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 FACIL: 50-251 Turkey Point Plant, Unit 4, Florida Power and Light C 05000251
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 UHRIG, R.E. Florida Power & Light Co.
 RECIP. NAME RECIPIENT AFFILIATION
 EISENHUT, D.G. Division of Licensing

SUBJECT: Forwards results of steam generator insps conducted during
 Nov 1981 outage. Insp revealed no new phenomena & verified
 general pattern of denting is within predictable limits.
 Return to power presents no unresolved safety question.

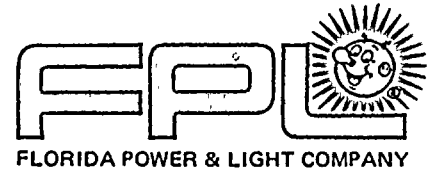
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DEC 28 1981



December 18, 1981
L-81-529

Office of Nuclear Reactor Regulation
Attention: Mr. Darrell G. Eisenhut, Director
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555



Dear Mr. Eisenhut:

Re: Turkey Point Unit 4
Docket No. 50-251
Steam Generator Inspections

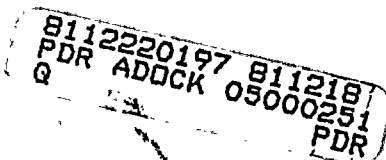
The results of the Turkey Point Unit 4 steam generator inspections conducted during the November 1981 outage are attached. The inspections which were performed in accordance with Turkey Point Unit 4 operating license DPR-41 showed no new phenomena and verified that the general pattern of denting in Unit 4 is within predictable limits and consistent with previous inspections of the Turkey Point Units.

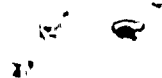
The general criteria applied for steam generator inspections and preventive plugging are the same as previously applied to Turkey Point Units 3 and 4. This approach provides reasonable assurance of steam generator tube integrity such that safe operation of the unit during normal full power operation and during hypothetical accident conditions is assured for an operating period in excess of six equivalent full power months. Therefore, the implementation of this program with the resulting preventive plugging, enables continued safe full power operation of Turkey Point Unit 4.

Total steam generator tube plugging is presently 24.8%. This is conservatively bounded by the 28% tube plugging ECCS analysis.

The results of this inspection and the preventive tube plugging program have been reviewed by the Turkey Point Plant Nuclear Safety Committee and the Florida Power & Light Company Nuclear Review Board. FPL has concluded that based on the inspection results, the implemented plugging pattern, and previously submitted analyses, that the return of Turkey Point Unit 4 to full power operation for at least six equivalent months does not involve an unreviewed safety question.

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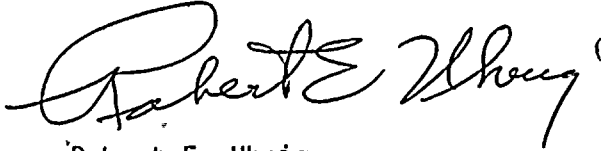
7. [Illegible text]

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Mr. Darrell G. Eismut
Office of Nuclear Reactor Regulation
Page 2

The results are submitted in accordance with Section 3.D.5 of Facility
Operating License DPR-41.

Very truly yours,

A handwritten signature in cursive script, reading "Robert E. Uhrig".

Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/JEM/ras

Attachment

cc: J. P. O'Reilly, Region II
Harold F. Reis, Esquire

TURKEY POINT 4 STEAM GENERATOR
INSPECTION PROGRAM

I. INTRODUCTION

An extensive inspection program for the Turkey Point Unit 4 steam generators was conducted in October/November, 1981. The following were performed:

1. Gauging of steam generator hot leg and cold leg tubes - all steam generators.
2. Measurements of visible flow slots in all steam generators.
3. Eddy current inspection of small radius U-bends in steam generator A cold leg.
4. Regulatory Guide 1.83 eddy current measurements in the hot leg and cold leg tubes of all steam generators.
5. Preventive plugging.

Table 1 is a summary of the approximate number of steam generator tubes inspected in each category and in each steam generator.

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TABLE 1: SUMMARY OF TOTAL STEAM GENERATOR TUBES INSPECTED

	A	A	B	B	C	C
	<u>Hot Leg</u>	<u>Cold Leg</u>	<u>Hot Leg</u>	<u>Cold Leg</u>	<u>Hot Leg</u>	<u>Cold Leg</u>
Gauging	1292	141	1236	95	1286	149
U-Bend Rows 2-5	-	73	-	-	-	-
R.G. 1.83 (Orig. Prog.)	290	388	270	422	169	447
R.G. 1.83 (Expand. Prog.)	106	116	-	-	104	100

This report summarizes the inspections conducted, the data from these inspections, and preventive plugging programs performed.

II. INSPECTION PROGRAMS

A. Gauging Program

The tube gauging program in the tubelane area is based on previously defined regions where significant tube deformation has been observed. These regions were formerly determined using finite element analysis techniques which yield tube hoop strain contours as a function of plate deformation. The boundary in the peripheral tubelane areas near the three and nine o'clock wedge locations is modified to take into account the greater extent of deformation in these regions of the plate as determined by previous experience.



As a result of the May, 1980 inspection at Turkey Point #4, it became apparent that the calculated 17.5% strain contour overpredicted the plant inspection data and that a finite element model no longer gave reasonable expectations as to the position of a strain boundary which might be linked to the locations of the most extensively restricted tubes.

The next inspection was performed at Turkey Point #3 in October, 1980. As a result of the prior experience at both Turkey Point Units described above, the gauging inspection boundary at that unit was also adjusted to reflect prior experience. Additional inspection programs were defined for the periphery, wedge, and patch plate regions. These programs were based on previous tube leakage histories at Turkey Point and Surry Plant sites, as well as previous gauging results at the Surry and Turkey Point sites as deemed appropriate.

Inspections of all three steam generator cold legs were also performed.

The gauging inspections boundary for the present inspection (October - November, 1981) at Turkey Point #4 has also been adjusted to reflect prior experience at Turkey Point and other plants.



3

The typical inspection boundaries for the preceding inspection (November, 1980) (Figures 1 to 6) are included for reference. The gauging inspection boundaries for the November, 1981 inspection are indicated in Figures 7 to 12 inclusive, for each leg of each steam generator.

The following conservatisms were utilized in determining the Turkey Point #4 inspection boundary for this inspection:

1. If a restricted tube was found close to the inspection boundary, the inspection was expanded in that area.
2. In addition to the specific gauging inspection program, it should be noted that tubes in the central portion of the tube bundles from Row 12 upward were tested with 700 mil diameter probes; such probing should provide early indication of any new deformation which might exist away from the regions usually regarded as active, i.e. the tubelane, patch plate, wedges, and periphery.
3. Restricted tubes discovered in previous inspections, including those that were not adjacent to the areas of predominant activity, were included in the gauging program laid out generally for the three steam generators.



B. Flow Slot Measurements

Photographs were taken in each steam generator through the secondary handholes. These photographs were then utilized to measure the openings in the visible flow slots. Results are discussed in Section III. Flow slot measurements provide a gross measure of the progression of denting, as reflected in the rate of flow slot hourglassing.

C. Other Denting Related Inspections

The U-bends of unplugged tubes in rows 3 thru 5 in steam generator A (outlet) were examined with 100 kHz to confirm the integrity of the small radius U-bends in low number rows.

In the April, 1979 inspection, annulus measurements were taken in steam generator B. These measurements provided a qualitative indicator of the upper plate expansion trends in the most affected steam generator. That had been the third measurement of this type for steam generator B. No obvious trends had been noted in this unit or in Turkey Point Unit #3. Therefore, this measurement was not made at the November, 1980 inspection nor at the present inspection.

D. Regulatory Guide 1.83 Inspection

The types and extent of inspections required in this area are specified in R.G. 1.83. The original inspection plans are shown in Figs. 7 to 12 inclusive. During the inspections, a single expansion of the program in the inlet and outlet sides of steam generators A and C was accomplished as required by R.G. 1.83. Results of the inspection are discussed later in this report.



III. INSPECTION RESULTS

A. Gauging Programs

Results of the gauging inspections are indicated in Figures (13 to 18) and are summarized in Table 2.

TABLE 2: TUBE RESTRICTION SUMMARY
Number of Tubes Restricting Passage of Gauge Listed But
Allowing Next Smaller Gauge To Pass

S/G and Gauge <u>Diameter</u>	Tubelane		Periphery and Wedge		Patch Plate
	<u>Hot Leg</u>	<u>Cold Leg</u>	<u>Hot Leg</u>	<u>Cold Leg</u>	<u>Hot Leg</u>
SG A					
.650"	45	0	41	0	5
.610"	3	0	4	0	1
.540"	2	0	0	0	0
SG B					
.650"	43	0	69	0	17
.610"	2	1	8	0	0
.540"	1	0	0	0	0
SG C					
.650"	26	0	37	0	26
.610"	2	3	0	0	0
.540"	0	0	0	0	0



Summary comments resulting from the review of this and other data are as follows:

1. Tubes in the tubelane region that restrict the 0.650" probe lie adjacent to the areas in which such restrictions occurred in prior examinations.
2. There were no tubes restricting a 0.540" probe in the tubelane regions of the cold legs in any of the three SG's.
3. Tube restrictions were noted in the wedge areas and the patch plates of all three steam generators; these data appear consistent with previous experience.
4. In steam generator A inlet, 2 tube restrictions appeared away from the pattern of prior inspection results. Both were restricted to passage of the 0.650" probe and passed the next smallest (.610" probe). One of these 0.650" restrictions was located in tube R23-C15 which is located between the 2 o'clock and 3 o'clock wedge regions and may be related to an interactive effect between these regions. The other 0.650" restriction reported away from the previously observed results is in tube R23-C41, located near the center of the tube bundle.



5. In the previous inspection (Nov. 1980), four tube restrictions in steam generator B inlet were reported away from the pattern of prior inspection results. Two of the restrictions, R25-C73 (0.650" restriction) and R26-C72 (0.610" restriction), were located immediately adjacent to a tube which had been pulled in September, 1975. No restrictions were reported in tubes immediately adjacent to this area in the present inspection.

The other two steam generator B inlet tube restrictions reported as being located in regions away from the pattern of previous results were R37-C60 and R38-C64 (both 0.650" restrictions), both in an area adjacent to the patch plate. In the present inspection, additional restrictions, ten to the 0.650" probe and one to the 0.610" probe, have been reported in the same general area. It appears that this activity may be related to an interactive effect between the 10 and 11 o'clock wedge areas and the patch plate.

In the November, 1980 inspection, one tube in steam generator C inlet, R35-C56, was reported restricted to the 0.650" probe away from the pattern of prior inspection results, in an area near the patch plate. No additional tube restrictions were reported in the immediate vicinity of this tube in the present inspection.



6. Only limited cold leg activity, i.e. restriction to the 0.610" probe, was observed: None in steam generator A, 1 in steam generator B and 3 in steam generator C. The level of cold leg activity remains quite low compared to the hot leg experience.
7. No leaking tubes (small leakage present at shutdown was attributed to leaking plugs) were observed during the approximately 8.69 Equivalent Full Power Months (EFPM) of operation prior to shutdown for the present inspection.
8. Review of the gauging results shows that 27 tubes restricted the 0.610" probe after 8.69 EFPM of operation. This compares with 46 such restrictions observed in November, 1980 after approximately 4.75 EFPM of operation, 80 such restrictions observed in May, 1980 after approximately 9.12 EFPM of operation and 72 such restrictions observed in April, 1979 after approximately 4.52 EFPM of operation. As a measure of denting progression, the current data are consistent with the previously observed slowing rate of denting since April, 1979.

B. FLOW SLOT MEASUREMENTS

The results of the #1 TSP flow slot measurements are indicated in Fig. 22. Results are consistent with previous behavior.

C. Other Denting Related Inspections

The U-bends of unplugged tubes in rows 3 thru 5 in steam generator A outlet were examined at 100 kHz. No indications were noted in these small radius U-bends.



During this inspection, it was discovered that a steam generator tube plug was lost. The plug came from S/G A (R6-C7) hot leg side. The plug was explosively installed during the July 1977 outage. The tube end was re-plugged during this outage using a mechanical plug. The missing plug was not found; however, this poses no significant safety concerns as previously evaluated in letter L-77-240 (Appendix A), dated July 27, 1977.

D. Regulatory Guide 1.83 Inspection Results and Evaluation

The results of the Regulatory Guide 1.83 inspection are summarized in Table 3. As a result of this inspection, a total of 11 tubes were plugged for indications equal to or greater than 40% wall penetration. This total compares with 25 such indications reported in November, 1980, after an operating period approximately 0.55 times the length (in EFPM) of the operating period preceding the present shutdown.

Preliminary evaluation of the results suggest probable thinning in the region of the sludge pile in each SG occurring at a rate which has not increased substantially since the April, 1979 inspection. An average change of the order of zero to 1% was indicated for Steam Generators A and C, while an apparent average decrease of 4.9% was indicated for Steam Generator B. The apparent growth of indications since the previous inspection was calculated for those tubes in which indications equal to or greater than 20% were reported in both inspections. Results of the calculations are summarized in Table 4, where similar calculations made after the November, 1980 inspections are tabulated for purposes of comparison.



It can be seen that in the present inspection, apparent growth or indications on the order of about 1% were calculated for all steam generators except Steam Generator B outlet, where an apparent decrease of 4.89% was calculated and Steam Generator C inlet, where insufficient data comparisons were available for meaningful statistical calculations to be made. The present averages compare favorably with those calculated for the operating period prior to the previous (November, 1980) inspection. Of special interest is the difference between the results calculated for Steam Generator B outlet, where the previous calculated average growth was greater than 8%. The present results reinforce the previous evaluation, supported by photographs of eddy current signal comparisons which suggested that denting at the top of the tube sheet may have affected the estimate of the eddy current phase angles leading to possible overestimates of the depth of penetration in some of the November, 1980 signals.

Overall comparison of the present with the previous results shows that the highest calculated rate of thinning (Steam Generator A inlet) during the most recent operating period (Jan. 1981 to Oct. 1981) is only about 0.15% per EFPM, compared with the conservatively calculated maximum estimates of 1.77% EFPM (for Steam Generator B outlet) obtained for the June, 1980 - November, 1980 operating period.

It is to be noted that the negative average incremental thinning data shown in Table 4 do not indicate an actual decrease in tube thinning but reflect the variability in the eddy current test itself as well as possible human factors involved in evaluating the eddy current signals.



TABLE 3: REGULATORY GUIDE 1.83

Inspection Results

Size of Indication

(% Wall Penetration) SG A SG B SG C

	<u>Inlet</u>	<u>Outlet</u>	<u>Inlet</u>	<u>Outlet</u>	<u>Inlet</u>	<u>Outlet</u>
< 20	108	110	51	242	3	176
20-29	61	209	45	85	4	171
30-39	36	88	23	19	3	71
≥ 40	2	2	0	0	1	6



TABLE 4: SUMMARY OF TURKEY POINT UNIT 4
STEAM GENERATOR TUBING INCREMENTAL
WASTAGE FROM JAN. 1981 TO OCT. 1981

Operating Period

Jan. 1981-Oct. 1981 (8.69 EFPM)

Operating Period

June 1980-Nov. 1980 (4.75 EFPM)

<u>SG</u>	<u>LEG</u>	<u>X</u>	<u>n</u>	<u>σ %</u>	<u>X</u>	<u>n</u>	<u>σ %</u>
A	Inlet	1.30%	56	5.24%	-3.82%	11	3.0%
A	Outlet	-0.07%	227	4.43%	-2.23%	219	4.1%
B	Inlet	0.67%	48	5.34%	-1.14%	21	5.9%
B	Outlet	-4.89%	101	5.84%	8.41%	46	6.4%
C	Inlet	2%	2	2.83%	3%	1	-
C	Outlet	0.79%	223	5.29%	-1.65%	132	4.5%

X = arithmetic mean

n = number of comparisons

σ = standard deviation



IV. PLUGGING CRITERIA

A. GAUGING PROGRAM

The plugging criteria which support at least ten months of operation are:

1. All tubes which do not pass the 0.540" probe will be plugged.
2. Additionally, for in excess of ten (10) months operation, two (2) tubes beyond (i.e , higher row numbers) any tube in columns 1-92 in the tubelane region which did not pass the 0.540" probe will be plugged. (Calculation of the progression of the 17-1/2% strain contour, as determined from finite element plots through 24 EFPM after closure, results in predicted advancement of this contour by 1.9 tube rows for a 10 month operating period.) Given the conservatism of this approach, plugging two additional tubes beyond observed 540 mil restrictions provides adequate margin. In this inspection, this criterion was applicable for only one 540 mil restriction, (R5-C30) in Steam Generator B, and one 540 mil restriction (R6-C32) in Steam Generator A.
3. All tubes which do not pass the 0.610" probe will be plugged.
4. The tubes in any column for which plugging under criteria (1), (2), or (3) above is implemented in the tubelane region will also be plugged in the lower row numbered tubes back to the tubelane if not already plugged.



5. As a conservative measure, tubes completely surrounding any known leaking tubes including the diagonally next tube will be plugged if not already covered by the foregoing criteria. Since there were no leaking tubes observed in this inspection, this criterion was not applied.
6. In any given column which is surrounded by columns containing tubes with significant tube restrictions or prior plugging, (thereby creating a "plugging valley" in the pattern) engineering judgement will be used to fill the bottom of the valley. In the peripheral tubelane areas near the three and nine o'clock wedges, tubes surrounded by previously plugged tubes or tubes exhibiting high deformation activity will be plugged based on engineering judgment. Particular attention was paid to 650 mil restricted tubes relative to the two month operating period.
7. Additional preventive plugging will be implemented at the hot leg wedge locations. This plugging will include all tubes that:
 - a. Restrict the 0.540" probe.
 - b. Restrict the 0.610" probe.
 - c. Restrict the 0.650" probe at the periphery.
 - d. Surround leaking tubes and tubes that restrict the 0.540" probe, including the diagonally next tube.
8. Application of the criteria specified in 7 above, will be made on the basis of engineering judgment for cold leg wedge locations.



9. Additional preventive plugging will be implemented in the patch plate region. This plugging will include all tubes that:

- a. Restrict the 0.540" probe.
- b. Restrict the 0.610" probe.
- c. Surround leaking tubes and tubes that restrict the 0.540" probe including the diagonally next tube.
- d. Lie on either sides of the patch-plate boundary (plate perimeter on one side, the plug welds on the other three) and restrict the 0.650" probe.

The ten month operating period was also evaluated relative to a postulated main steam line break accident (MSLB). In doing this, it was conservatively assumed that each unplugged tube in the two rows beyond the present tubelane plugging boundary in the most advanced Steam Generator (B) would leak at a rate of 0.05 gpm/tube during a postulated main steam line break. Since there are 92 tubes in a row, the total number of unplugged tubes in the tubelane region lying adjacent to the current plugging boundary at the end of the next six months is less than: $2 \times 92 \text{ tubes per row} = 184 \text{ tubes}$. The total resulting leakage from these tubes would be:

$$184 \text{ tubes} \times 0.05 \frac{\text{GPM}}{\text{tube}} = 9.2 \text{ GPM}$$



This added to the 0.3 GPM leakage assumed to be present at the start of a postulated start of a MSLB (which would increase to approximately 0.7 GPM due to MSLB differential pressures) yield a total leakage less than 10 GPM, which has been determined in previous submittals to be an acceptable level of leakage during a postulated MSLB.

B. Regulatory Guide 1.83 Program

All tubes which exhibit reported eddy current indications equal to or greater than 40% wall penetration will be plugged.

C. Preventive Plugging Accomplished

Table 5 summarizes the plugging performed at this outage. The cumulative percentage of tubes plugged to date is 24.8%.

The preventive plugging programs that were implemented to justify at least 10 months operation are indicated in Figs. 19, 20 and 21. Both gauging and Regulatory Guide 1.83 program plugging are shown on the figures. The coordinates of the plugged tubes are listed for each steam generator in Tables 6, 7 and 8 respectively.



TABLE 5
SUMMARY OF TUBES PLUGGED

	<u>Gauging</u>	<u>R.G. 1.83</u>	<u>Total</u>
S/G A	31	4	35
S/G B	41	0	41
S/G C	<u>21</u>	<u>7</u>	<u>28</u>
	93	11	104



TABLE 6

TURKEY POINT UNIT #4
OCTOBER - NOVEMBER 1981 INSPECTION
STEAM GENERATOR A - PLUGGING LIST

A. Recommended Plugging For Gauging Results:

<u>For 6 Mo. Plugging Program</u>			<u>Additional for 10 Mo. Plugging Program</u>	
<u>R - C</u>	<u>R - C</u>	<u>R - C</u>	<u>R - C</u>	<u>R - C</u>
9 - 2	8 - 22	9 - 56	11 - 3	17 - 13
10 - 2	6 - 32	3 - 92	15 - 8	18 - 13
3 - 1	7 - 32		17 - 10	6 - 31
15 - 3	8 - 32		18 - 10	9 - 54
* 6 - 7	44 - 48		15 - 11	10 - 55
8 - 7	45 - 52		18 - 11	8 - 57
10 - 7	38 - 54			
16 - 10	9 - 55			
19 - 13	8 - 56			

Total Plugging for Gauging,
6 Mo. Program = 20 Tubes

Total Additional Plugging for Gauging
10 Mo. Program = 12 Tubes

* Tube was previously plugged; was replugged during this outage due to a missing plug.

B. Reg. Guide 1.83 Plugging:

R - C
27 - 38
16 - 47
30 - 53
8 - 61

Total Reg. Guide 1.83 Plugging = 4



TABLE 7
TURKEY POINT UNIT #4

OCTOBER - NOVEMBER , 1981 INSPECTION
STEAM GENERATOR B - PLUGGING LIST

A. Recommended Plugging for
Gauging Results:

For 6 Mo. Plugging Program

<u>R - C</u>	<u>R - C</u>
17 - 4	45 - 43
15 - 6	45 - 48
12 - 8	45 - 52
16 - 8	34 - 53
11 - 11	40 - 53
12 - 11	44 - 53
32 - 19	37 - 54
5 - 20	38 - 58
6 - 20	35 - 74
37 - 20	36 - 74
5 - 30	4 - 79
6 - 30	26 - 83
7 - 30	23 - 85
40 - 40	7 - 86
42 - 40	18 - 86

Total Plugging for Gauging,
6 Mo. Program = 30 Tubes

Additional for 10 Mos.
Plugging Program

<u>R - C</u>	<u>R - C</u>
15 - 5	9 - 23
15 - 7	5 - 80
16 - 7	17 - 87
32 - 17	
31 - 18	
32 - 18	
33 - 19	
31 - 20	

Total Additional Plugging for
Gauging 10 Mo. Program = 11 Tubes

B. Reg. Guide 1.83 Plugging:
None



TABLE 8

TURKEY POINT UNIT #4

OCTOBER - NOVEMBER 1981 INSPECTION
STEAM GENERATOR C - PLUGGING LISTA. Recommended Plugging for Gauging Results:For 6 Mo. Plugging Program:Additional for 10 Mo. Plugging Program

<u>R - C</u>	<u>R - C</u>	<u>R - C</u>
20 - 6	33 - 53	20 - 7
42 - 30	38 - 53	41 - 61
5 - 33	39 - 53	
7 - 39	42 - 63	
35 - 40	41 - 65	
42 - 40	4 - 81	
43 - 40	5 - 81	
44 - 40	6 - 83	
45 - 42	7 - 86	
	4 - 92	

Total Plugging for Gauging,
6 Mo. Program = 19 tubes

Total Additional plugging for
Gauging, 10 Mo. program = 2 Tubes

B. Reg. Guide 1.83 Plugging:

<u>R - C</u>	<u>R - C</u>
10 - 21	44 - 36
11 - 21	
9 - 22	
23 - 29	
7 - 30	
17 - 33	

Total Reg. Guide 1.83 Plugging: 7



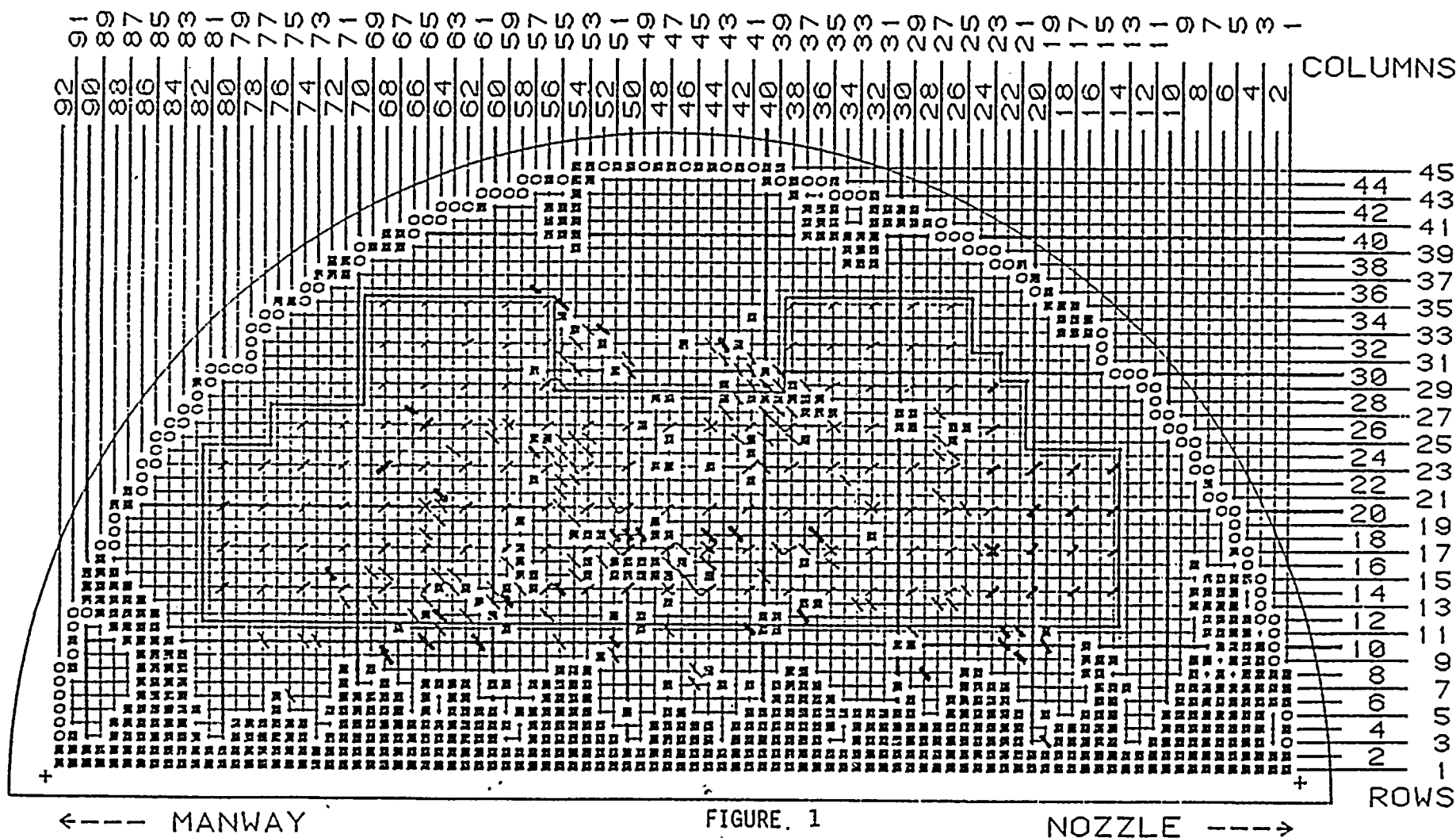
1- x Rise gauge inspection 134 tubes than u-bend } w 720 sf (ALT 2002) gauging any restricted
 \ RLG gauge no section 106 tubes than 1st support } tubes during gauging program.
 560 restricted tubes must be boxed

SERIES 44

Gauging to be performed for 1184 tubes outside bounded area to top support
 - 650, .610, .540 -

FLA-A

INLET (ALT 2002)



INSPECTION PROGRAM-NOV., 1980

TURKEY POINT UNIT #4

STEAM GENERATOR A

INLET

✓ REG GAUGE - INSPECT 291 TUBES THAN 1ST SUPPORT W/ 720" (ALT 700") GAUGE - ANY RESTRICTED
TUBES WITH 610 # PAIR DURING GAMING PROGRAM.
GAUGE 154 TUBES WITHIN BOUNDED AREA THRU 6TH SUPPORT - .610 & .540 PROGES. ANY
RESTRICTED TUBES ON CODE OF GAMING PROGRAM MUST BE BOUNDED IN

SERIES 44

FLA-A

OUTLET / COAL LEG

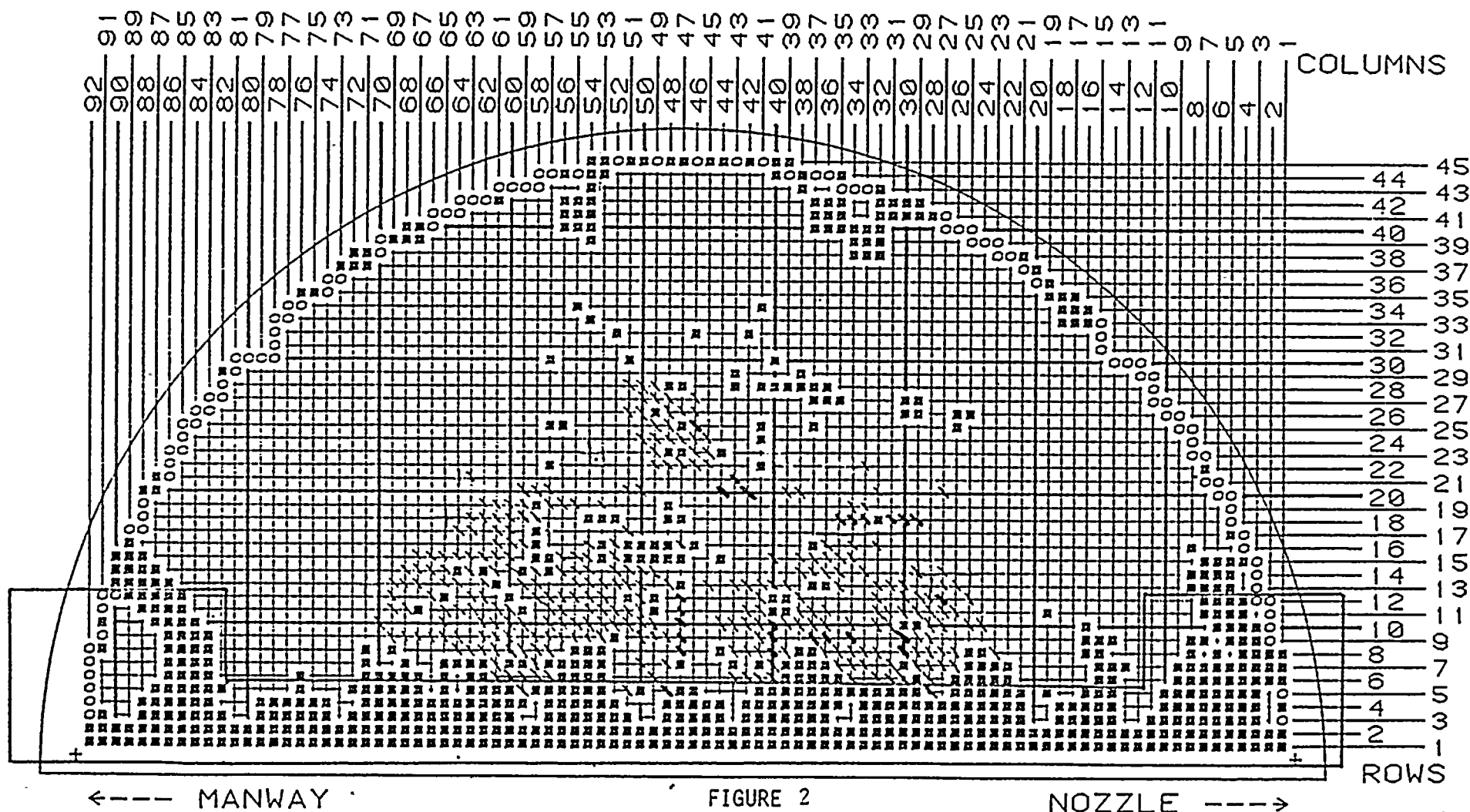


FIGURE 2
INSPECTION PROGRAM-NOV., 1980
TURKEY POINT UNIT #4
STEAM GENERATOR A
OUTLET



27 } W 220 (ALF 2001) CAUSING ANY RESTRICTED
 TALKS DURING CAUSING PROGRAM.
 28 } 650 RESTRICTED TALK MUST BE BANNED SER

FLA-B

INLET (HOT LEG)

CAUSING TO BE PERFORMED 1159 TUBES ON TENSION BOUNDARY AREA TO TOP SUPPORT
-.650, .610, .540 PROBS -

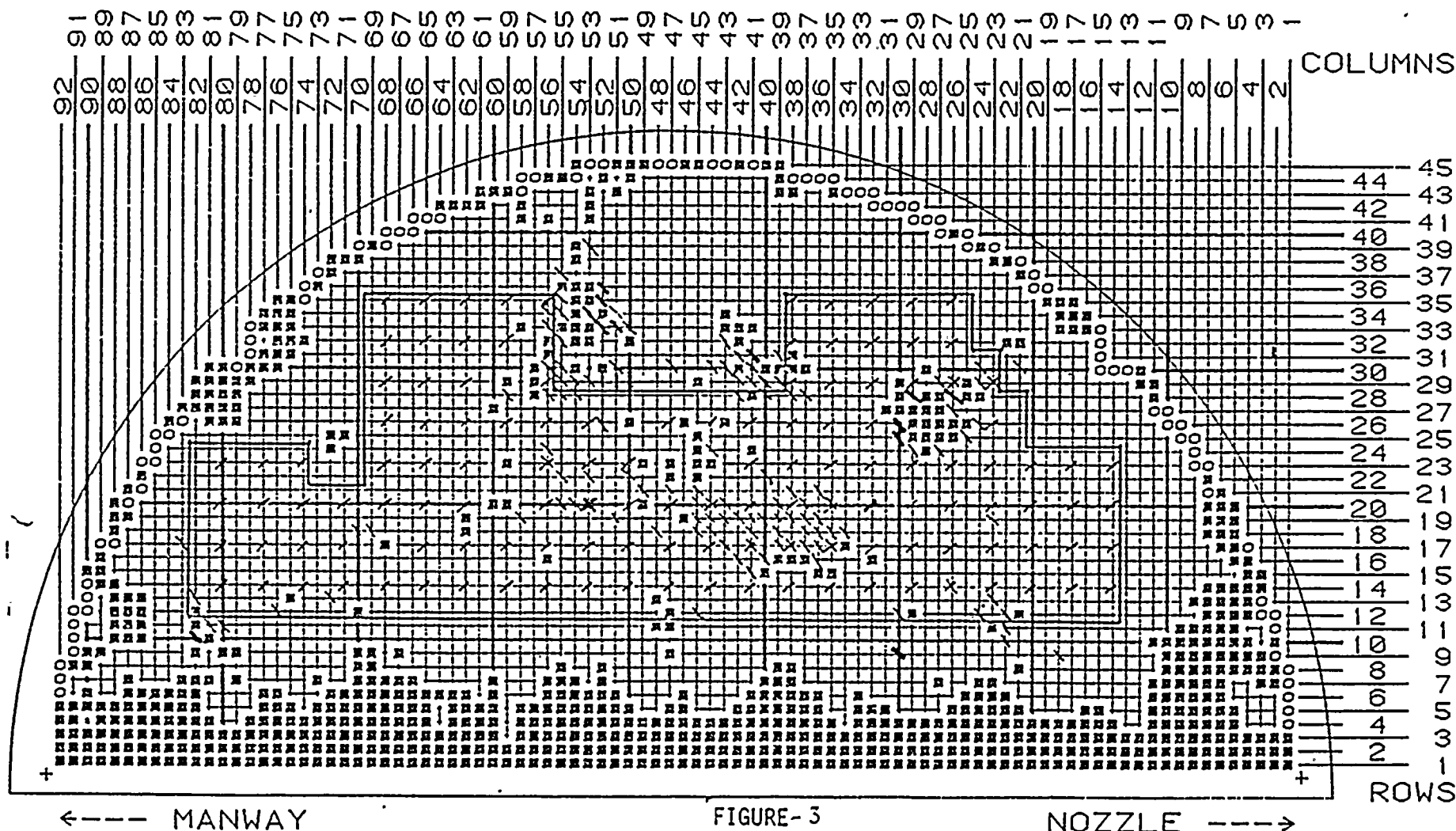


FIGURE- 3
INSPECTION PROGRAM-NOV., 1980
TURKEY POINT UNIT #4
STEAM GENERATOR B
INLET

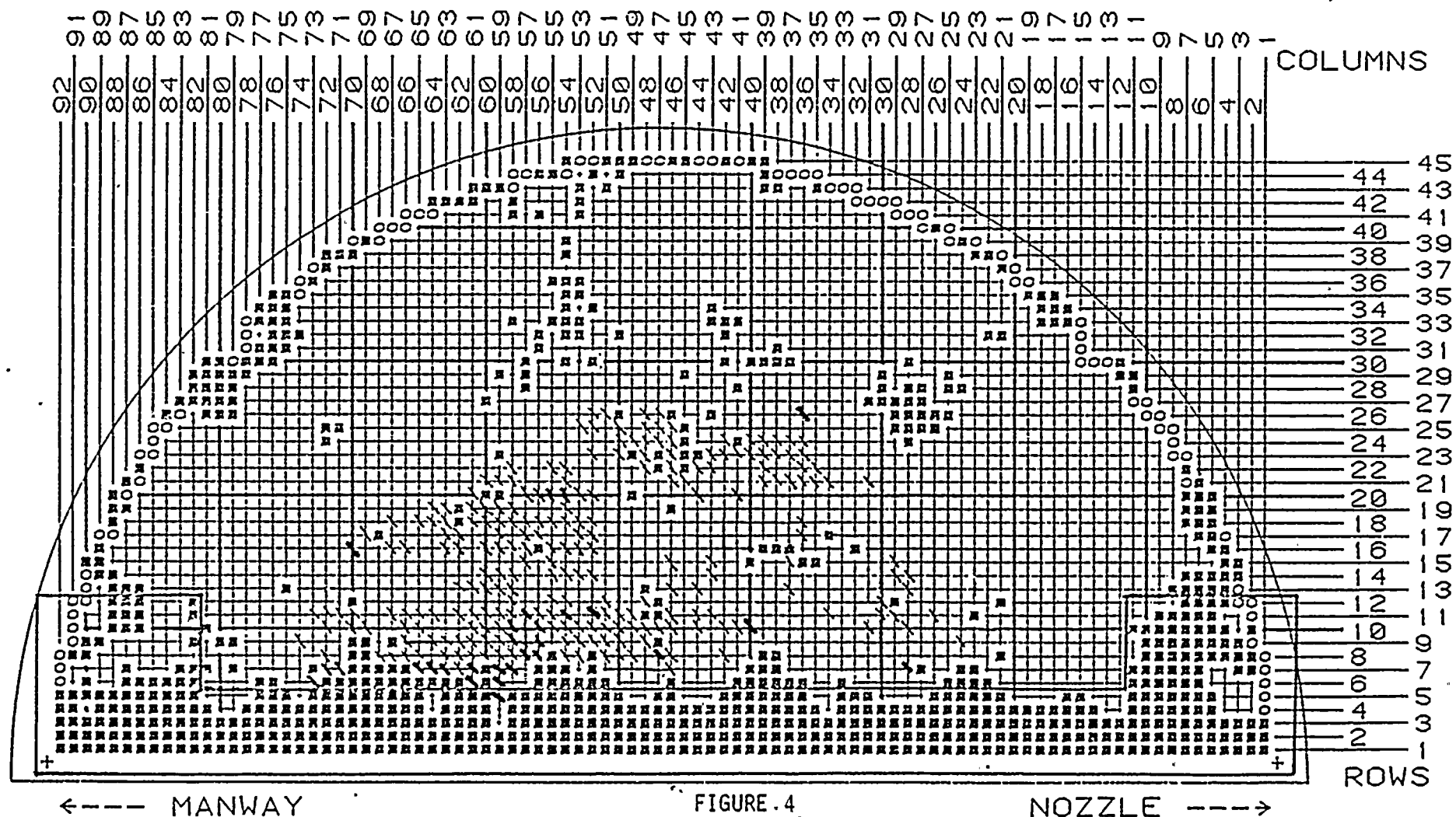
- REG. GUIDE INSPECT 219 TUBES THRU 1/2 INCH W 720 1/2 (700F) GAUGE ANY RESTRICTED TUBES WITH .610E PASSAGE DURING GAUGING PROGRAM

GAUGE 116 TUBES WITHIN BOUNDED AREA TO TOP SUPPORT - .610 & .540 PROBES. ANY RESTRICTED TUBES ON EDGE OF GAUGING PROGRAM MUST BE BOXED IN.

SERIES 44

FLA-B

OUTLET / COLLEG



INSPECTION PROGRAM-NOV., 1980

TURKEY POINT UNIT #4
STEAM GENERATOR B

OUTLET



1 - X REG. INSPECTION 142 TUBES THAN USING GUIDE INSPECTION 10 TUBES THAN 15 SUPPORT. } W/ SA (ALT DOOR) GAUGING ANY RESTRICTED TUBES DURING GAUGING PROGRAM.
 - 650 RESTRICTED TUBES MUST BE BONED

SERIES 44

GAUGING TO BE PERFORMED FOR 1324 TUBES OUTSIDE BOUNDARY AREA TO TOP SUPPORT
 - .650, .610, .540 THROATS -

FLA-C

INLET (NOT USED)

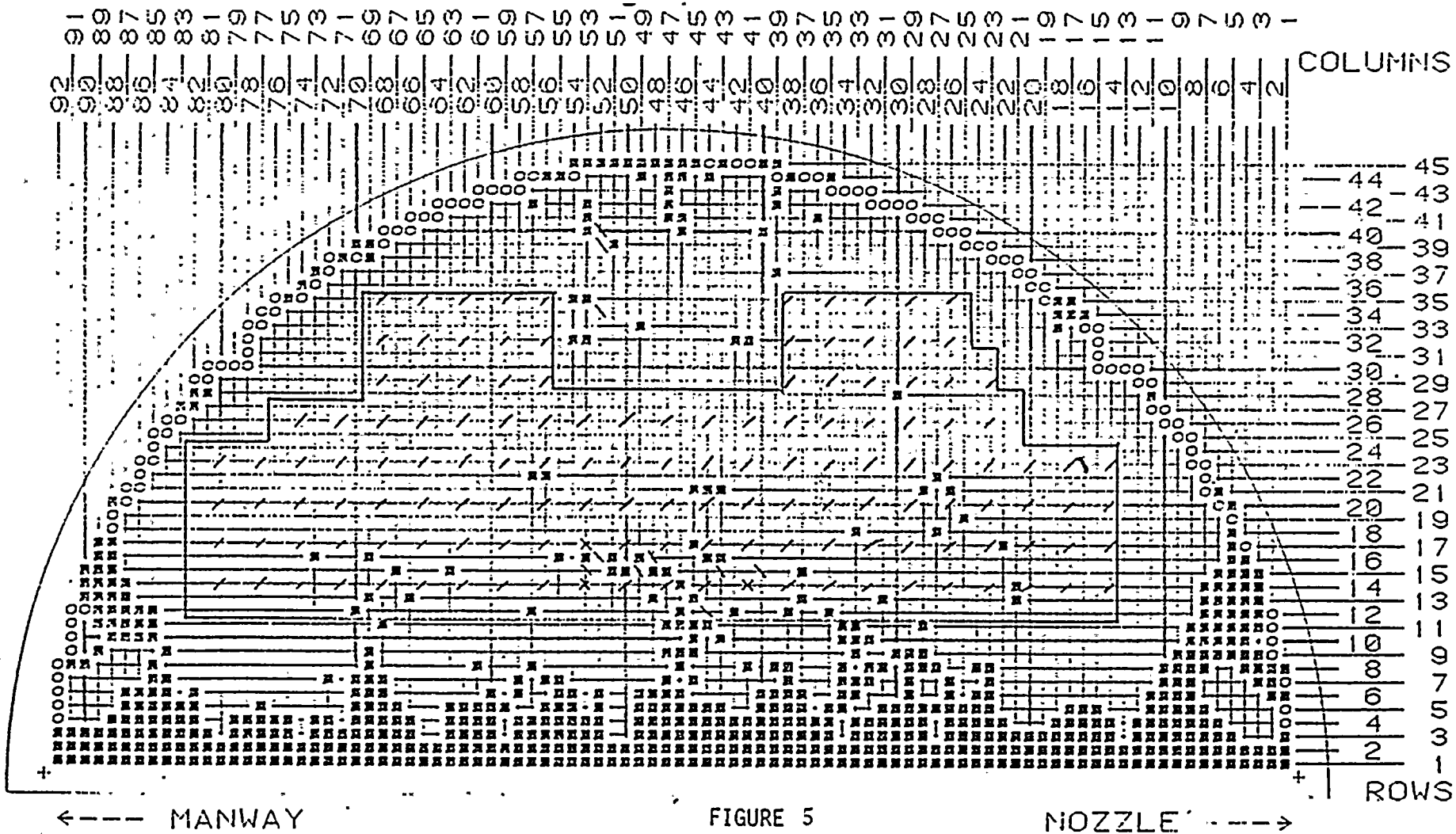


FIGURE 5
 INSPECTION PROGRAM-NOV., 1980
 TURKEY POINT UNIT #4
 STEAM GENERATOR C
 INLET

REG. CODE INSPECT 3rd TUBES THRU 1st SUPPORT W/ LOSS (ALT 2015) GAUGE ANY RESTRICTED
TUBE WITH .610 & PAUSE DURING GAUGING PROGRAM

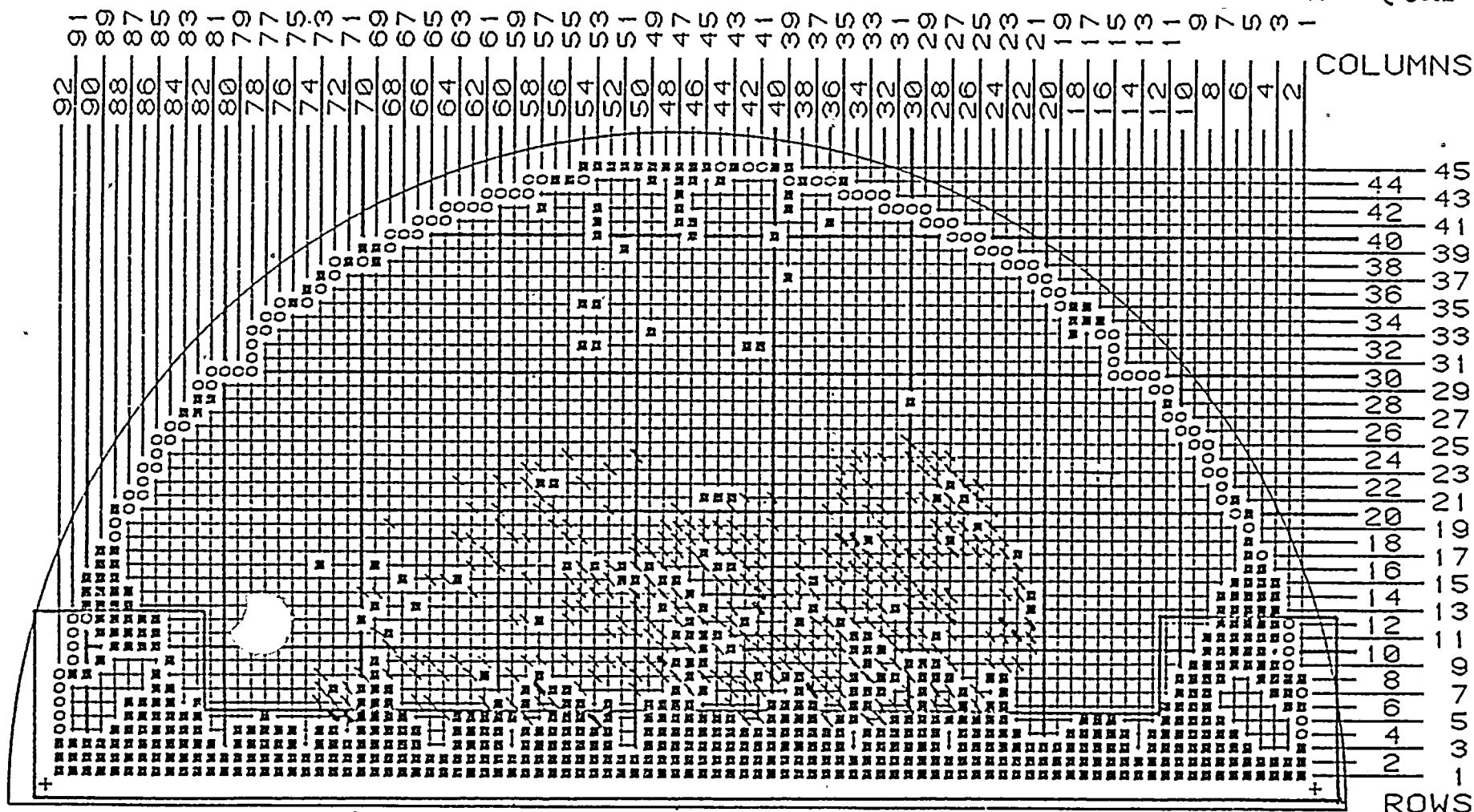
SERIES 44

GAUGE 161 TUBES WITHIN DOWNWARD AREA TO TOP SUPPORT - .610 & .540 PROBES ANY
RESTRICTED TUBES ON RECD OF GAUGING PROGRAM MUST BE BOXED IN.

FLA-C

LI-BEND TESTING ALL TUBES ROWS 1-5 / COLUMNS 1-12 .610 BF

OUTLET (COLD LEG)



←--- MANWAY

FIGURE 6

NOZZLE ---→

INSPECTION PROGRAM-NOV., 1980

TURKEY POINT UNIT #4

STEAM GENERATOR C

OUTLET



Guide Program:

- Inspect Tubes Thru U-Bend - 141 Tubes
- Inspect Previous Indications Thru First Support

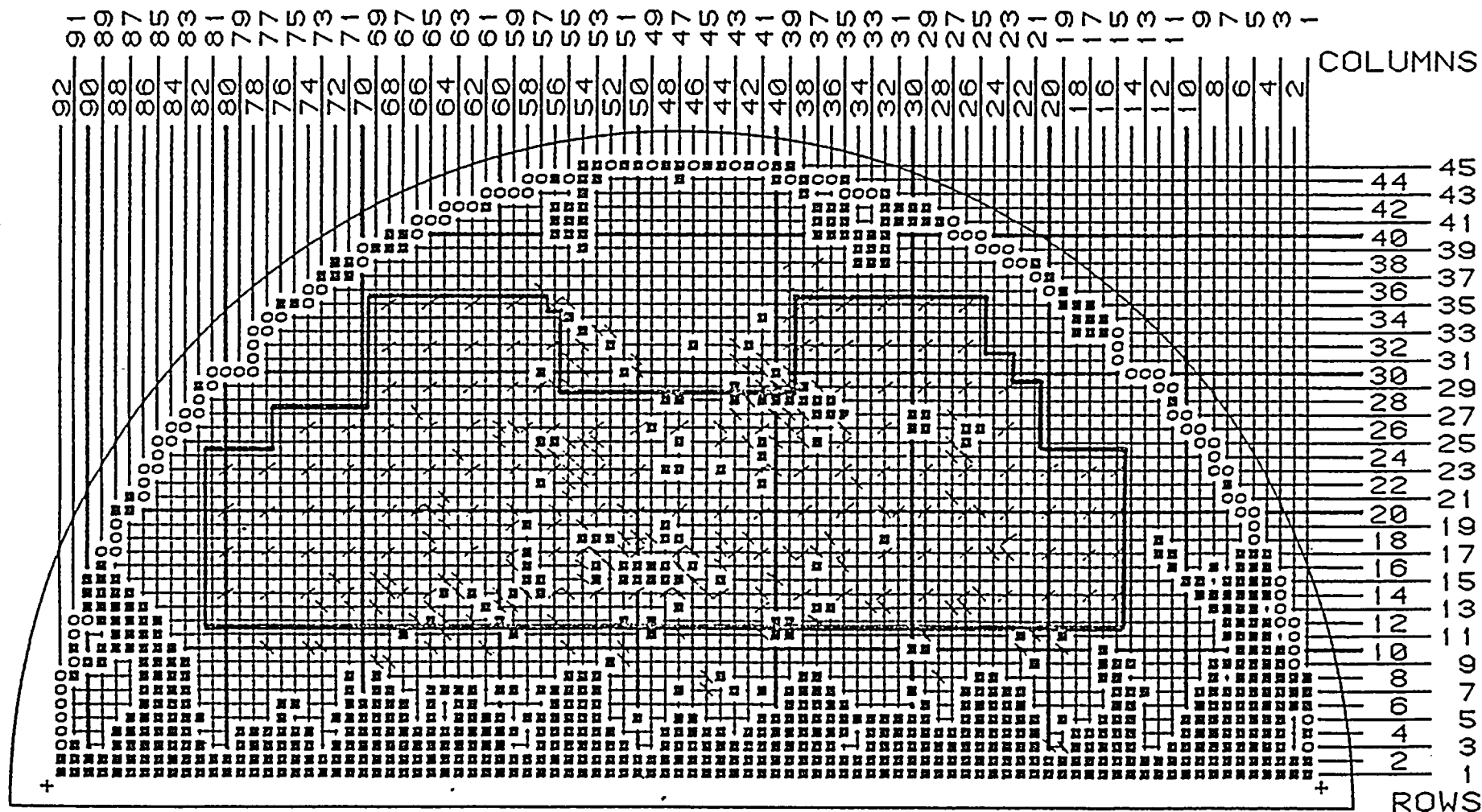
Gauging Program:

Gauge all tubes outside enclosed area.

SERIES 44

FLA-A

INLET



←--- MANWAY

TURKEY POINT UNIT #4
STEAM GENERATOR A - INLET
OCTOBER, NOVEMBER, 1981
INSPECTION PROGRAM

NOZZLE --->

ROWS

FIGURE 7



Reg. Guide Program:

- / - Inspect Tubes Thru U-Bend - 134 Tubes
- \ - Inspect Previous Indications Thru First Support

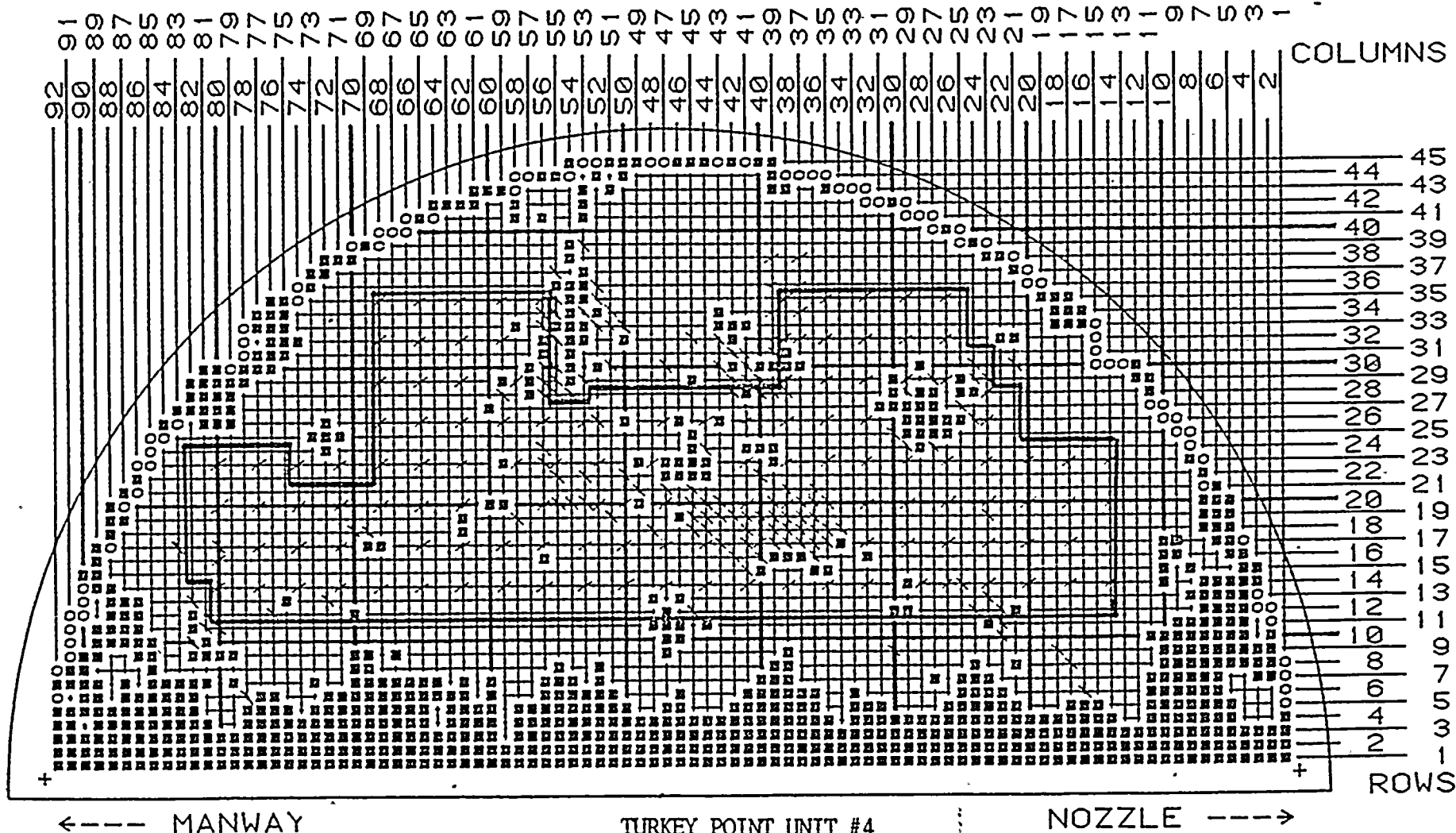
Gauging Program:

Gauge all tubes outside enclosed area.

SERIES 44

FLA-B

INLET



TURKEY POINT UNIT #4
STEAM GENERATOR B - INLET
OCTOBER-NOVEMBER, 1981
INSPECTION PROGRAM

FIGURE 8



Reg. Guide Program:

/- Inspect Tube Thru U-Bend - 148 Tubes

\- Inspect Previous Indications Thru First Support

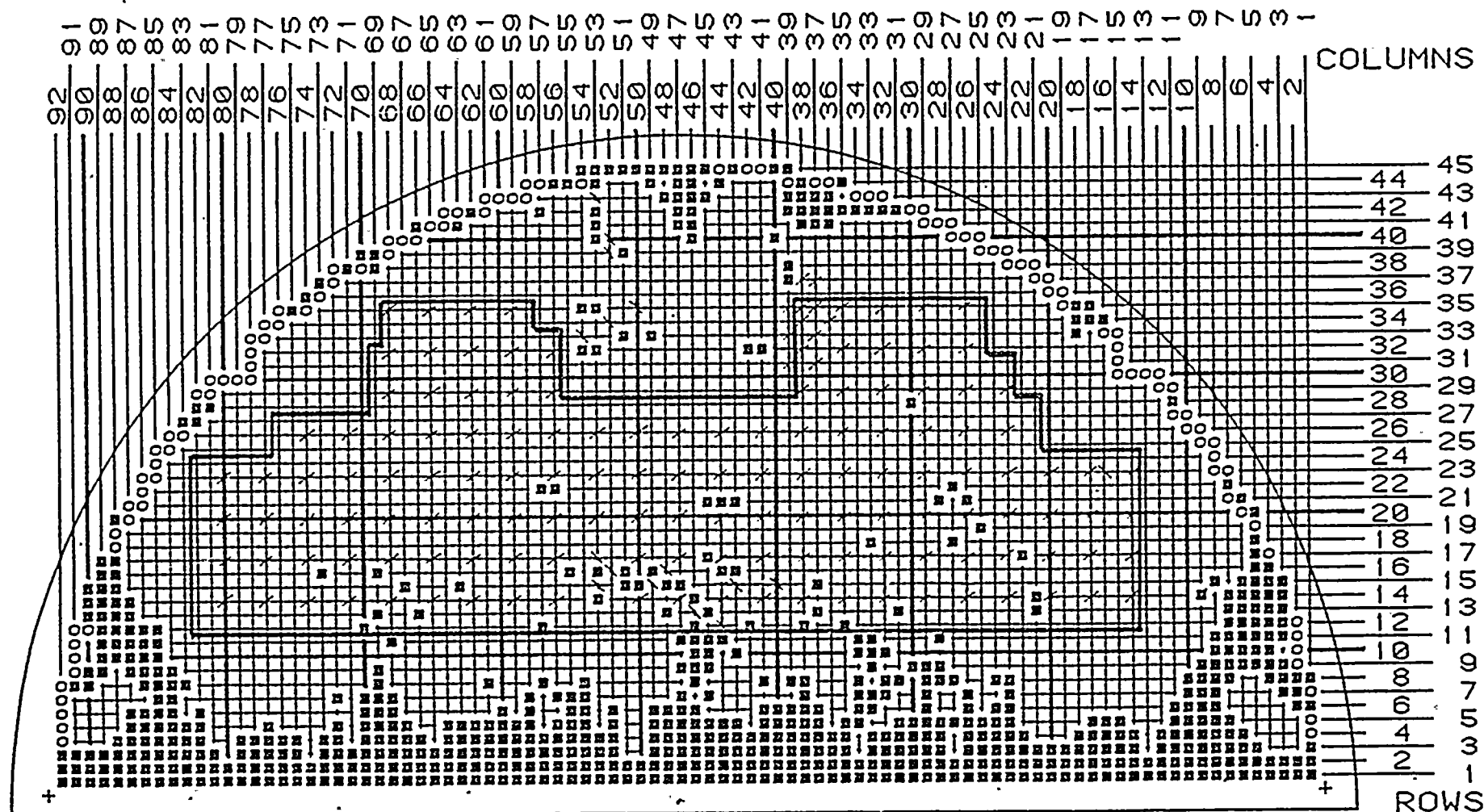
Gauging Program:

Gauge all tubes outside enclosure area.

SERIES 44

FLA-C

INLET



←--- MANWAY

TURKEY POINT UNIT #4
STEAM GENERATOR C - INLET
OCTOBER-NOVEMBER, 1981
INSPECTION PROGRAM

NOZZLE ---->

FIGURE 9



Reg. Guide Program:

\ - Inspect Previous Indications Thru First Support

X - Inspect Tubes in 5 x 5 Pattern Thru First Support

U-Bend Testing: All tubes Rows 3-5, Col. 1-92

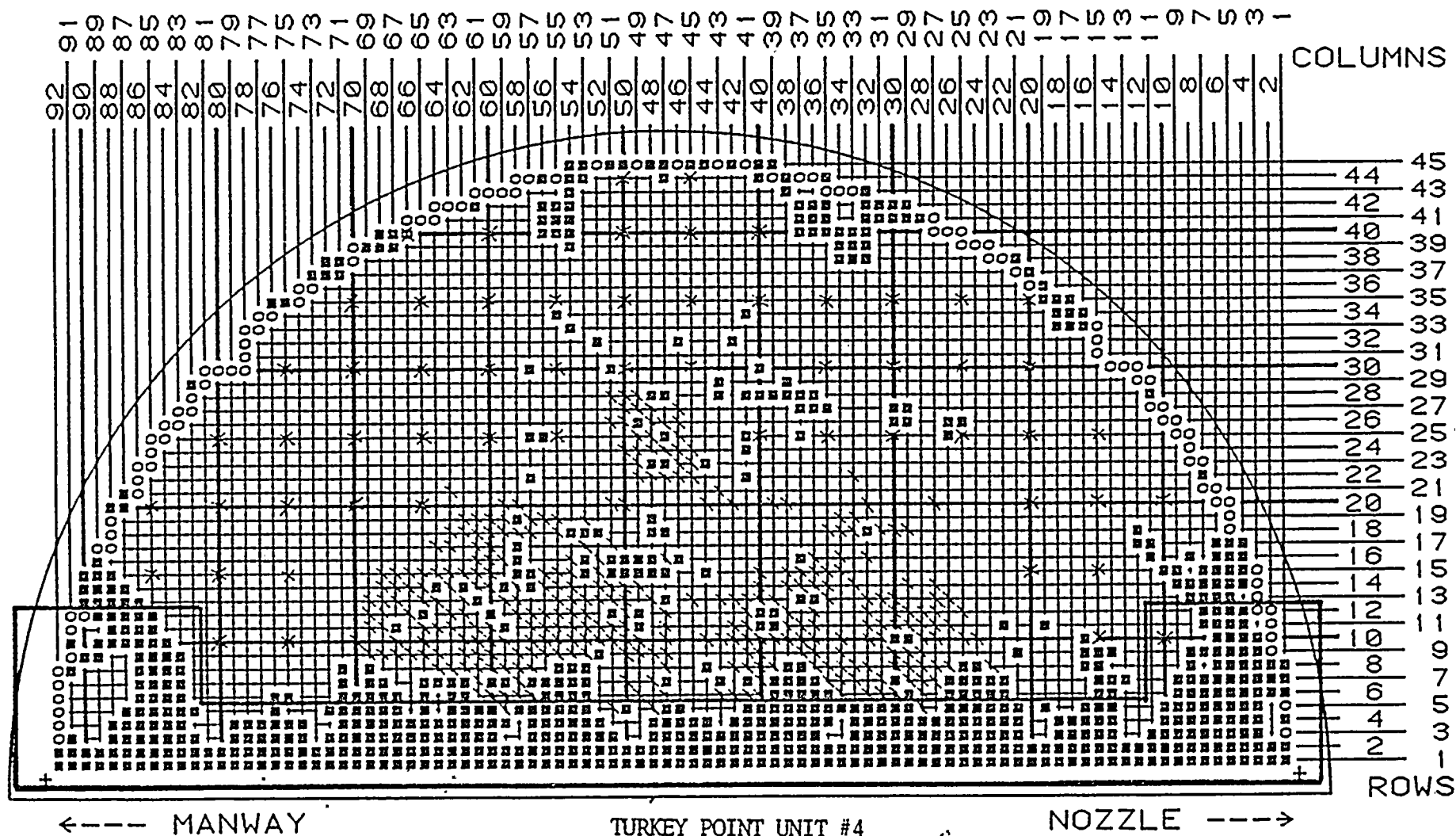
Gauging Program:

Gauge all tubes within enclosed area.

SERIES 44

FLA-A

OUTLET



TURKEY POINT UNIT #4
STEAM GENERATOR A - OUTLET
OCTOBER-NOVEMBER, 1981
INSPECTION PROGRAM

FIGURE 10



Reg. Guide Program:

\- Inspect Previous Indications Thru First Support

X- Inspect Tubes in 5 x 5 Pattern Thru First Support

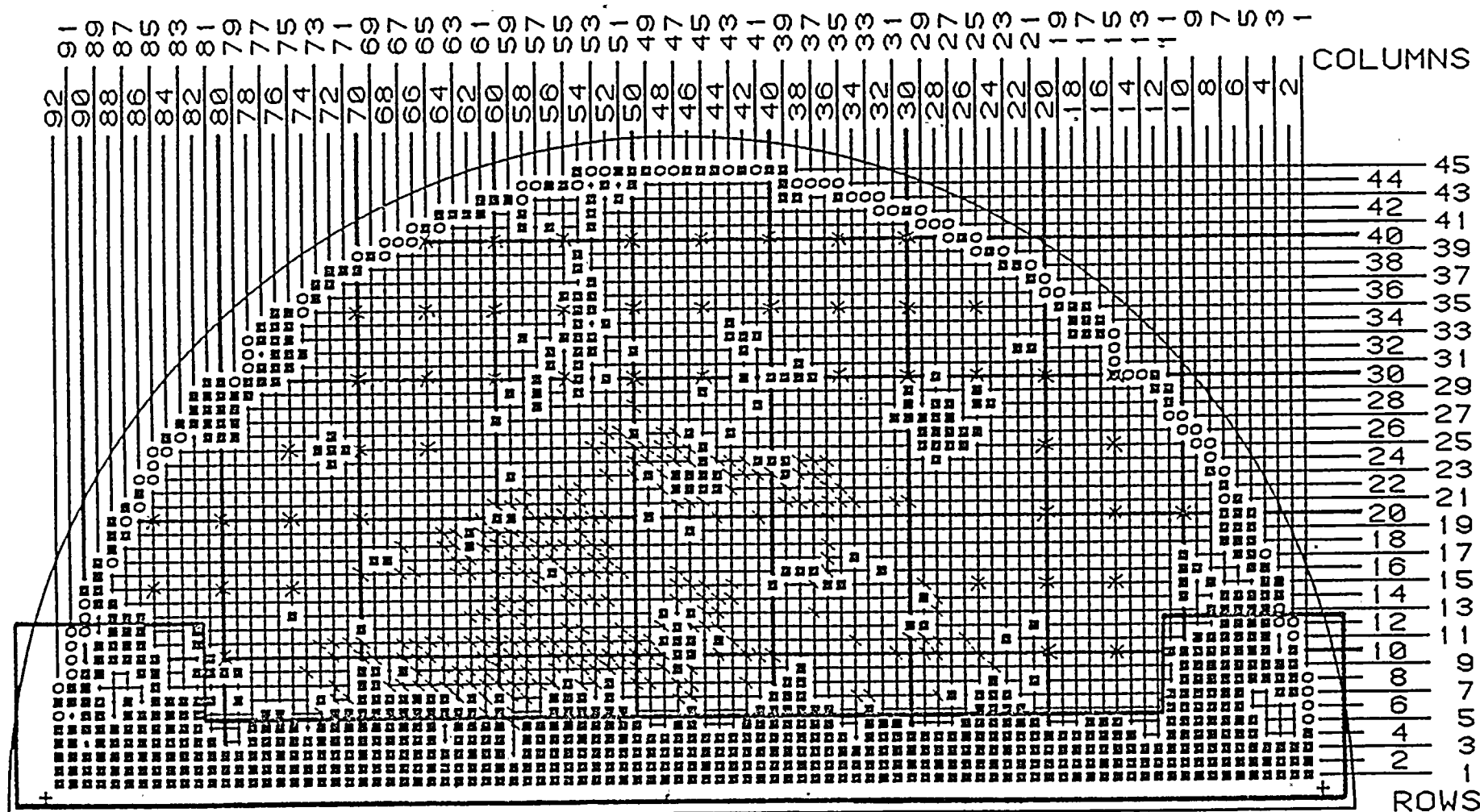
Gauging Program:

Gauge all tubes within enclosed area.

SERIES 44

FLA-B

OUTLET



←--- MANWAY

TURKEY POINT UNIT #4
STEAM GENERATOR B - OUTLET
OCTOBER-NOVEMBER, 1981
INSPECTION PROGRAM

NOZZLE ---->

FIGURE 11



Reg. Guide Program:

- \- Inspect Previous Indications Thru First Support
- X- Inspect Tubes in 5 x 5 Pattern Thru First Support

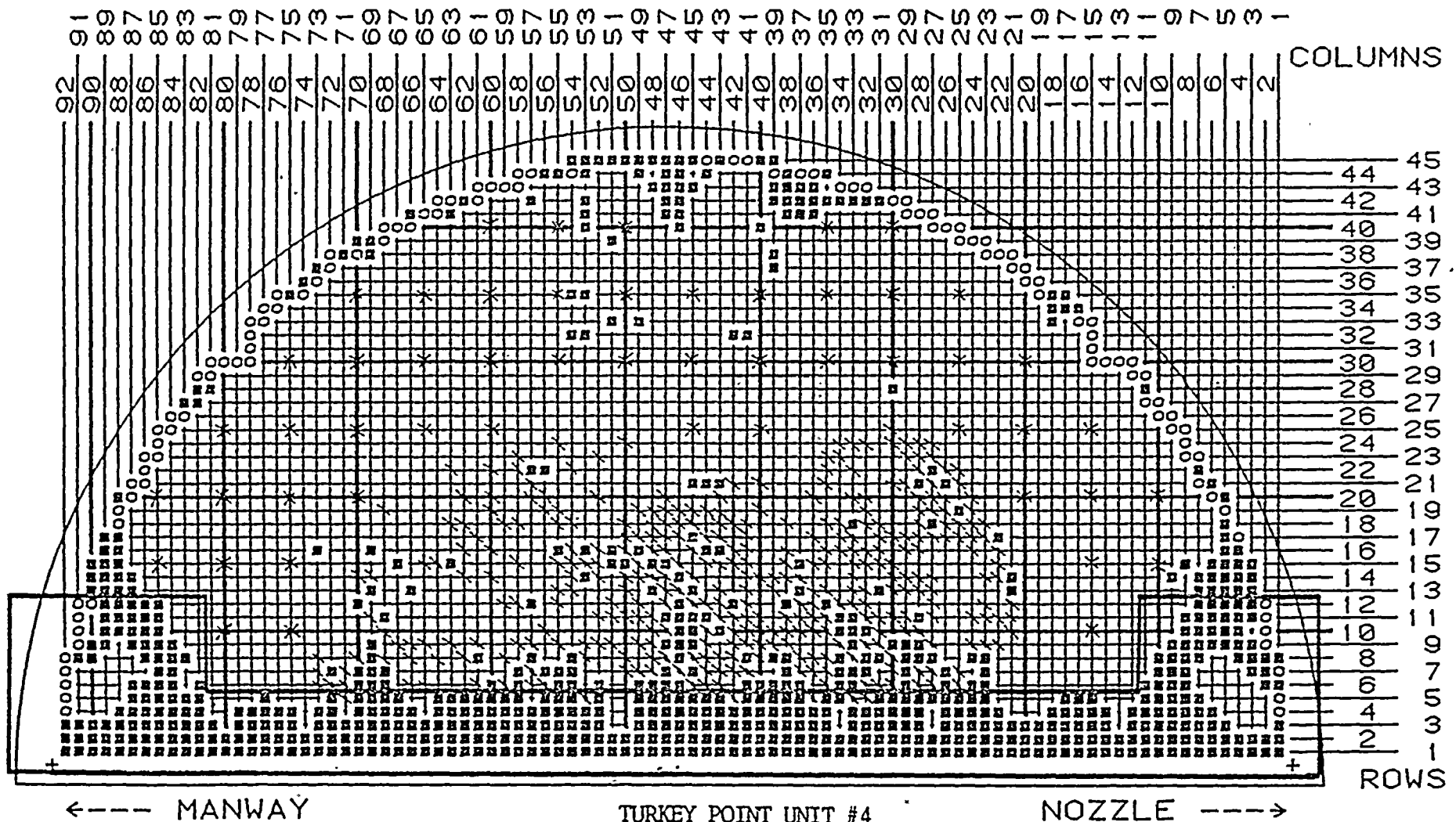
Gauging Program:

Gauge all tubes within enclosed area.

SERIES 44

FLA-C

OUTLET



TURKEY POINT UNIT #4
STEAM GENERATOR C - OUTLET
OCTOBER-NOVEMBER, 1981
INSPECTION PROGRAM

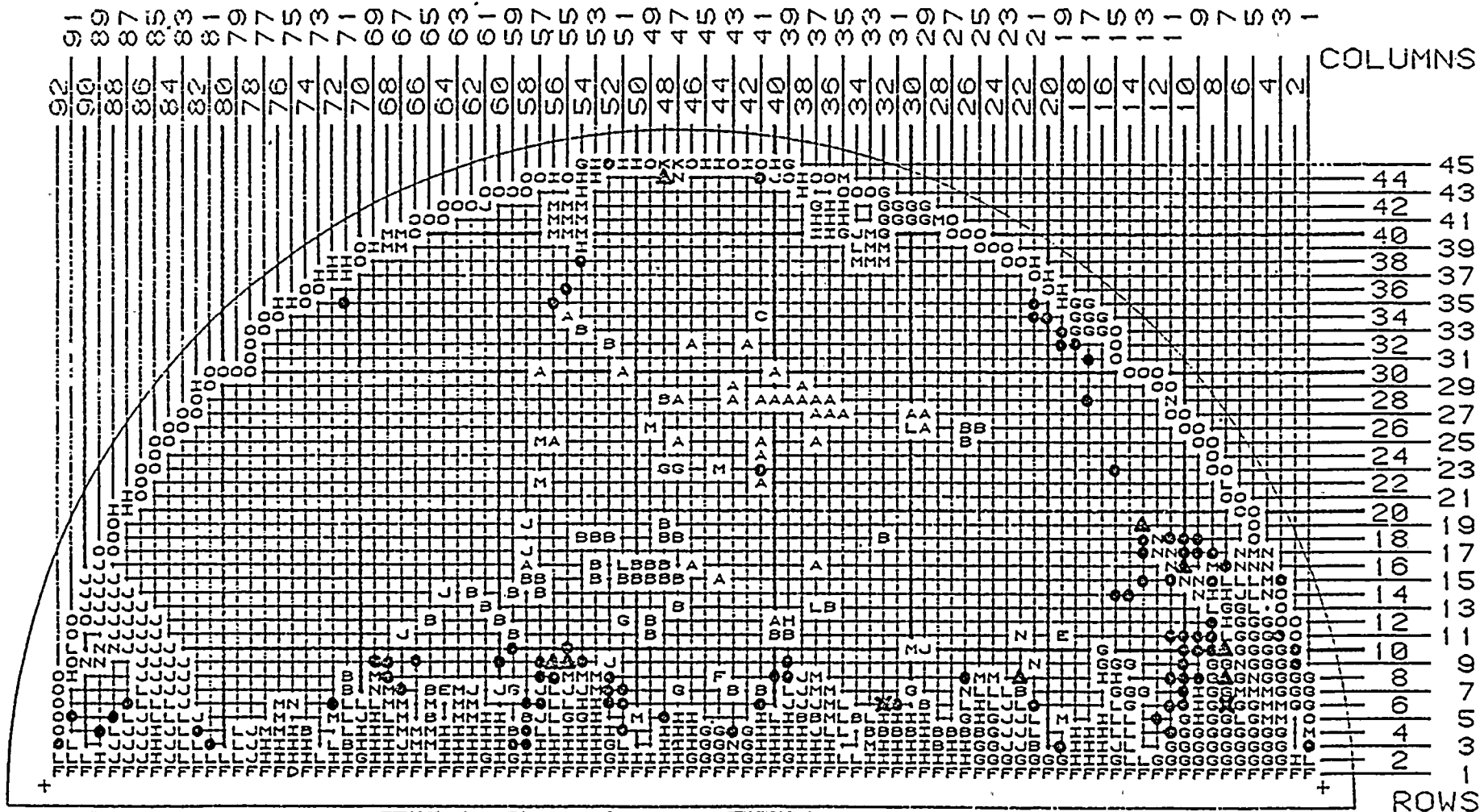
FIGURE 12



H	1	7/77; WELD REPAIR HL, E/P CL
I	169	2/78; TUBES PLUGGED
J	86	8/78; TUBES PLUGGED
K	2	SHOP WELD, HL MISDRILLED
L	79	4/79; TUBES PLUGGED
M	72	5/80; MECH PLUGGED
N	27	11/80; MECH PLUGGED

SERIES 44

FLA-A



TURKEY POINT UNIT #4
GAUGING RESULTS OCT.-NOV. 1981
STEAM GENERATOR A - INLET

TUBE RESTRICTIONS

NO. OF TUBES

FIGURE 1.3

X = .540 PROBE
 A = .610 PROBE
 C = .650 PROBE

2
8
93

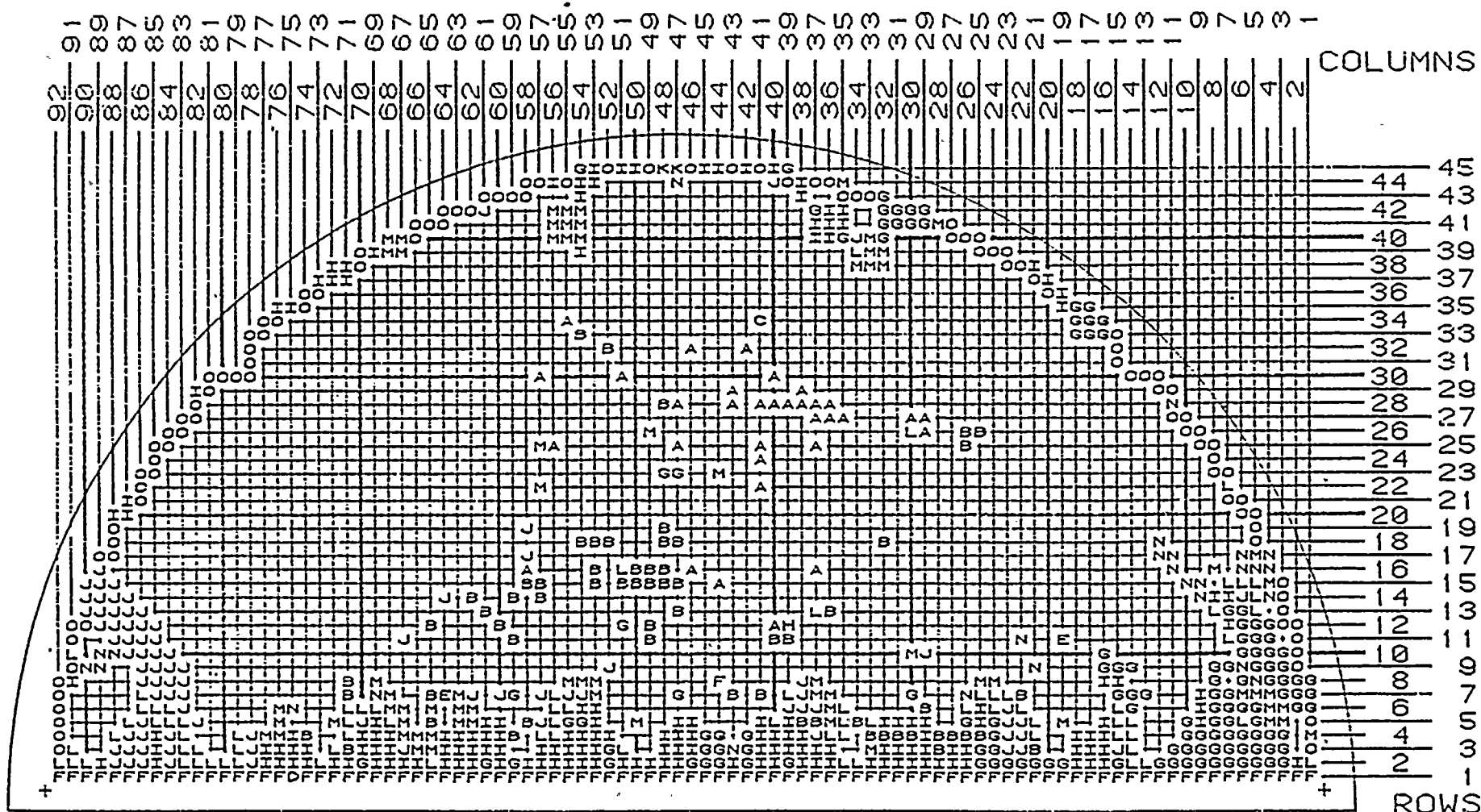


A 33 9/74; TUBES PLUGGED
 B 63 6/75; TUBES PLUGGED
 C 1 DATE NOT KNOWN; TUBES PLUGGED
 D 1 SHOP WELD
 E 2 5/76; TUBES PLUGGED
 F 92 11/76; TUBES PLUGGED
 G 132 7/77; TUBES PLUGGED

H 1 7/77; WELD REPAIR HL, E/P CL.
 I 169 2/78; TUBES PLUGGED
 J 86 8/78; TUBES PLUGGED
 K 2 SHOP WELD, HL MISDRILLED
 L 79 4/79; TUBES PLUGGED
 M 72 5/80; MECH PLUGGED
 N 27 11/80; MECH PLUGGED

SERIES 44

FLA-A



TURKEY POINT UNIT #4
 GAUGING RESULTS OCT.-NOV. 1981
 STEAM GENERATOR A - OUTLET

TUBE RESTRICTIONS
 X = .540 PROBE
 Δ = .610 PROBE

NO. OF TUBES
 None
 None

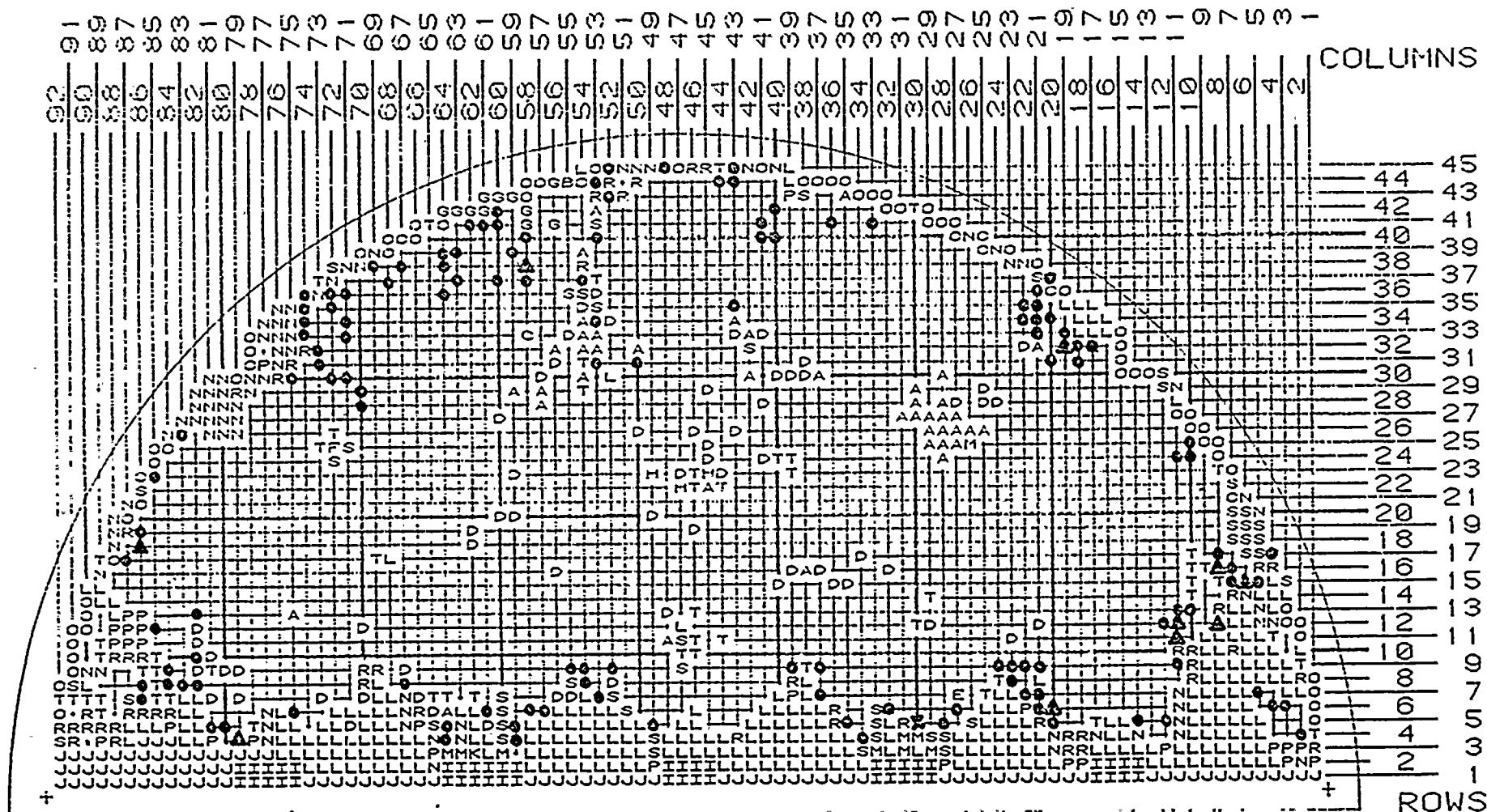
FIGURE 14

42 9/74; TUBES PLUGGED
1 8/75; TUBE PLUGGED
1 8/75; BARE HOLE PLUG HL-E/P CL
66 8/75; TUBES PLUGGED
1 SHOP WELD
1 9/75; BARE HOLE PLUGS--HL, CL
11 8/75; TUBES PLUGGED
3 5/76; TUBES PLUGGED
48 9/76; TUBES PLUGGED

J	100	11/76; TUBES PLUGGED
K	1	7/77; WELD REPAIR
L	304	7/77; TUBES PLUGGED
M	9	10/77; TUBES PLUGGED
N	79	2/78; TUBES PLUGGED
P	28	8/78; TUBES PLUGGED
R	52	4/79; TUBES PLUGGED
S	48	5/80; MECH PLUGGED
T	56	11/80; MECH PLUGGED

SERIES 44

FLA-B



TURKEY POINT UNIT #4
GAUGING RESULTS OCT.-NOV.1981
STEAM GENERATOR B - INLET

TUBE RESTRICTIONS

X	=	.540	PROBE
△	=	.610	PROBE
⊙	=	.650	PROBE

NO. OF TUBES
1
10
129

FIGURE 15



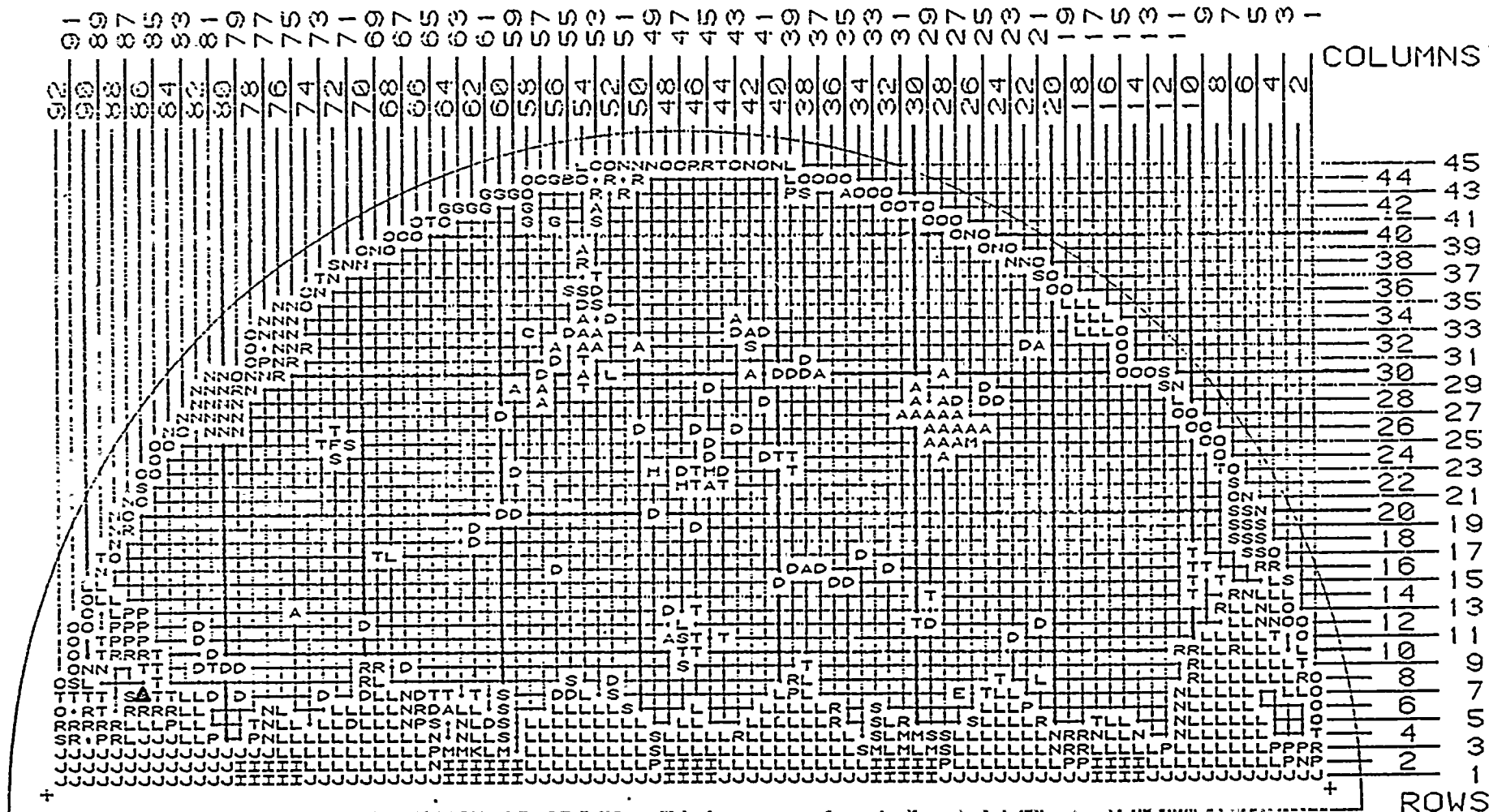
A
B
C
D
E
F
G
H
I

42 9/74; TUBES PLUGGED
1 8/75; TUBE PLUGGED
1 8/75; BARE HOLE PLUG HL-E/P CL
88 8/75; TUBES PLUGGED
1 SHOP WELD
1 9/75; BARE HOLE PLUGS--HL,CL
11 8/75; TUBES PLUGGED
3 5/76; TUBES PLUGGED
48 9/76; TUBES PLUGGED

J	100	11/76; TUBES PLUGGED
K	1	7/77; WELD REPAIR
L	384	7/77; TUBES PLUGGED
M	9	18/77; TUBES PLUGGED
N	79	2/78; TUBES PLUGGED
P	28	8/78; TUBES PLUGGED
R	52	4/79; TUBES PLUGGED
S	48	5/80; MECH PLUGGED
T	56	11/80; MECH PLUGGED

SERIES 44

FLA-B



TURKEY POINT UNIT #4
GAUGING RESULTS OCT.-NOV.1981
STEAM GENERATOR.B - OUTLET

TUBE RESTRICTIONS	NO OF TUBES
X=.540 PROBE	None
A=.610 PROBE	1
G=.650 PROBE	Not Tested

FIGURE 16



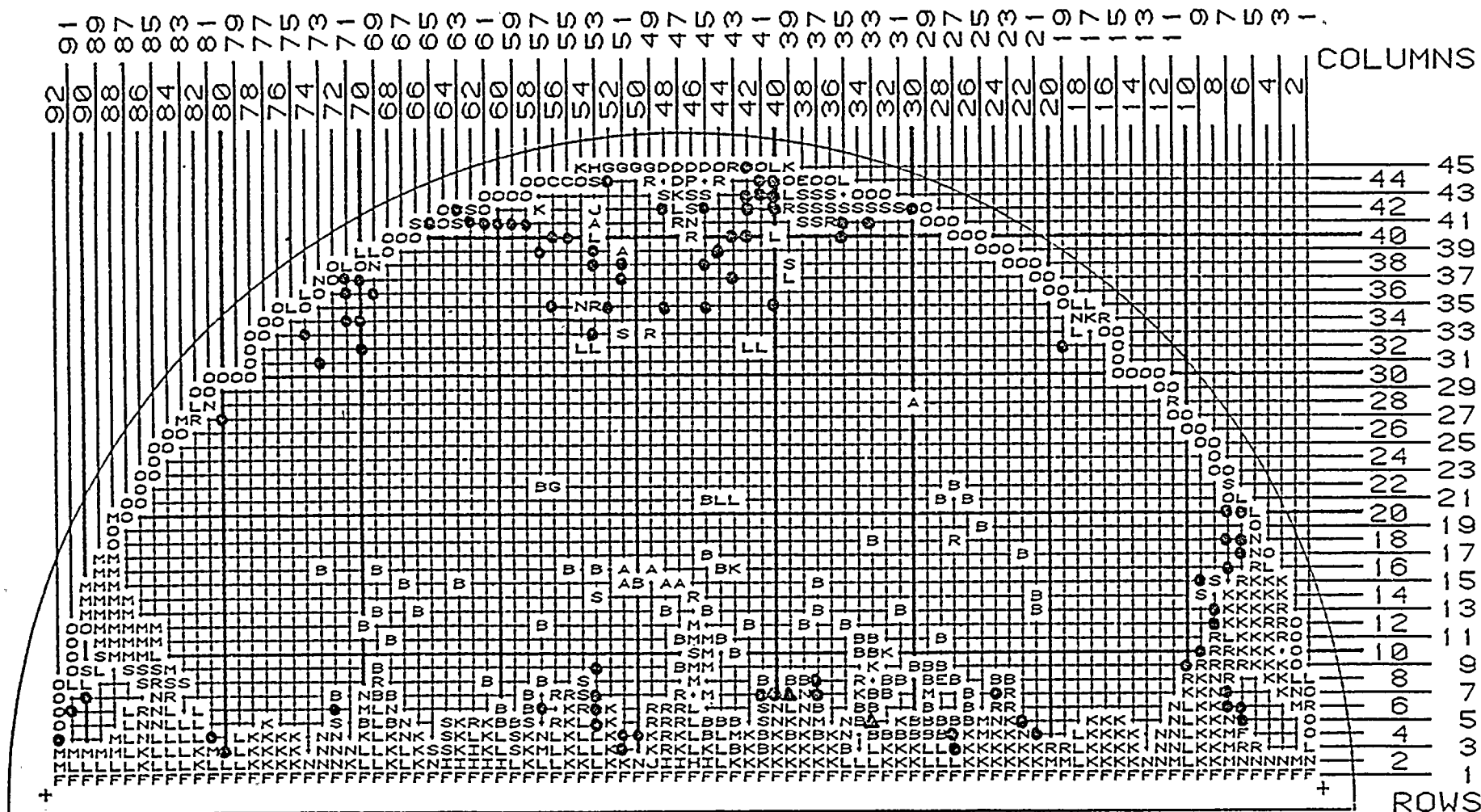
A
B
C
D
E
F
G
H
I

8 8/74; TUBES PLUGGED
98 8/75; TUBES PLUGGED
2 1/76; TUBES PLUGGED
5 5/76; TUBES PLUGGED
2 9/76; TUBES PLUGGED
93 11/76; TUBES PLUGGED
5 1/77; TUBES PLUGGED
2 9/77; TUBES PLUGGED
8 4/77; TUBES PLUGGED

J 2 7/77; BARE HOLE HL, E/P OUTLET
K 157 7/77; TUBES PLUGGED
L 110 2/78; TUBES PLUGGED
M 62 8/78; TUBES PLUGGED
N 54 4/78; TUBES PLUGGED
P 1 8/78; EP 5/78, WR HL
R 56 5/80; MECH PLUGGED
S 48 11/80; MECH PLUGGED

SERIES 44

FLA-C



TURKEY POINT UNIT #4
GAUGING RESULTS OCT.-NOV. 1981
STEAM GENERATOR C - INLET

TUBE RESTRICTIONS

NO. OF TUBES

X = .540 PROBE

None

Δ = .610 PROBE

2

⊙ = .650 PROBE

89

FIGURE 17



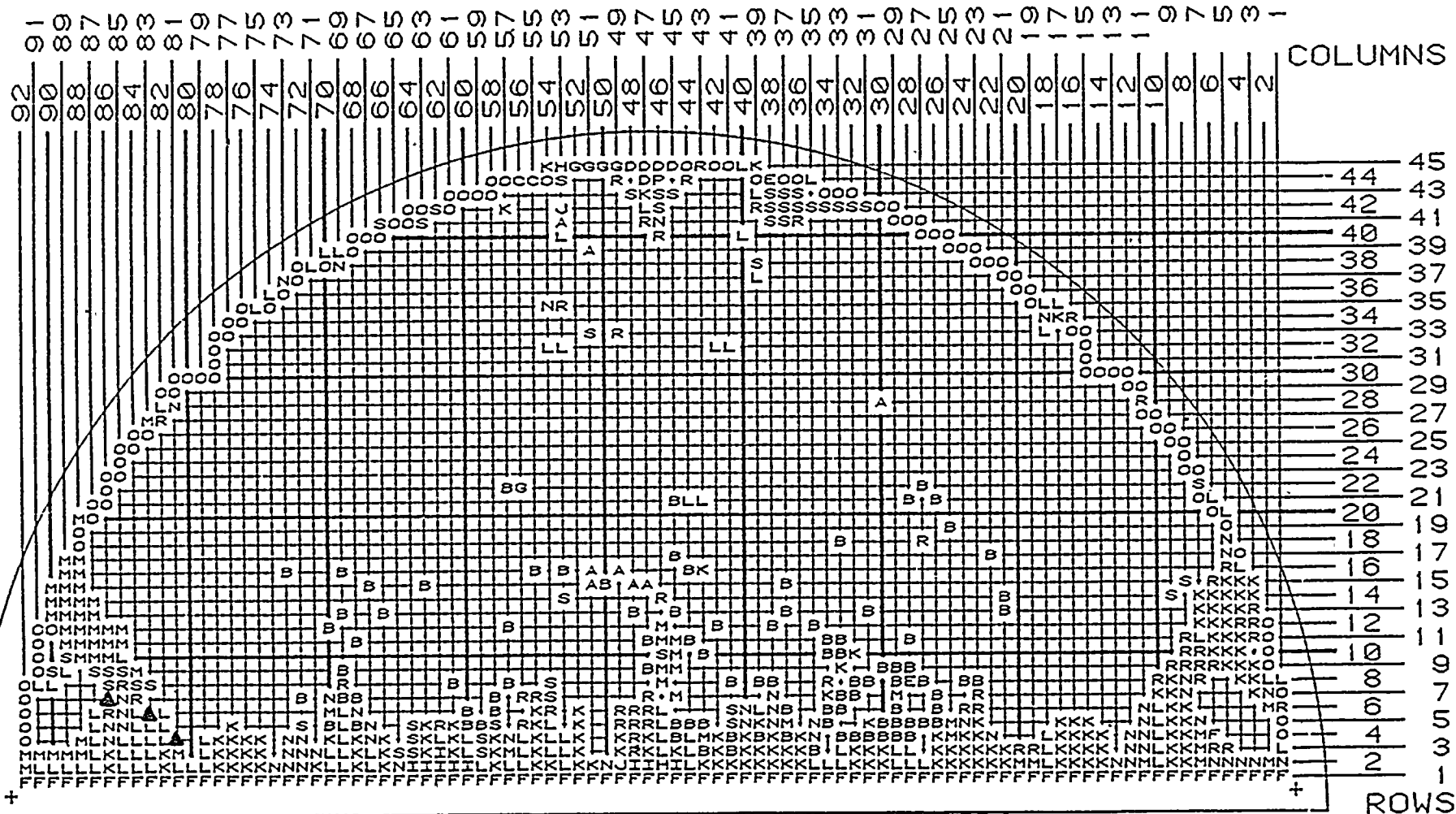
A
B
C
D
E
F
G
H
I

8 9/74; TUBES PLUGGED
S6 8/75; TUBES PLUGGED
2 1/78; TUBES PLUGGED
5 5/78; TUBES PLUGGED
2 9/78; TUBES PLUGGED
93 11/78; TUBES PLUGGED
5 1/77; TUBES PLUGGED
2 3/77; TUBES PLUGGED
9 4/77; TUBES PLUGGED

J 2 7/77; BARE HOLE HL, E/P OUTLET
K 157 7/77; TUBES PLUGGED
L 118 2/78; TUBES PLUGGED
M 62 8/78; TUBES PLUGGED
N 54 4/79; TUBES PLUGGED
P 1 8/78; EP 5/78, WR HL
R 56 5/88; MECH PLUGGED
S 48 11/88; MECH PLUGGED

SERIES 44

FLA-C



X = .540 PROBE
△ = .610 PROBE
⊙ = .650 PROBE

None-
3
Not Tested



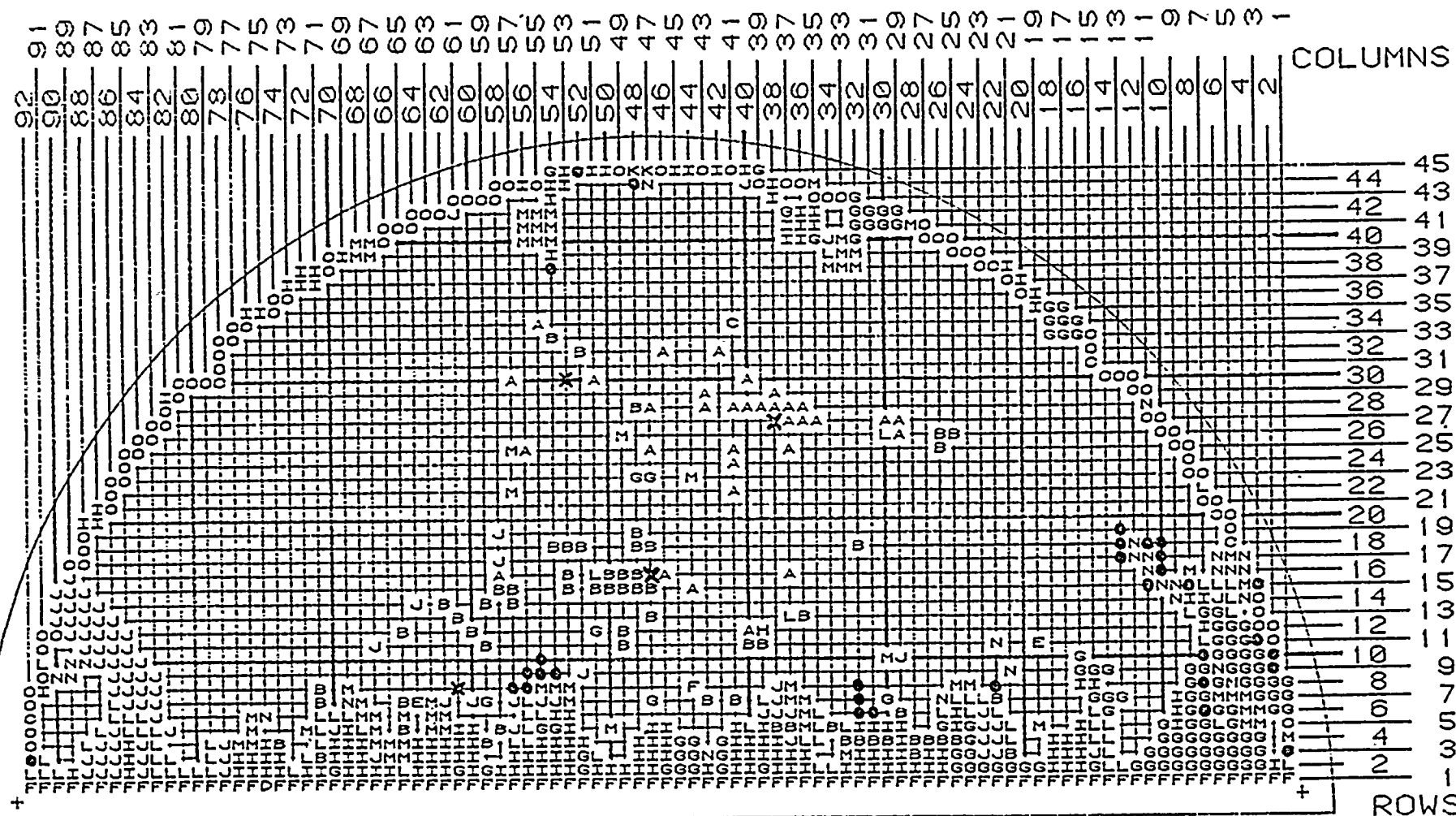
A
B
C
D
E
F
G

33 9/74; TUBES PLUGGED
63 6/75; TUBES PLUGGED
1 DATE NOT KNOWN; TUBES PLUGGED
1 SHOP WELD
2 5/76; TUBES PLUGGED
92 11/76; TUBES PLUGGED
132 7/77; TUBES PLUGGED

H 1 7/77; WELD REPAIR HL, E/P CL
I 169 2/78; TUBES PLUGGED
J 86 8/78; TUBES PLUGGED
K 2 SHOP WELD, HL MISDRILLED
L 79 4/79; TUBES PLUGGED
M 72 5/80; MECH PLUGGED
N 27 11/80; MECH PLUGGED

SERIES 44

FLA-A



←--- MANWAY TURKEY POINT UNIT #4
STEAM GENERATOR A
October - November, 1981

RECOMMENDED PLUGGING PER: NOZZLE
● = Gauging Results (32 Tubes)
X = Reg. Guide 1.83 (4 Tubes)

FIGURE 19

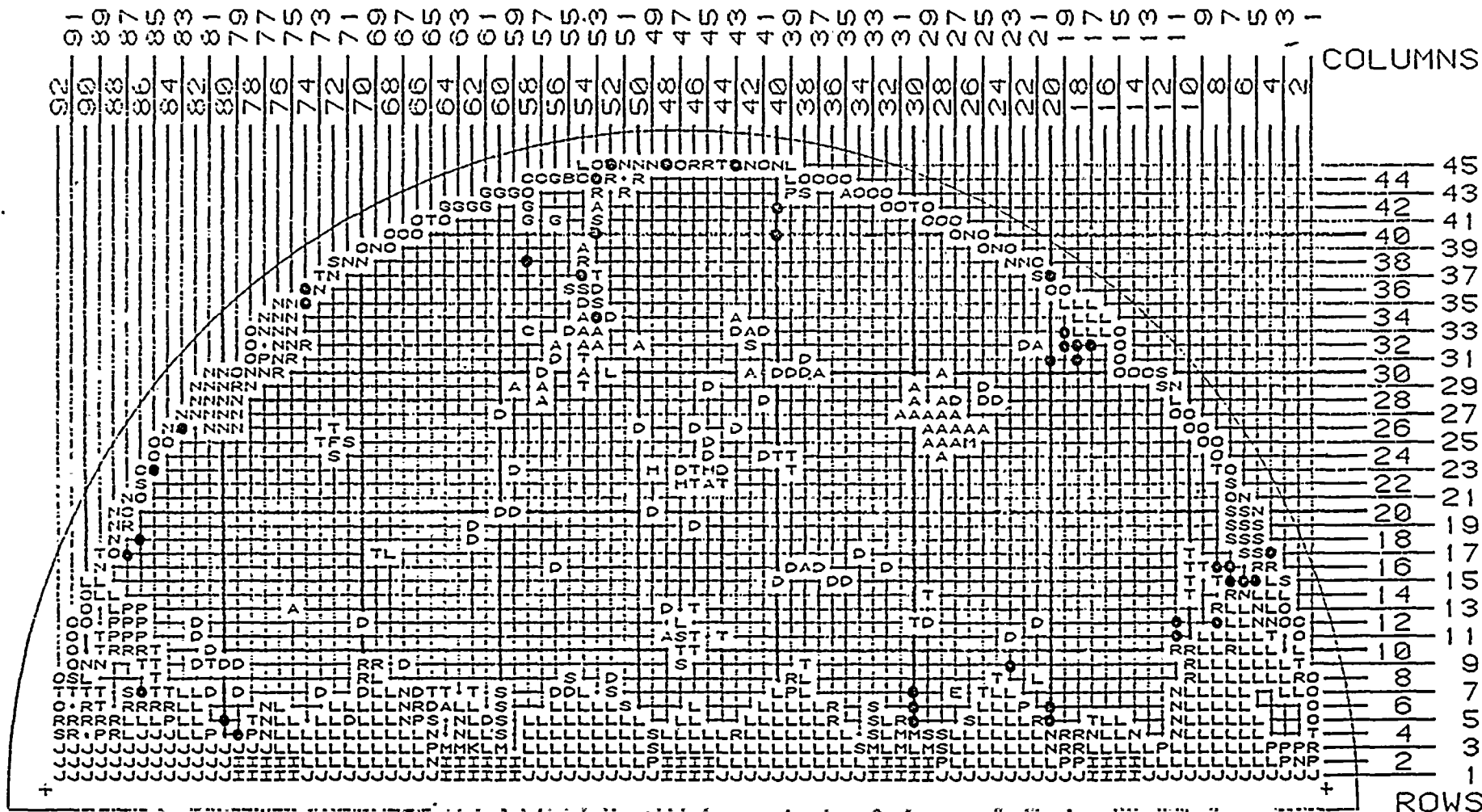


A 42 9/74; TUBES PLUGGED
 B 1 8/75; TUBE PLUGGED
 C 1 8/75; BARE HOLE PLUG HL-E/P CL
 D 68 8/75; TUBES PLUGGED
 E 1 SHOP WELD
 F 1 9/75; BARE HOLE PLUGS--HL, CL
 G 11 9/75; TUBES PLUGGED
 H 3 5/76; TUBES PLUGGED
 I 48 9/76; TUBES PLUGGED

J 100 11/76; TUBES PLUGGED
 K 1 7/77; WELD REPAIR
 L 384 7/77; TUBES PLUGGED
 M 9 10/77; TUBES PLUGGED
 N 70 2/78; TUBES PLUGGED
 P 28 8/78; TUBES PLUGGED
 R 52 4/79; TUBES PLUGGED
 S 48 5/80; MECH PLUGGED
 T 56 11/80; MECH PLUGGED

SERIES 44

FLA-B



←--- MANWAY TURKEY POINT UNIT #4
 STEAM GENERATOR - B
 October-November, 1981

RECOMMENDED PLUGGING PER: NOZZLE. --->
 ● = Gauging Results (41 tubes)
 X = Reg. Guide 1.83 (No tubes)

FIGURE 20

A
B
C
D
E
F
G
H

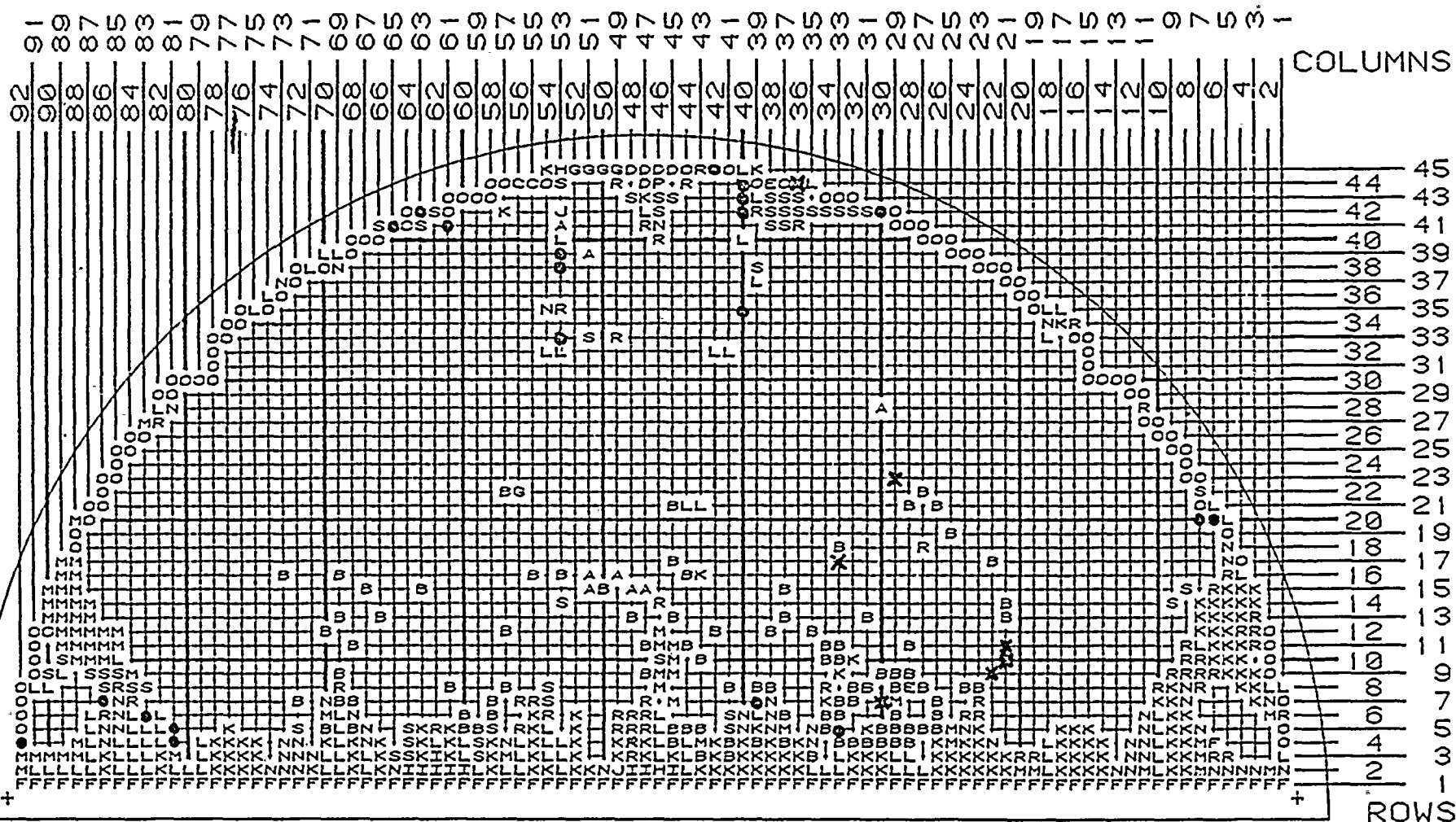
8 9/74; TUBES PLUGGED
9 8/75; TUBES PLUGGED
2 1/78; TUBES PLUGGED
5 5/78; TUBES PLUGGED
2 9/78; TUBES PLUGGED
93 11/78; TUBES PLUGGED
5 1/77; TUBES PLUGGED
2 3/77; TUBES PLUGGED
9 4/77; TUBES PLUGGED

J
K
L
M
N
P
R
S

2 7/77; BARE HOLE HL, E/P OUTLET
157 7/77; TUBES PLUGGED
118 2/78; TUBES PLUGGED
82 8/78; TUBES PLUGGED
54 4/79; TUBES PLUGGED
1 8/78; EP 5/78, WR HL
56 S/80; HECH PLUGGED
48 11/80; HECH PLUGGED

SERIES 44

FLA-C



←--- MANWAY TURKEY POINT UNIT #4
STEAM GENERATOR C
October-November, 1981

RECOMMENDED PLUGGING PER:
O = Gauging Results (21 tubes)
X = Reg. Guide 1.83 (7 tubes)

NOZZLE ---->
FIGURE 21



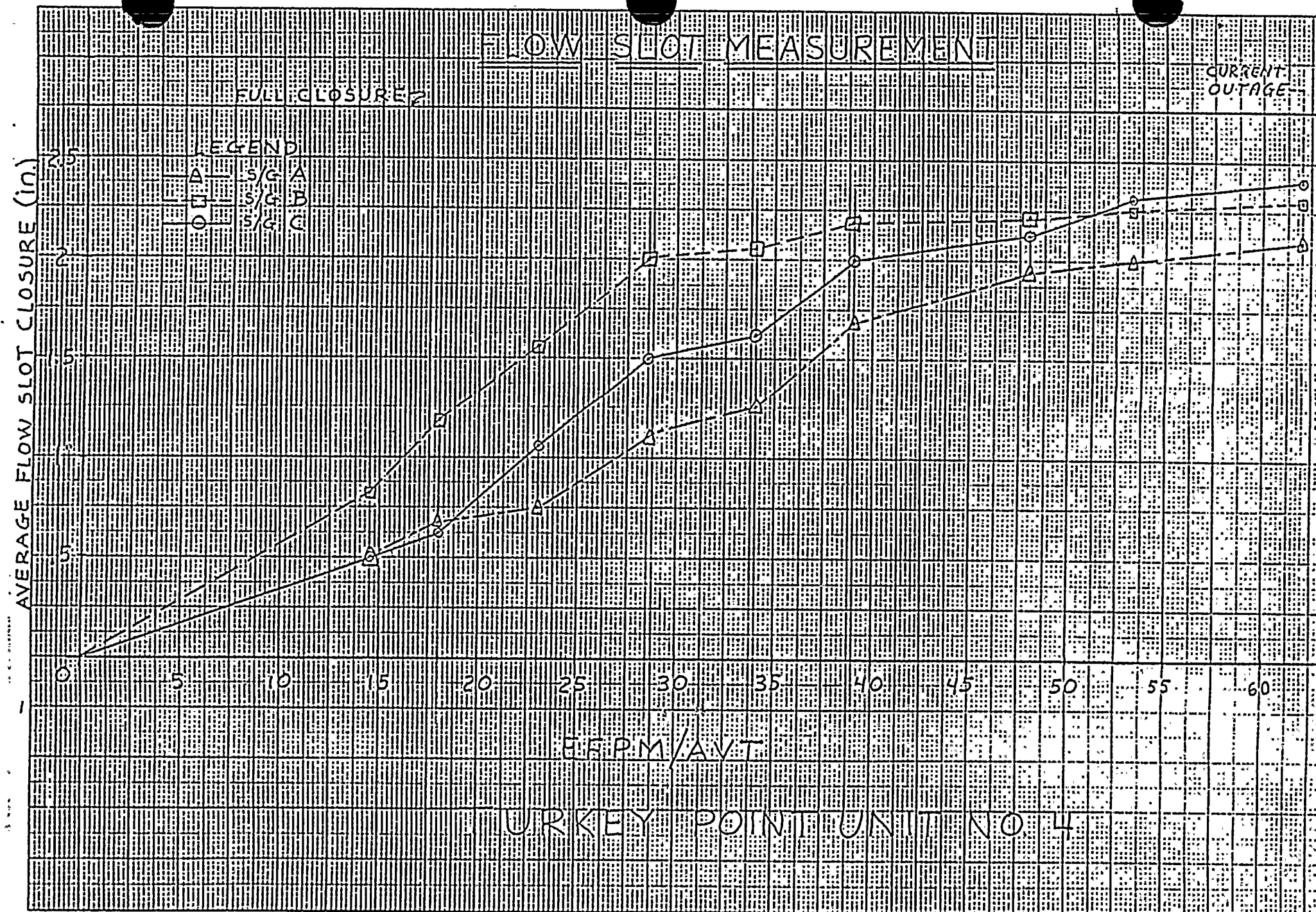


FIG. 22

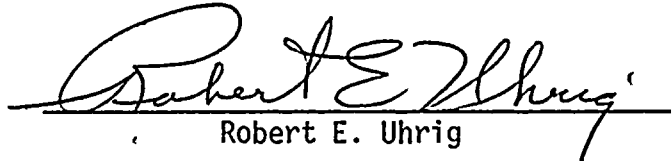


STATE OF FLORIDA)
)
COUNTY OF DADE) ss.

Robert E. Uhrig, being first duly sworn, deposes and says:

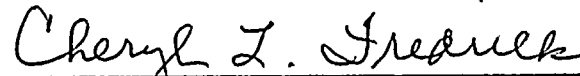
That he is Vice President of Florida Power & Light Company, the herein;

That he has executed the foregoing document; that the statements made in this said document are true and correct to the best of his knowledge, information, and belief, and that he is authorized to execute the document on behalf of said


Robert E. Uhrig

Subscribed and sworn to before me this

18 day of December, 1981


NOTARY PUBLIC, in and for the County of Dade,
State of Florida

My commission expires: Notary Public, State of Florida at Large
My Commission Expires October 30, 1983
Bonded thru Maynard Bonding Agency



100

