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SUBJECT: Application to amend License DPR-31 requesting permission to return facility to power operation for six equivalent full power months.Class III amend fee encl.

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FLORIDA POWER & LIGHT COMPANY

April 2, 1981
L-81-144

RECEIVED
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U.S. NUCLEAR REGULATORY COMMISSION

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 3
Docket No. 50-250
Steam Generator Inspections

The results of the Turkey Point Unit 3 steam generator inspections conducted during the current outage are attached. The inspections which were performed in accordance with Turkey Point Unit 3 operating license DPR-31 showed no new phenomena and verified that the general pattern of denting in Unit 3 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 3.

Total steam generator tube plugging at the conclusion of the current outage will be approximately 21.0%. This is conservatively bounded by the 25% 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. They have concluded that based on the inspection results, the implemented plugging pattern, and previously submitted analyses, that the return of Turkey Point Unit 3 to full power operation for at least six equivalent months does not involve an unreviewed safety question.

In accordance with condition E.5 of operating license DPR-31, Florida Power & Light Company requests permission to return Unit 3 to power operation for a period of six equivalent full power months.

8104070395

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A001 S 3/3

w/check $4,000

PEOPLE . . . SERVING PEOPLE

Based on our current schedule, we could be ready to resume power operation by April 20, 1981. We will keep you advised of any significant changes.

We have determined that this is a Class III request in accordance with 10 CFR 170. Accordingly, a check for $4,000 is enclosed.

Very truly yours,

Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/RJA/mbd

Attachment

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

STATE OF FLORIDA)
) ss.
COUNTY OF DADE)

H. J. Dager, Jr., being first duly sworn, deposes and says:

That he is Vice President of Florida Power & Light Company, the Licensee 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 Licensee.

H. J. Dager, Jr.

Subscribed and sworn to before me this

2 day of April, 1981

Cheryl F. Fredrick
NOTARY PUBLIC, in and for the County of Dade, State of Florida

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

My commission expires:

TURKEY POINT 3 STEAM GENERATOR
INSPECTION PROGRAM
March, 1981

I. INTRODUCTION

An extensive inspection program for the Turkey Point Unit 3 steam generators was conducted in March, 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 C.
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.

TABLE 1: SUMMARY OF TOTAL STEAM GENERATOR TUBES INSPECTED

	A Hot Leg	A Cold Leg	B Hot Leg	B Cold Leg	C Hot Leg	C Cold Leg
Gauging	1245	252	1242	210	1269	231
U-Bend Rows 2-5	--	--	--	--	--	102
R.G. 1.83	256	234	170	139	171	253

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.

Initially, a 12.5% strain boundary was used in the gauging program when little plant specific data was available. After two initial inspections and four periodic subsequent inspections of the Turkey Point Plants, review of specific information indicated the conservatism of the 12.5% boundary. Consequently, a 15% boundary was adopted and used in the gauging program during the April, 1979 inspection at Turkey Point #4. With the addition of the information gained from that inspection (then totaling five reinspections), it became apparent that the 15% boundary was also overly conservative and the 17.5% boundary would be more appropriate for the next inspection (May, 1980). That is, the majority of the tubes inspected in April, 1979 did not restrict the .650 probe. In addition, all tubes restricting the .610 inch or .540 inch probe in the tubelane area were within the inspection boundary. This is significant since the .610 inch and .540 inch restricted tubes form the basis for the plugging patterns in the tubelane region. Accordingly, the 17.5% boundary was used as the basis for the May, 1980 inspection. Since full closure of the flowslots was observed in Turkey Point 4 steam generators during the May, 1977 inspection, Turkey Point 4 was regarded in May, 1980 as beyond full closure by approximately 25.5 Effective Full Power Months (EFPM's). Since the 17.5% contour at 24 months appears to involve much of the hot leg tube bundle, the program was adjusted to reflect prior 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 inspections were performed at Turkey Point #3 in October, 1980 and Turkey Point #4 in November, 1980. As a result of the prior experience at both Turkey Point Units described above, the gauging inspection boundaries for these inspections were 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 inspection boundary for the present inspection (March, 1981) at Turkey Point #3 has also been adjusted to reflect prior experience at Turkey Point and other plants, in accordance with the discussion in the preceding paragraphs.

The typical gauging inspection boundaries for the October, 1980 inspection (Fig. 1 and 2) are included for reference. The gauging inspection boundaries for the March, 1981 inspection are indicated in Figures 3 to 8 inclusive, for each leg of each steam generator.

The following conservatisms were utilized in determining the Turkey Point #3 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 incorporated into 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 C were examined with 100 kHz to confirm the integrity of the small radius U-bends in low number rows, as shown in Figure 9.

In the January, 1979 inspection, annulus measurements were taken in steam generator B. These measurements provide a qualitative indicator of the upper plate expansion trends in the most affected steam generator. That had been the second measurement of this type for steam generator B. No obvious trends had been noted in this unit or in three such measurements in Turkey Point Unit #4. Therefore, this measurement was not made at the October, 1980 or March, 1981 inspection and is not planned for future inspections.

D. Regulatory Guide 1.83 (R.G. 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 included (Figs. 10-15 inclusive). In addition to a systematic sampling of tubes, all tubes with previous indications, regardless of size, were reinspected, as shown in Figs. 10 to 15. During the inspections, no expansion of the program (per Reg. Guide 1.83) was required in any of the steam generators. 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 16, 17, 18, and 19 are summarized in Table 2. (Since no tube restrictions were reported in the cold legs of steam generators A and B, figures are not included for these legs.)

TABLE 2: TUBE RESTRICTION SUMMARY

Number of Tubes Restricting Passage of Gauge Listed But Allowing Next Smaller Gauge To Pass

S/G and Gauge Diameter	Tubelane Hot Leg	Tubelane Cold Leg	Periphery and Wedge Hot Leg	Periphery and Wedge Cold Leg	Patch Plate Hot Leg
SG A					
.650"	26	0	27	0	25
.610"	3	0	1	0	0
.540"	0	0	0	0	0
SG B					
.650"	13	0	20	0	4
.610"	2	0	3	0	0
.540"	0	0	1	0	0
SG C					
.650"	29	0	13	0	9
.610"	8	1	0	1	0
.540"	0	0	0	0	0

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

1. Tubes in the tubelane region that restrict the 0.650 inch probe lie adjacent to the areas in which such restrictions occurred in prior examinations.
2. There were no tubes restricting a 0.540 inch 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. Only limited cold leg activity, i.e. restrictions to the 0.610 inch probe, was observed: No tubes in SG A, 2 in SG B, and no tubes in SG C. The level of cold leg activity remains quite low compared to the hot leg experience.
5. No leaking tubes were observed during the previous operating period.
6. Only a single restriction to the smallest probe used (0.540 mils) was observed in this inspection after approximately 3.5 EFPM of operation, compared with 13 such restrictions observed in October, 1980 after approximately 8.5 EFPM of operation.

B. Flow Slot Measurements

The results of the flow slot measurements are provided by Figure 23.

C. Other Denting Related Inspections

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

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, no tubes were plugged for indications equal to or greater than 40% wall penetration.

D. NON-DENTING RELATED INSPECTION

During the course of the steam generator inspection program, 1 piece of foreign material was found and retrieved from steam generator 3C (see attached LER update). It was concluded that this piece of material was of the same origin as the debris previously discovered and reported during December 1979. The occurrence has been evaluated and conservatively resolved.

TABLE 3: REGULATORY GUIDE 1.83

Inspection Results

Size of Indication (% Wall Penetration)	SG A		SG B		SG C	
	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
< 20	41	79	3	33	4	50
20-29	20	63	4	23	7	96
30-39	5	6	0	5	3	23
≥ 40	0	0	0	0	0	0

Preliminary evaluation of the results suggests probable thinning in the region of the sludge pile in the cold leg occurring at a rate which has not increased substantially since the October, 1980 inspection.

A comparison of eddy current indications equal to or greater than 20% observed at this inspection was made with similar observations made at the last inspection (October, 1980). The results of this comparison for the cold leg data are shown in Table 4. Hot leg comparisons are not tabulated since only a single comparison at most, could be made for each steam generator. This difference is reflected in the smaller number of indications observed in the hot legs as compared with the cold legs.

Table 4

Comparison of Eddy Current Indications ≥ 20% at Both the March 1981 and October 1980 Inspections - Cold Leg Data

Steam Generator	Number of Tubes Compared	Calculated Average (Change as % Wall Penetration)
A	62	-3.1 %
B	22	-4.0 %
C	93	-0.7 %

The calculated negative changes in wall penetration are not interpreted as actual changes, but rather reflect the uncertainties inherent in the eddy current technique.

IV Plugging Criteria

A. Gauging Program

Although experience has shown that advance of the predicted strain contours from the finite element model no longer is an appropriate basis for tube plugging, the plugging criteria which were developed using the model have generally been retained, since their application has been effective in reducing the frequency of tube leakage events resulting from denting. As in the October, 1980 inspection of Turkey Point 3, and the May, 1980 inspection at Turkey Point 4, a program which incorporates all previously observed activity with several rows margin beyond is considered appropriate; again a sampling of central area tubes provided by the Regulatory Guide 1.83 inspection permits detection of new areas of activity should any occur. The criteria established for plugging tubes in the region of the patch-plate differ from those used for other regions of the bundle. All leaks in the patch-plate region have occurred at the perimeter of the plate or near to the patch-plate boundary, where plug welds connect the patch-plate to the main body of the tube support plate. All observed data indicate that the behavior in the patch plate is local in nature and is not consistent with the general strained state of the plate, nor can the behavior be represented by the finite element model. Due to these factors, the regions of the patch-plate are inspected and a specific set of plugging criteria applied. Because tube leakage in this region have not always restricted 0.540 inch probes, leaking tubes and tubes that restrict the 0.540 inch probe should be treated alike, and the surrounding tubes about both should be plugged and tubes on either side of the patch-plate boundary (plate perimeter on one side, the plug welds on the other three sides) that restrict the 0.650 inch probe should be plugged.

Due to the local plate cracking that is believed to occur at the periphery and near wedge locations, tube leaks may occur here at lower levels of tube restriction than in the tubelane. Thus, the wedge areas should have their own inspection program and plugging criteria. The plugging criteria at hot leg wedge locations calls for treating leaking tubes and tubes that restrict the 0.540 inch probe in a similar manner. In addition, tubes that restrict the 0.610 inch probe and peripheral tubes that restrict the 0.650 inch probe should be plugged. Cold leg plugging will be based on the degree of activity noted and rates of progression observed from gauging.

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

1. All tubes which do not pass the 0.540 inch probe will be plugged. Only one such tube (steam generator B, R 15-C10) was observed in this inspection.
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 inch 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. This criterion was not applicable in this inspection.)
3. All tubes which do not pass the 0.610 inch 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.

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 judgement. Particular attention was paid to 650 mil restricted tubes relative to the ten 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 inch probe.
   b. Restrict the 0.610 inch probe.
   c. Restrict the 0.650 inch probe at the periphery.
   d. Surround leaking tubes and tubes that restrict the 0.540 inch probe, including the diagonally next tube.
8. Application of the criteria specified in 7 above, will be made on the basis of engineering judgement 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 inch probe.
   b. Restrict the 0.610 inch probe.
   c. Surround leaking tubes and tubes that restrict the 0.540 inch probe including the diagonally next tube.
   d. Lie on either sides of the patchplate boundary (plate perimeter on one side, the plug welds on the other three) and restrict the 0.650 inch 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 SG(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 x 92 tubes per row = 184 tubes. The total resulting leakage from these tubes would be less than:

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

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

The criteria for plugging tubes in this area are established in the Technical Specifications.

C. Preventive Plugging Accomplished

The preventive plugging programs that were implemented to justify at least 10 months operation are indicated in Figures 20, 21 and 22. Table 5 summarizes the plugging performed at this outage. The coordinates of the plugged tubes are listed for each steam generator in Tables 6, 7 and 8 respectively. As noted in Table 5 and 8, two tubes were plugged as a conservative measure in steam generator C. These tubes, R16-C41 and R28-C39, were reported as having eddy current indications of 43% and 44% respectively in the November 1974 inspection. These tubes were not plugged at that time since the plugging criterion was then in excess of the reported indications. In addition, no indications were observed in subsequent inspections for tube R16-C41, and an indication of <20% was reported for tube R28-C39 in the October 1975 inspection. However, as discussed above in Section II D, Inspection Programs, Regulatory Guide 1.83, all tubes with any previous indications, including these two tubes, were reinspected in March, 1981.

In this latest inspection, distorted tubesheet (DTS) signals were observed for these two tubes. To preclude any possibility that sizeable indications may have been masked by the DTS signal, since indications in excess of 40% wall penetration had been reported previously, both tubes were plugged as a conservative measure. These were the only two tubes for which the combination of the above conditions was observed.

TABLE 5

SUMMARY OF TUBES PLUGGED

STEAM GENERATOR	FOR GAUGING	TUBES PLUGGED R.G. 1.83	CONSERVATIVE
A	10	None	0
B	23	None	0
*C	25	None	2

*NOTE: Additionally, S/G C had 2 tubes which were erroneously plugged: R5C88 and R6C88; making the plugging in S/G C, a total of 29 tubes.

TABLE 6. RECOMMENDED PLUGGING TURKEY POINT UNIT 3, MARCH 1981, INSPECTION STEAM GENERATOR A

A. Recommended Plugging for Gauging Results:

For Six Month Plugging Program:

R-C
3-73
4-45
7-69
22-86
26-84
41-61

Total Plugging for Gauging, Six Month Program:

6 Tubes

Additional for Ten Month Plugging Program

R-C
3-21
3-28
3-74
4-21

Total Additional Plugging for Gauging, Ten Month Program:

4 Tubes

B. Regulatory Guide 1.83 Plugging:

None

TABLE 7. RECOMMENDED PLUGGING TURKEY POINT UNIT 3, MARCH 1981, INSPECTION STEAM GENERATOR B

A. Recommended Plugging for Gauging Results:

For Six Month Plugging Program:

R-C	R-C
3-3	15-11
4-1	16-4
4-3	16-9
4-30	16-10
5-3	16-11
8-69	37-72
14-10	39-34
14-11	43-40
15-9	43-53
15-10	

Total Plugging for Gauging, Six Months Program:

19 Tubes

Additional for Ten Month Plugging Program:

R-C
5-2
6-2
17-9
39-33

Total Additional Plugging For Gauging, Ten Month Program:

4 Tubes

B. Regulatory Guide 1.83 Plugging:

None

TABLE 8. RECOMMENDED PLUGGING TURKEY POINT UNIT 3, MARCH 1981, INSPECTION STEAM GENERATOR C

A. Recommended Plugging for Gauging Results:

For Six Month Plugging Program:

R-C	R-C
3-19	7-23
4-16	7-69
4-19	9-10
4-77	22-7
4-78	22-86
4-89	30-12
5-19	33-40
5-87	42-53
5-89	43-40
6-87	45-45

Total Plugging for Gauging Six Month Program:

20 Tubes

Additional for Ten Month Plugging Program:

R-C
3-20
4-88
5-90
6-89
7-70

Total Additional Plugging for Gauging, Ten Month Program:

5 Tubes

B. Regulatory Guide 1.83 Plugging:

None

C. Additional Conservative Plugging:

R-C
16-41
28-39

FIGURE 1

GAUGING PROGRAM (TYPICAL) INLET

GAUGE ALL TUBES OUTSIDE BOUNDED AREA, OCTOBER, 1980

SERIES 44

FPL-A

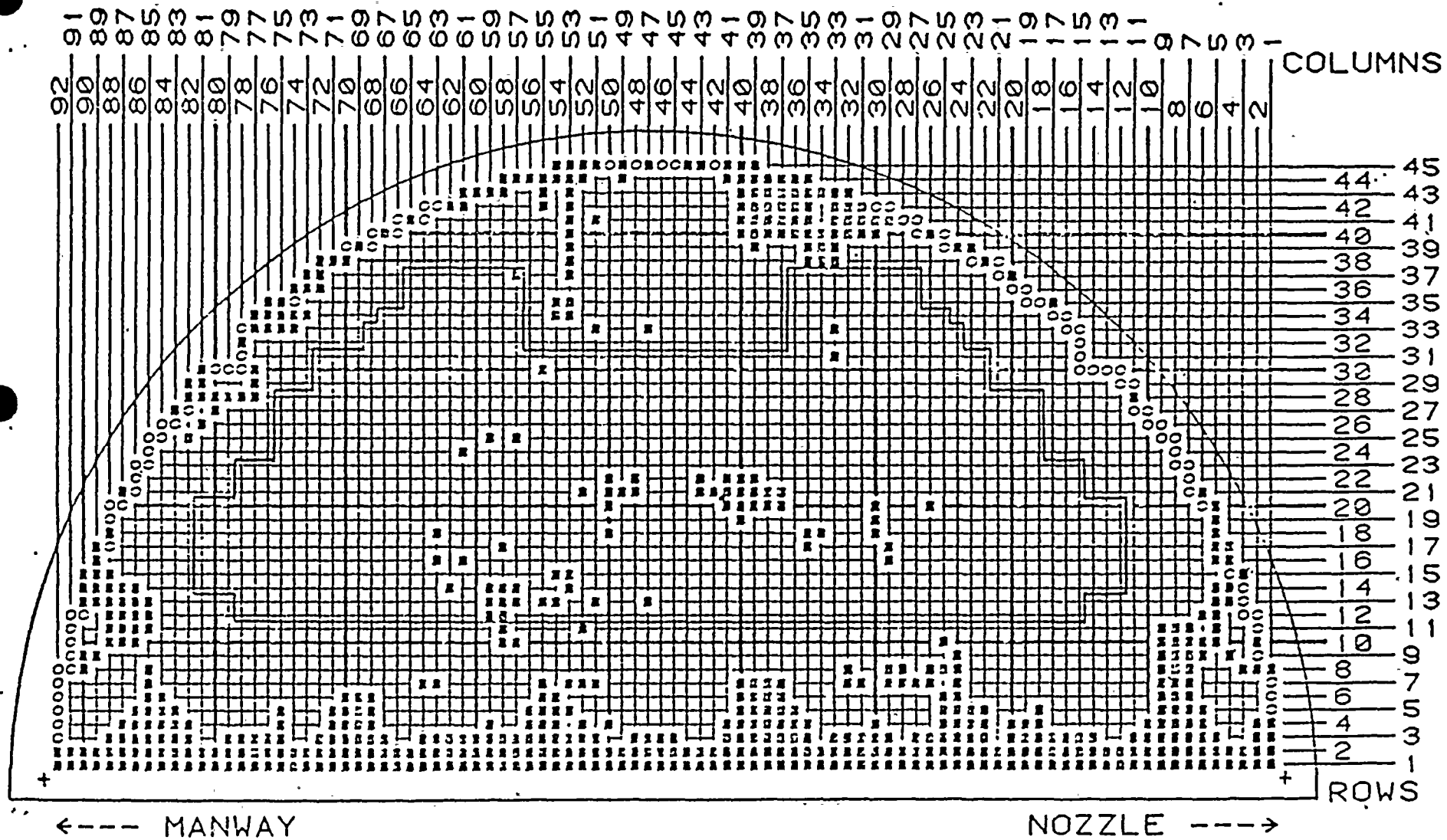


FIGURE 2

GAUGING PROGRAM (TYPICAL) OUTLET

GAUGE ALL TUBES WITHIN BOUNDED AREA
OCTOBER, 1980

SERIES 44

FPL-A

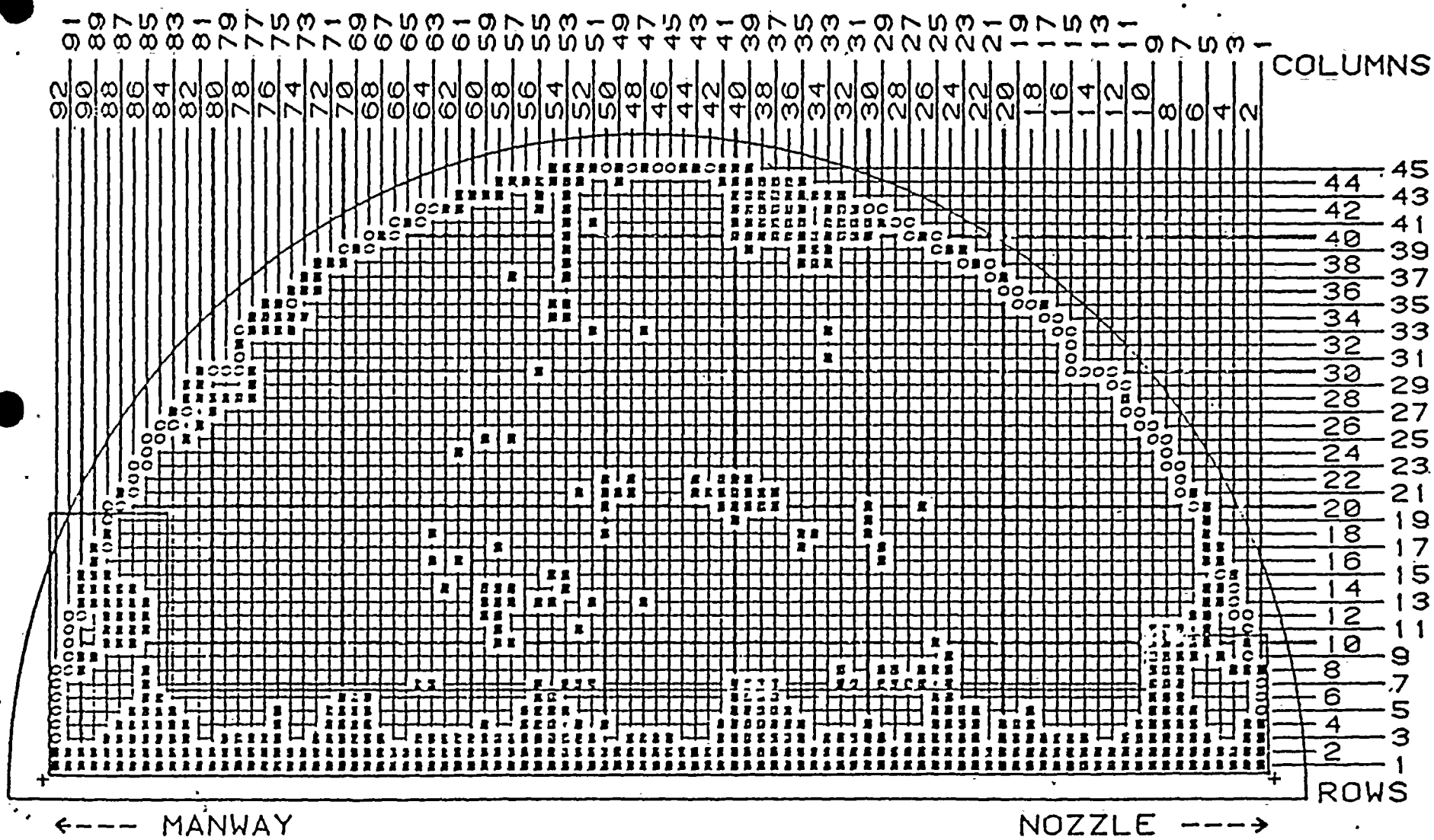


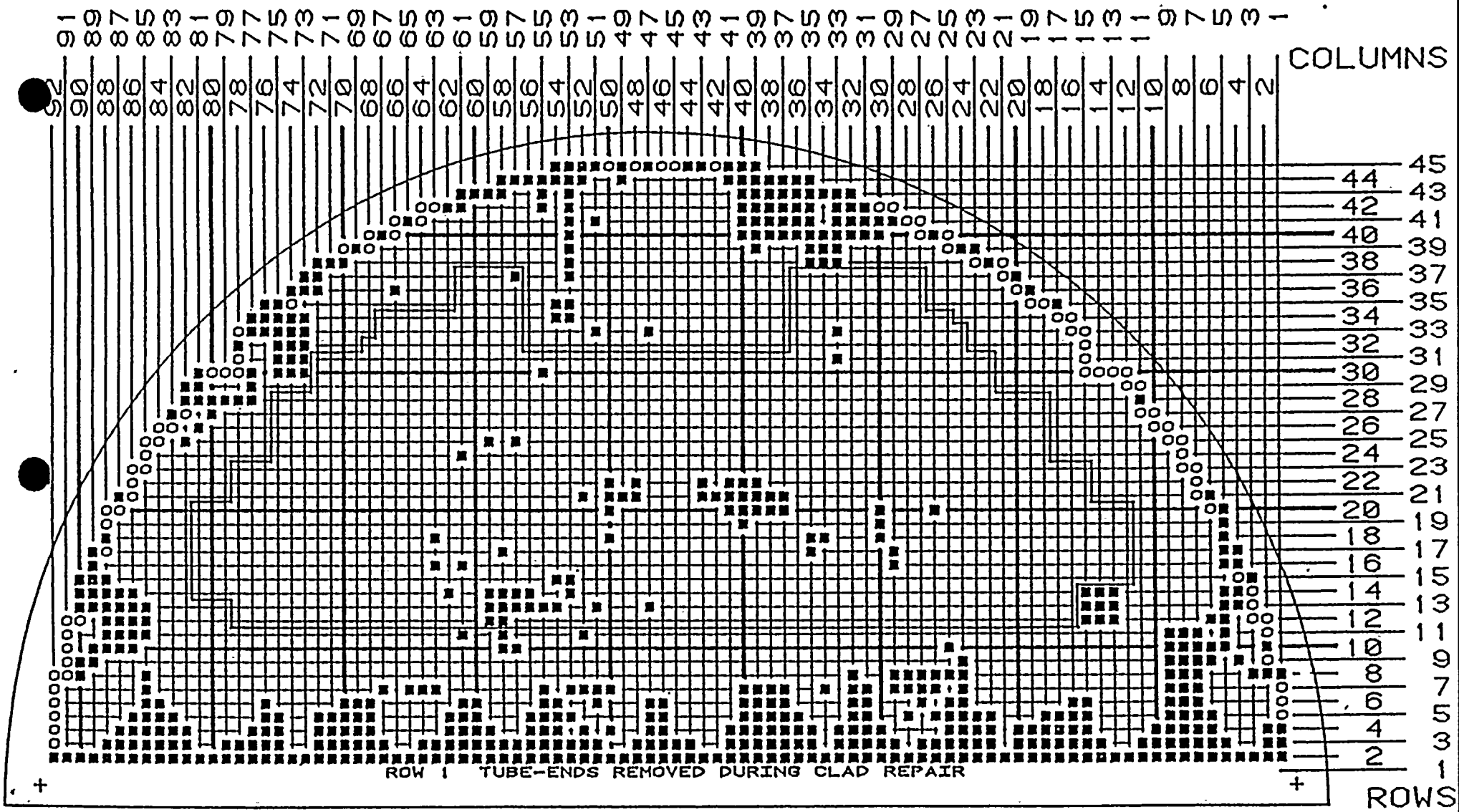
FIGURE 3

TURKEY POINT UNIT #3
STEAM GENERATOR A - HOT LEG
GAUGING PROGRAM

MARCH, 1981 INSPECTION

SERIES 44

FPL-A
INLET (HL)



← --- MANWAY Gauging Program - M/F Through Top Support NOZZLE --- →

.650, .610 AND .540 PROBES - 1239 TUBES

TEST AREA OUTSIDE BOX

FIGURE 4

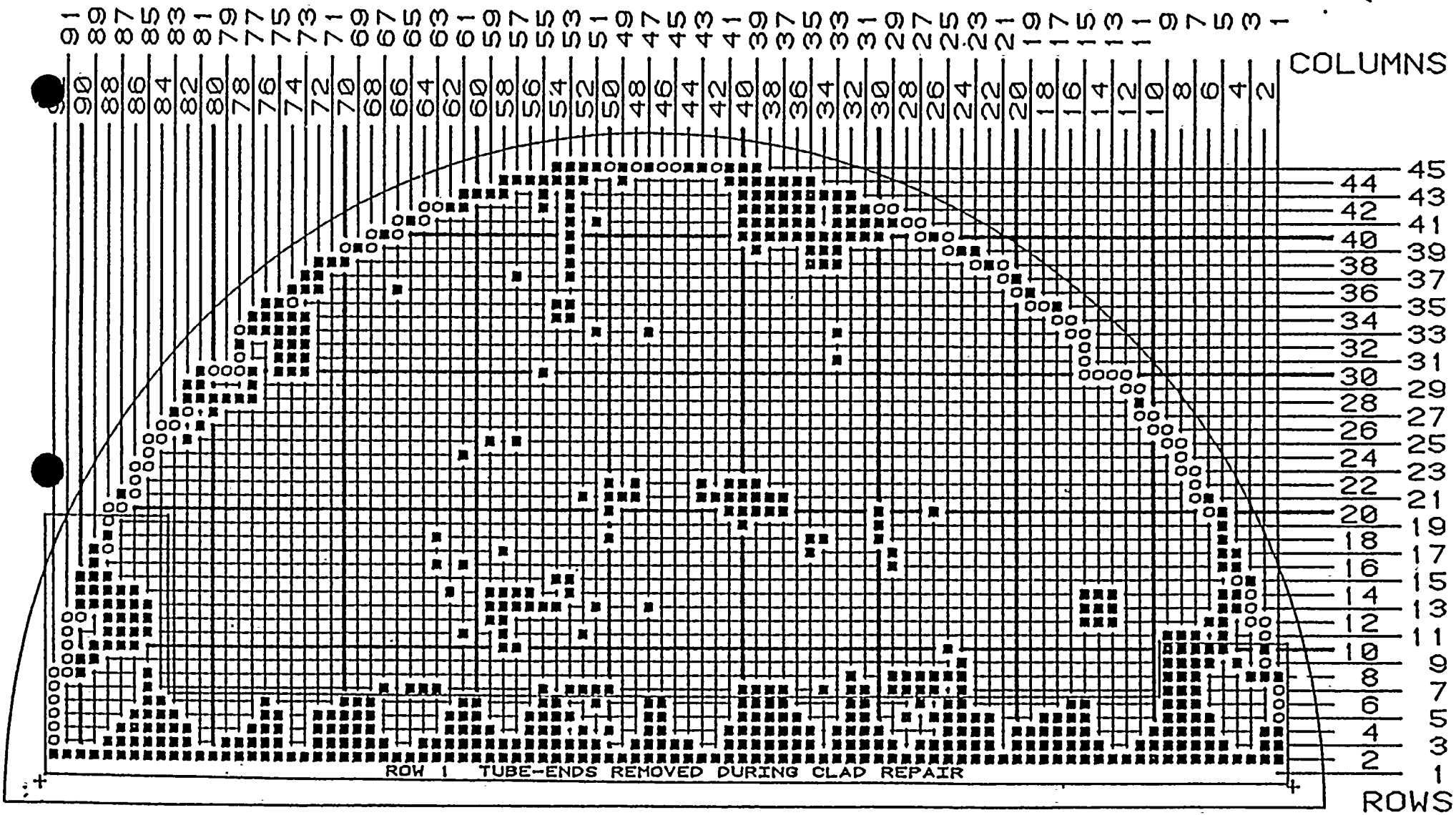
TURKEY POINT UNIT #4
STEAM GENERATOR A - COLD LEG
GAUGING PROGRAM

MARCH, 1981 INSPECTION

SERIES 44

FPL-A

OUTLET (CL)



← --- MANWAY Gauging Program - Test blocked in Area w/ m/r through Top Support w/.610 and .540 probes NOZZLE ---→

FIGURE 5

TURKEY POINT UNIT #3
STEAM GENERATOR B - HOT LEG
GAUGING PROGRAM

MARCH, 1981 INSPECTION

SERIES 44

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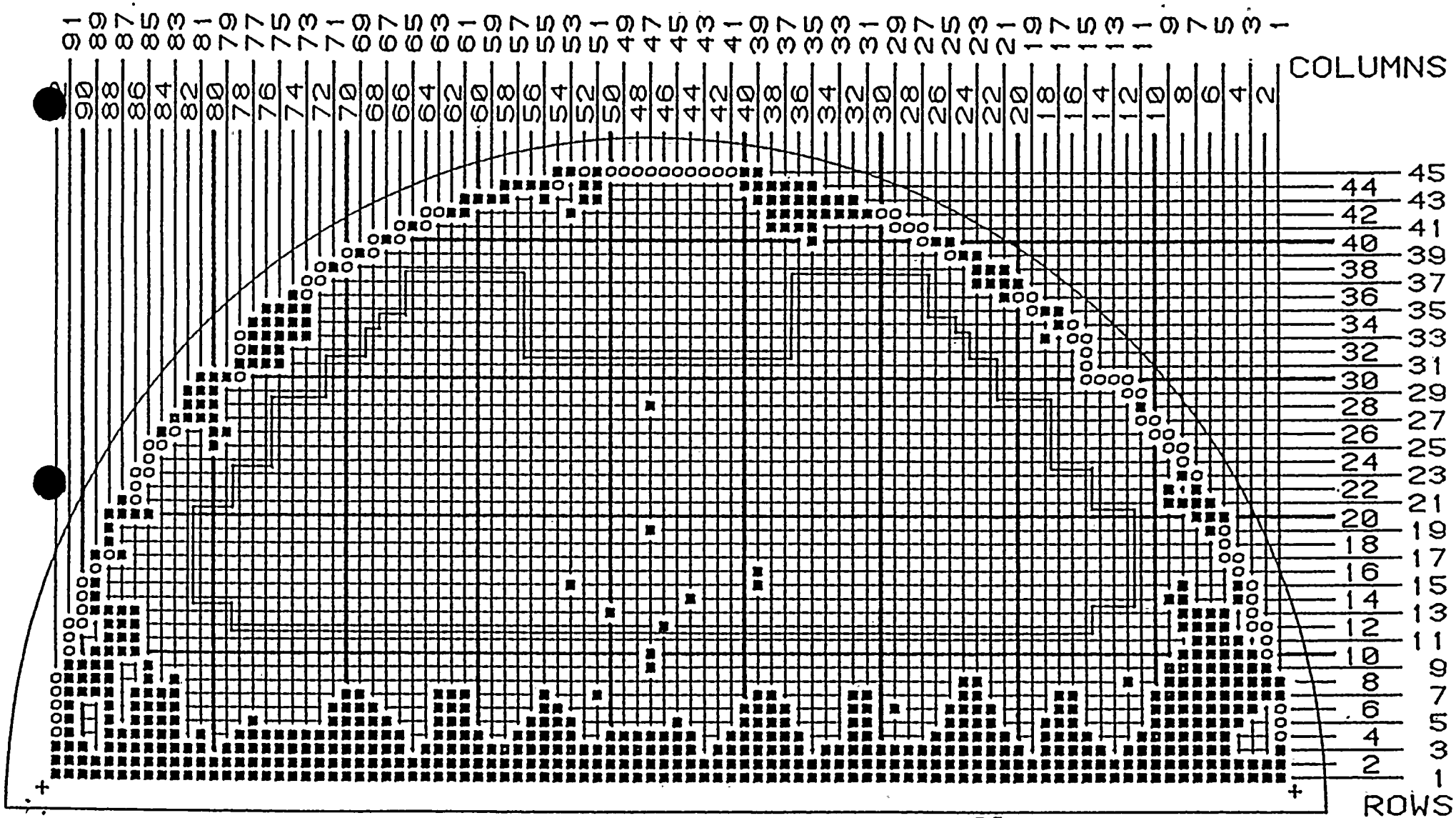
INLET (HL)



← --- MANWAY Gauging Program - Test Area Outside Box NOZZLE ---→
through top support with .650, .610 and .540 probes. - 1242 Tubes

FIGURE 6

TURKEY POINT UNIT #3
STEAM GENERATOR B - COLD LEG
GAUGING PROGRAM

MARCH, 1981 INSPECTION

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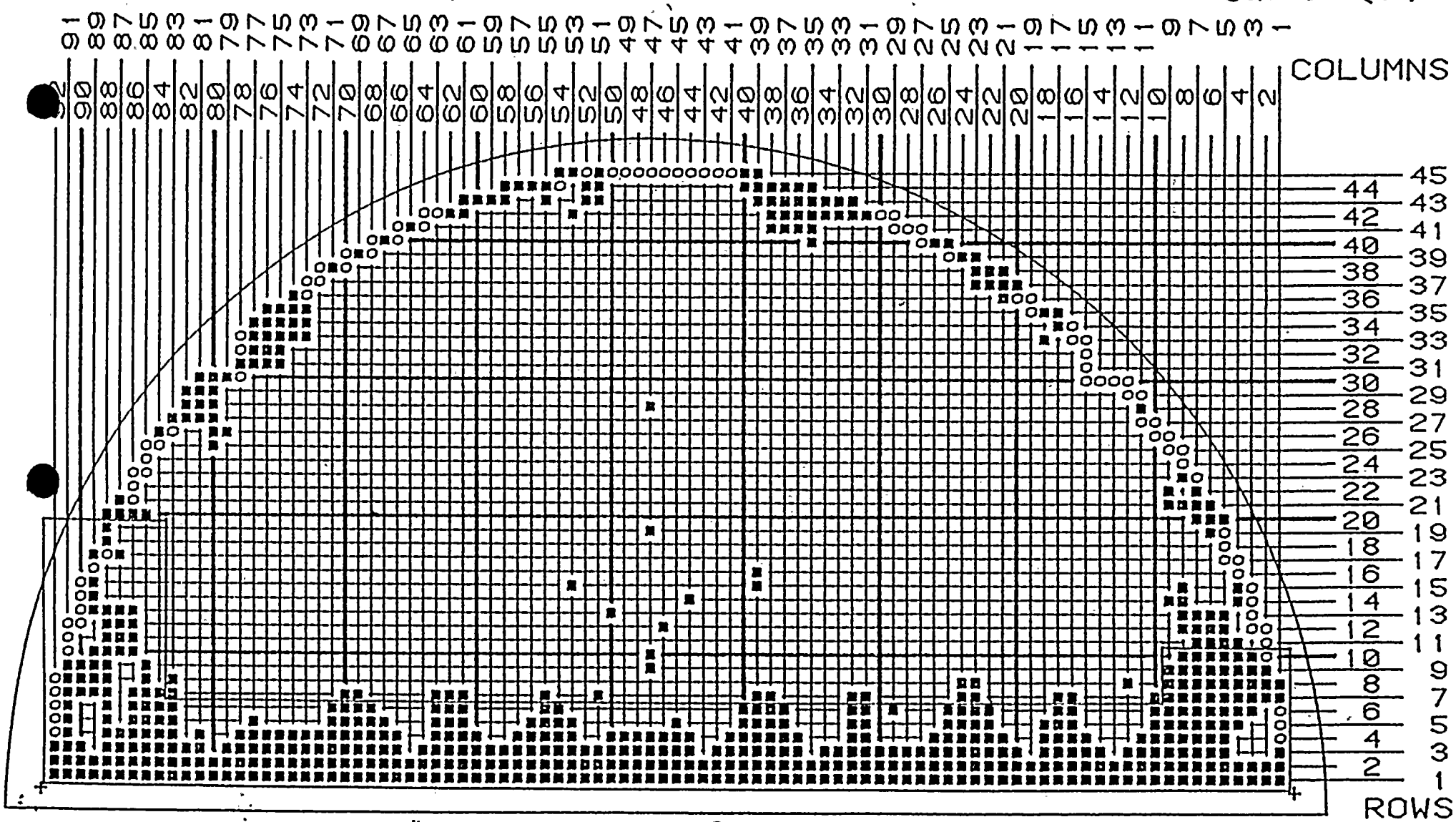


← --- MANWAY

Gauging Program - Test Blocked in Area through Top Support with .610 and .540 probes

NOZZLE ---→

208 TUBES

FIGURE 7

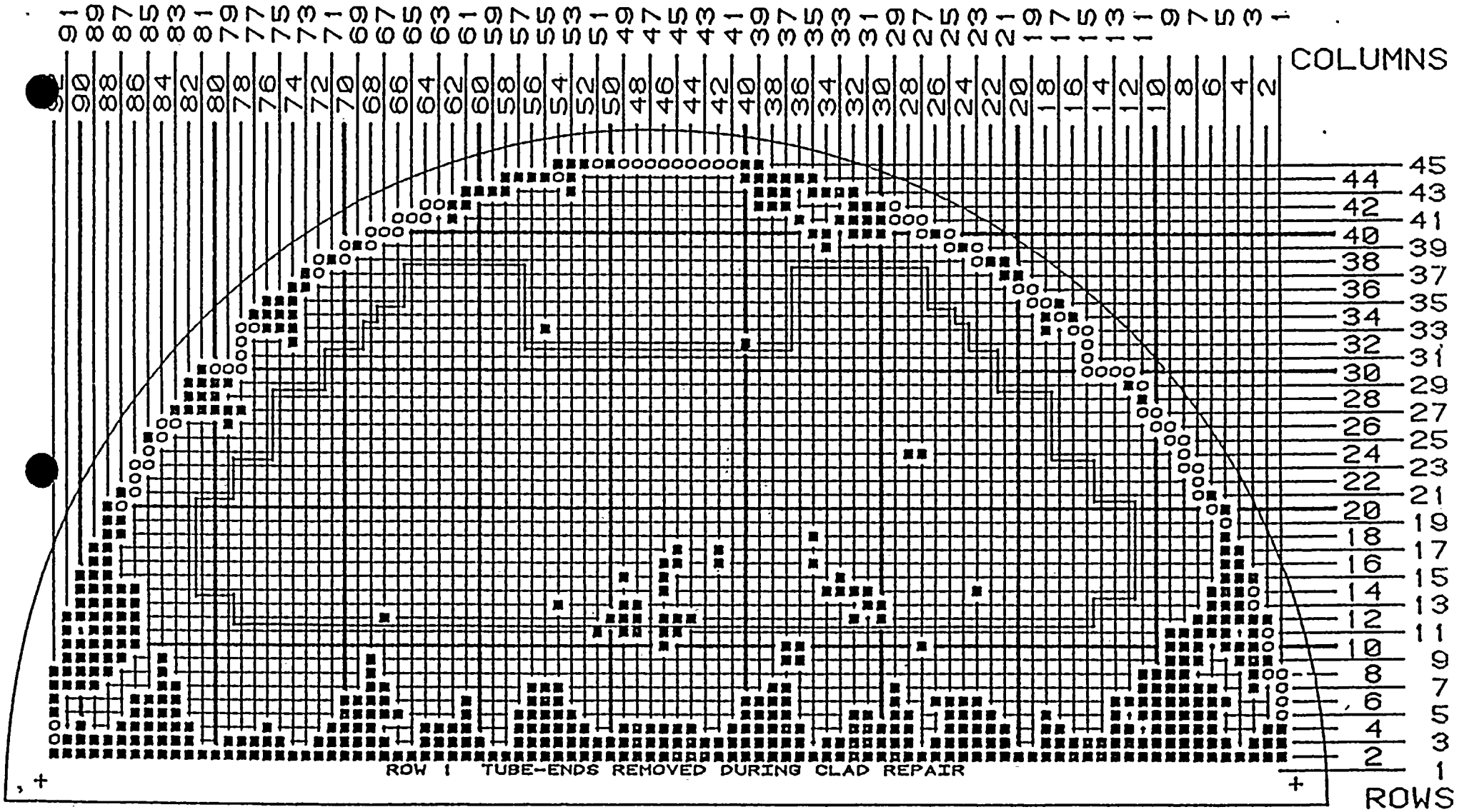
TURKEY POINT UNIT #3
STEAM GENERATOR C - HOT LEG
GAUGING PROGRAM

MARCH, 1981 INSPECTION

SERIES 44

FPL-C

INLET (HL)



<---- MANWAY Gauging Program - Test Area outside Box through top support with .650, .610 and .540 probes. - 1269 TUBES.

NOZZLE ---->

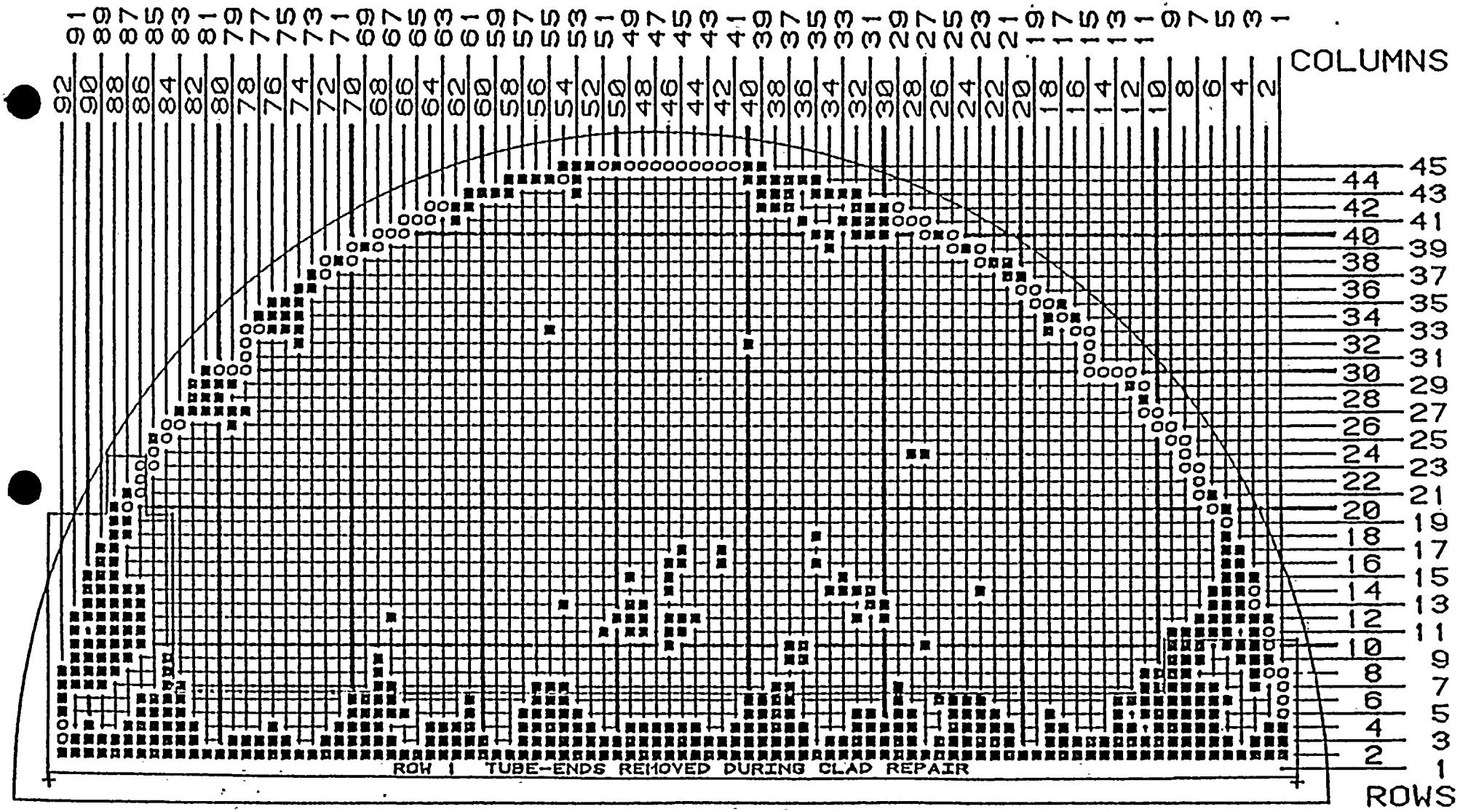
FIGURE 8

TURKEY POINT UNIT #3
STEAM GENERATOR C - COLD LEG
GAUGING PROGRAM

MARCH, 1981 INSPECTION

SERIES 44

FPL-C
OUTLET (CL)



←--- MANWAY Gauging Program - Test Blocked in Area NOZZLE ---→
through Top Support with .610 and .540 probes

226 Tubes

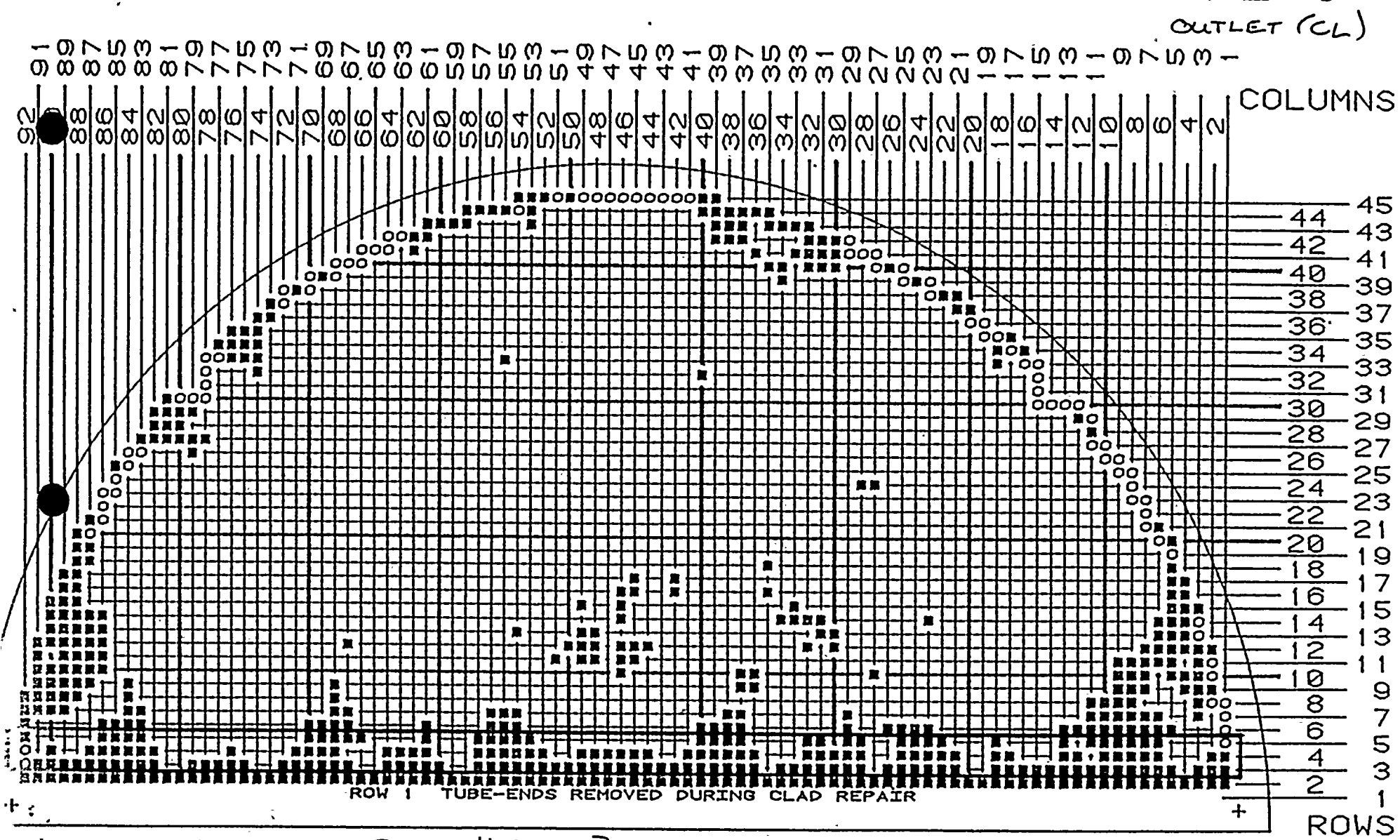
FIGURE 9

TURKEY POINT UNIT #3
STEAM GENERATOR C - COLD LEG
TIGHT RADIUS U-BEND PROGRAM

MARCH, 1981 INSPECTION

SERIES 44

FPL-C

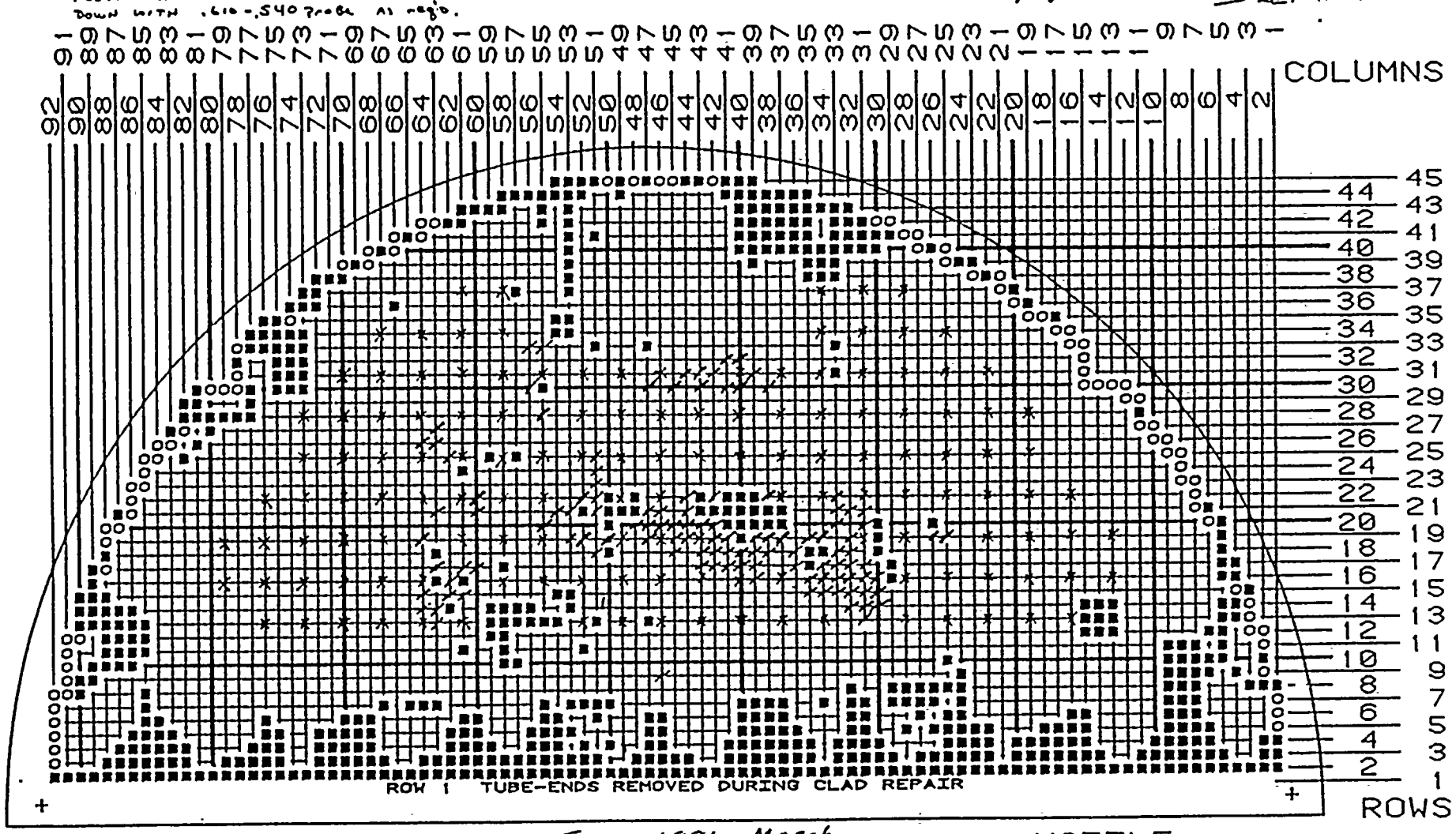


Tight Radius U-Bend Program - Test Blocked-in Area through U-Bend with .610 BF and 540 BF

102 Tubes.

X Reg Guide - inspect Thru ubend w/.700 F - 139 Tubes
If any Tubes are found restricted gauge w/.610 F (ic) followed by .610/.540 as req'd.
All Tubes found Restricted to .650 probe shall be "boxed" in with .650 probes
All Restricted Tubes shall be gauged down with .610 - .540 probe as req'd.
1 - Inspect 111 tubes with previous indications thru 1st support with .700 F probe. If any tubes are restricted to .700 probe gauge w/.650 probe through support. Tubes found to be restricted to .650 probe shall be "boxed in" with .650. All restricted tubes shall be gauged down with .610 - .540 probe as req'd.

SERIES 44
Reg Guide
FPL-A
Inlet (HL)



←--- MANWAY Reg Guide inspection - 1981 March NOZZLE ---→

INLET

FIGURE 10

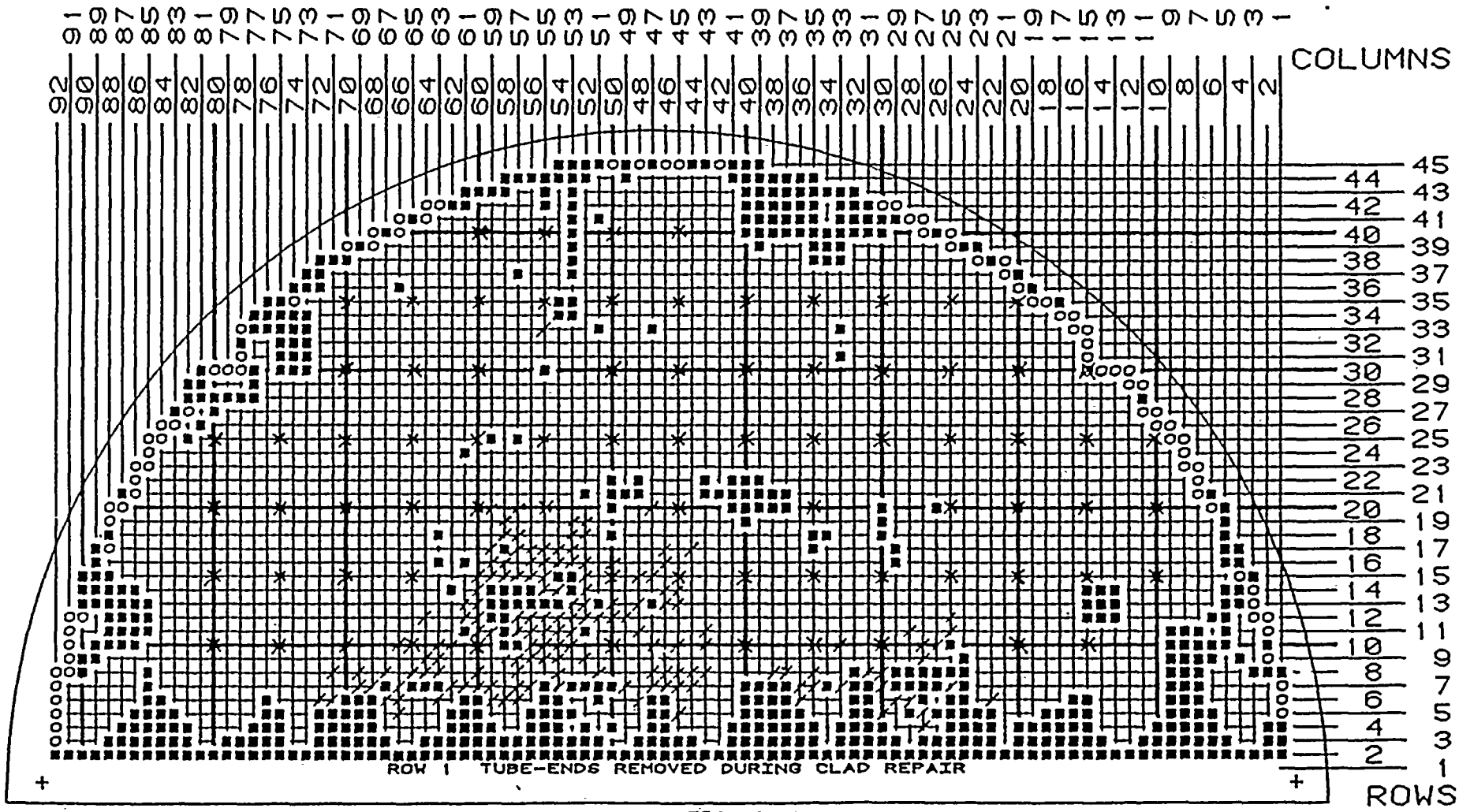
TURKEY POINT UNIT #3
STEAM GENERATOR A - HOT LEG
REG. GUIDE 1.83 INSPECTION PROGRAM
MARCH 1981

X - Reg Guide Inspection - 78 Tubes Thru 1ST support with .700 F probe.
Same method of inspection will be applied to these tubes as is explained below.

/ - Inspect 156 tubes with previous indications thru 1st support with .700 F probe. If any tubes are restricted to .700 probe gauge w/.610 probe thru 6TH support. Tubes found restricted to .610 probe shall be "Boxed In" with .610 probe. Any restricted tubes shall be gauged down with .540 probe as req'd.

SERIES 44
REG Guide

FPL-A
OUTLET (CL).



← --- MANWAY

NOZZLE --- →

FIGURE 11

TURKEY POINT UNIT #3
STEAM GENERATOR A - COLD LEG
REG. GUIDE 1.83 INSPECTION PROGRAM

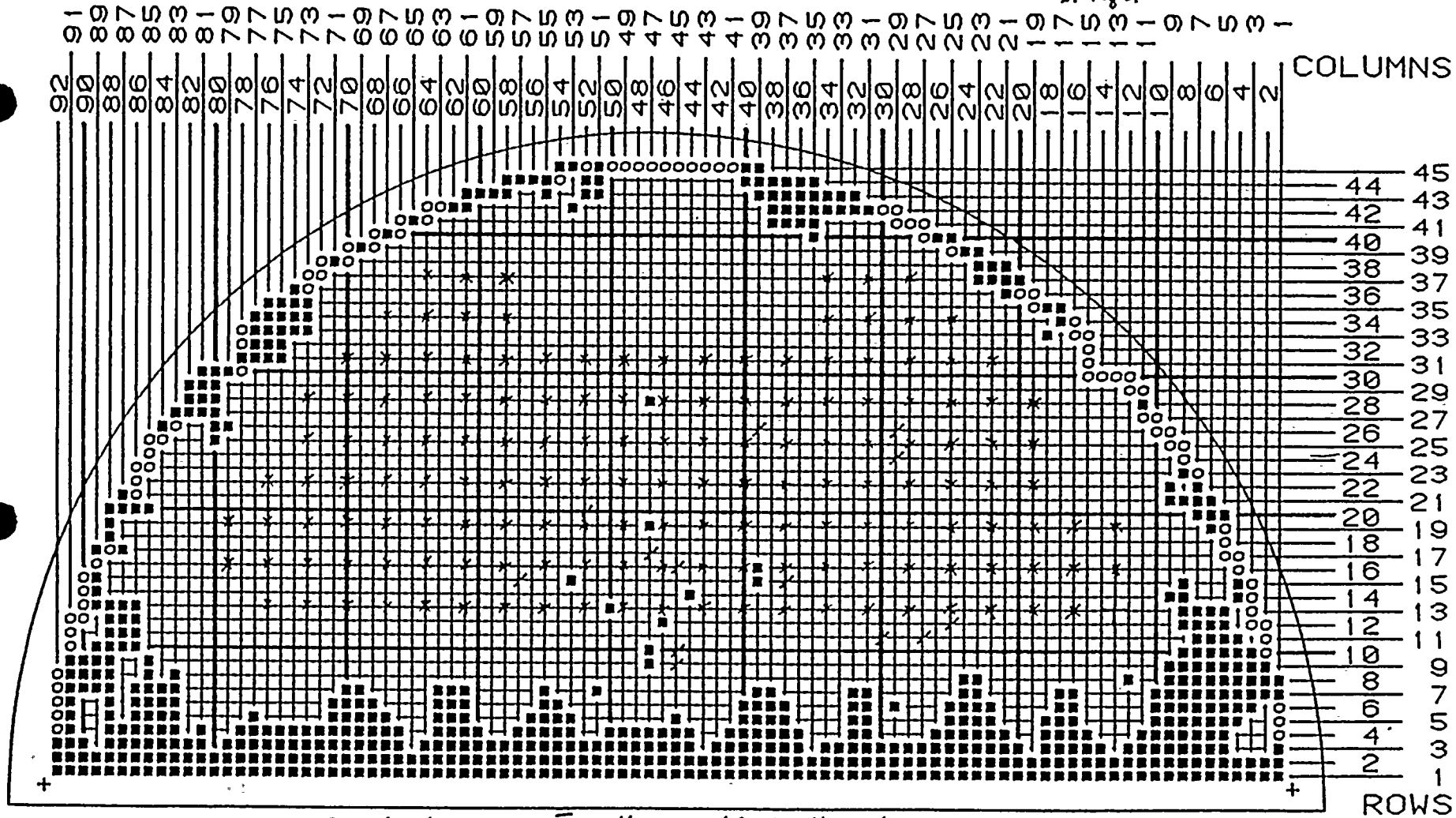
MARCH, 1981

X - REG GUIDE INSPECTION 157 TUBES THRU U BEND w/.720SF (ALT .700F)
ANY TUBES RESTRICTED w/.650 PROBE ARE TO BE BOXED (8 ADJ. TUBES)
ANY TUBES RESTRICTED w.650 PROBE ARE TO BE GAUGED DOWN w/.610 - .540

SERIES 44
REG GUIDE

FPL-B
INLET

/ - INSPECT 13 TUBES WITH PREVIOUS INDICATIONS THRU 1ST SUPPORT WITH .700F PROBE. IF ANY TUBES ARE RESTRICTED TO .700, GAUGE w/.650 PROBE THRU 6TH SUPPORT. TUBES FOUND RESTRICTED TO .650 PROBE SHALL BE "BOXED IN" WITH .650. ALL RESTRICTED TUBES SHALL BE GAUGED DOWN w/.610 - .540 PROBE AS req'd.



← --- MANWAY REG GUIDE INSPECTION MAP - 1981 MARCH
INLET

NOZZLE --- →

FIGURE 12

TURKEY POINT UNIT #3
STEAM GENERATOR B - HOT LEG
REG. GUIDE 1.83 INSPECTION PROGRAM
MARCH, 1981

/ - Inspect 51 tubes with previous indications thru 1st support with .700 F probe. If any tubes are restricted to .700, gauge w/.610 probe thru 6th support. Tubes found to be restricted to .610 shall be "Boxed In" with a .610. All restricted tubes shall be gauged down w/.540 as req'd.

X - Reg Guide Inspection. 88 tubes thru 1st support w/.700 probe. Same method of inspection will be applied to these tubes as explained above. (These 88 tubes are picked at random, if tube is obstructed ((i.e. template plug)) do adjacent tube)

SERIES 44
Reg Guide
FPL-B
OUTLET (CL)

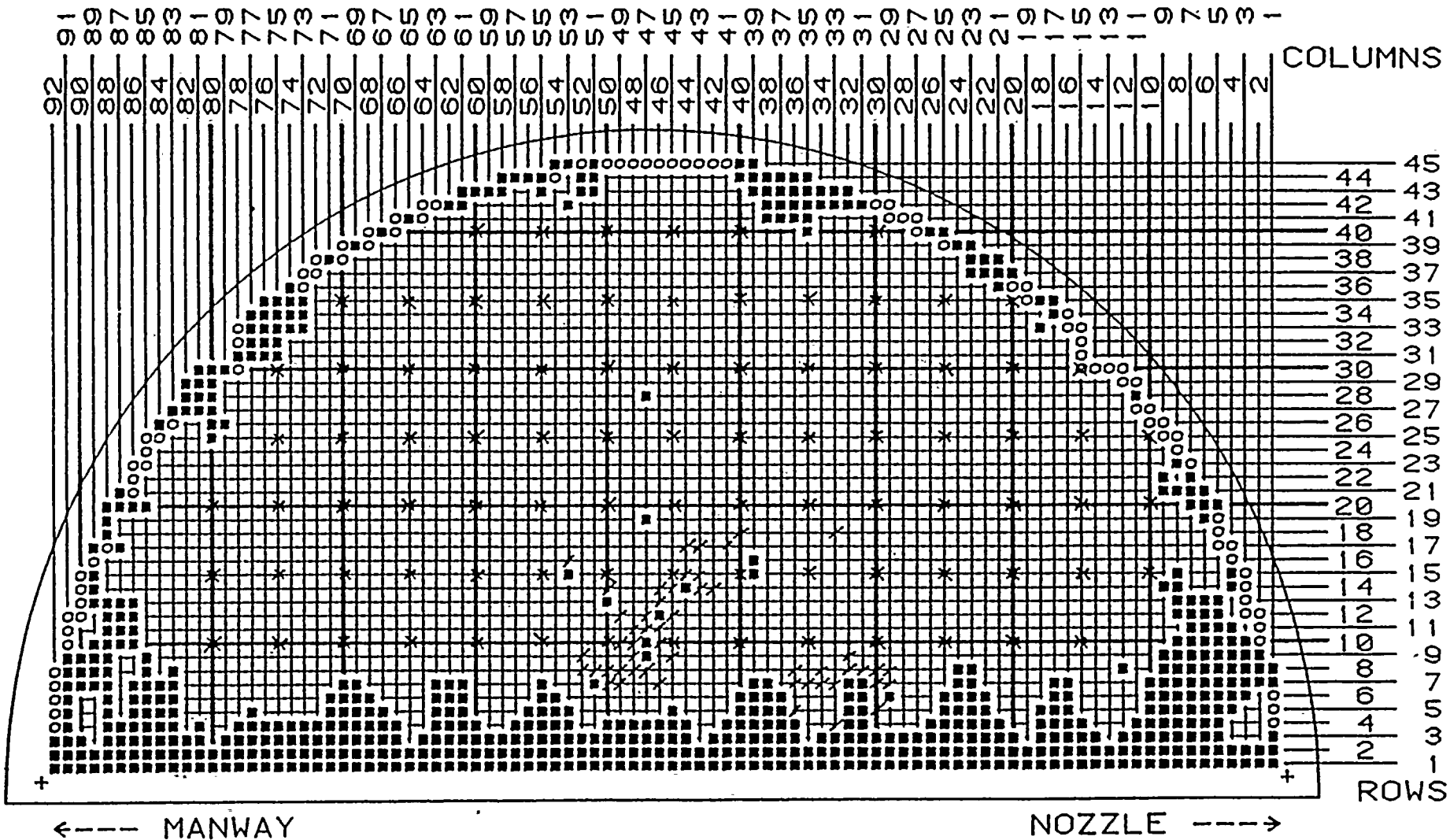


FIGURE 13

TURKEY POINT UNIT #3
STEAM GENERATOR B - COLD LEG
REG. GUIDE 1.83 INSPECTION PROGRAM
MARCH, 1981

X - REG GUIDE PROGRAM - INSPECT 153 TUBES THRU U-BEND W/ 720 SF (ALT. 700 F). IF RESTRICTED GAUGE W/ .650 Ø BURINT GAUGING PROGRAM. (I.D. IN PROGRAM BY "RG" AND EXTENT) IF tube restricts CEO, gauge & adjacent tubes with CEO.

/ - INSPECT 14 TUBES W/ PERIMETER INDICATIONS THRU FIRST SUPPORT PLATE W/.700 F PROBE. IF ANY TUBES ARE RESTRICTED TO .700 PROBE GAUGE W/.650 PROBE TOW 6TH SUPPORT PLATE. TUBE RESTRICTED TO .650 PROBE ARE TO BE "BOXED IN" W/.650 PROBE. ALL RESTRICTED TUBES SHALL BE GAUGED DOWN W/ .610 - .540 PROBE AS REQ'D.

SERIES 44
REG GUIDE

FPL-C
INLET (HL)

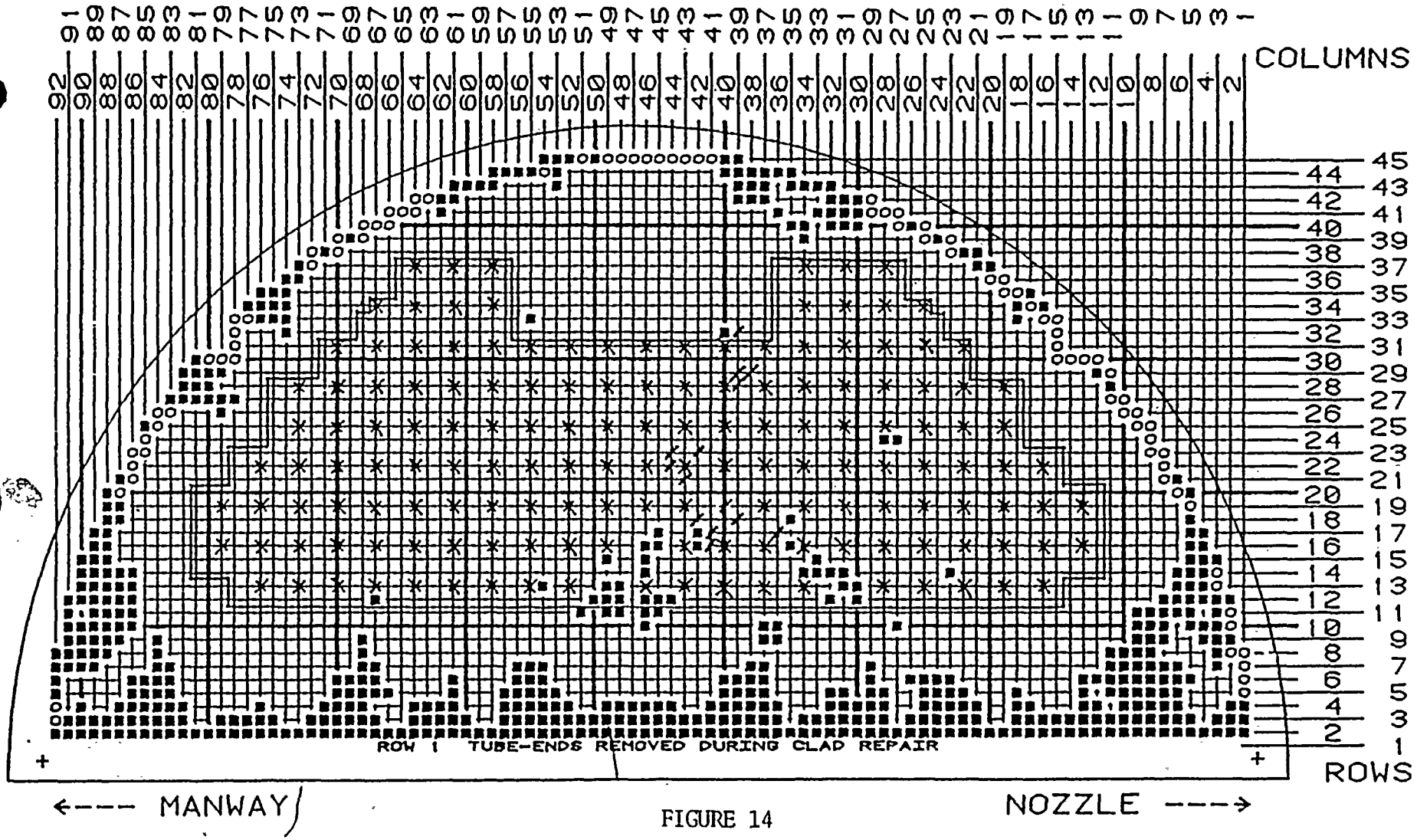


FIGURE 14

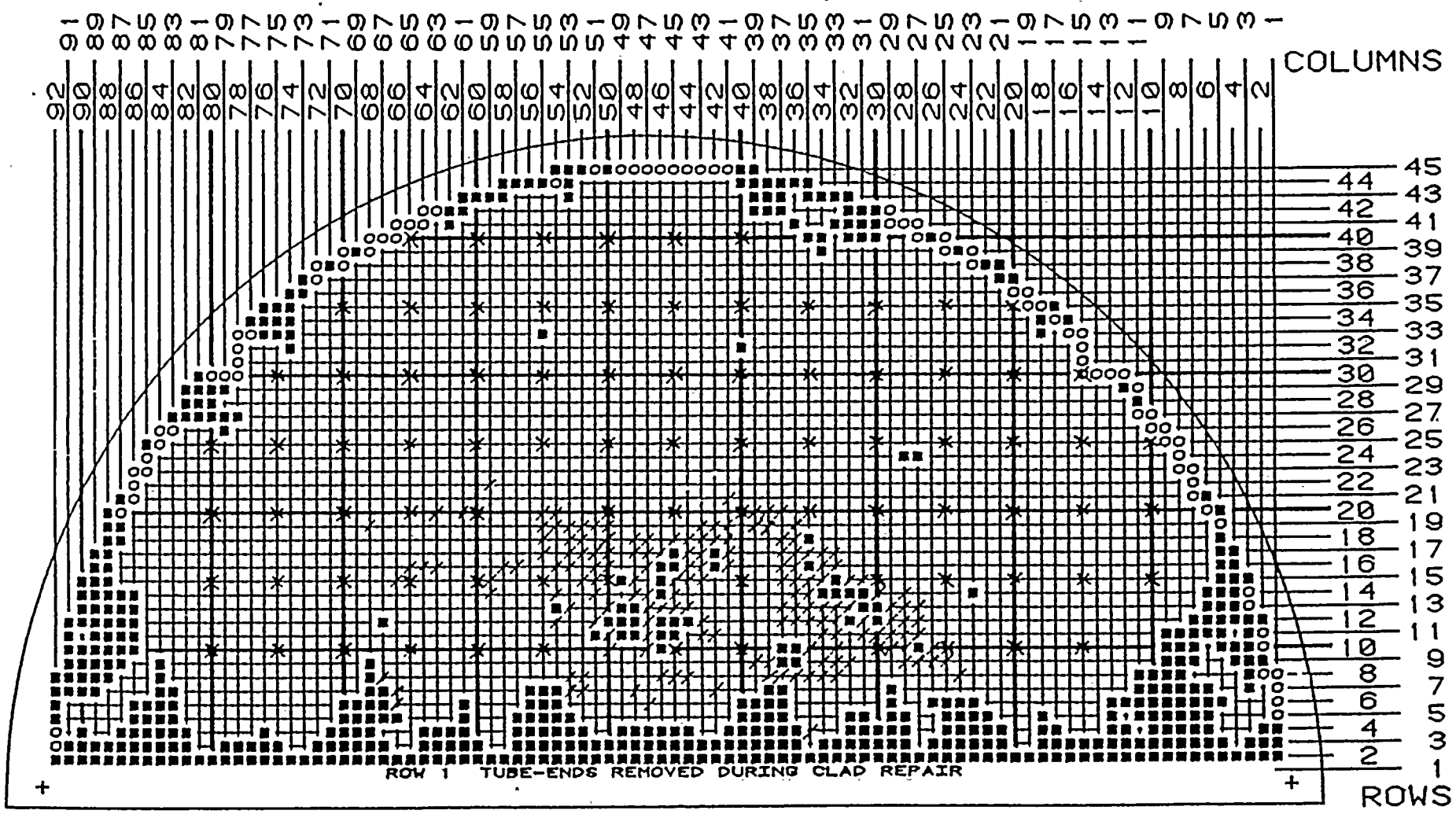
TURKEY POINT UNIT #3
STEAM GENERATOR C - HOT LEG
REG. GUIDE 1.83 INSPECTION PROGRAM

MARCH, 1981

X - REG GUIDE INSPECTION - 84 TUBES THRU FIRST SUPPORT PLATE W/ .700 F PROBE. (Use method of inspection described below)

/ - INSPECT 169 TUBES W/ PREVIOUS INDICATIONS THRU FIRST SUPPORT W/ .700 F PROBE. IF ANY TUBES ARE RESTRICTED TO .700 PROBE GAUGE W/ .610 PROBE THRU 6TH SUPPORT PLATE. TUBES FOUND RESTRICTED TO .610 PROBE SHALL BE "BOXED IN" WITH .610 PROBE. ALL RESTRICTED TUBES SHALL BE GAUGED DOWN W/ .540 PROBE AS REQ'D

SERIES 44
Reg Guide
FPL-C
OUTLET (CL)



← --- MANWAY

NOZZLE ---→

FIGURE 15

TURKEY POINT UNIT #3
STEAM GENERATOR C - COLD LEG
REG. GUIDE 1.83 INSPECTION PROGRAM

MARCH, 1981

A	92	BEFORE 1/76; TUBE ENDS REMOVED
B	20	PRIOR TO 12/75; TUBES PLUGGED
C	22	12/75; TUBES PLUGGED
D	1	5/76;;TUBE PLUGGED
E	1	8/76; TUBE PLUGGED
F	67	12/76; TUBES PLUGGED
G	181	12/77; TUBES PLUGGED
H	2	8/78; TUBES PLUGGED
I	0	SYMBOL NOT USED
1	0	INDICATIONS
J	186	1/79; TUBES PLUGGED
K	67	1/80; TUBES PLUGGED
L	70	10/80; MP TUBES

SERIES 44

FPL-A

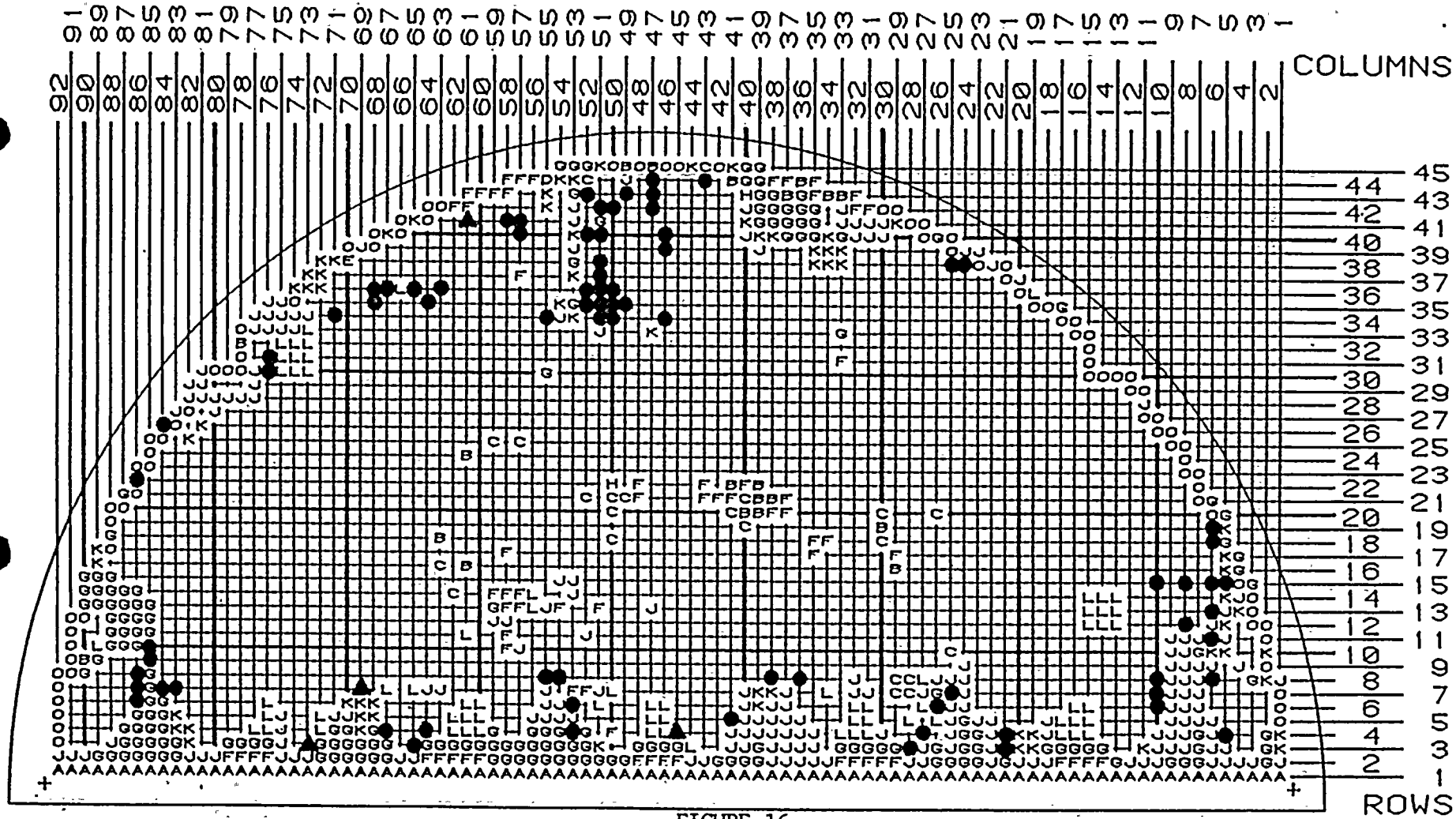


FIGURE 16

TURKEY POINT UNIT #3
GAUGING RESULTS, MARCH, 1981
STEAM GENERATOR A - HOT LEG

RESTRICTED TUBES	NO. OF TUBES
X = .540 Probe	None
▲ = .610 Probe	4
● = .650 Probe	78

A	2	SHOP WELD
B	6	PRIOR TO 12/75, TUBES PLUGGED
C	3	12/75, TUBES PLUGGED
D	8	3/76, TUBES PLUGGED
E	149	12/76, TUBES PLUGGED
F	263	12/77, TUBES PLUGGED
G	141	1/79, TUBES PLUGGED
H	17	2/79, TUBES PLUGGED
I	1	2/79, EP PRIOR TO 12/75, WR HL
J	1	2/79, EP 12/76, WR HL
K	1	2/79, EP 1/79, WR HL
L	48	1/80, TUBES PLUGGED
M	1	1/80, EP 12/75, WR HL
N	1	1/80, EP 12/76, WR HL
P	2	1/80, EP 2/79, WR HL
R	7	10/80, MP TUBES

SERIES 44

FPL-B

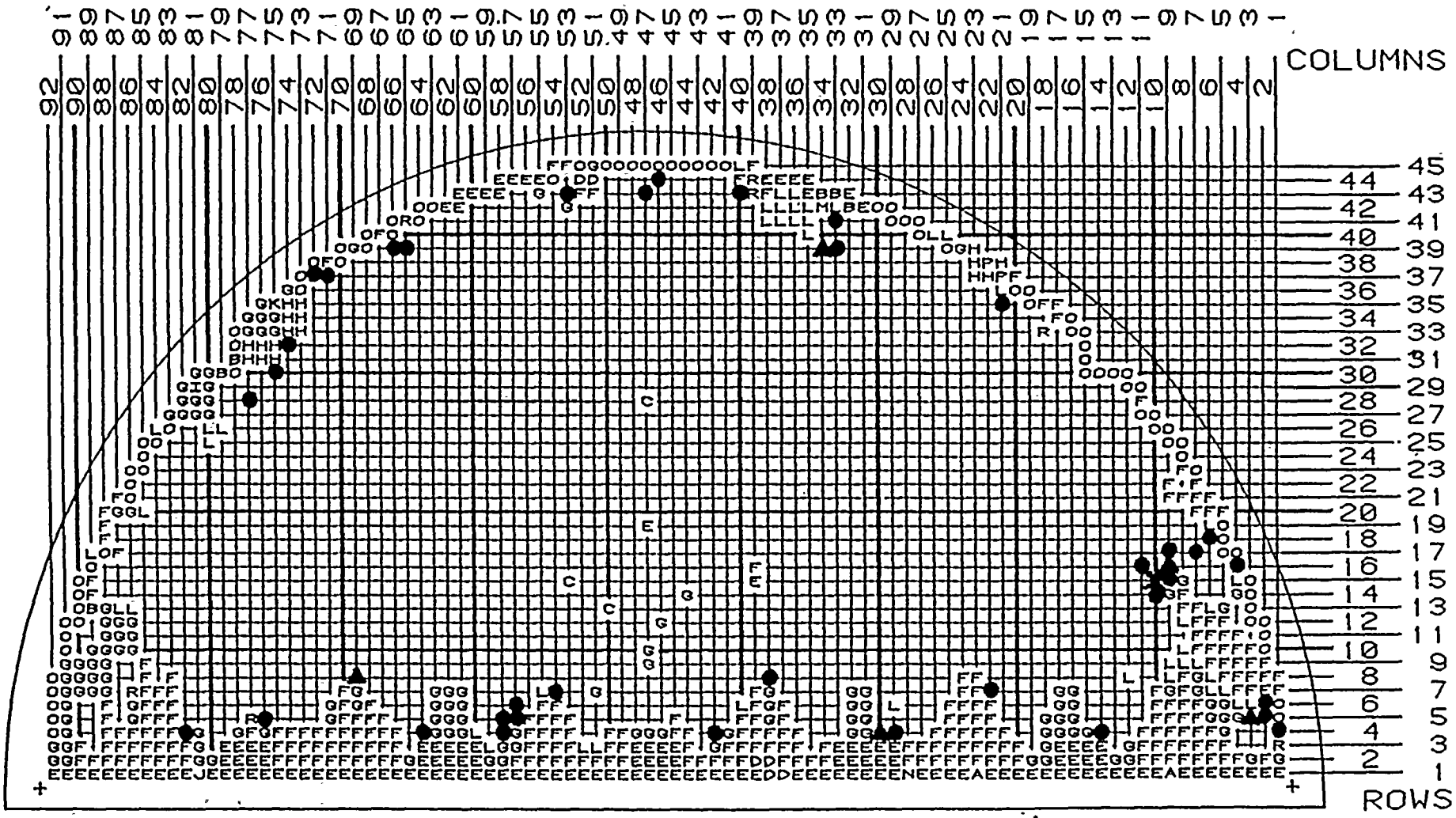


FIGURE 17

TURKEY POINT UNIT #3
GAUGING RESULTS, MARCH, 1981
STEAM GENERATOR B - HOT LEG

RESTRICTED TUBES	NO. OF TUBES
X = .540 Probe	1
▲ = .610 Probe	5
● = .650 Probe	37

A	92	BEFORE 1/76; TUBE ENDS REMOVED
B	1	SHOP WELD
C	7	PRIOR TO 12/75; TUBES PLUGGED
D	9	12/75; TUBES PLUGGED
E	1	6/76; TUBE PLUGGED
F	56	12/76; TUBES PLUGGED
G	160	12/77; TUBES PLUGGED
H	1	8/78; TUBE PLUGGED
X	0	INDICATIONS
1	0	INDICATIONS
I	225	1/79; TUBES PLUGGED
J	67	1/80; TUBES PLUGGED
K	23	10/80;MP TUBES

SERIES 44

FPL-C

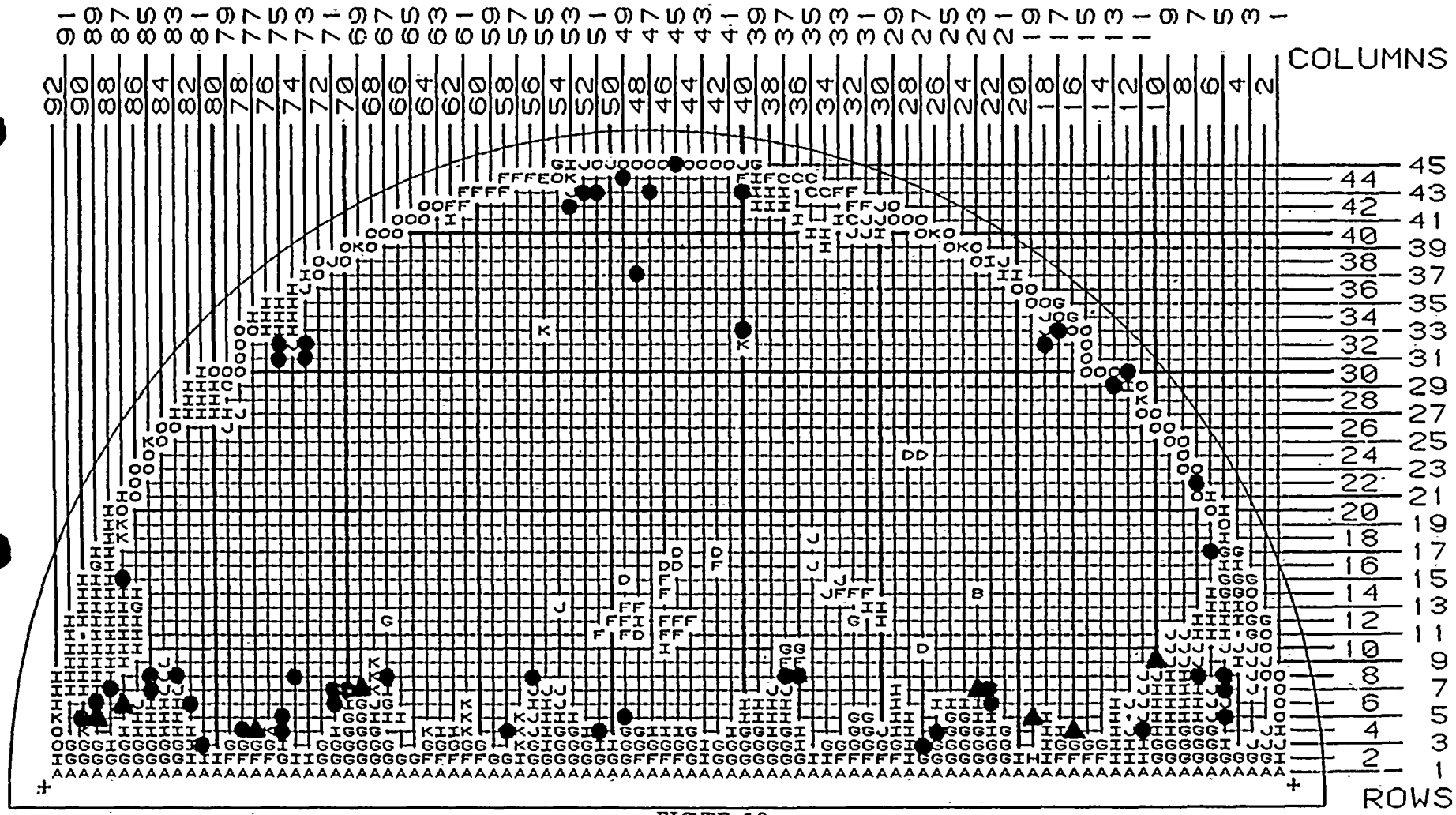


FIGURE 18
TURKEY POINT UNIT #3
STEAM GENERATOR C - HOT LEG
GAUGING RESULTS - MARCH, 1981

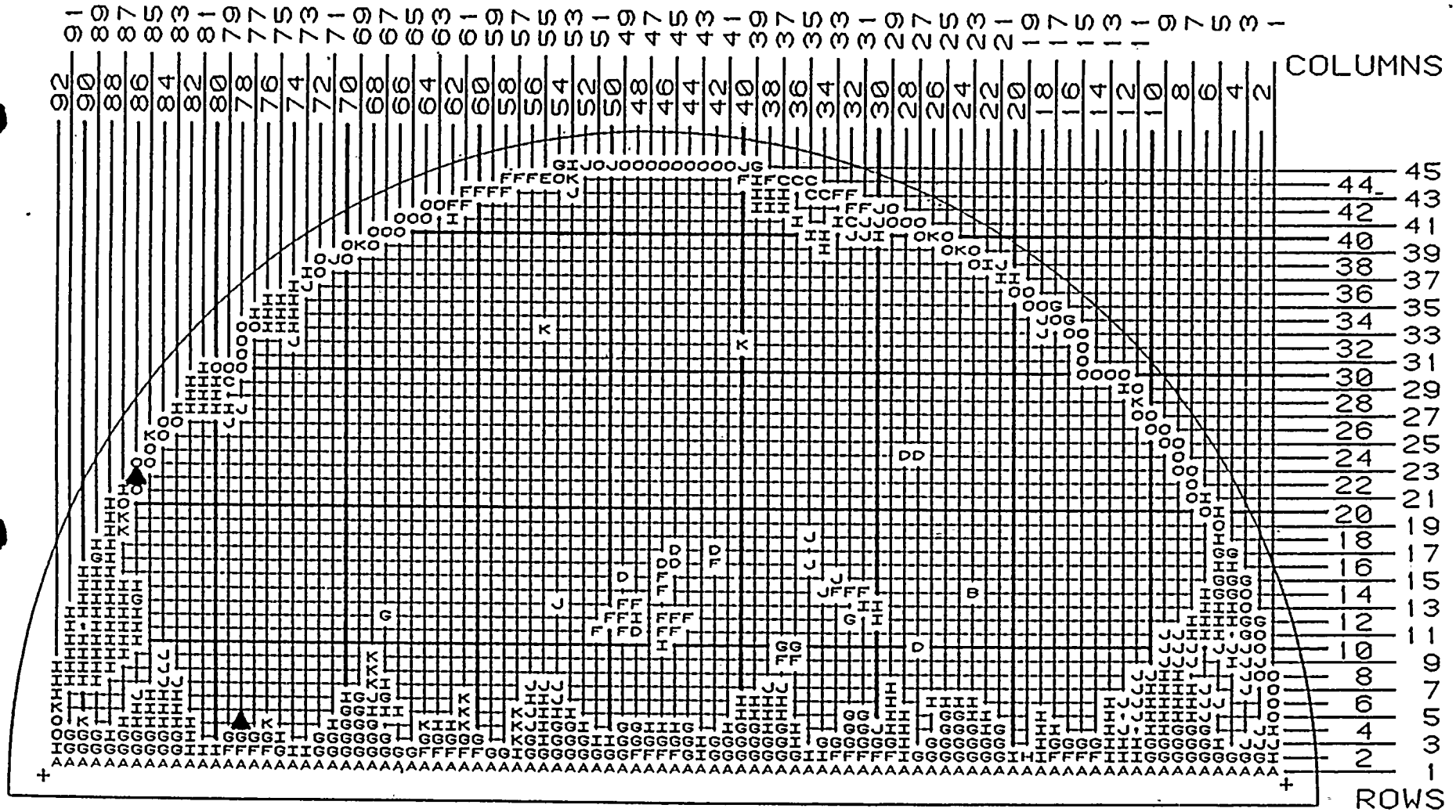
RESTRICTED TUBES	NO. OF TUBES
X = .540 Probe	None
▲ = .610 Probe	8
● = .650 Probe	51

FIGURE 19

A	92	BEFORE 1/76; TUBE ENDS REMOVED
B	1	SHOP WELD
C	7	PRIOR TO 12/75; TUBES PLUGGED
D	9	12/75; TUBES PLUGGED
E	1	6/76; TUBE PLUGGED
F	56	12/76; TUBES PLUGGED
G	160	12/77; TUBES PLUGGED
H	1	8/78; TUBE PLUGGED
X	0	INDICATIONS
I	0	INDICATIONS
I	225	1/79; TUBES PLUGGED
J	67	1/80; TUBES PLUGGED
K	23	10/80;MP TUBES

SERIES 44

FPL-C



TURKEY POINT UNIT 3
STEAM GENERATOR C - COLD LEG
GAUGING RESULTS, MARCH 1981

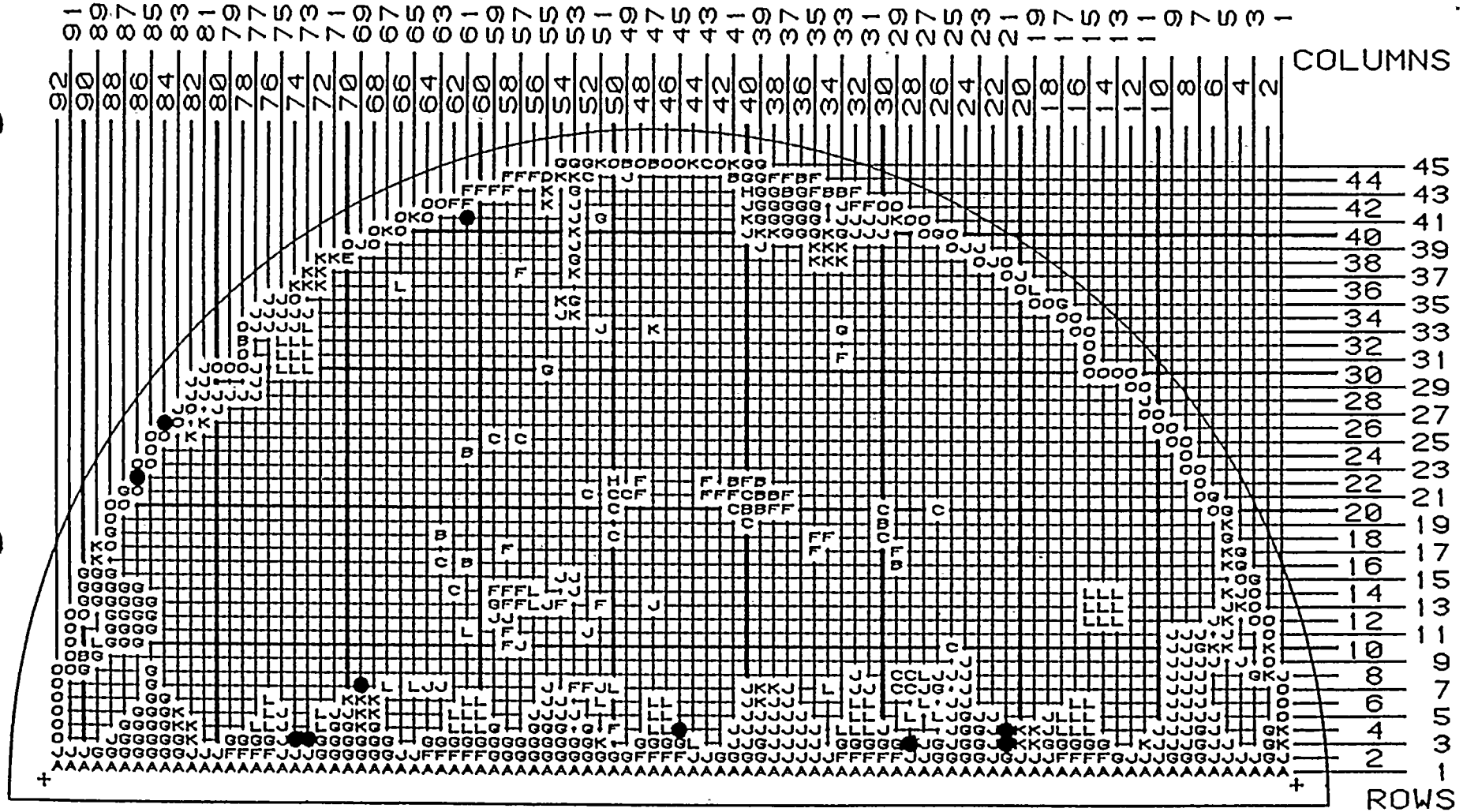
RESTRICTED TUBES	NO. OF TUBES
X = .540 PROBE	NONE
▲ = .610 PROBE	2
● = .650 PROBE	NOT TESTED

FIGURE 20

A	92	BEFORE 1/76; TUBE ENDS REMOVED
B	20	PRIOR TO 12/75; TUBES PLUGGED
C	22	12/75; TUBES PLUGGED
D	1	5/76;;TUBE PLUGGED
E	1	8/76; TUBE PLUGGED
F	67	12/76; TUBES PLUGGED
G	181	12/77; TUBES PLUGGED
H	2	8/78; TUBES PLUGGED
I	0	SYMBOL NOT USED
I	0	INDICATIONS
J	186	1/79; TUBES PLUGGED
K	67	1/80; TUBES PLUGGED
L	70	10/80; MP TUBES

SERIES 44

FPL-A



TURKEY POINT UNIT 3
STEAM GENERATOR A
MARCH 1981

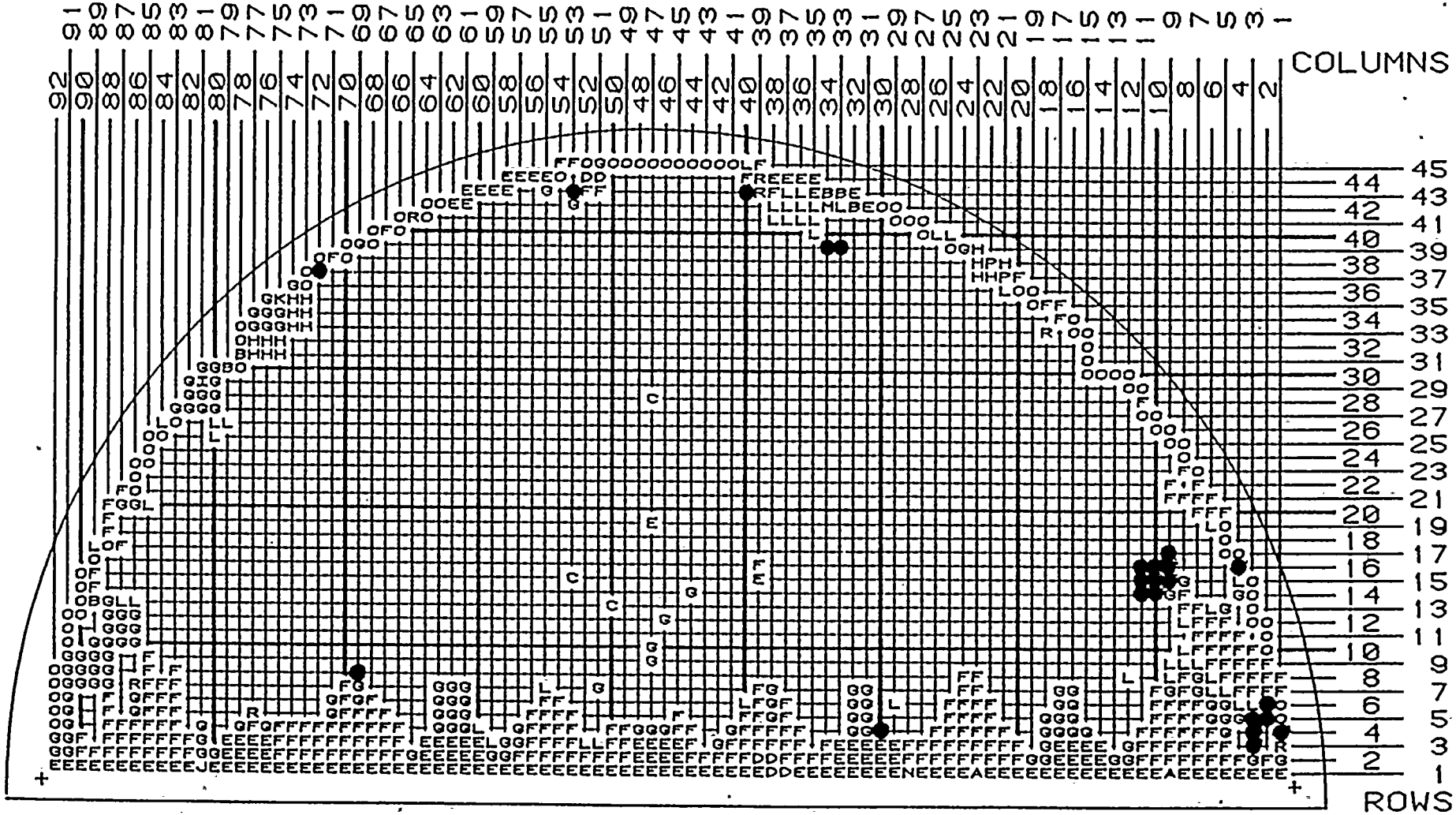
RECOMMENDED PLUGGING PER:
● = GAUGING RESULTS (10 TUBES)
X = REG. GUIDE 1.83 (NO TUBES)

FIGURE 21

A	2	SHOP WELD
B	6	PRIOR TO 12/75, TUBES PLUGGED
C	3	12/75, TUBES PLUGGED
D	6	3/76, TUBES PLUGGED
E	149	12/76, TUBES PLUGGED
F	263	12/77, TUBES PLUGGED
G	141	1/79, TUBES PLUGGED
H	17	2/79, TUBES PLUGGED
I	1	2/79, EP PRIOR TO 12/75, WR HL
J	1	2/79, EP 12/76, WR HL
K	1	2/79, EP 1/79, WR HL
L	46	1/80, TUBES PLUGGED
M	1	1/80, EP 12/75, WR HL
N	1	1/80, EP 12/76, WR HL
P	2	1/80, EP 2/79, WR HL
R	7	10/80, HP TUBES

SERIES 44

FPL-B



← --- MANWAY

NOZZLE ---→

TURKEY POINT UNIT 3
STEAM GENERATOR B
MARCH 1981

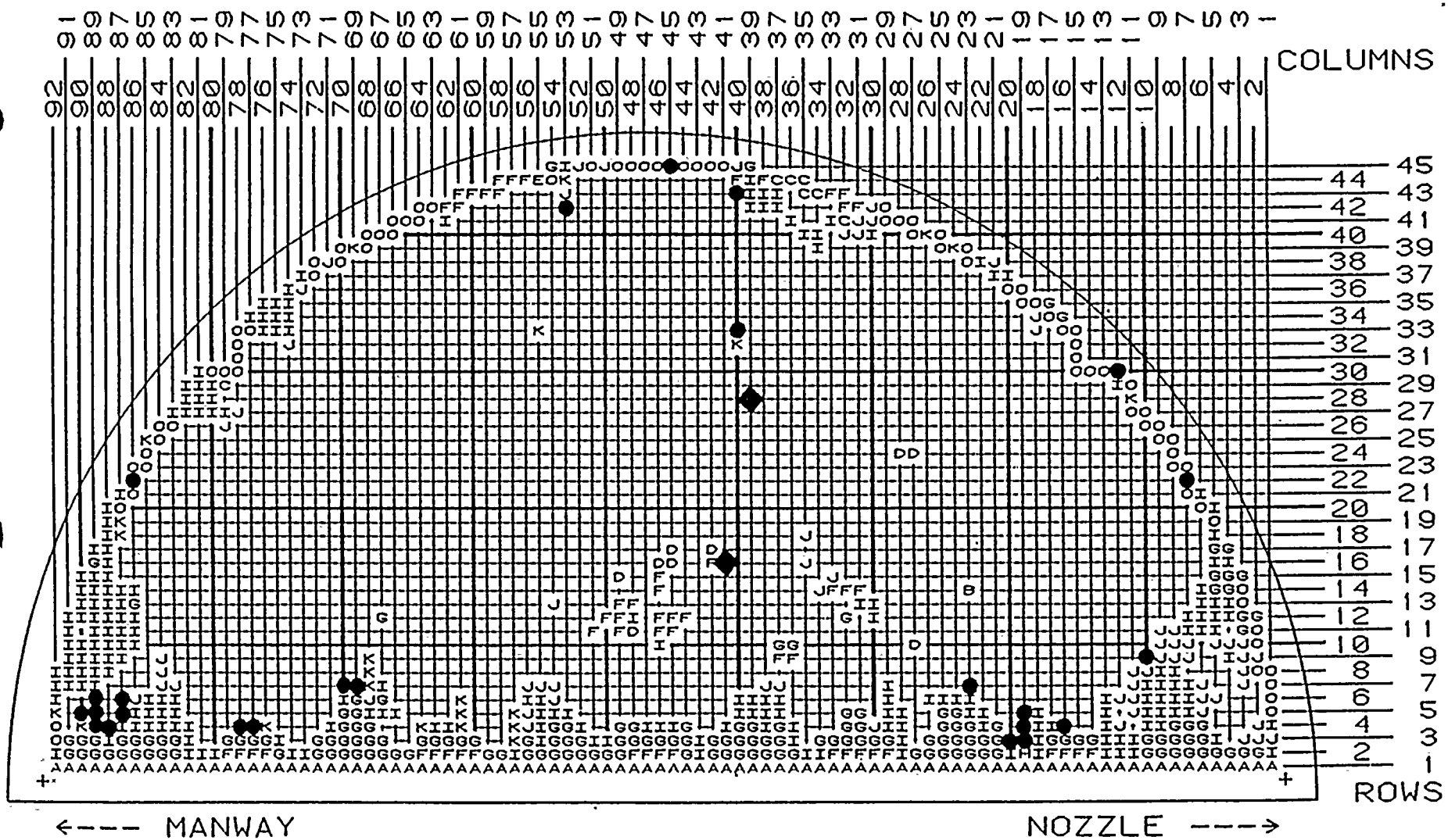
RECOMMENDED PLUGGING PER:
● = GAUGING RESULTS (23 TUBES)
X = REG. GUIDE 1.83 (NO TUBES)

FIGURE 22

A	92	BEFORE 1/76; TUBE ENDS REMOVED
B	1	SHOP WELD
C	7	PRIOR TO 12/75; TUBES PLUGGED
D	9	12/75; TUBES PLUGGED
E	1	6/76; TUBE PLUGGED
F	56	12/76; TUBES PLUGGED
G	160	12/77; TUBES PLUGGED
H	1	8/78; TUBE PLUGGED
X	0	INDICATIONS
I	0	INDICATIONS
I	225	1/79; TUBES PLUGGED
J	67	1/80; TUBES PLUGGED
K	23	10/80; MP TUBES

SERIES 44

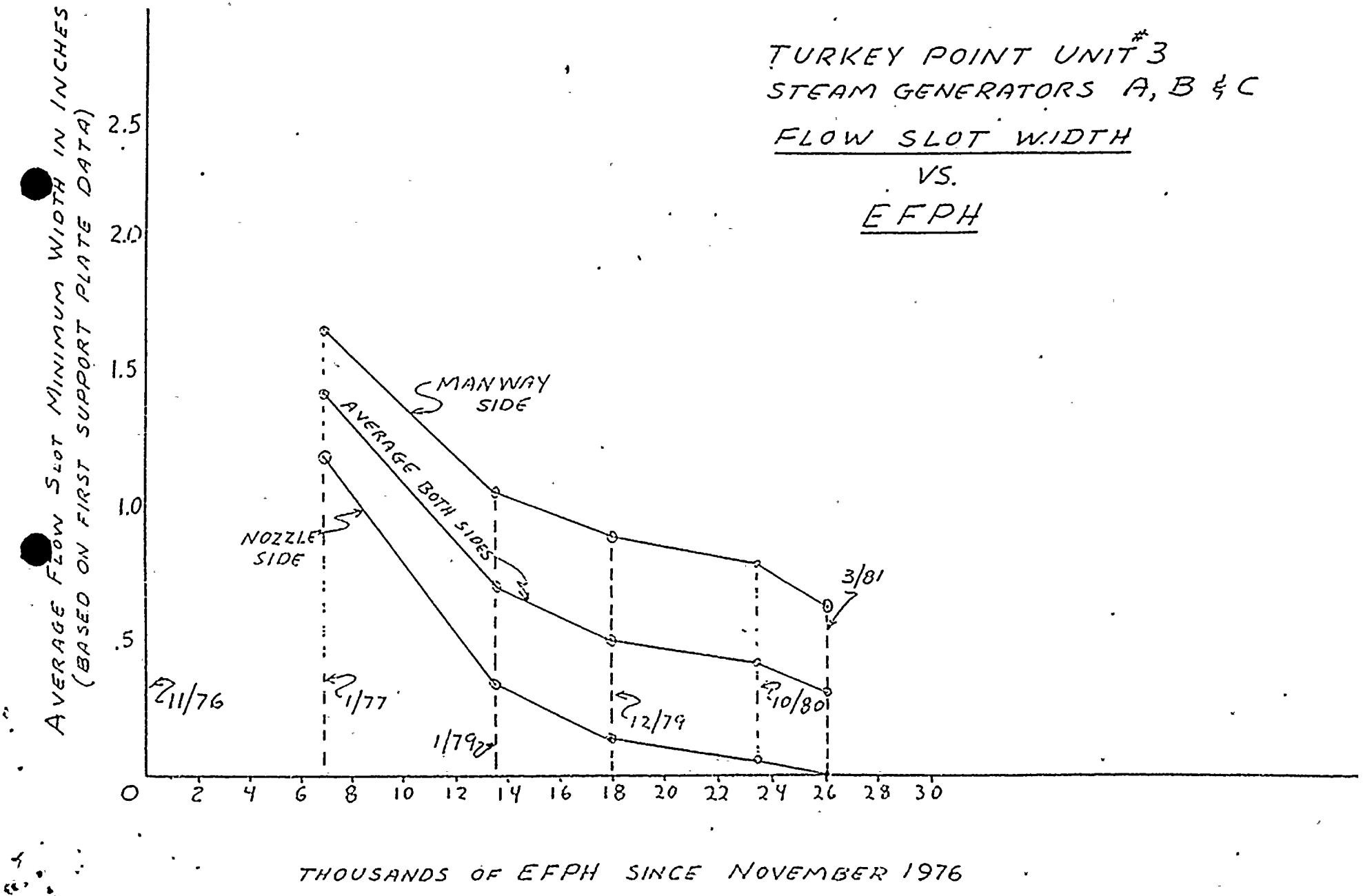
FPL-C



TURKEY POINT UNIT #3
STEAM GENERATOR C
MARCH 1981

RECOMMENDED PLUGGING PER:
● = GAUGING RESULTS (25 TUBES)
X = REG. GUIDE 1.83 (NO TUBES)
◆ = CONSERVATIVE (2 TUBES)

FIGURE 23


TURKEY POINT UNIT #3
STEAM GENERATORS A, B & C
FLOW SLOT WIDTH
VS.
EFPH
AVERAGE FLOW SLOT MINIMUM WIDTH IN INCHES
(BASED ON FIRST SUPPORT PLATE DATA)
2.5
2.0
1.5
1.0
.5
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
MANWAY SIDE
AVERAGE BOTH SIDES
NOZZLE SIDE
11/76
1/77
1/79
12/79
10/80
3/81
THOUSANDS OF EFPH SINCE NOVEMBER 1976

UPDATE REPORT - PREVIOUS REPORT DATE JANUARY 2, 1980

NRC FORM 366 (7-77)

U. S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT

CONTROL BLOCK: (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

01 FLTPS3 (2) 00-00000-00 (3) 4111 1 (4) (5)

LICENSEE CODE — LICENSE NUMBER — LICENSE TYPE — CAT

CON'T

01 REPORT SOURCE L (6) 05000 2510 (7) 120379 (8) 040181 (9)

DOCKET NUMBER — EVENT DATE — REPORT DATE

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

During refueling shutdown while conducting steam generator inspections, foreign material was observed on the "as found" 3B steam generator tubesheet photographs. Subsequent inspection by both licensee and NSSS vendor personnel resulted in discovery and retrieval of additional foreign material.

09 SYSTEM CODE CA (11) CAUSE CODE A (12) CAUSE SUBCODE X (13) COMPONENT CODE ZZZZZZ (14) COMP. SUBCODE Z (15) VALVE SUBCODE Z (16)

(17) LER/RO REPORT NUMBER: EVENT YEAR 79 — SEQUENTIAL REPORT NO. 039 — OCCURRENCE CODE 03 — REPORT TYPE X — REVISION NO. 1

ACTION TAKEN X (18) FUTURE ACTION X (19) EFFECT ON PLANT Z (20) SHUTDOWN METHOD Z (21) HOURS (22) 0000 ATTACHMENT SUBMITTED Y (23) NPRD-4 FORM SUB. N (24) PRIME COMP. SUPPLIER Z (25) COMPONENT MANUFACTURER Z999 (26)

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

Subsequent examination and evaluation determined the objects to be from a single piece of unalloyed plain carbon steel and a steam generator tube plug skirt. Visual examinations and planned use of a MIMS during startup should provide assurance that all foreign material was retrieved. Current programs/procedures should prevent recurrence of an event of this type.

FACILITY STATUS H (28) % POWER 000 (29) OTHER STATUS (30) NA METHOD OF DISCOVERY C (31) DISCOVERY DESCRIPTION (32) Steam generator inspection

ACTIVITY RELEASED Z (33) CONTENT OF RELEASE Z (34) AMOUNT OF ACTIVITY (35) NA LOCATION OF RELEASE (36) NA

PERSONNEL EXPOSURES NUMBER 000 (37) TYPE Z (38) DESCRIPTION (39) NA

PERSONNEL INJURIES NUMBER 000 (40) DESCRIPTION (41) NA

LOSS OF OR DAMAGE TO FACILITY TYPE Z (42) DESCRIPTION (43) NA

PUBLICITY ISSUED N (44) DESCRIPTION (45) NA

NRC USE ONLY

A002

1/0 S

NAME OF PREPARER P.L. Pace PHONE: (305) 552-3801

Dupe of 8104070393

Additional Event Description and Probable Consequences:

During refueling shutdown while conducting steam generator inpsections, foreign material was observed on the "as found" 3B steam generator tubesheet photographs. Subsequent inspection by both licensee and NSSS vendor personnel resulted in discovery and retrieval of the following:

3B S/G - Hot Leg
- 7 pieces of sheet metal type (approx. 16 gauge), ferromagnetic material
- 1 apparent piece of tube plug skirt (ring), non-ferromagnetic
- total weight of the above 8 pieces: 243 grams

- 1 apparent piece of tube plug skirt, non-ferromagnetic material, was removed from R-8, C-12. (The material was retrieved from a point approx. 2 inches up from the primary face of the tubesheet.)
- total weight of the above piece: 4.5 grams

3C S/G - Hot Leg
- 4 pieces of sheet metal type (approx. 16 gauge), ferromagnetic material
- total weight of the above 4 pieces: 116 grams

During the March 1981 refueling shutdown, while conducting steam generator inspections, foreign material was observed and retrieved from the 3C steam generator.

3C S/G - Hot Leg
- 1 piece of sheet metal type, ferromagnetic material
- total weight of the above piece: 255 grams

Additional Cause Description and Corrective Actions:

Independent laboratory analyses of a sample of the ferromagnetic material confirmed that the sample is an unalloyed plain carbon steel. Additionally, visual examination of the foreign material supports the conclusion that the objects were from separate sources. i.e., the ferromagnetic objects originated from the same base piece and that the non-ferromagnetic objects were part of a tube plug skirt.

Based on the fact that unalloyed carbon steel is not used within the reactor coolant system, an examination of equipment in proximity to the reactor vessel/refueling cavity was conducted. However, the source of the material could not be located. The logical conclusion is that the ferromagnetic material was introduced into the reactor coolant system during a previous refueling shutdown, steam generator inspection outage, or during construction. The source of the non-ferromagnetic material was confirmed to be a tube plug that expanded improperly during the plugging process.

Visual examination of the foreign material which was discovered during the March 1981 refueling outage supports the conclusion that it originated from the same base piece which was previously discovered. A Metal Impact Monitoring System

had been used to monitor startups following both the previous refueling shutdown and the steam generator inspection, however, no abnormalities were detected.

As inspection was performed by licensee and NSSS vendor personnel of the upper internals and of a 90° sector of the reactor vessel where RC piping connects to steam generator "C". No anomalies, i.e., damage or additional foreign material, were noted.

The steam generator inspection program augmented by a visual examination of both the steam generator primary side and the reactor vessel provides assurance that all foreign objects were retrieved from the reactor coolant system. However, we currently plan to employ a Metal Impact Monitoring System to monitor startup.

Current inspection, surveillance, and quality control programs/procedures should prevent recurrence of an event of this type.