful in that the three objectives outlined in the Process Test Plan were met. Under current 241-AZ-101 conditions, the airlift circulators can be shut down without experiencing an large or rapid temperature increase or a tank bump. In fact the tank will not reach the boiling point, even with the annulus exhauster shutdown.

The gamma probes did not work as well as expected, therefore, specific settling data (total suspended solids and settling rates) was not obtained. General information regarding total suspended solids was obtained from the sludge level data which the gamma probe provided. There was no increased sludge level in 241-AZ-101 during the test which implies the tank solids were already settled before the test. This means either the ALCs do not suspend the solids or there is not enough solids to suspend (i.e. only 18 inch sludge level).

RECOMMENDATIONS

1. It is recommended that the airlift circulators in 241-AZ-101 remain off indefinitely. The temperature data should continue to be monitored to ensure slow rises in temperature do not unexpectedly occur. 241-AZ-102 heat load, temperature and sludge level data should be evaluated to permit turning off the ALCs in this tank as well. Periodic flushing of the ALCs should continue to prevent the ALCs from plugging in case they are needed in the future.

2. Plans should continue to demonstrate the viability of In-Tank Sludge Washing. This includes completing decant pump and mixer installation in tank 241-AZ-101.

REFERENCES

1. WHC-SD-WM-PTP-025, "AZ-101 Steam Bumping and Settling Process Test Plan," G. T. MacLean, C. M. Winkler, dated May 6, 1993.

2. Keele, B. D., G. R. Blewett, and G. L. Troyer, "Final Test of the Sludge Monitoring Radiation Detector System, "WHC-SD-W151-TI-001," dated May 1993.

3. Internal Memo, B. D. Keele to G. T. MacLean, "2 Radionuclide Setting in 241-AZ-101," 8E-920-SAS94-086, dated May 3, 1994.

FIGURE 1

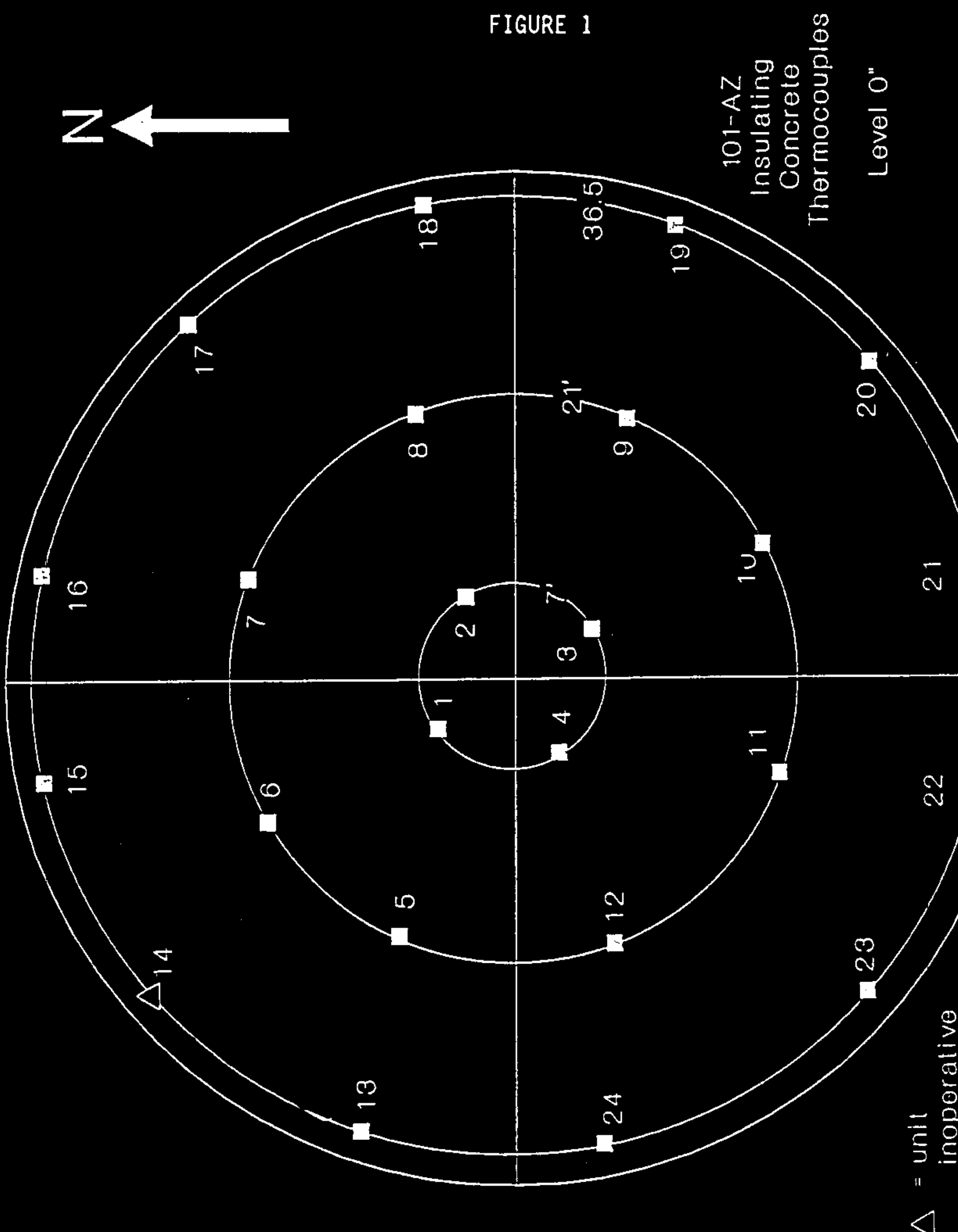
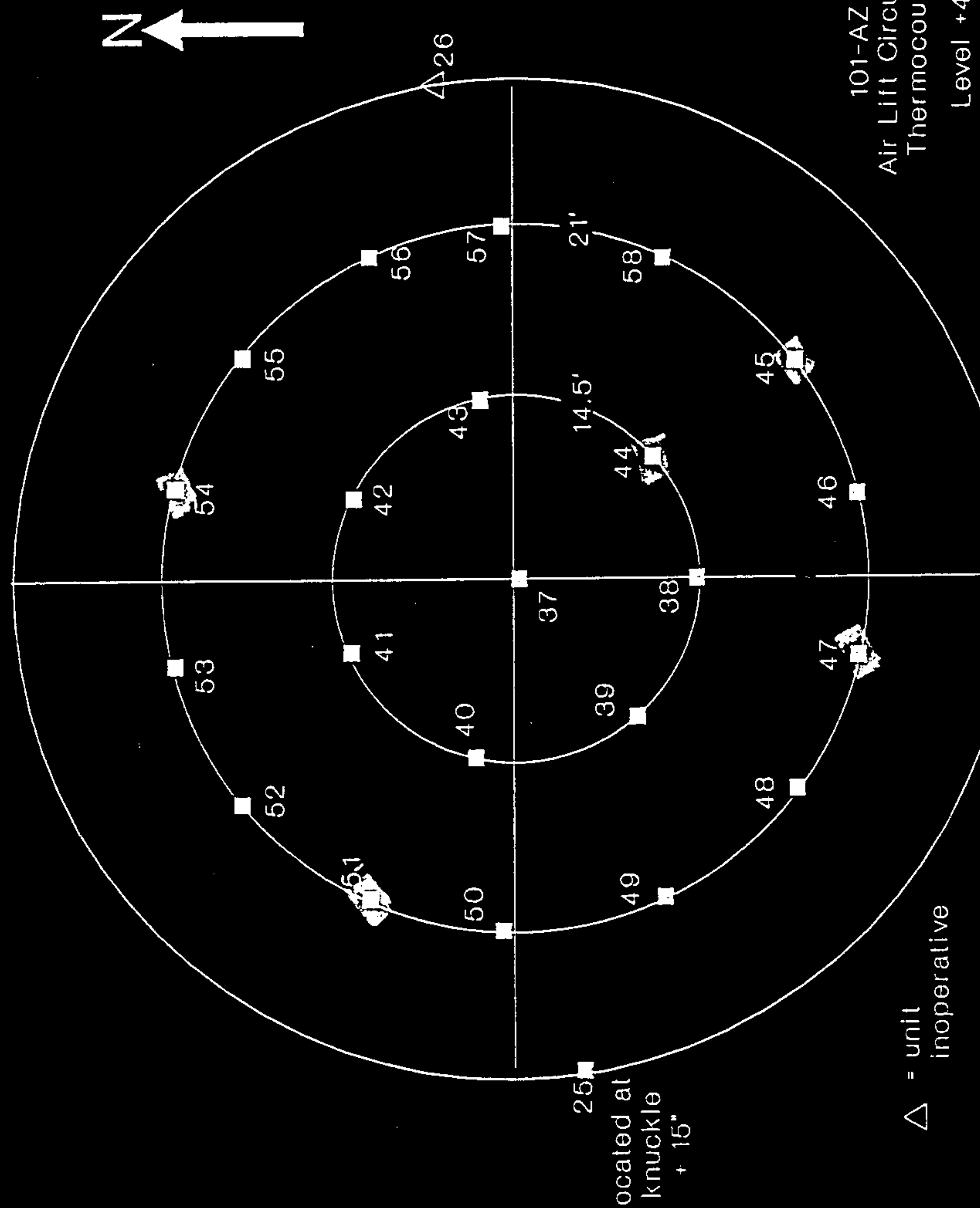

N
101-AZ
Insulating
Concrete
Thermocouples
Level 0"
36.5
1
2
3
4
5
6
7
8
9
11
12
13
14
15
16
17
18
19
20
21
21'
22
23
24
△ = unit inoperative

FIGURE 2



N
101-AZ
Air Lift Circulator
Thermocouples
Level +4"
26
21'
14.5'
25
located at
knuckle
+ 15"
△ = unit inoperative
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58

FIGURE 3

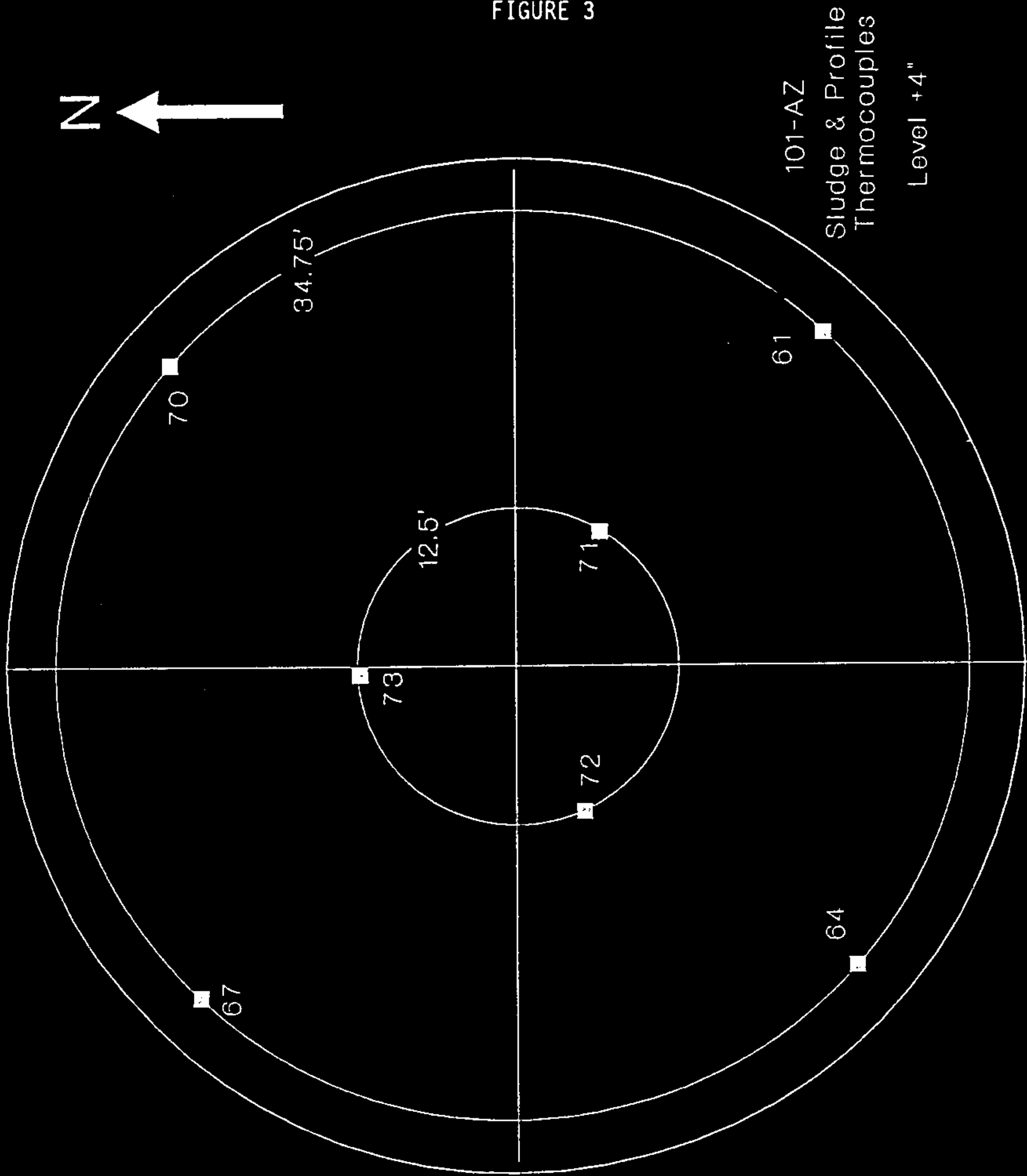

101-AZ
Sludge & Profile
Thermocouples
Level +4"
N
34.75'
12.5'
61
64
67
70
71
72
73

FIGURE 4

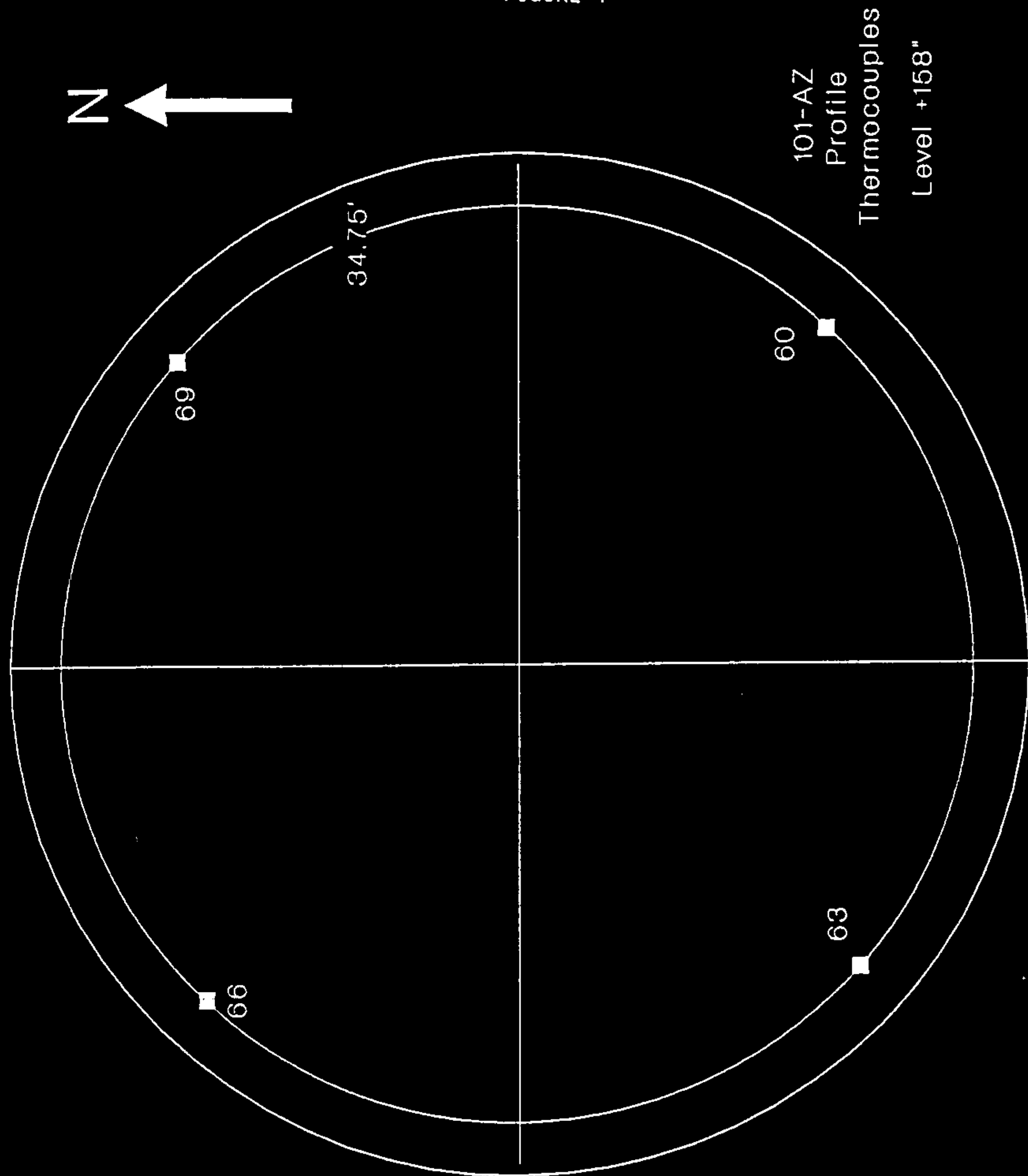


FIGURE 5

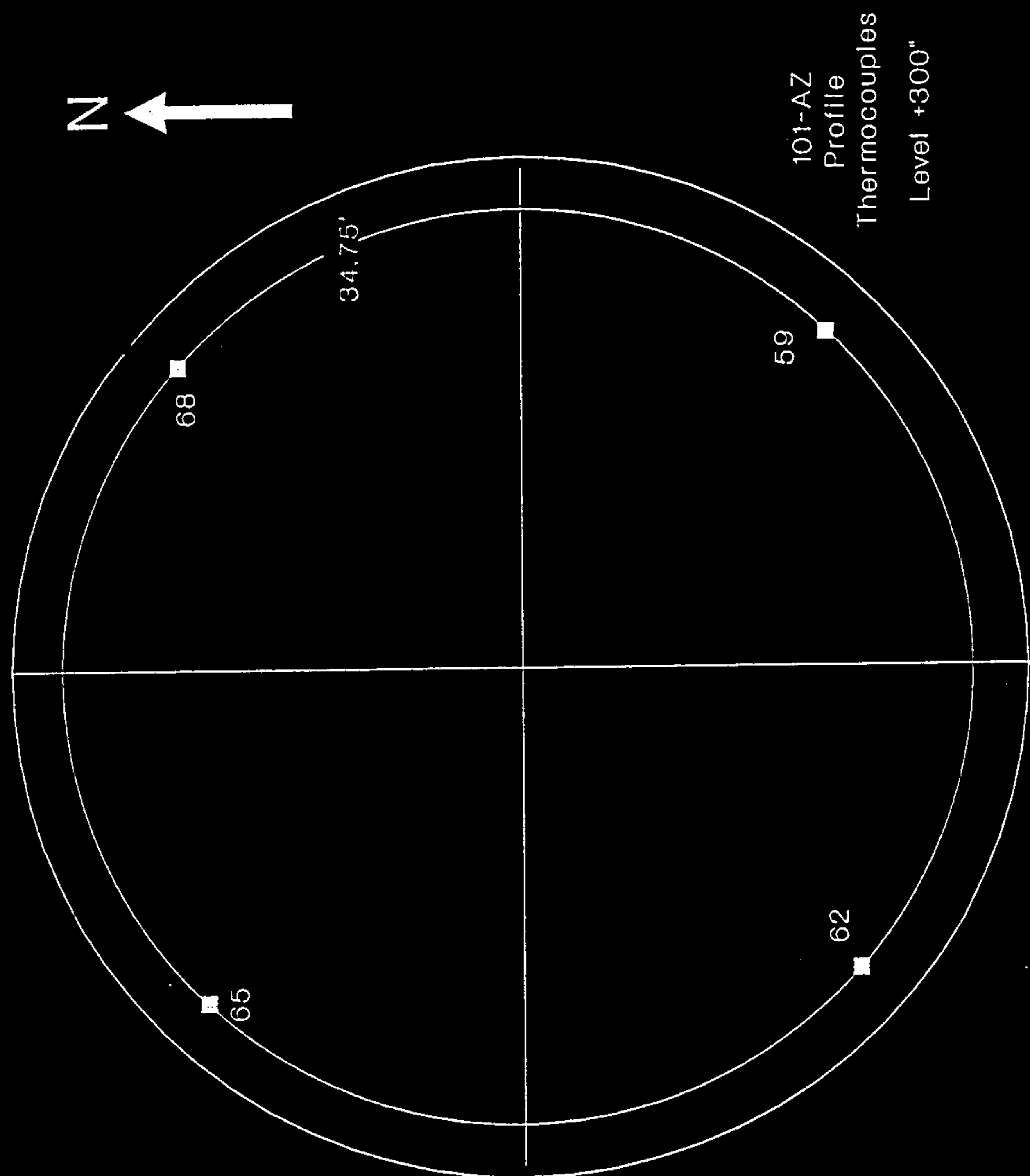


FIGURE 6

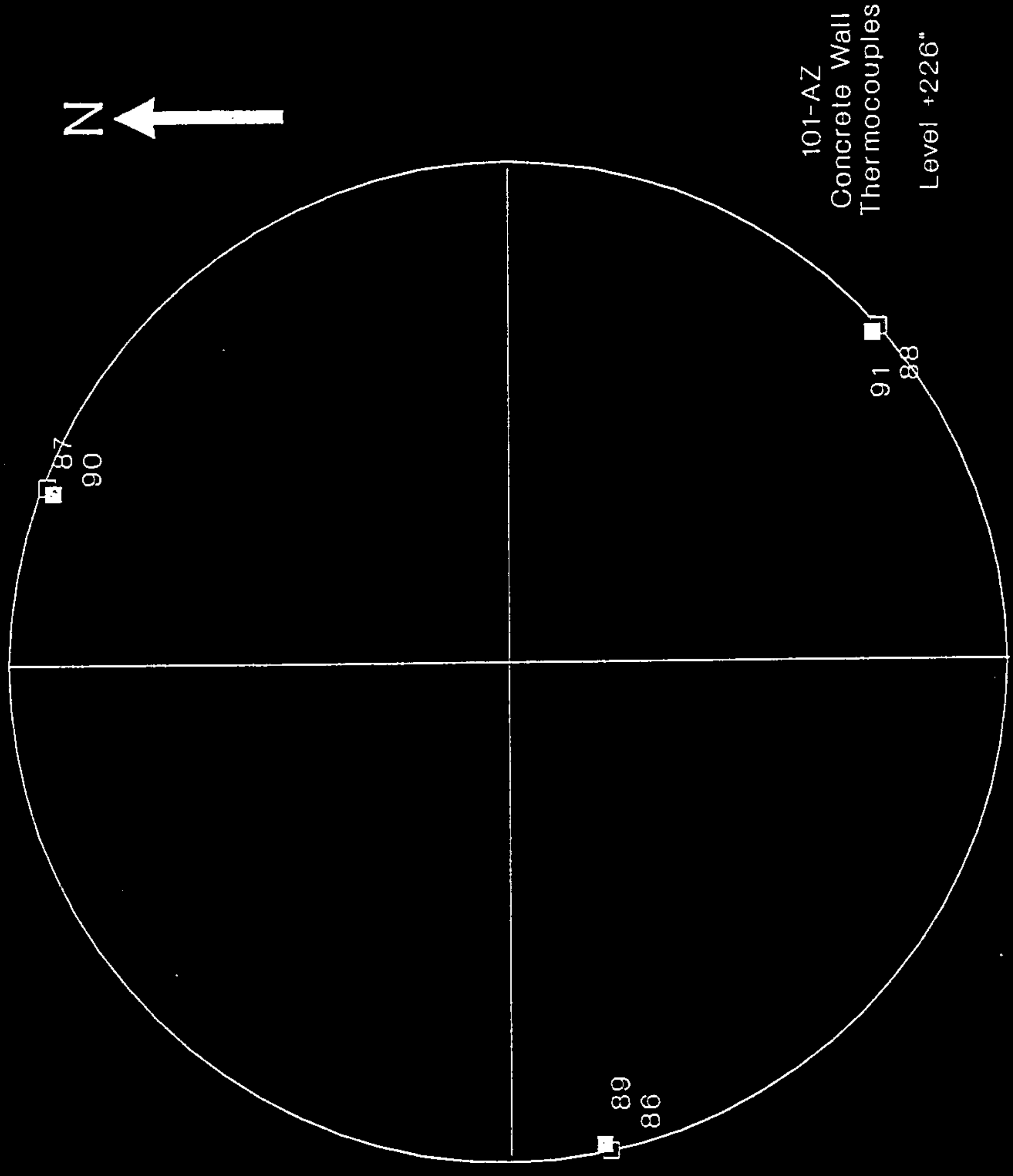

101-AZ
Concrete Wall
Thermocouples
Level +226"
N
91
88
87
90
89
86

FIGURE 7

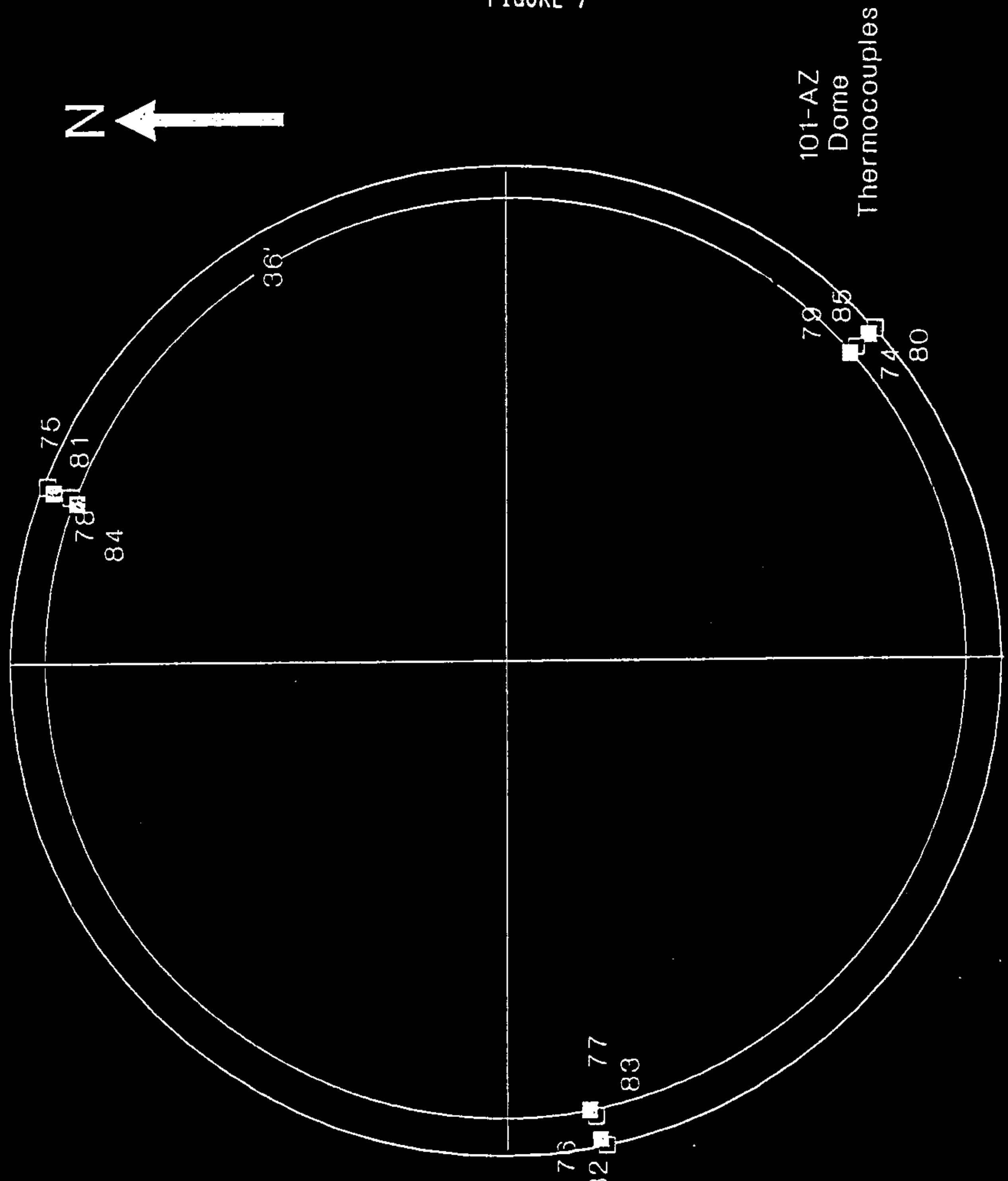


FIGURE 8

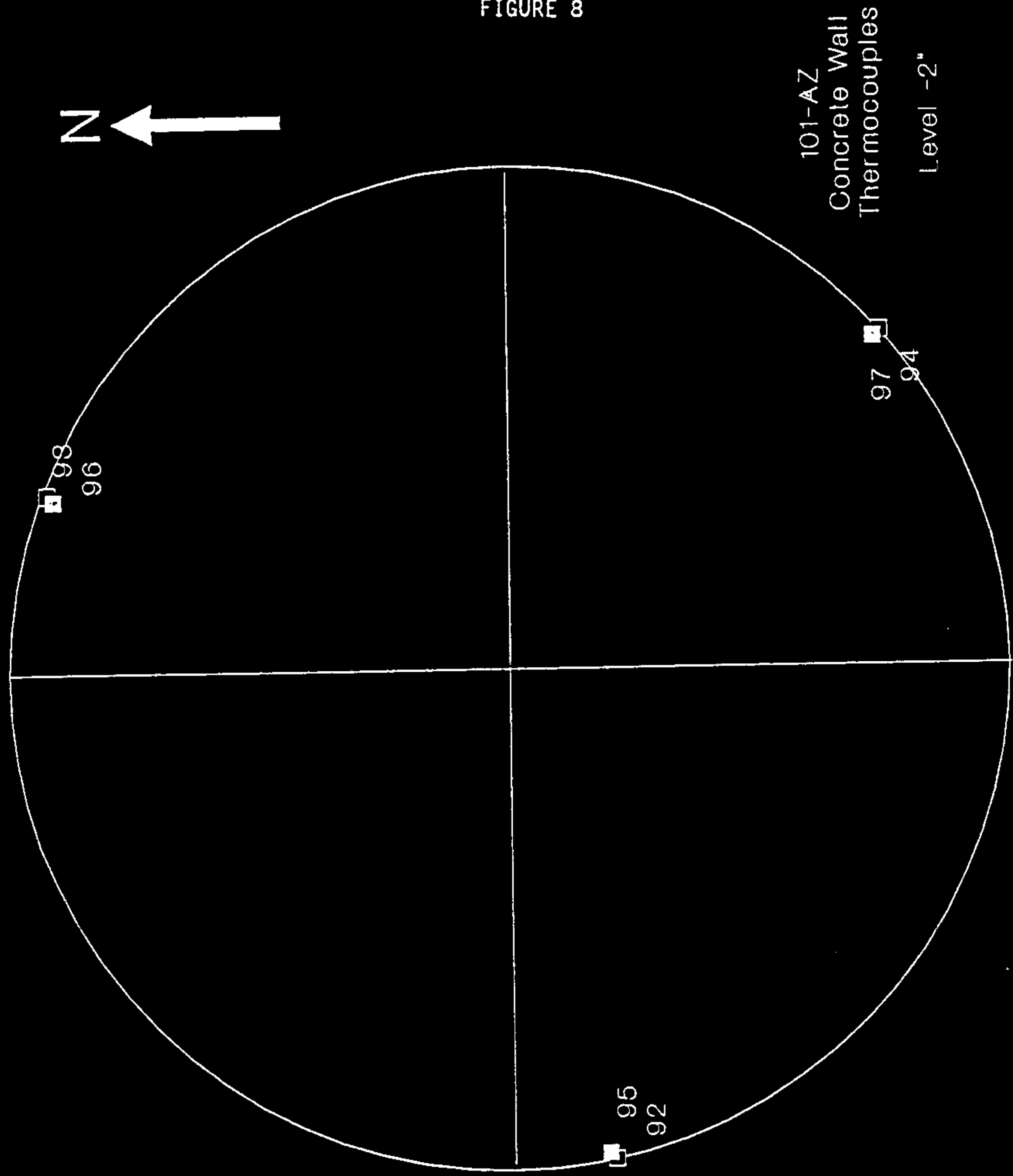


FIGURE 9

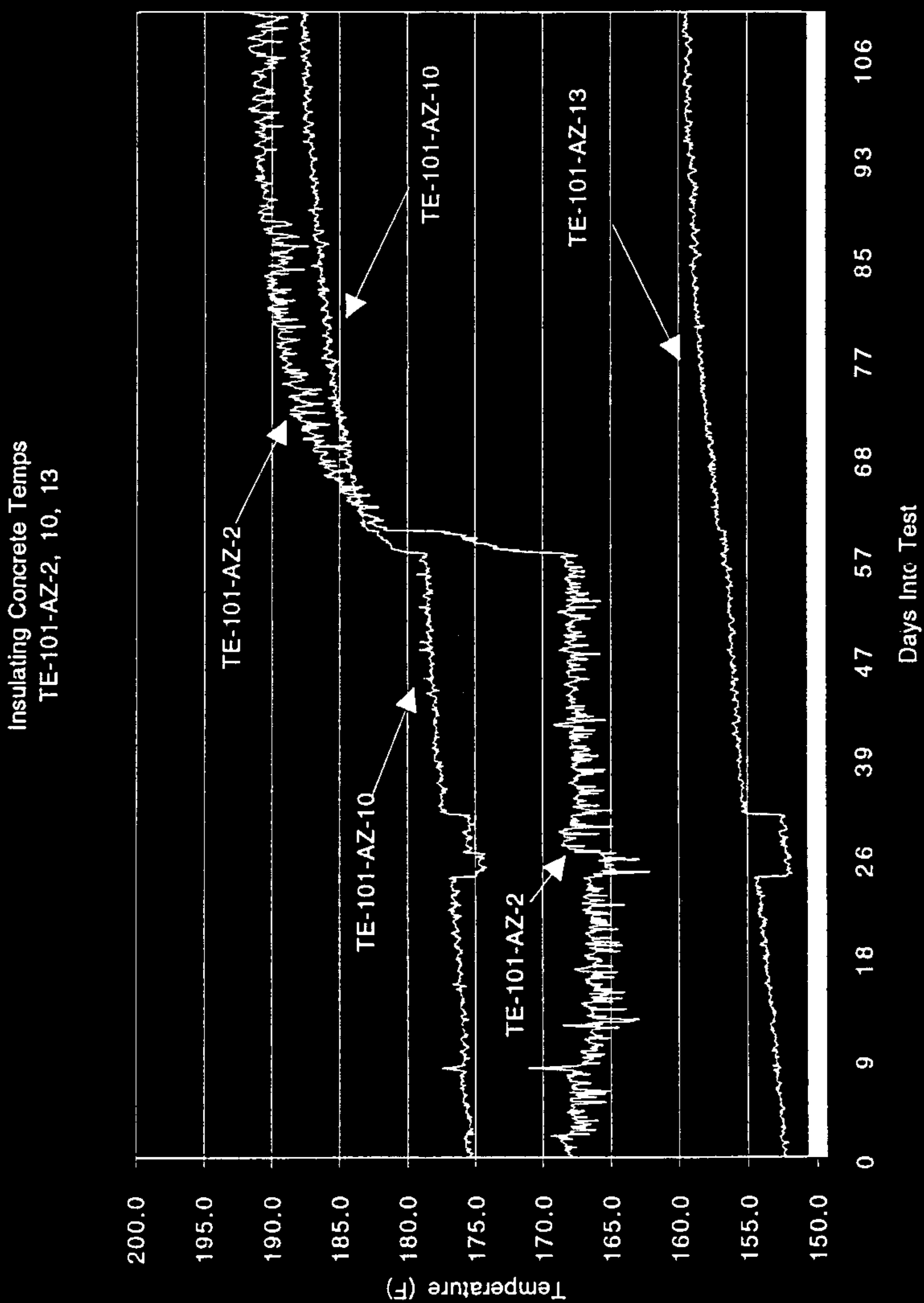

Insulating Concrete Temps
TE-101-AZ-2, 10, 13
TE-101-AZ-2
TE-101-AZ-10
TE-101-AZ-13
TE-101-AZ-10
TE-101-AZ-2
Temperature (F)
200.0
195.0
190.0
185.0
180.0
175.0
170.0
165.0
160.0
155.0
150.0
Days Into Test
0
9
18
26
39
47
57
68
77
85
93
106

FIGURE 10

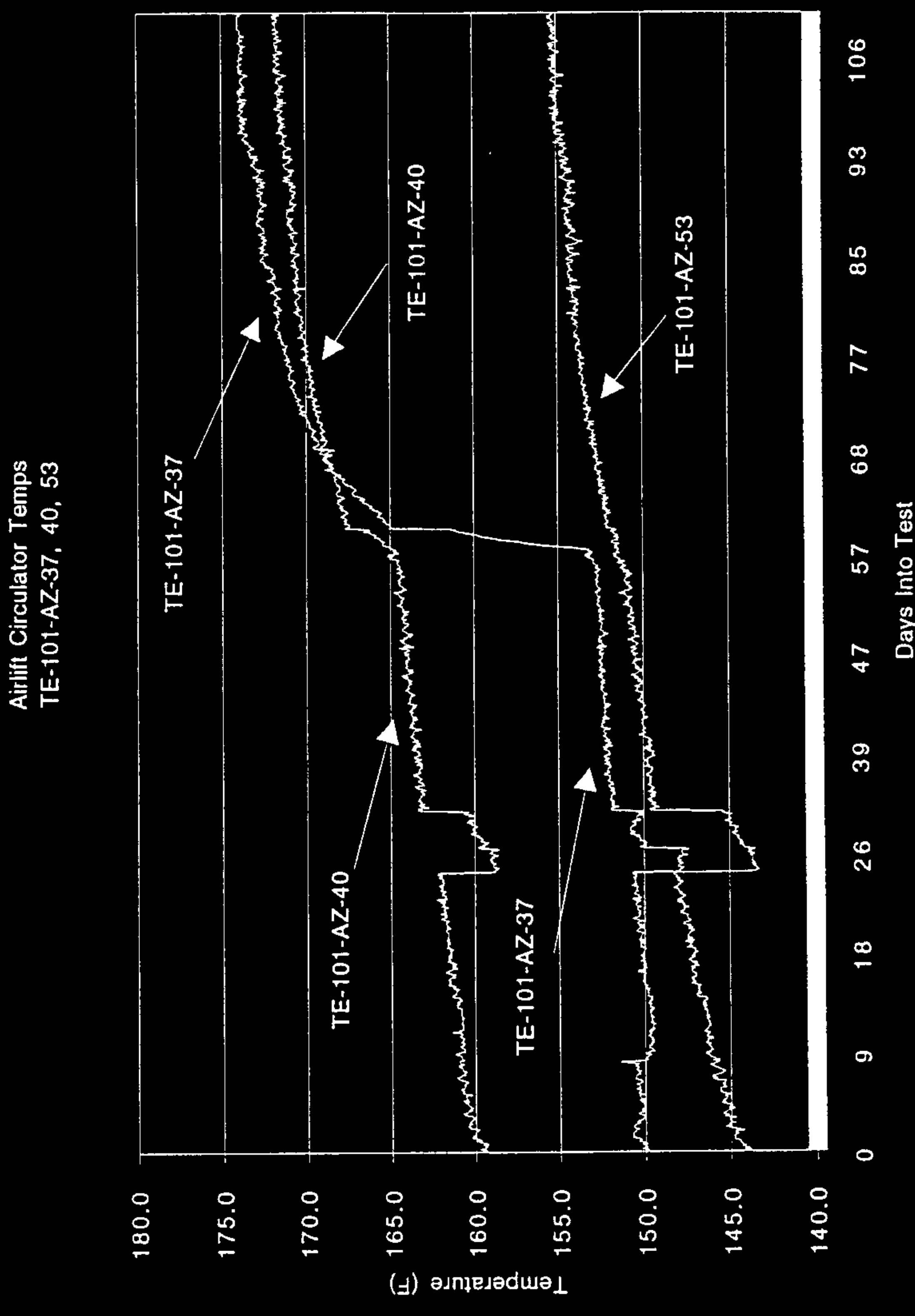

Airlift Circulator Temps
TE-101-AZ-37, 40, 53
TE-101-AZ-37
TE-101-AZ-40
TE-101-AZ-53
TE-101-AZ-40
TE-101-AZ-37
Temperature (F)
180.0
175.0
170.0
165.0
160.0
155.0
150.0
145.0
140.0
Days Into Test
0
9
18
26
39
47
57
68
77
85
93
106

FIGURE 11

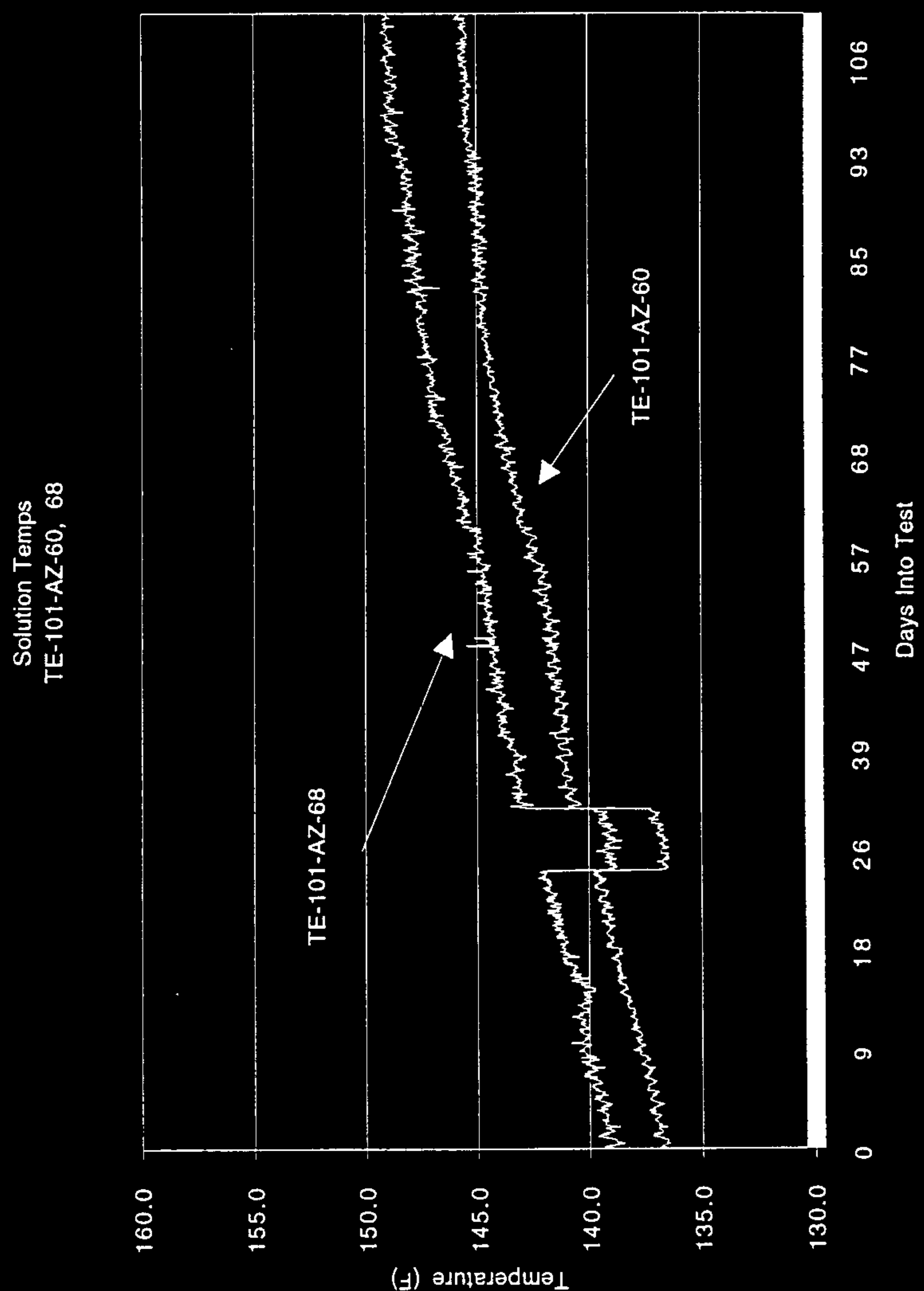

Solution Temps
TE-101-AZ-60, 68
TE-101-AZ-68
TE-101-AZ-60
Temperature (F)
160.0
155.0
150.0
145.0
140.0
135.0
130.0
Days Into Test
0
9
18
26
39
47
57
68
77
85
93
106

FIGURE 12

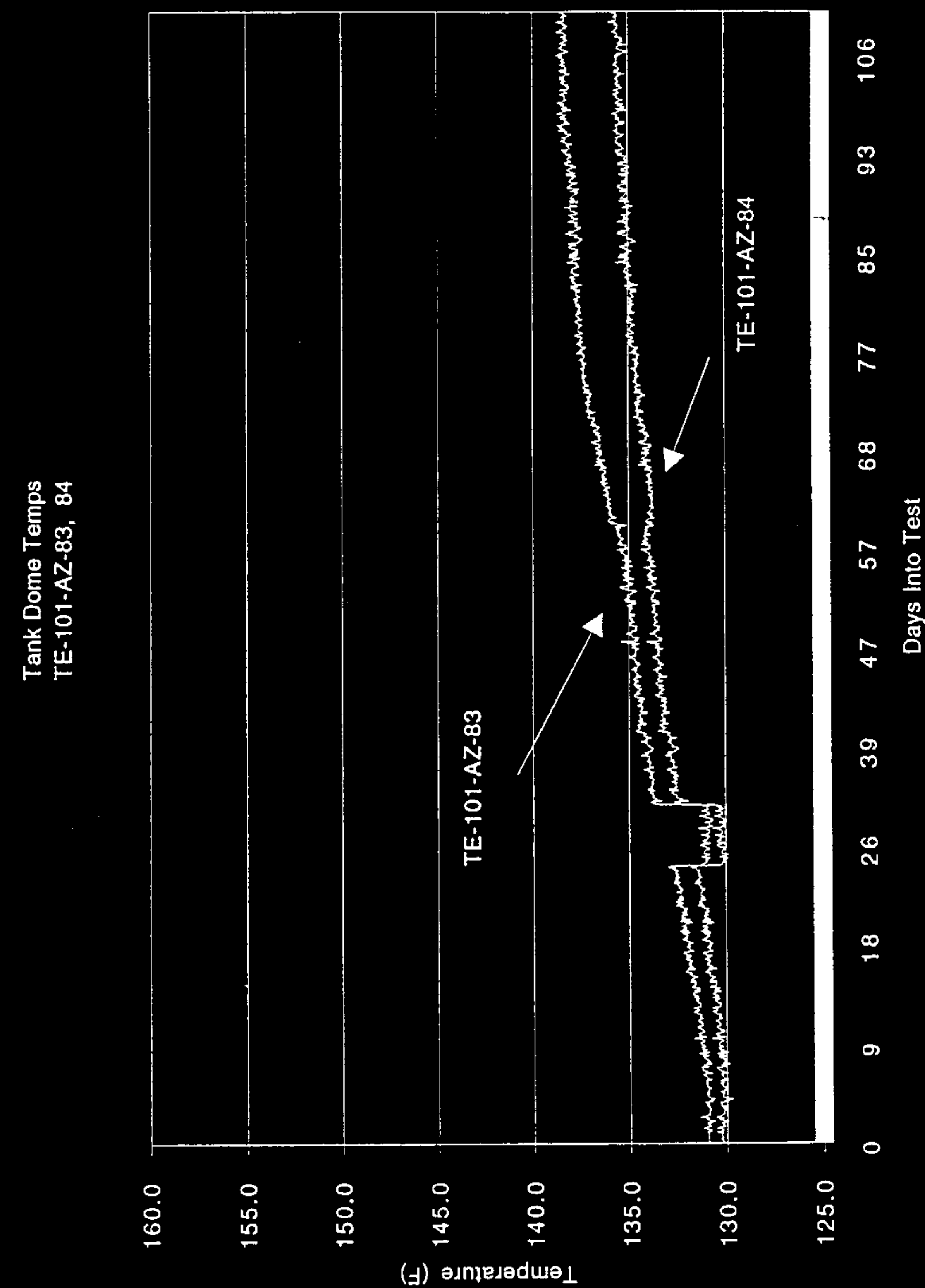

Tank Dome Temps
TE-101-AZ-83, 84
TE-101-AZ-83
TE-101-AZ-84
Temperature (F)
160.0
155.0
150.0
145.0
140.0
135.0
130.0
125.0
Days Into Test
0
9
18
26
39
47
57
68
77
85
93
106

FIGURE 13

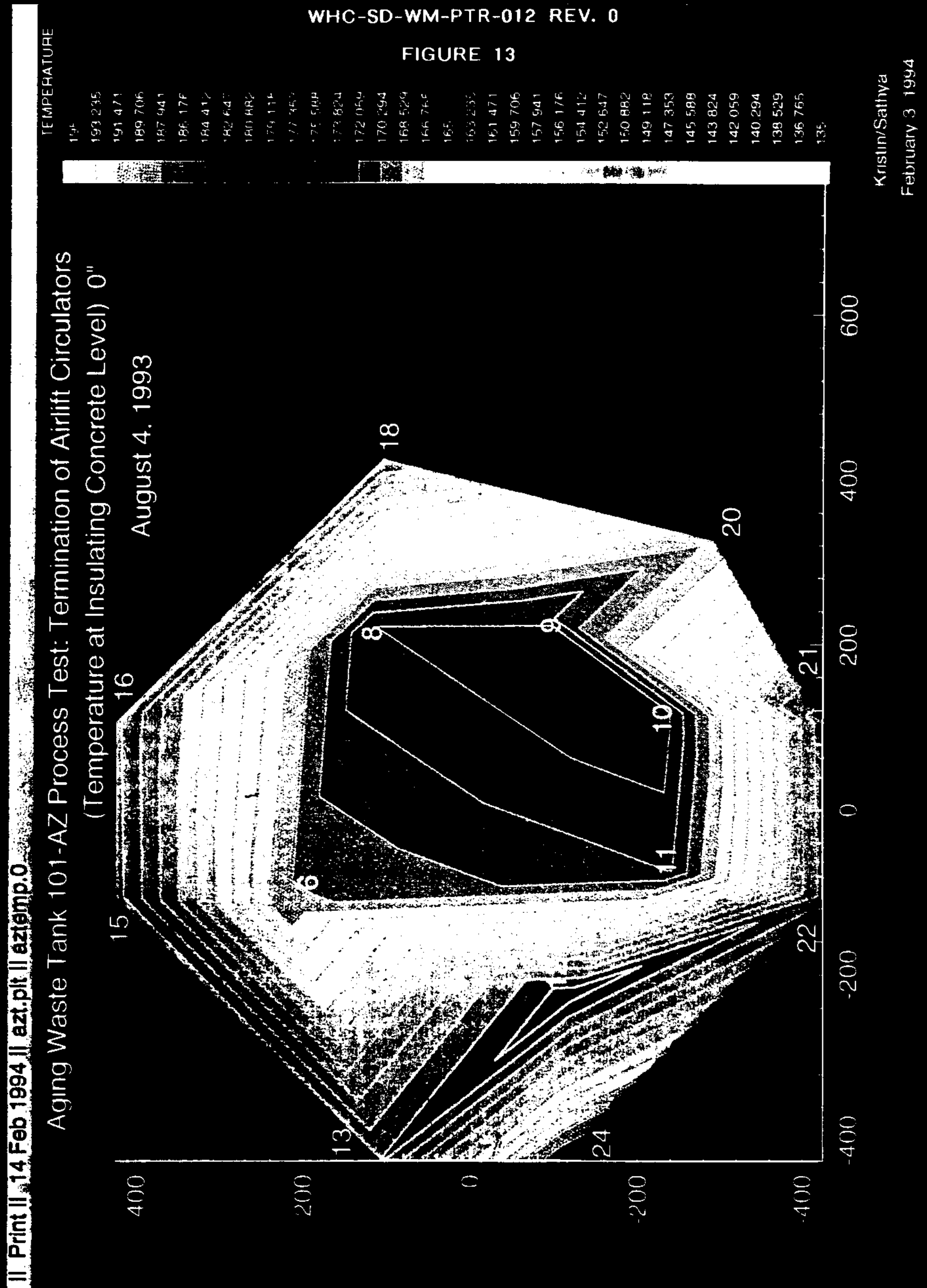
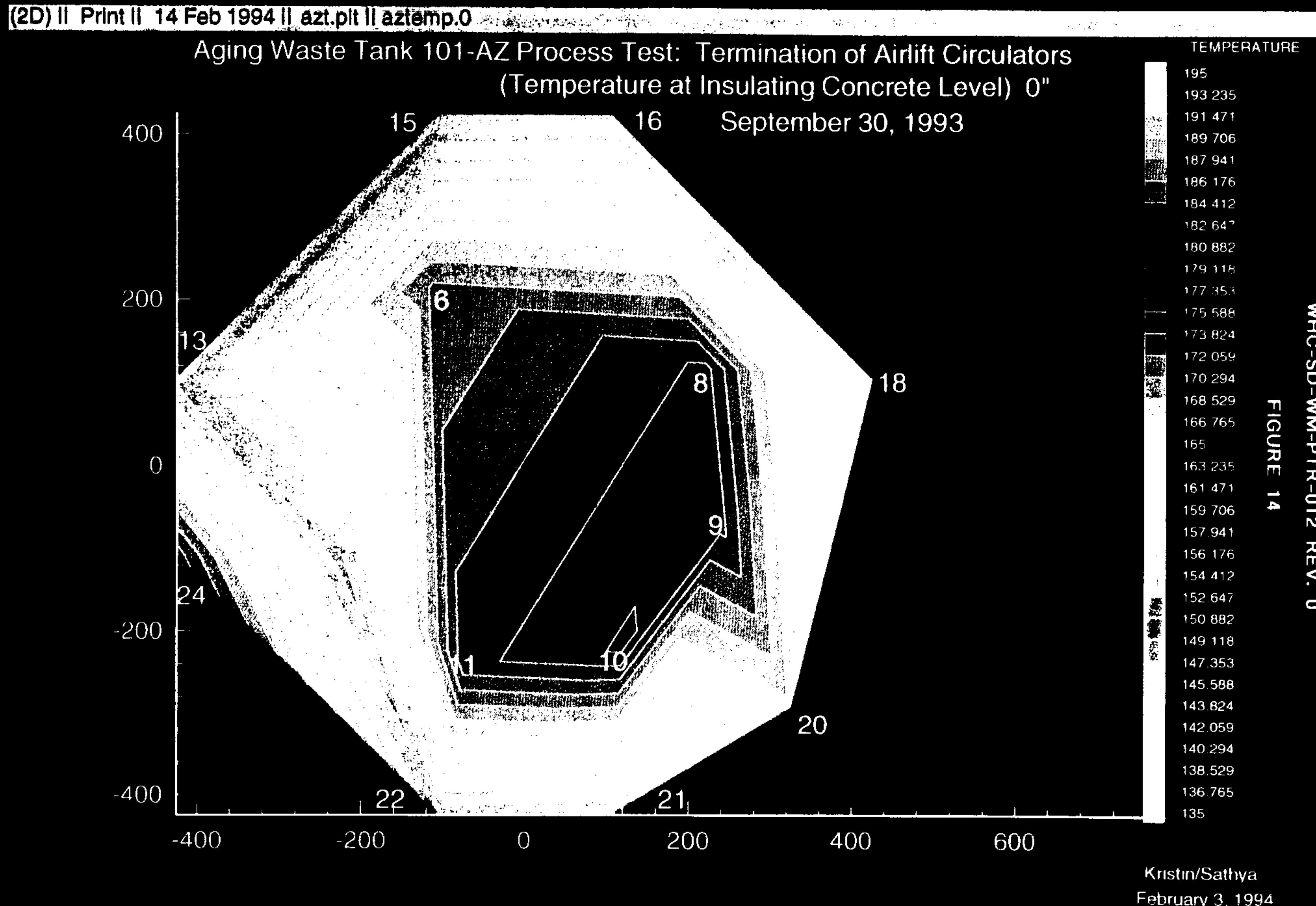

(2D) II Print II 14 Feb 1994 II azt.plt II aztemp.0
Aging Waste Tank 101-AZ Process Test: Termination of Airlift Circulators
(Temperature at Insulating Concrete Level) 0"
August 4, 1993
TEMPERATURE
193.235
191.471
189.706
172.059
170.294
168.529
165
161.471
159.706
157.941
156.176
154.412
152.647
150.882
149.118
147.353
145.588
143.824
142.059
140.294
138.529
136.765
135
Kristin/Sathya
February 3 1994
400
200
0
-200
-400
600
13
15
16
18
20
21
22
24
6
8
9
10
11

FIGURE 14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Aging Waste Tank 101-AZ Process Test: Termination of Airlift Circulators
(Temperature at Insulating Concrete Level) 0"
September 30, 1993
TEMPERATURE
195
193 235
191 471
189 706
187 941
186 176
184 412
182 647
180 882
179 118
177 353
175 588
173 824
172 059
170 294
168 529
166 765
165
163 235
161 471
159 706
157 941
156 176
154 412
152.647
150 882
149 118
147.353
145.588
143.824
142.059
140.294
138.529
136.765
135
400
200
0
-200
-400
600
15
16
13
6
8
18
9
24
11
10
20
22
21
Kristin/Sathya
February 3, 1994

FIGURE 15

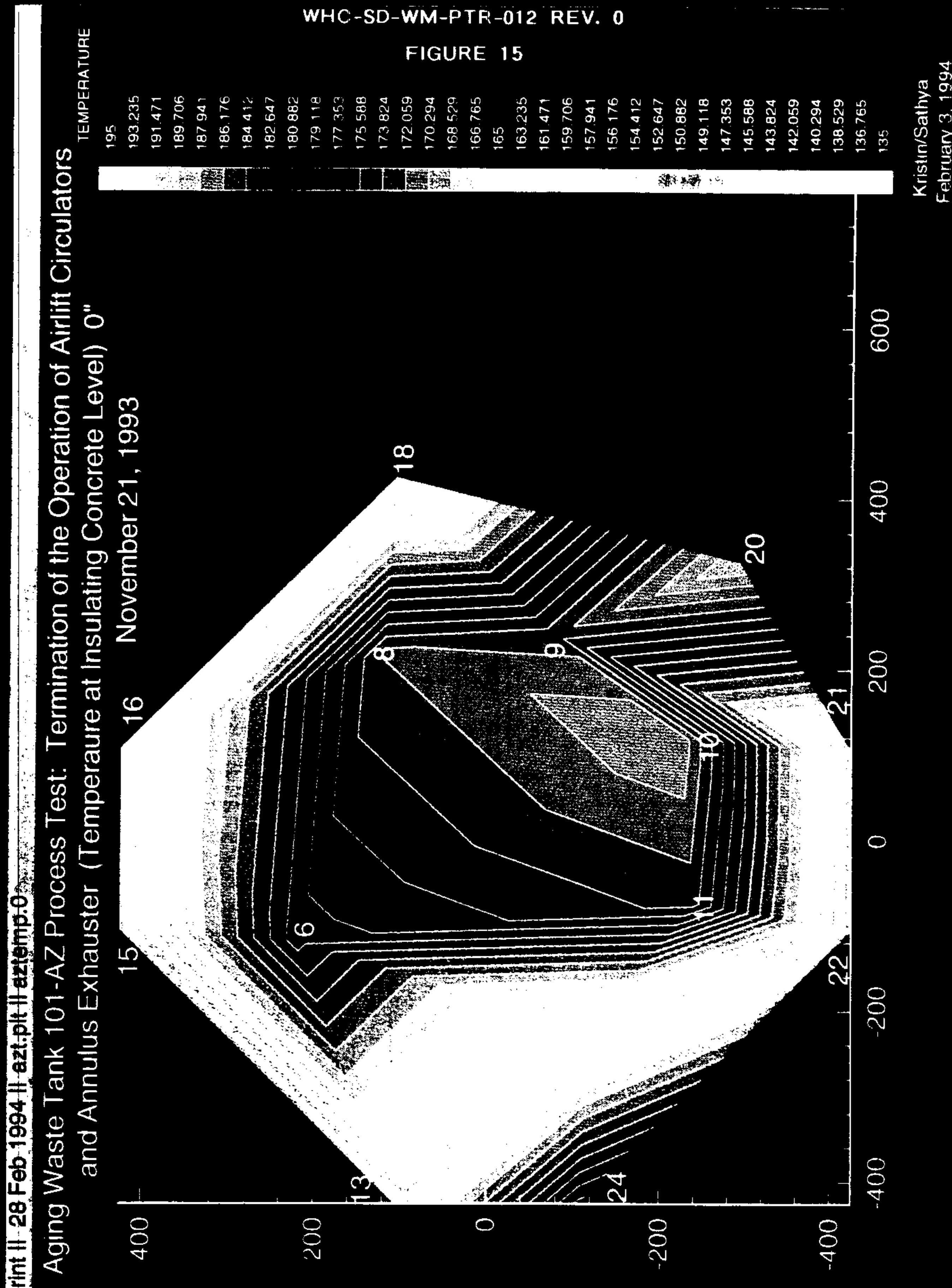

(2D) II Print II 28 Feb 1994 II azt.plt II aztemp.0
Aging Waste Tank 101-AZ Process Test: Termination of the Operation of Airlift Circulators
and Annulus Exhauster (Temperaure at Insulating Concrete Level) 0"
November 21, 1993
TEMPERATURE
195
193.235
191.471
189.706
187.941
186.176
184.412
182.647
180.882
179.118
177.353
175.588
173.824
172.059
170.294
168.529
166.765
165
163.235
161.471
159.706
157.941
156.176
154.412
152.647
150.882
149.118
147.353
145.588
143.824
142.059
140.294
138.529
136.765
135
Kristin/Sathya
February 3, 1994
400
200
0
-200
-400
-400
-200
0
200
400
600
13
15
16
18
20
21
22
24
6
8
9
10
11

FIGURE 16

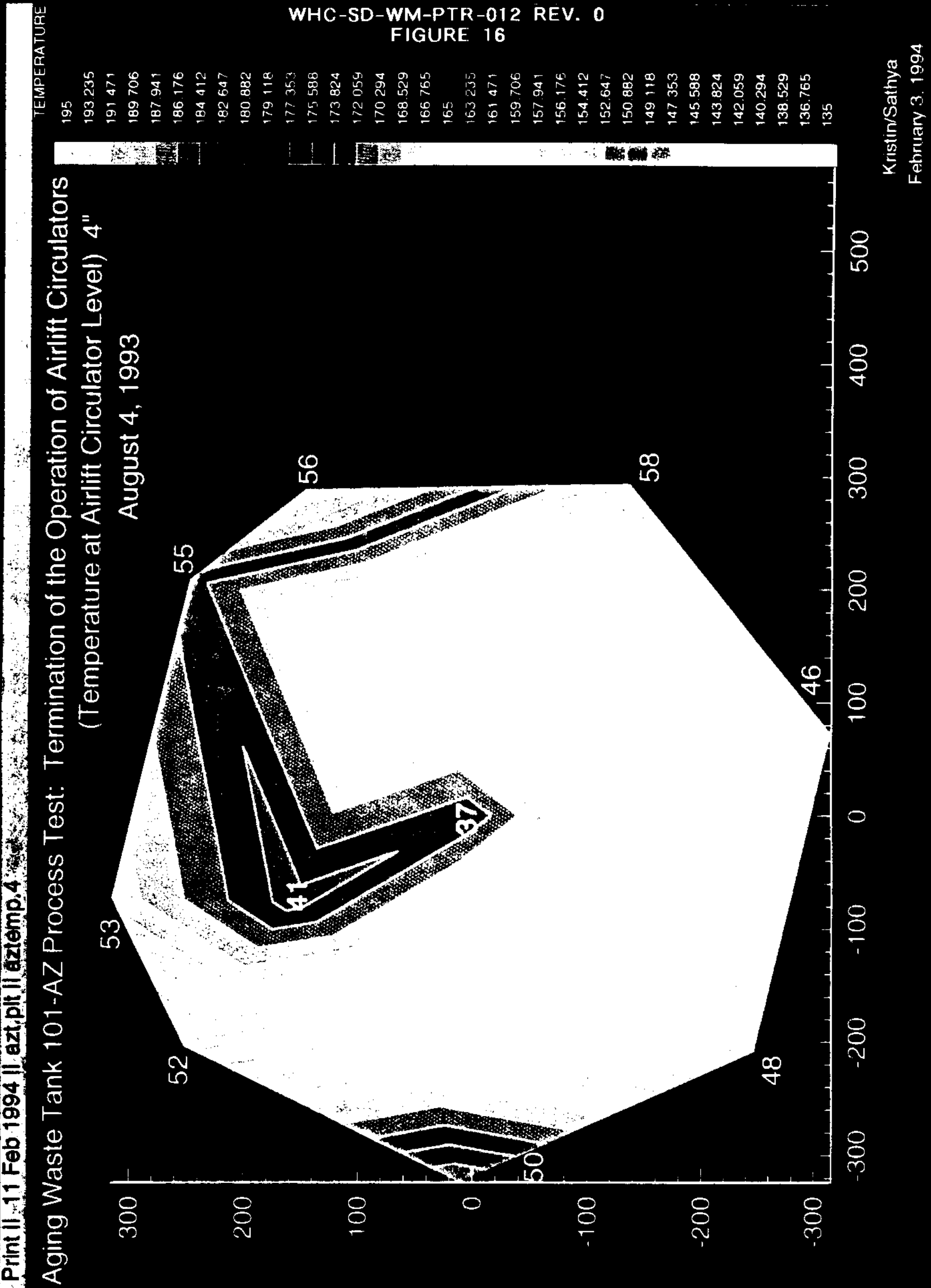

(2D) || Print || 11 Feb 1994 || azt.plt || aztemp.4
Aging Waste Tank 101-AZ Process Test: Termination of the Operation of Airlift Circulators
(Temperature at Airlift Circulator Level) 4"
August 4, 1993
300
200
100
0
-100
-200
-300
-300
-200
-100
0
100
200
300
400
500
52
53
55
56
58
46
48
50
37
41
TEMPERATURE
195
193.235
191.471
189.706
187.941
186.176
184.412
182.647
180.882
179.118
177.353
175.588
173.824
172.059
170.294
168.529
166.765
165
163.235
161.471
159.706
157.941
156.176
154.412
152.647
150.882
149.118
147.353
145.588
143.824
142.059
140.294
138.529
136.765
135
Kristin/Sathya
February 3, 1994

FIGURE 17

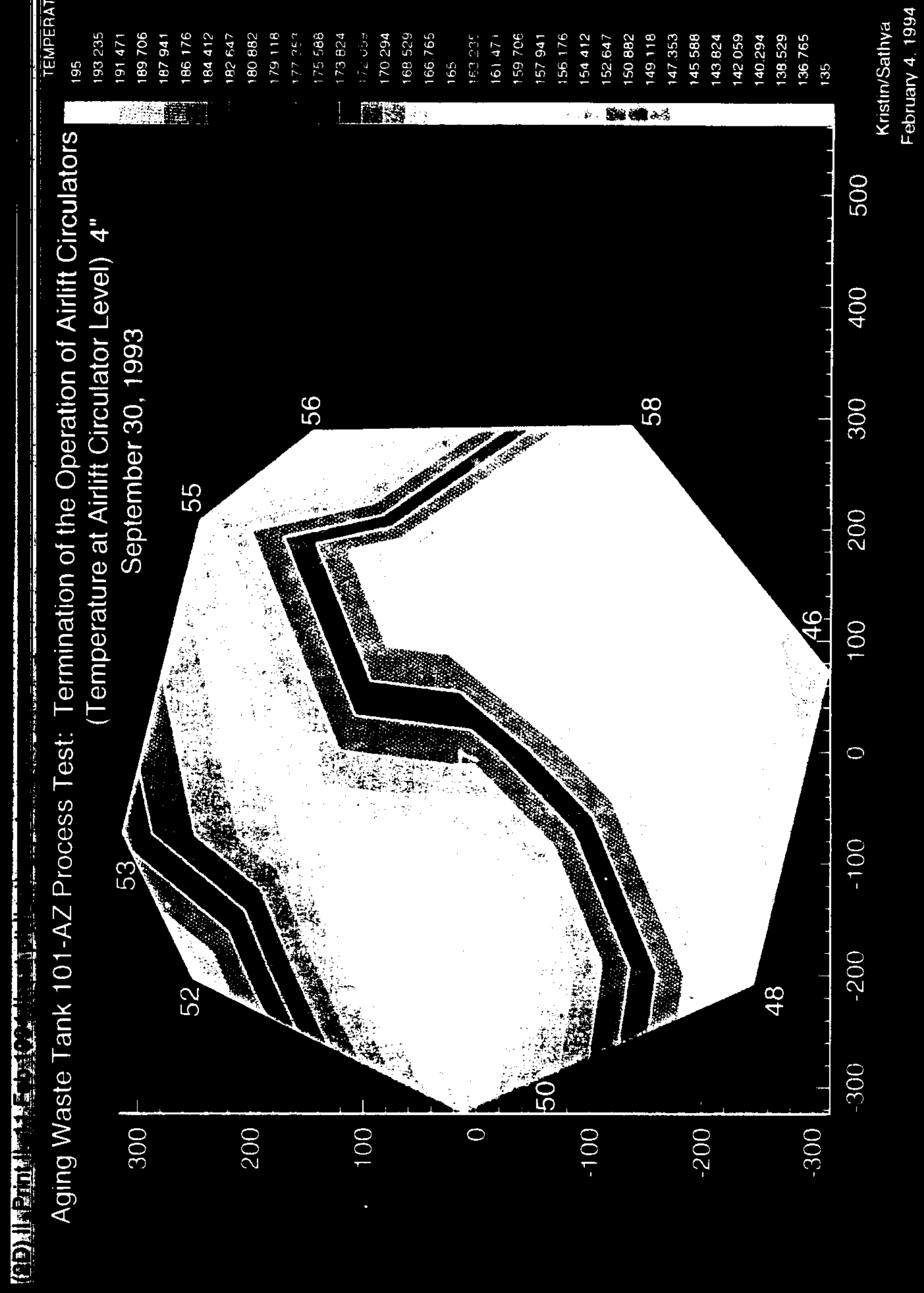
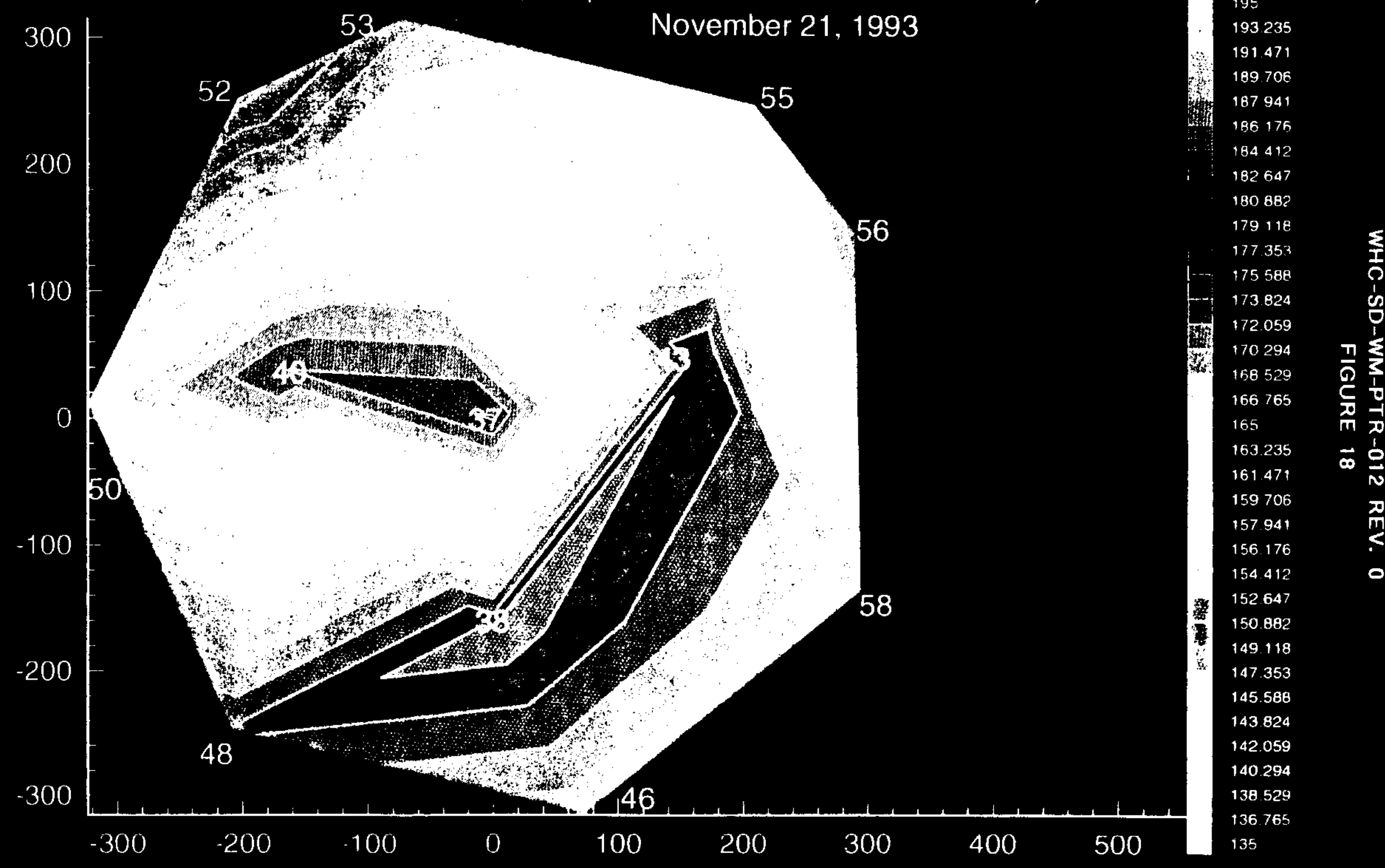

Aging Waste Tank 101-AZ Process Test: Termination of the Operation of Airlift Circulators
(Temperature at Airlift Circulator Level) 4"
September 30, 1993
TEMPERATURE
195
193.235
191.471
189.706
187.941
186.176
184.412
182.647
180.882
179.118
175.588
173.824
170.294
168.529
166.765
165
161.471
159.706
157.941
156.176
154.412
152.647
150.882
149.118
147.353
145.588
143.824
142.059
140.294
138.529
136.765
135
52
53
55
56
58
46
48
50
300
200
100
0
-100
-200
-300
400
500
Kristin/Sathya
February 4, 1994

FIGURE 18

(2D) || Print || 28 Feb 1994 || azt.plt || aztemp.4

Aging Waste Tank 101-AZ Process Test: Termination of Airlift Circulators and Annulus Exhausters (Temperature at Airlift Circulator Level) 4"

November 21, 1993



Kristin/Sathya
February 4, 1994

FIGURE 19

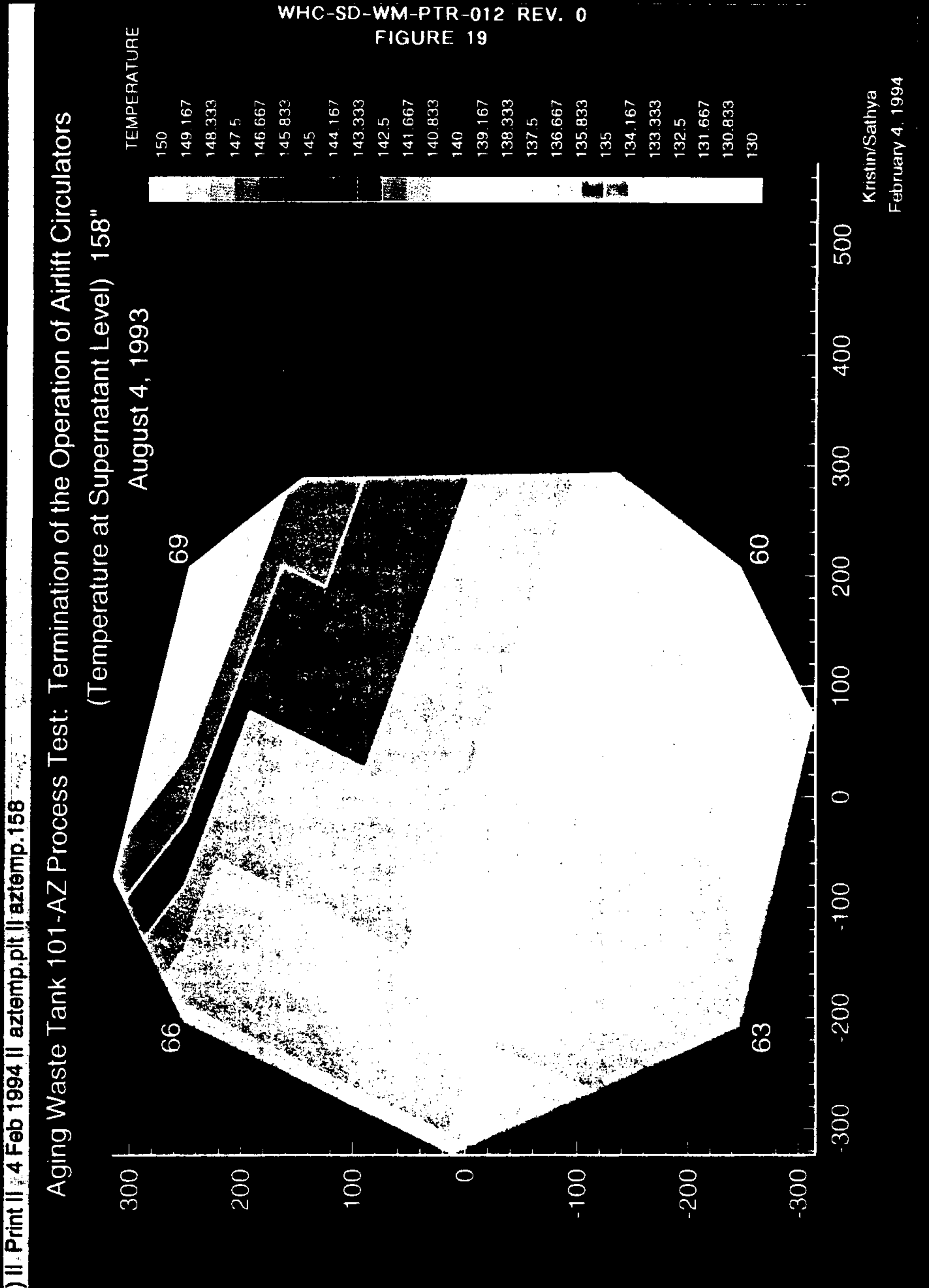
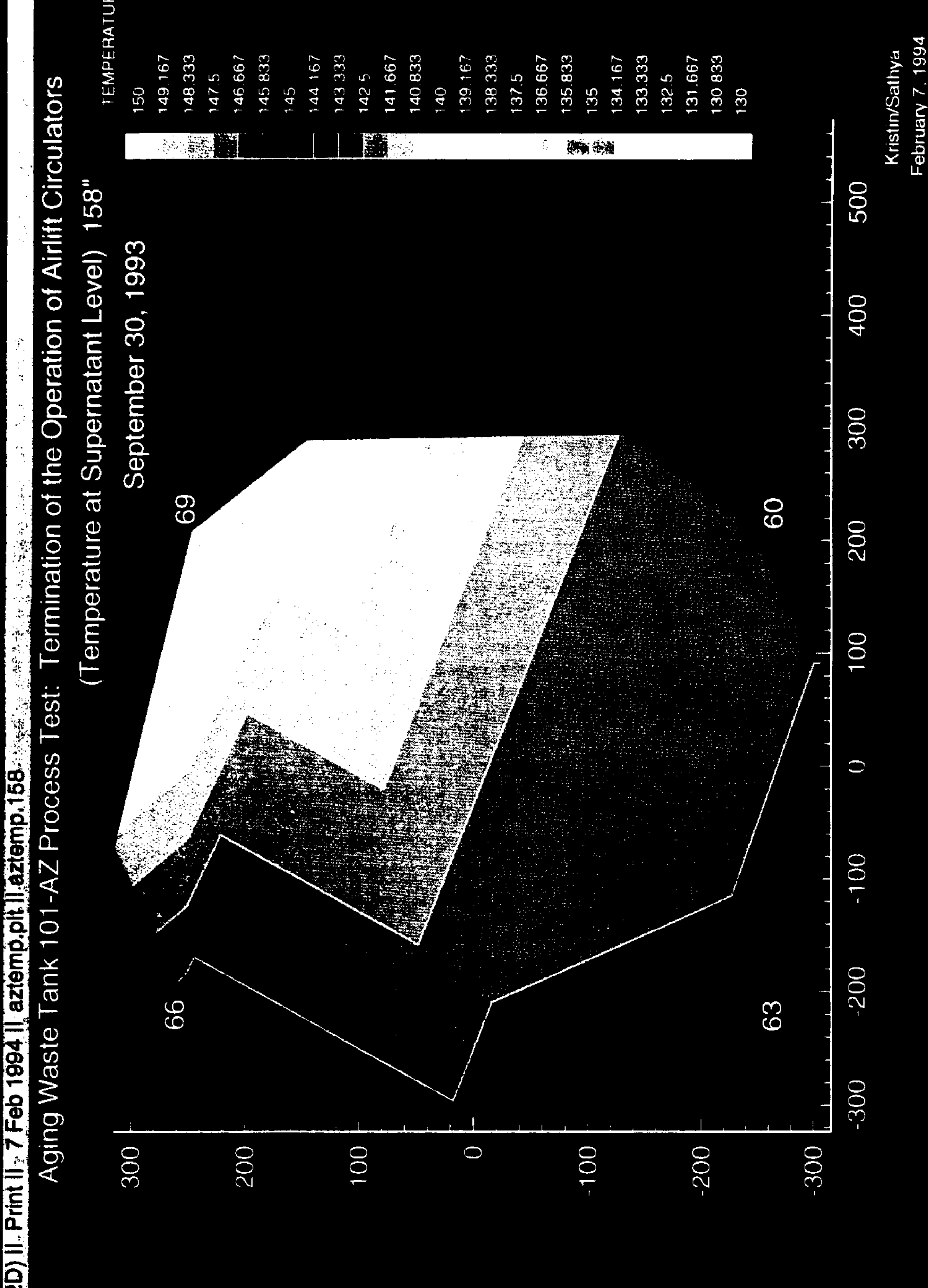

(2D) II Print II 4 Feb 1994 II aztemp.plt II aztemp.158
Aging Waste Tank 101-AZ Process Test: Termination of the Operation of Airlift Circulators
(Temperature at Supernatant Level) 158"
August 4, 1993
TEMPERATURE
150
149.167
148.333
147.5
146.667
145.833
145
144.167
143.333
142.5
141.667
140.833
140
139.167
138.333
137.5
136.667
135.833
135
134.167
133.333
132.5
131.667
130.833
130
69
66
60
63
300
200
100
0
-100
-200
-300
Kristin/Sathya
February 4, 1994

FIGURE 20


(2D) II. Print II. 7 Feb 1994 II. aztemp.plt II.aztemp.158.
Aging Waste Tank 101-AZ Process Test: Termination of the Operation of Airlift Circulators
(Temperature at Supernatant Level) 158"
September 30, 1993
TEMPERATURE
150
149.167
148.333
147.5
146.667
145.833
145
144.167
143.333
142.5
141.667
140.833
140
139.167
138.333
137.5
136.667
135.833
135
134.167
133.333
132.5
131.667
130.833
130
69
66
60
63
300
200
100
0
-100
-200
-300
500
400
300
200
100
0
-100
-200
-300
Kristin/Sathya
February 7, 1994

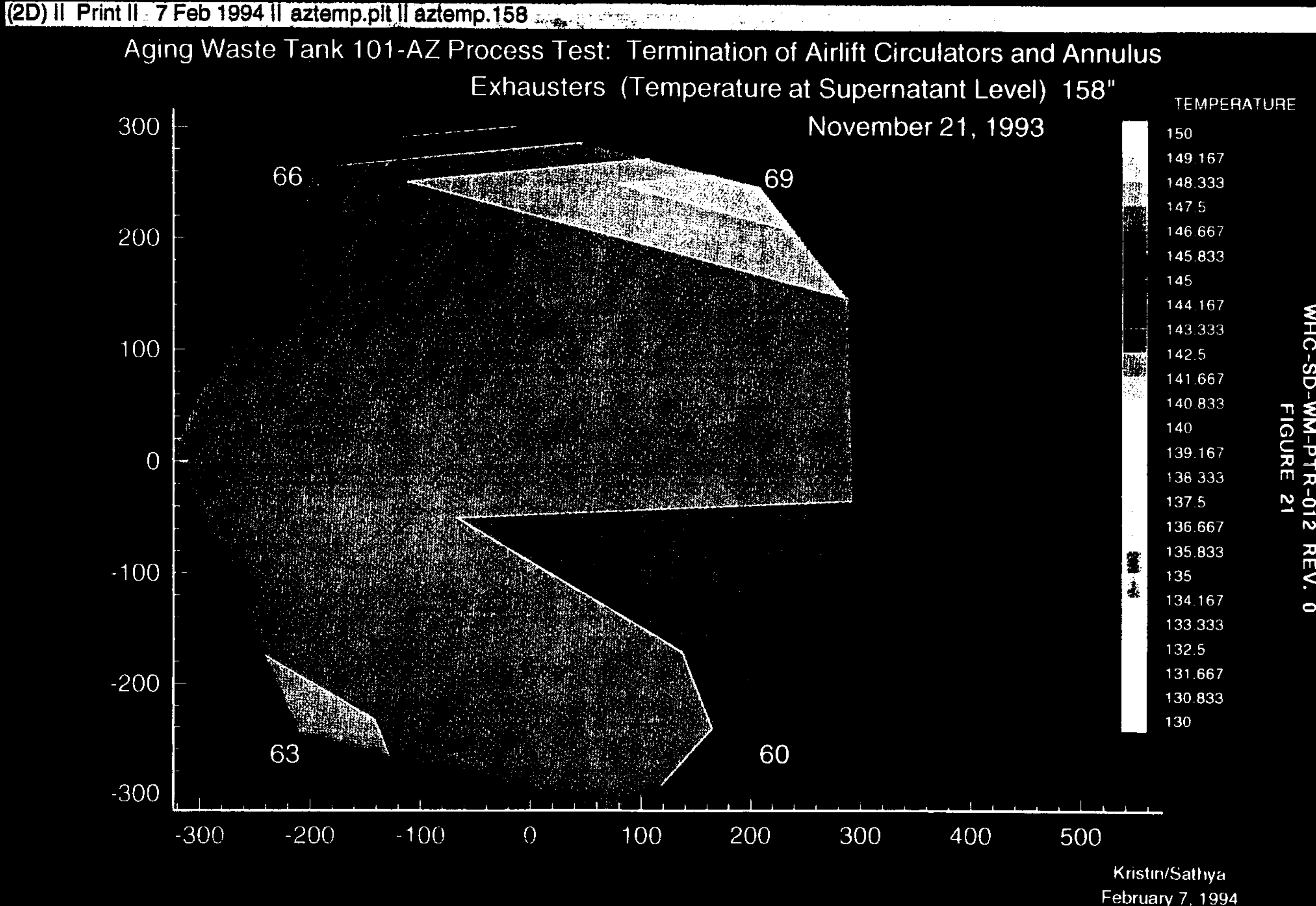

(2D) II Print II 7 Feb 1994 II aztemp.plt II aztemp.158
Aging Waste Tank 101-AZ Process Test: Termination of Airlift Circulators and Annulus
Exhausters (Temperature at Supernatant Level) 158"
November 21, 1993
66
69
63
60
300
200
100
0
-100
-200
-300
-300
-200
-100
0
100
200
300
400
500
TEMPERATURE
150
149.167
148.333
147.5
146.667
145.833
145
144.167
143.333
142.5
141.667
140.833
140
139.167
138.333
137.5
136.667
135.833
135
134.167
133.333
132.5
131.667
130.833
130
Kristin/Sathya
February 7, 1994

FIGURE 22

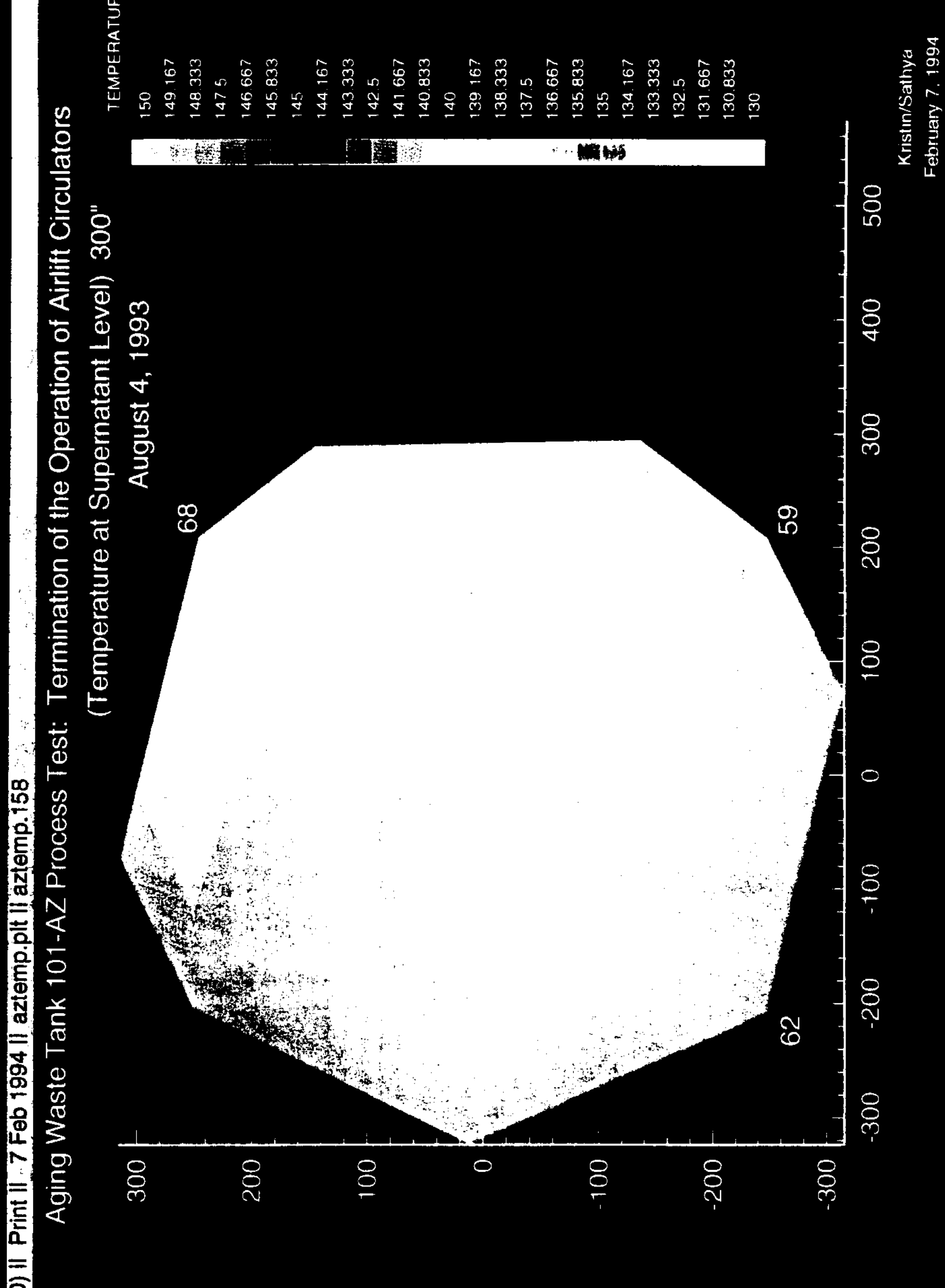

(2D) II Print II 7 Feb 1994 II aztemp.plt II aztemp.158
Aging Waste Tank 101-AZ Process Test: Termination of the Operation of Airlift Circulators
(Temperature at Supernatant Level) 300"
August 4, 1993
TEMPERATURE
150
149.167
148.333
147.5
146.667
145.833
145
144.167
143.333
142.5
141.667
140.833
140
139.167
138.333
137.5
136.667
135.833
135
134.167
133.333
132.5
131.667
130.833
130
68
59
62
300
200
100
0
-100
-200
-300
500
400
300
200
100
0
-100
-200
-300
Kristin/Sathya
February 7, 1994

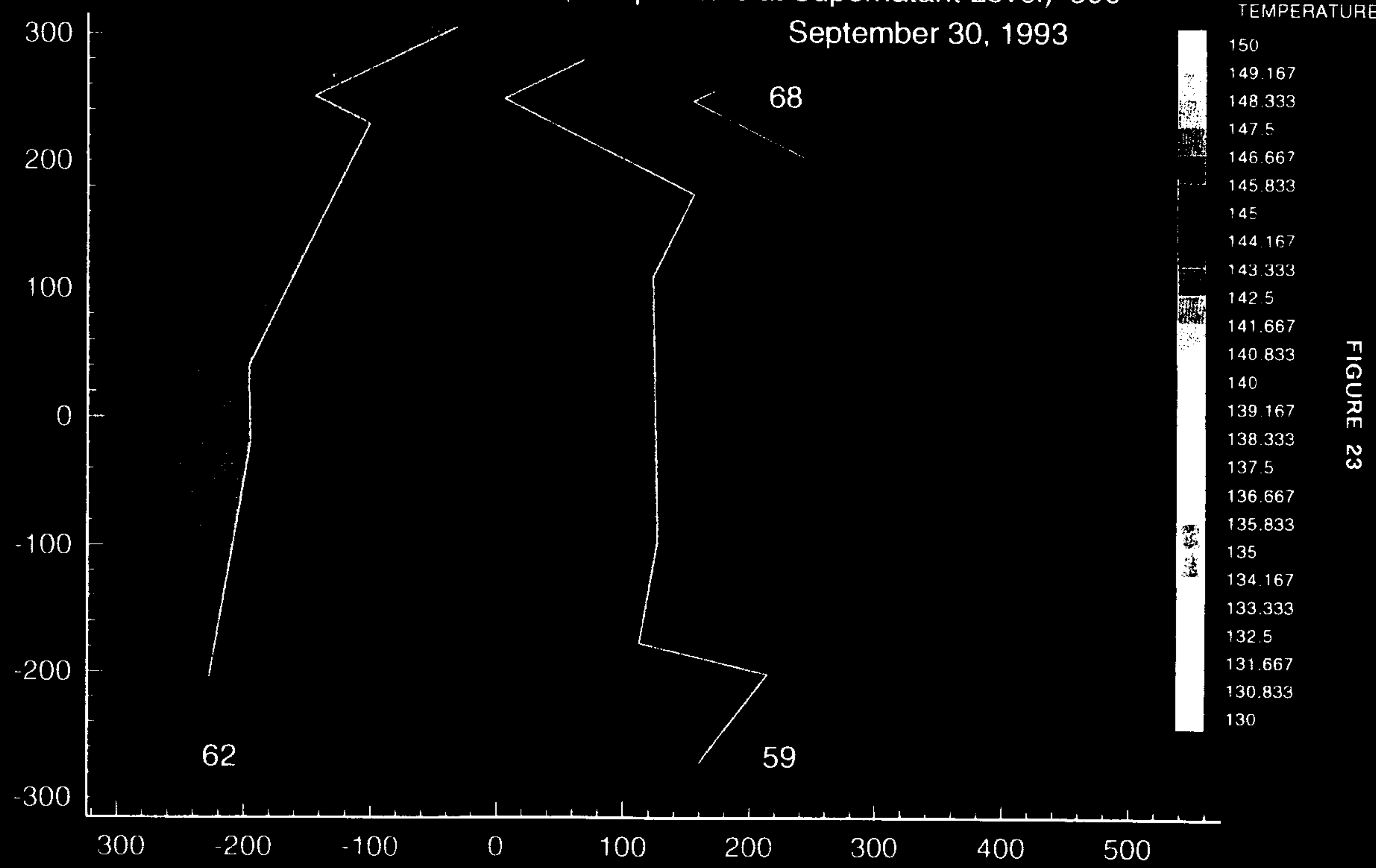
FIGURE 23

(2D) II Print II 7 Feb 1994 II aztemp.plt II aztemp.158

Aging Waste Tank 101-AZ Process Test: Termination of the Operation of Airlift Circulators

(Temperature at Supernatant Level) 300"

September 30, 1993



Kristin/Sathya
February 7, 1994

FIGURE 24

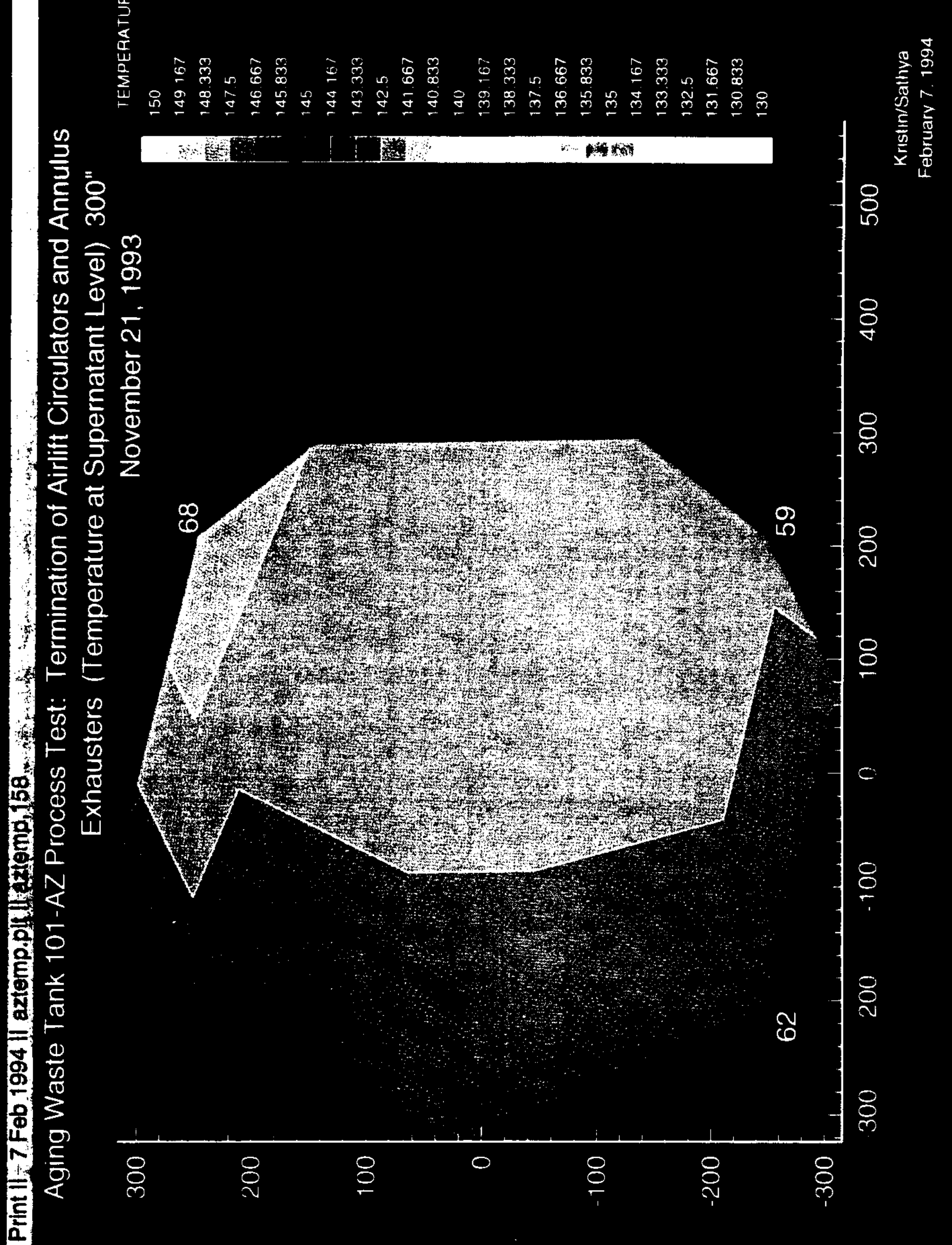

(2D) II Print II - 7 Feb 1994 II aztemp.plt II aztemp.158
Aging Waste Tank 101-AZ Process Test: Termination of Airlift Circulators and Annulus
Exhausters (Temperature at Supernatant Level) 300"
November 21, 1993
TEMPERATURE
150
149.167
148.333
147.5
146.667
145.833
145
144.167
143.333
142.5
141.667
140.833
140
139.167
138.333
137.5
136.667
135.833
135
134.167
133.333
132.5
131.667
130.833
130
68
59
62
300
200
100
0
-100
-200
-300
500
400
Kristin/Sathya
February 7, 1994

FIGURE 25

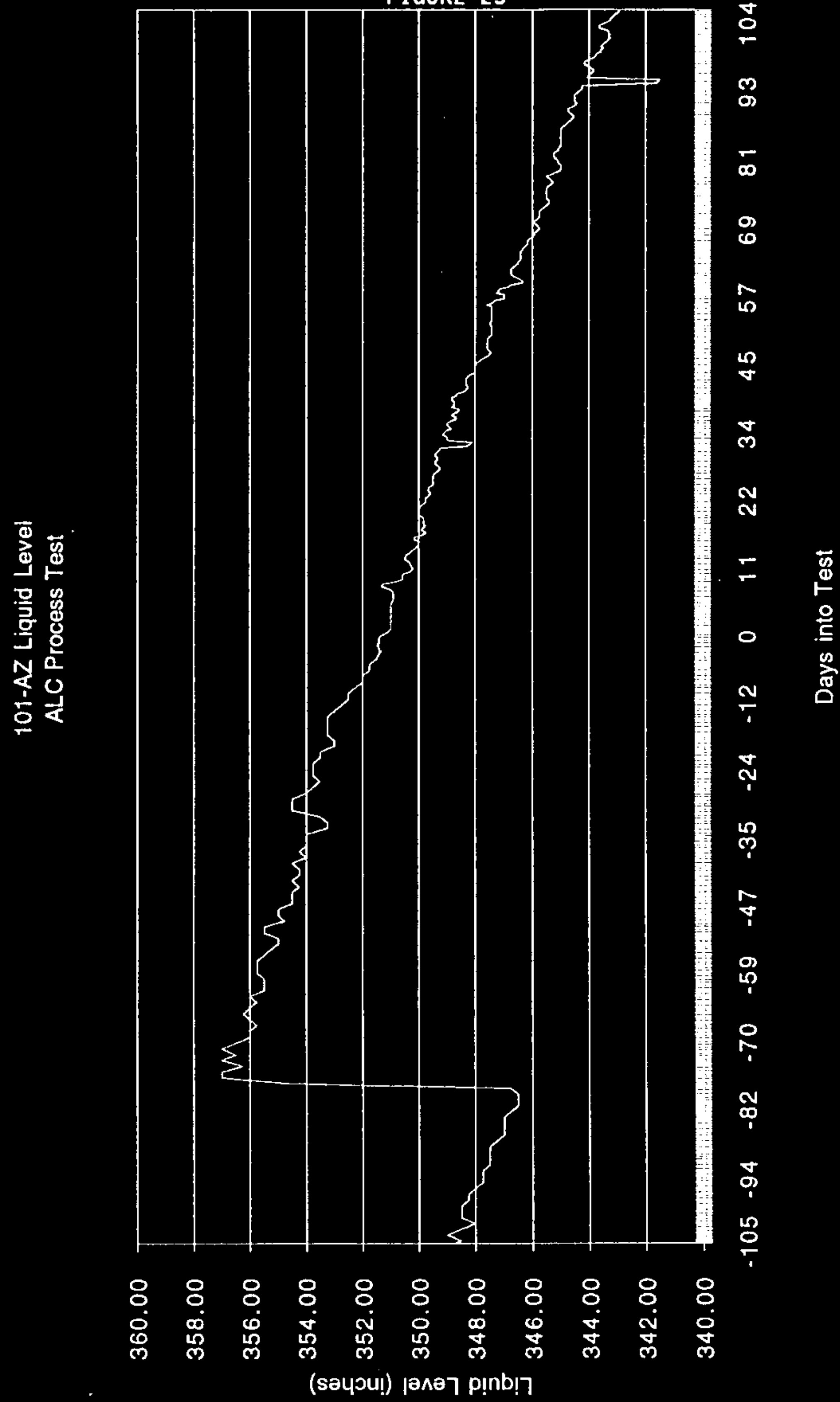

101-AZ Liquid Level
ALC Process Test
Liquid Level (inches)
360.00
358.00
356.00
354.00
352.00
350.00
348.00
346.00
344.00
342.00
340.00
-105 -94 -82 -70 -59 -47 -35 -24 -12 0 11 22 34 45 57 69 81 93 104
Days into Test

FIGURE 26

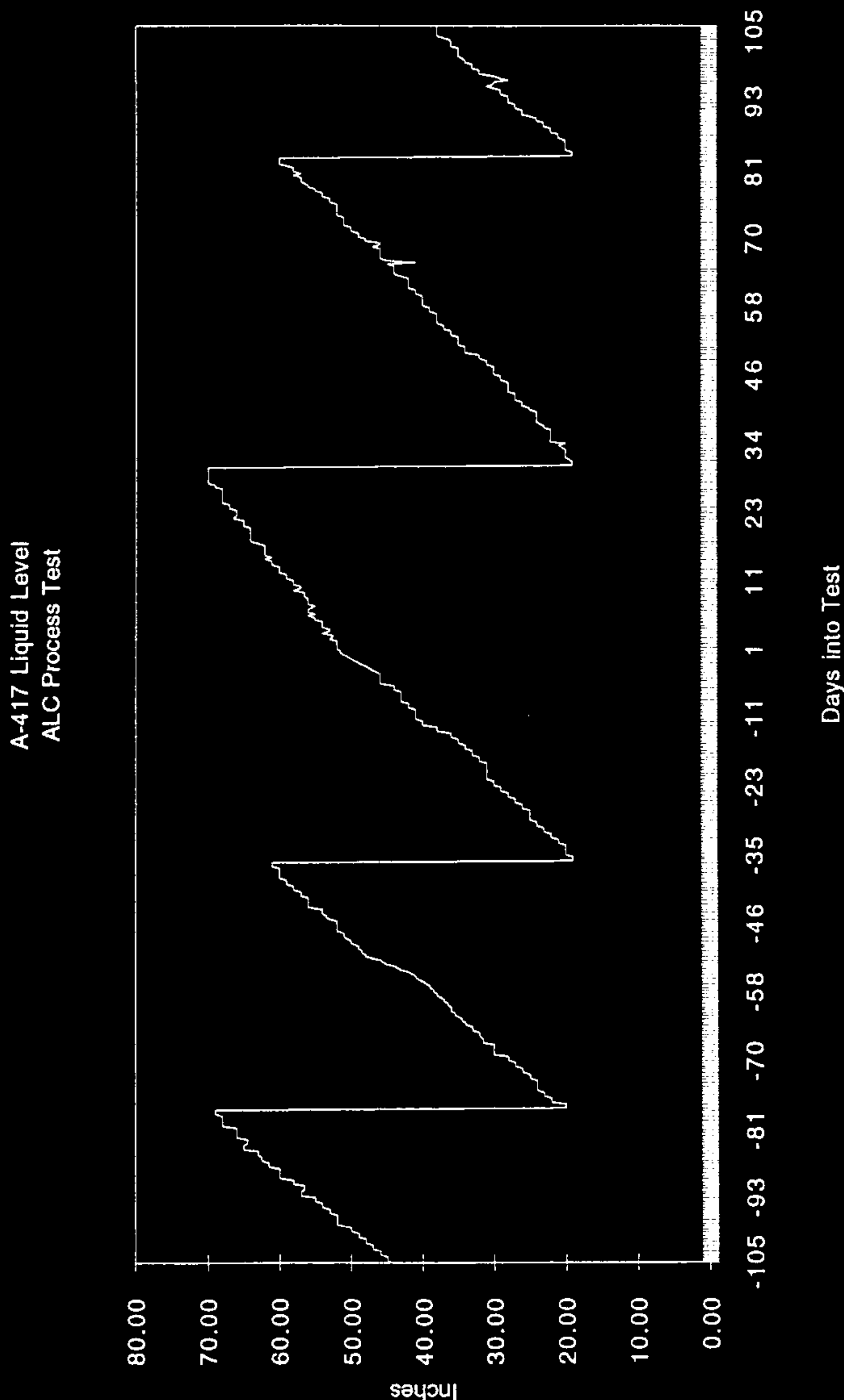

A-417 Liquid Level
ALC Process Test
Inches
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
-105 -93 -81 -70 -58 -46 -35 -23 -11 1 11 23 34 46 58 70 81 93 105
Days into Test

FIGURE 27

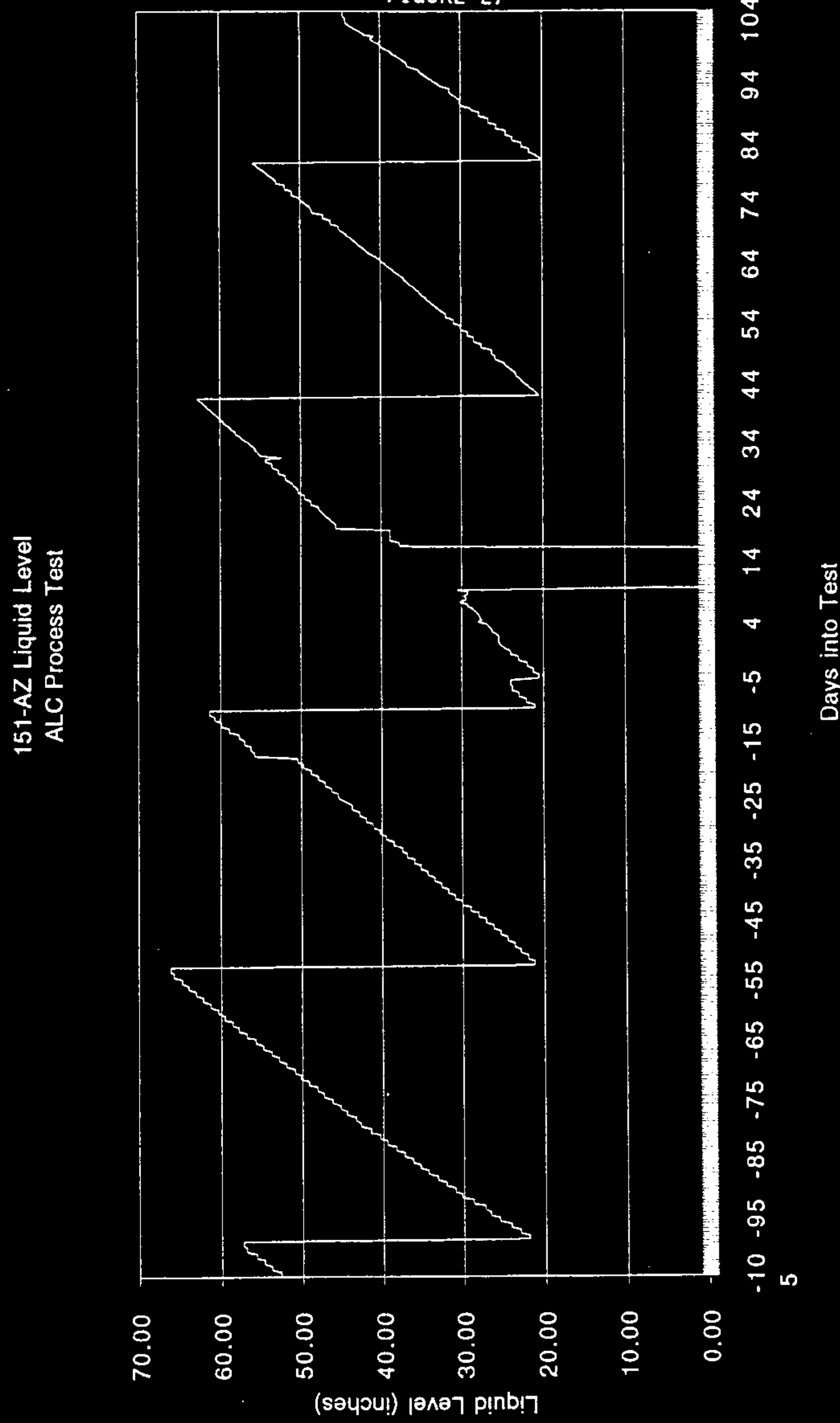

151-AZ Liquid Level
ALC Process Test
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Liquid Level (inches)
-10 -95 -85 -75 -65 -55 -45 -35 -25 -15 -5 4 14 24 34 44 54 64 74 84 94 104
5
Days into Test

FIGURE 28

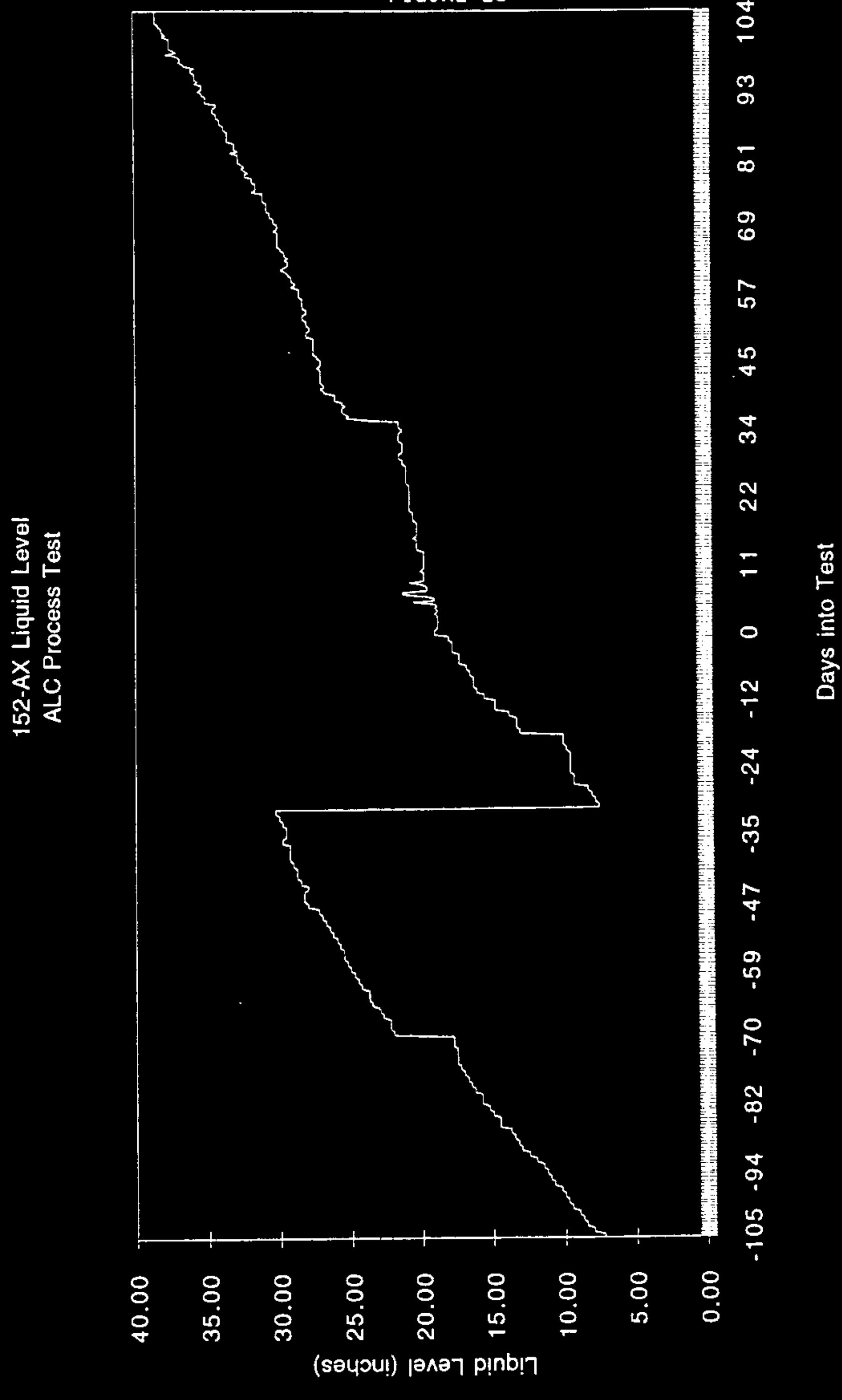

152-AX Liquid Level
ALC Process Test
Liquid Level (inches)
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-105 -94 -82 -70 -59 -47 -35 -24 -12 0 11 22 34 45 57 69 81 93 104
Days into Test

FIGURE 29

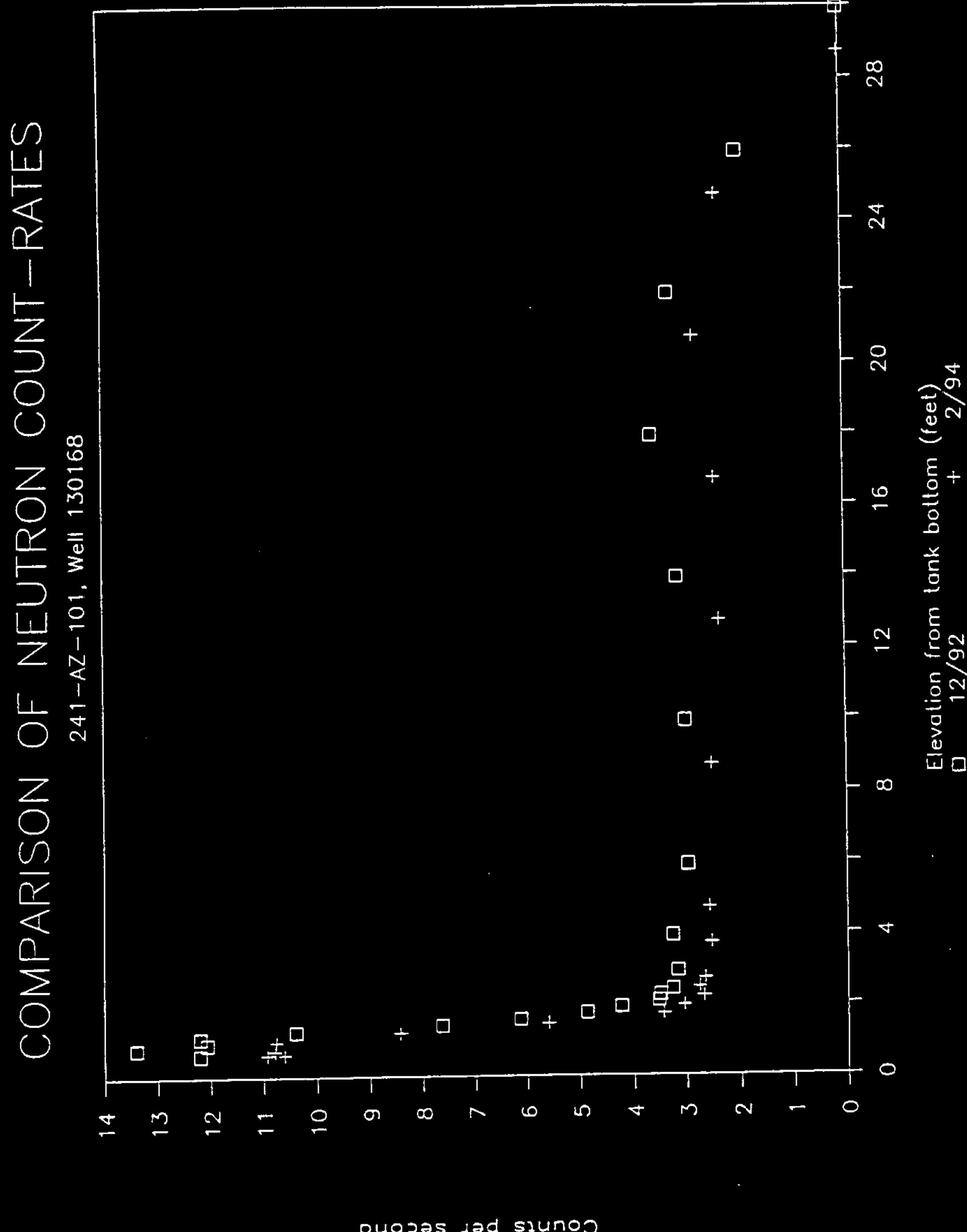

COMPARISON OF NEUTRON COUNT-RATES
241-AZ-101, Well 130168
Counts per second
Elevation from tank bottom (feet)
12/92
2/94

FIGURE 30

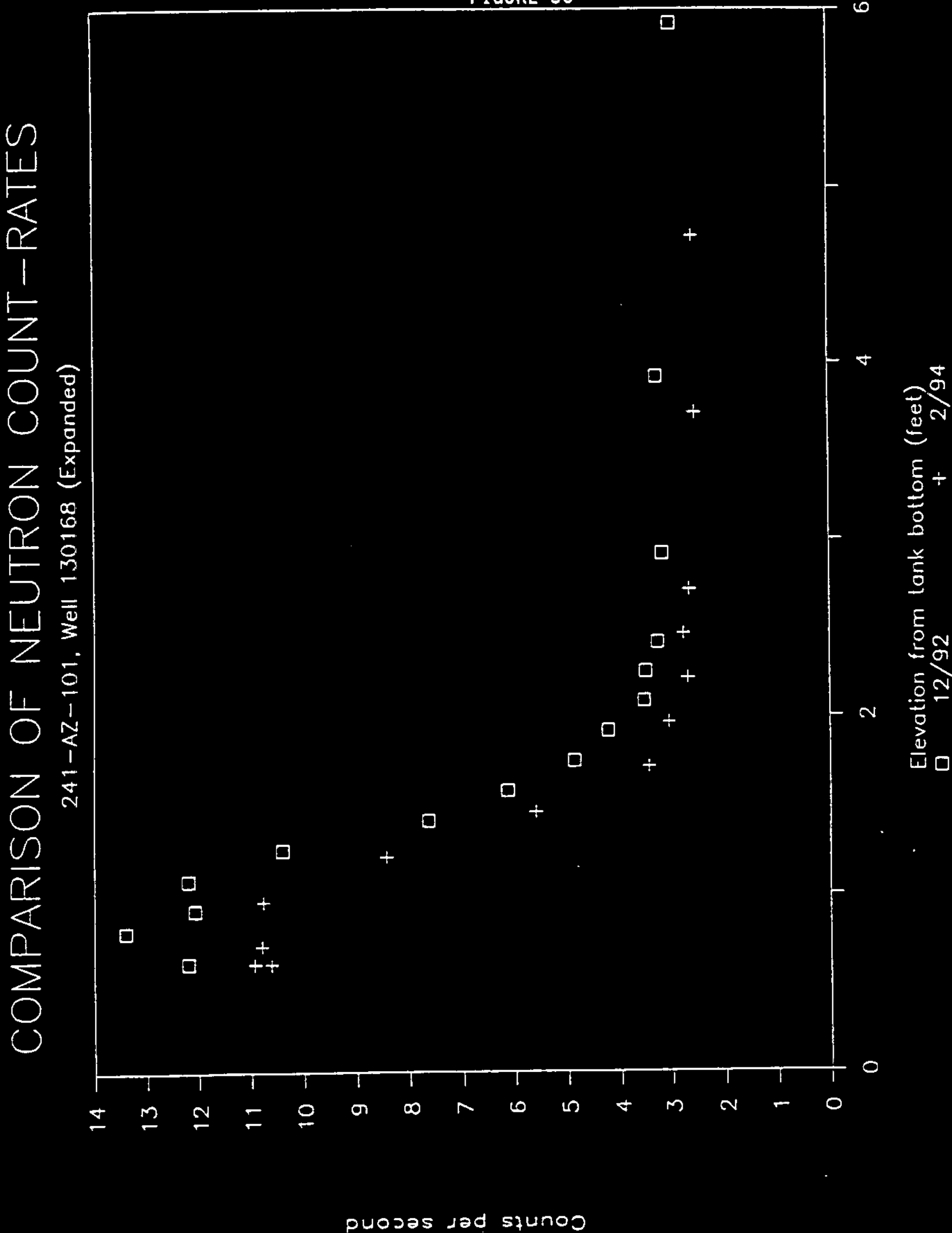

COMPARISON OF NEUTRON COUNT-RATES
241-AZ-101, Well 130168 (Expanded)
Counts per second
Elevation from tank bottom (feet)
12/92
2/94
0
2
4
6
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14

FIGURE 31

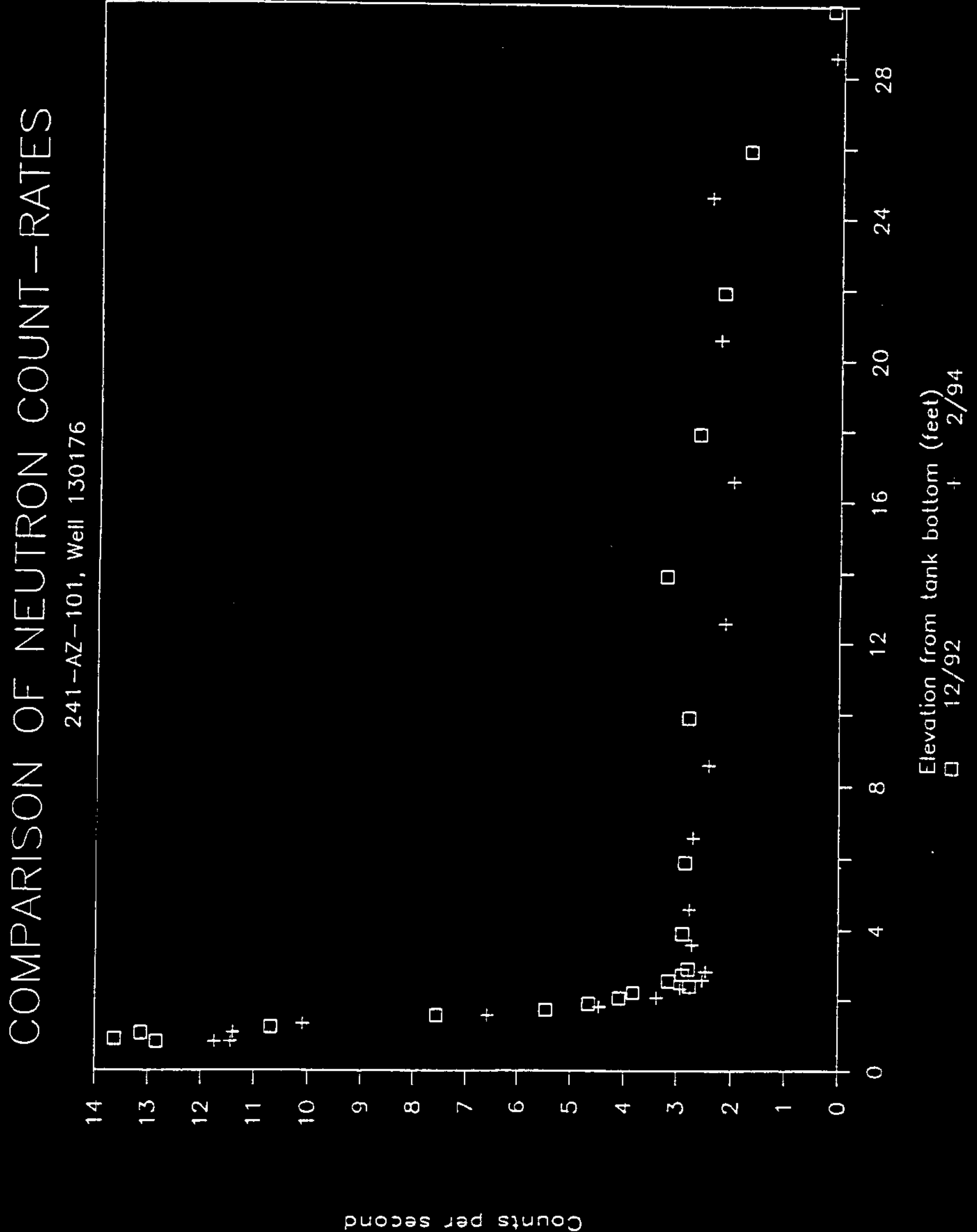

COMPARISON OF NEUTRON COUNT--RATES
241-AZ-101, Well 130176
Elevation from tank bottom (feet)
Counts per second
12/92
2/94
0
4
8
12
16
20
24
28
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14

FIGURE 32

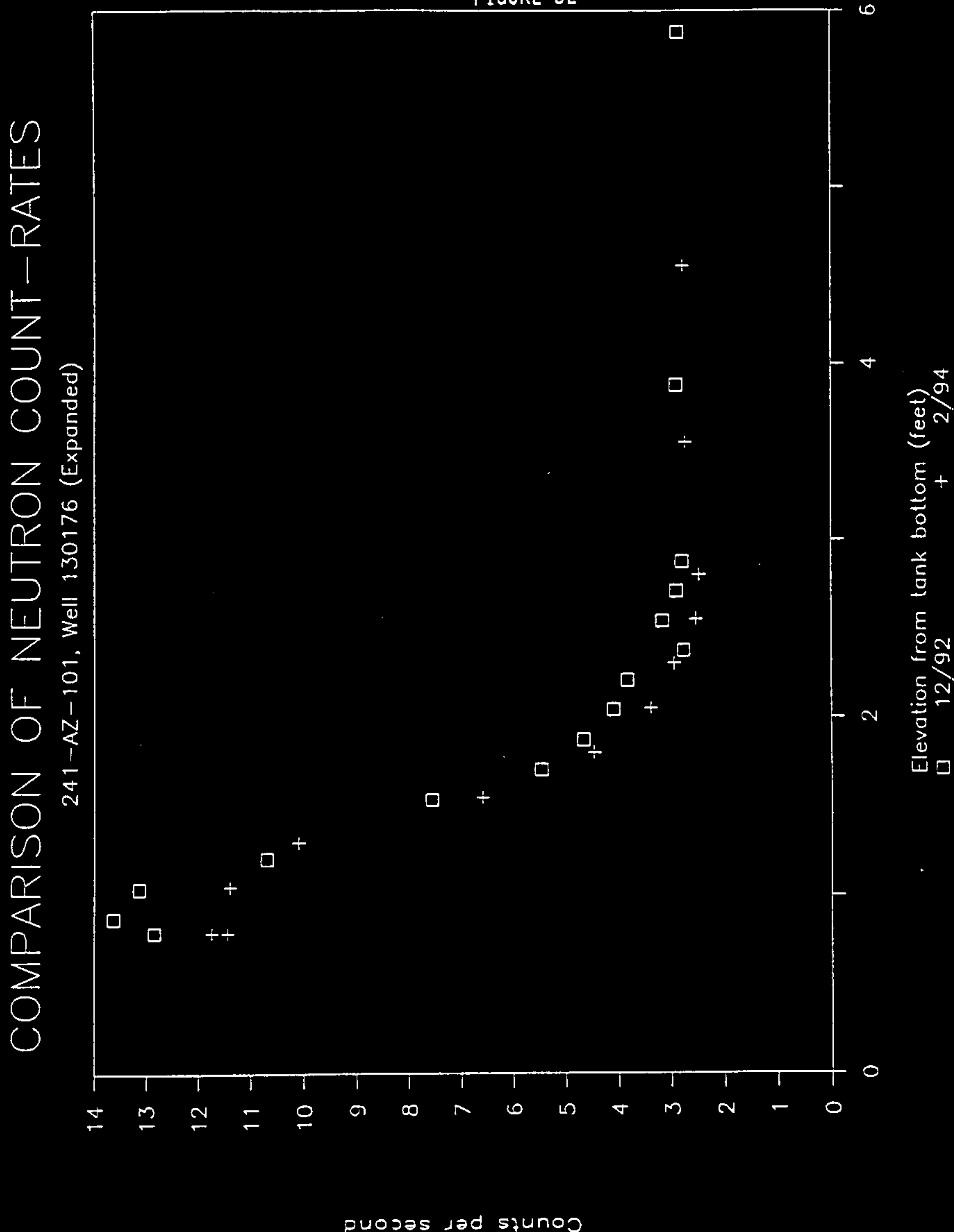

COMPARISON OF NEUTRON COUNT-RATES
241-AZ-101, Well 130176 (Expanded)
Counts per second
Elevation from tank bottom (feet)
0
2
4
6
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
□ 12/92
+ 2/94

FIGURE 33

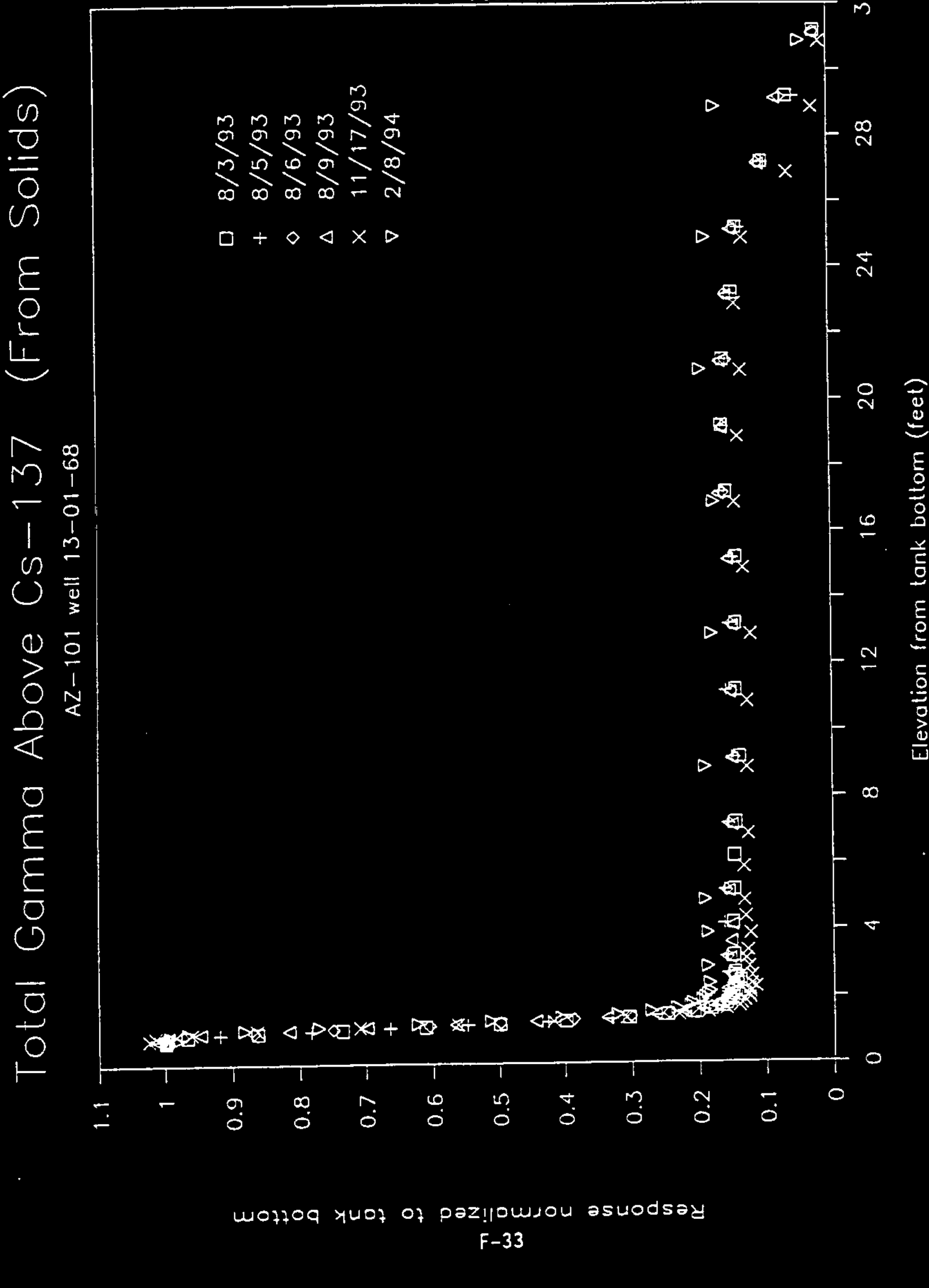

Total Gamma Above Cs-137 (From Solids)
AZ-101 well 13-01-68
8/3/93
8/5/93
8/6/93
8/9/93
11/17/93
2/8/94
Response normalized to tank bottom
Elevation from tank bottom (feet)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
4
8
12
16
20
24
28
32

FIGURE 34

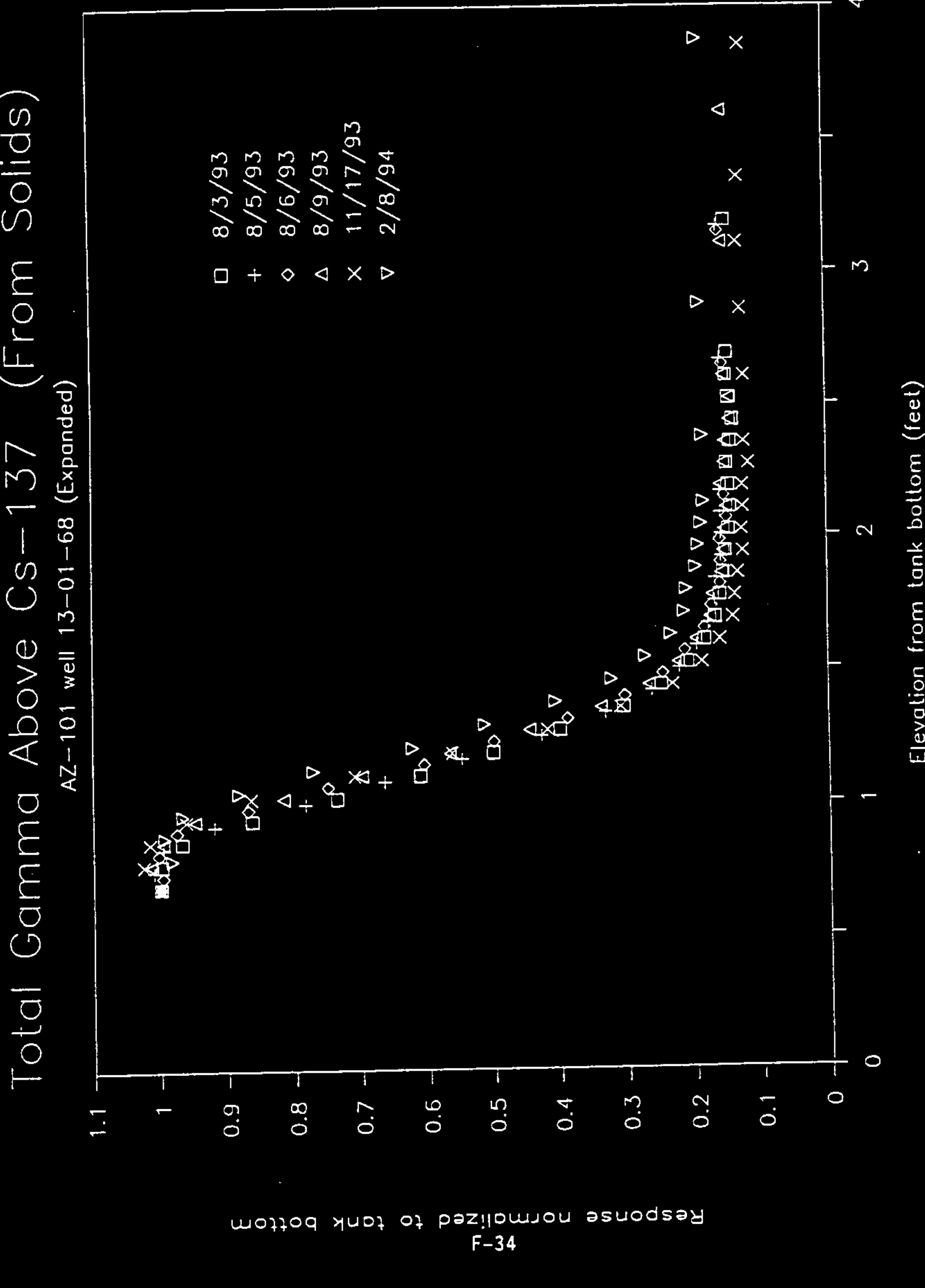

Total Gamma Above Cs-137 (From Solids)
AZ-101 well 13-01-68 (Expanded)
8/3/93
8/5/93
8/6/93
8/9/93
11/17/93
2/8/94
Response normalized to tank bottom
Elevation from tank bottom (feet)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
0
1
2
3
4

FIGURE 35

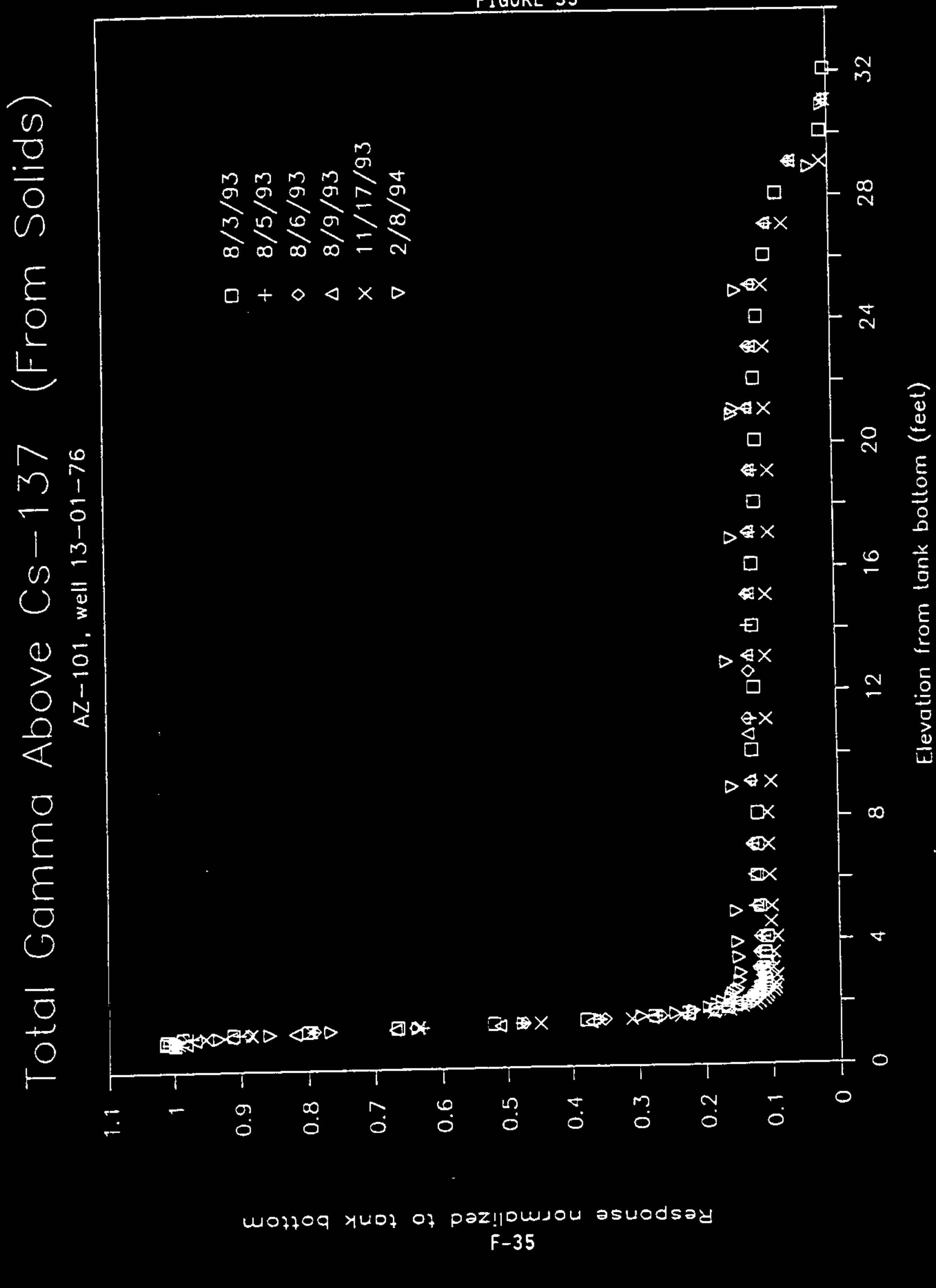
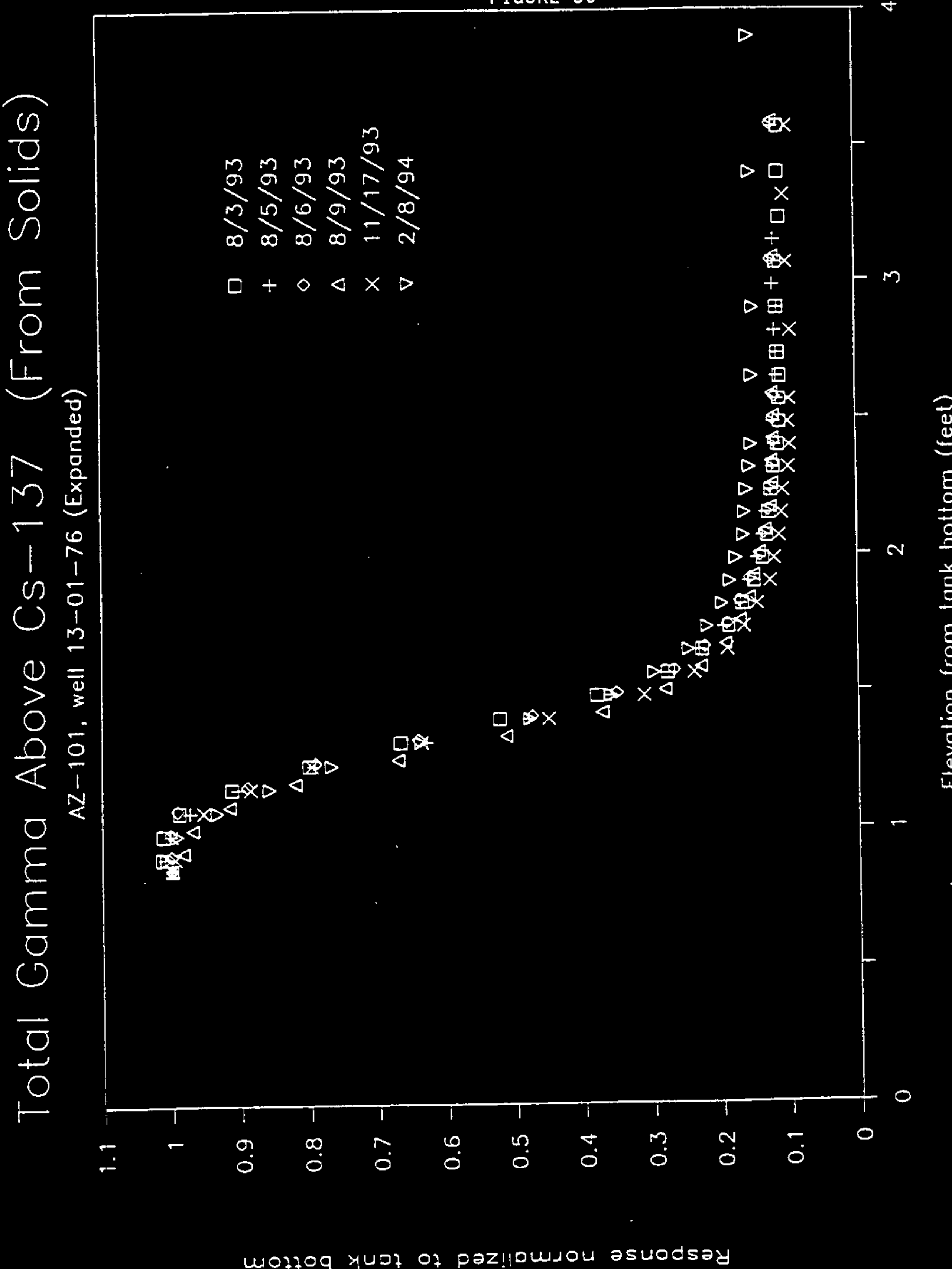

Total Gamma Above Cs-137 (From Solids)
AZ-101, well 13-01-76
8/3/93
8/5/93
8/6/93
8/9/93
11/17/93
2/8/94
Response normalized to tank bottom
Elevation from tank bottom (feet)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
0
4
8
12
16
20
24
28
32

FIGURE 36


Total Gamma Above Cs-137 (From Solids)
AZ-101, well 13-01-76 (Expanded)
□ 8/3/93
+ 8/5/93
◇ 8/6/93
△ 8/9/93
× 11/17/93
▽ 2/8/94
Elevation from tank bottom (feet)
Response normalized to tank bottom
0
1
2
3
4
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1

DISTRIBUTION SHEET

To	From	Page 1 of 1
Those Listed	C. M. Winkler	Date 11/20/95
Project Title/Work Order		EDT No. 611819
Tank 241-AZ-101 Steam Bumping and Settling Process Test Report		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
W. B. Barton	R2-11	X			
G. T. MacLean	H5-49	X			
W. J. Powell	H5-27	X			
E. A. Smith	H5-56	X			
G. R. Tardiff	S5-05	X			
C. M. Winkler	S5-14	X			
Technical Data Service Center	S5-00	X			
Central Files	A3-88	(2)			