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AUTH.NAME AUTHOR AFFILIATION
UTLEY,E.E. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
VARGA,S.A. Operating Reactors Branch 1

SUBJECT: Forwards description of steam generator outage eddy current insp program which util has committed to perform prior to exceeding six effective full power months of operation from 801025. Outage scheduled to commence 810509.

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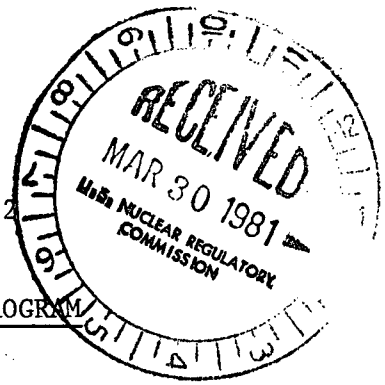
Carolina Power & Light Company

March 25, 1981

FILE: NG-3514(R) SERIAL NO: NO-81-536

Office of Nuclear Reactor Regulation
ATTENTION: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
United States Nuclear Regulatory Commission
Washington, D. C. 20555



H. B. ROBINSON STEAM ELECTRIC PLANT UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
STEAM GENERATOR OUTAGE EDDY CURRENT INSPECTION PROGRAM

Dear Mr. Varga:

In our letter to you dated October 22, 1980, Carolina Power & Light Company committed to provide a detailed description of the Steam Generator (S/G) Eddy Current inspection which Carolina Power & Light Company has committed to perform prior to exceeding six effective full power months of operation from October 25, 1980. The program is described in the enclosures.

The program scope far exceeds the minimum scope which would substantiate the calculated corrosion rates presented in our October 6, 1980 report for the U-bend region and the region just above the tubesheet in each S/G.

The Steam Generator outage is currently scheduled to commence May 9, 1981. This transmittal fulfills the requirement that Carolina Power & Light Company submit the Eddy Current inspection program scope for your review at least 45 days prior to the scheduled inspection.

Yours very truly,

E. E. Utley
Senior Executive Vice President
Power Supply and
Engineering & Construction

EVP/SDF/dk (N#46)
Enclosures

cc: Mr. J. D. Neighbors

A001
S
1/1

411 Fayetteville Street ◦ P. O. Box 1551 ◦ Raleigh, N. C. 27602

P 8103310546

Enclosure 1

General Inspection Requirements

The following general inspection requirements shall apply to all inspections to be performed:

1. Testing shall be performed using a multi-frequency eddy current probe capable of testing at four distinct frequencies simultaneously.

2. The following frequencies shall be used for all Steam Generator inspections:

   400 kHz high gain for defect detection
   100 kHz absolute for defect detection
   200 kHz for defect detection
   10 KHz for support plate ligament crack detection

3. Signal mixing shall be utilized to aid defect detection.

4. Eddy current data shall be recorded on magnetic tapes and two channel strip charts.

5. If a tube programmed for inspection will not pass an eddy current probe, each adjacent tube shall be inspected to the inspection requirements of the blocked tube.

Inspection Scope "A" Steam Generator

INLET

Total number of tubes to be inspected	2508
Total number of plugged tubes	267
Percentage of total unplugged tubes to be inspected	84%

1. Inspect all tubes in Group 1 from the inlet tubesheet to the second support plate.
2. Inspect all tubes in Group 2 from the inlet tubesheet around the U-bend to the sixth support plate on the outlet.
3. Inspect each tube in a second row third column grid (starting with R2C1), which is not included in Groups 1 and 2, from the inlet tubesheet around the U-bend to the sixth support plate on the outlet. (Total tubes to be inspected = 103).

Group 1

Row(s)	Column(s)	No. of Plugged Tubes	No. of Tubes to be Inspected
2	13 through & including 78; 83,84,85	1	68
3,4	13 through & including 78; 83,84,85; 90,91,92	5	139
5	13 through & including 78; 90,91,92	3	66
6,7	13 through & including 78	18	114
8,9,10	13 through & including 77	29	166
11,12	10,11,12,13; 15 through & including 75	7	123
13	10,11,12,13; 15 through & including 70	2	58
14,15	15 through & including 70	2	110
16,17	22 through & including 68	3	91
18,19,20	24 through & including 66	7	122
21,22,23, 24,25,26	26 through & including 66	3	243
27	26 through & including 64	4	35
28	35 through & including 64	4	26
29	35 through & including 63	2	27
30,31	37 through & including 63	7	47
32	37 through & including 61	2	23
33	43 through & including 61	0	19
34	50 through & including 61	0	12
35,36,37, 38,39,40	50 through & including 58	0	54
41	53,54,55	0	3
	Totals	99	1546

Group 2

Row(s)	Column(s)	No. of Plugged Tubes	No. of Tubes to be Inspected
8	1,2,3,4; 78 through & including 92	0	19
9	2,3,4; 78 through & including 91	0	17
10	2 through & including 9; 78 through & including 91	0	22
11,12	2 through & including 9; 76 through & including 91	5	43
13,14	3 through & including 9; 71 through & including 90	1	53
15	3 through & including 13; 71 through & including 90	1	61
16	4 through & including 13; 69 through & including 89	2	29
17	4 through & including 15; 69 through & including 89	4	29
18,19	5 through & including 15; 67 through & including 88	6	60
20	5 through & including 16; 67 through & including 88	1	33
21	6 through & including 16; 67 through & including 87	4	28
22,23	7 through & including 19; 67 through & including 86	13	53
24,25	8 through & including 25; 67 through & including 85	4	70
26	9 through & including 25; 67 through & including 84	2	33
27	10 through & including 25; 70 through & including 83	4	26
28	11 through & including 25; 70 through & including 82	1	27
29	11 through & including 22; 67 through & including 82	1	27
30	12 through & including 22; 67 through & including 81	4	22
31,32	15 through & including 22; 65 through & including 78	8	36
33	15 through & including 25; 65 through & including 78	2	23
34	16 through & including 25; 68 through & including 77	2	18
35	17 through & including 25; 27 through & including 32; 68 through & including 76	0	24
36	19; 27 through & including 32; 68 through & including 74	0	14
37,38	27 through & including 32	1	11
39	32 through & including 36; 67,68,69,70	0	9
40	32 through & including 36; 66,67	2	5
41	32 through & including 38	0	7
42,43	32 through & including 38; 54 through & including 59	6	20
44	35 through & including 58	0	24
45	39 through & including 54	0	16
	Totals	74	859

OUTLET

Total number of tubes to be inspected 32
Total number of plugged tubes 267
Percentage of total unplugged tubes to be inspected 68%

1. Inspect all tubes in Group 3 from the outlet tubesheet to the first support plate.
2. Inspect all tubes in Group 4 from the outlet tubesheet to the sixth support plate.
3. Inspect each tube in a second row third column grid (starting with R2C1), which is not included in Group 3 and 4, from the outlet tubesheet to the sixth support plate. (Total tubes to be inspected = 190).

Group 3

Row(s)	Column(s)	No. of Plugged Tubes	No. of Tubes to be Inspected
2,3	17 through & including 81	1	129
4,5,6, 7,8,9, 10,11 12,13	12 through & including 81	58	502
14,15 16,17,18, 19,20,21, 22	16 through & including 70	9	255
23,24,25, 26,27	24 through & including 72	13	372
28	30 through & including 72	7	238
29,30	30 through & including 63	4	39
31	30 through & including 60	5	63
32,33	33 through & including 53	4	27
34	37 through & including 53	2	40
35	50,51,52,53	0	17
	Totals	0	4
		103	1686

Group 4

Row(s)	Columns(s)	No. of Plugged Tubes	No. of Tubes to be Inspected
7	89,90,91,92	0	4
8	1,2,3,4; 89,90,91,92	0	8
9,10,11			
12	2,3,4; 89,90,91	1	23
13,14,15	3,4; 89,90	0	12
16	4; 89	0	2
29	11,12,13,14,15,16; 77,78,79,80,81,82	0	12
30	12,13,14,15,16; 27,28,29; 77,78,79,80,81	2	11
31,32	15,16; 27,28,29; 77,78	4	10
33	15,16; 77,78	2	2
34	16; 77	0	2
40	25,26,27,28,29,30	0	6
41	27,28,29,30	0	4
42	29,30; 57,58,59,60,61,62,63,64	0	10
43	35,36,37,38,39; 54 through & including 61	3	10
44	35 through & including 58	0	24
45	39 through & including 54	0	16
	Totals	12	156

Inspection Scope "B" Steam Generator

INLET

Total number of tubes to be inspected	2293
Total number of plugged tubes	208
Percentage of total unplugged tubes to be inspected	75%

1. Inspect all tubes in Group 1 from the inlet tubesheet to the second support plate.
2. Inspect all tubes in Group 2 from the inlet tubesheet around the U-bend to the sixth support plate on the outlet side.
3. Inspect each tube in a second row third column grid (starting with R2C1), which is not included in Groups 1 and 2, from the inlet tubesheet around the U-bend to the sixth support plate on the outlet. (Total tubes to be inspected = 142).

Group 1

Row(s)	Column(s)	No. of Plugged Tubes	No. of Tubes to be Inspected
1,2,3,4	1,2,3,4,5; 18 through & including 77	15	245
5,6,7	18 through & including 77	14	166
8,9	14 through & including 77	9	119
10	14 through & including 80	12	55
11,12,13,14	16 through & including 80	46	214
15,16	16 through & including 79	15	113
17	18 through & including 79	9	53
18	18 through & including 73	6	50
19,20	25 through & including 71	9	85
21	25 through & including 69	0	45
22,23,24	27 through & including 69	19	110
25	25 through & including 69	4	41
26,27,28,29	21 through & including 69	10	186
30,31	21 through & including 52; 56 through & including 69	5	87
32	37 through & including 52; 56 through & including 69	1	29
33	24,25,26; 37 through & including 66	1	32
34	24,25,26; 37 through & including 53; 57,58,59,60	0	24
35	24,25,26; 37 through & including 53	0	20
36	37 through & including 45; 49,50,51,52,53,54	1	14
37,38	40,41,42,43,44,45; 49,50,51,52,53,54	3	21
39,40	53,54	0	4
	Totals	179	1,713

Group 2

Row(s)	Columns(s)	No. of Plugged Tubes	No. of Tubes to be Inspected
8	1,2,3,4,5; 82 through & including 92	0	16
9,10,11, 12	2,3,4,5; 82 through & including 91	4	52
13,14	3,4,5; 89,90	1	9
15	3,4,5; 80 through & including 90	0	14
16	4,5; 80 through & including 89	3	9
17	4,5,6,7,8; 80 through & including 89	0	15
18,19,20	5,6,7,8; 80 through & including 88	0	39
21	6,7,8,9,10; 80 through & including 87	1	12
22,23	7,8,9,10; 18,19,20,21; 24,25,26; 81,82,83,84,85,86	3	31
24	8,9,10,11,12,13; 18,19,20,21; 24,25,26; 81,82,83, 84,85	0	18
25	8,9,10,11,12,13; 72,73,74; 81,82,93,84,85	1	13
26	9,10,11,12,13; 72,73,74; 81,82,83,84	1	11
27	10,11,12,13; 72,73,74	0	7
28	8,9,10	0	3
29	11 through & including 20; 76 through & including 82	1	16
30	12 through & including 20; 53,54,55; 76 through & including 81	1	17
31,32	15,16,17; 53,54,55; 76,77,78	1	17
33	15,16,17; 76,77,78	0	12
34	16,17; 54,55,56; 73,74,75,76,77	0	10
35	17; 54,55,56; 73,74,75,76	1	7
36	46,47,48; 54,55,56; 73,74	0	8
37	46,47,48; 73	1	3
38	46,47,48	0	3
39	46 through & including 52	0	7
40,41	46 through & including 52; 58 through & including 63	3	23
42	33 through & including 39; 54 through & including 62	0	16
43	33 through & including 39; 54 through & including 61	3	12
44	35 through & including 58	1	23
45	39 through & including 54	1	15
	Totals	27	438

Outlet

Total number of tubes to be inspected	2005
Total number of plugged tubes	208
Percentage of total unplugged tubes to be inspected	66%

1. Inspect all tubes in Group 3 from the outlet tubesheet to the first support plate.
2. Inspect all tubes in Group 4 from the outlet tubesheet to the sixth support plate.
3. Inspect each tube in a second row third column grid (starting with R2C1), which is not included in Groups 3 and 4, from the outlet tubesheet to the sixth support plate. (Total tubes to be inspected = 204).

Group 3

Row(s)	Column(s)	No. of Plugged Tubes	No. of Tubes to be Inspected
1,2,3,4,5,6,7,8,9, 10,11	10 through & including 79	62	708
12	10 through & including 77	12	56
13,14,15,16,17	12 through & including 77	43	287
18,19,20	17 through & including 77	15	168
21,22	20 through & including 76	3	111
23,24,25,26	23 through & including 76	24	192
27	32 through & including 70	2	37
28	32 through & including 46; 63,64,65,66,67	0	20
29	32 through & including 46	0	15
30	37,38,39	0	3
37,38,39	64,65,66	0	9
	Totals	161	1606

Group 4

Row(s)	Columns(s)	No. of Plugged Tubes	No. of Tubes to be Inspected
8	1,2,3,4; 89,90,91,92	0	8
9,10,11,12	2,3,4; 89,90,91	2	22
13,14,15	3,4; 89,90	1	11
16	89	0	1
28	75 through & including 82	0	8
29	11 through & including 18; 75 through & including 82	0	16
30	12 through & including 18; 75 through & including 81	1	13
31,32,33	15,16,17,18; 75,76,77,78	1	23
34	16,17,18; 75,76,77	0	6
35	17,18; 75,76	0	4
36,37	20,21,22,23	0	8
38	21,22,23	1	2
39	23	0	1
41	31 through & including 38	0	8
42,43	31 through & including 38; 54,55,56,57,58,59	2	26
44	35 through & including 58	1	23
45	39 through & including 54	1	15
	Totals	10	195

Inspection Scope "C" Steam Generator

INLET

Total number of tubes to be inspected	1993
Total number of plugged tubes	200
Percentage of total unplugged tubes to be inspected	65%

1. Inspect all tubes in Group 1 from the inlet tubesheet to the second support plate.
2. Inspect all tubes in Group 2 from the inlet tubesheet around the U-bend to the sixth support plate on the outlet side.
3. Inspect each tube in a second row third column grid (starting with R2C1), which is not included in Groups 1 and 2, from the inlet tubesheet around the U-bend to the sixth support plate on the outlet. (Total tubes to be inspected = 202).

Group 1

Row(s)	Column(s)	No. of Plugged Tubes	No. of Tubes to be Inspected
2	19 through & including 77	2	57
3,4,5	8,9,10; 19 through & including 77	18	168
6,7,8,9,10, 11,12,13	19 through & including 77	12	460
14,15	19 through & including 70	6	98
16,17,18,19,20	19 through & including 67	18	227
21	19 through & including 61	1	42
22	28 through & including 61	0	34
23	28 through & including 56	0	29
24	29 through & including 56	2	26
25,26	29 through & including 56; 65,66,67	6	56
27	34 through & including 56; 65,66,67	0	26
28,29	37 through & including 49	1	25
30,31	24,25,26; 37 through & including 49	1	31
32	24,25,26; 37 through & including 49; 60,61,62	0	19
33,34	35,36,37; 60,61,62	1	11
35,36,37,38	35,36,37	0	12
	Totals	68	1321

Group 2

Row(s)	Column(s)	No. of Plugged Tubes	No. of Tubes to be Inspected
8	1,2,3,4; 89,90,91,92	0	8
9,10,11	2,3,4; 89,90,91	0	18
12	2,3,4; 79 through & including 85; 89,90,91	0	13
13,14,15	3,4,5,6,7; 79 through & including 85; 89,90	3	39
16	79 through & including 85	0	7
17	76 through & including 85	0	10
18	70,71,72; 76 through & including 88	0	16
19,20	5,6; 70,71,72; 76 through & including 88	2	34
21	6; 76 through & including 87	1	12
22,23	78 through & including 86	0	18
24	21 through & including 28; 78 through & including 85	2	14
25	8 through & including 16; 21 through & including 28; 78 through & including 85	2	23
26	9 through & including 16; 21 through & including 28; 78 through & including 84	1	22
27	10 through & including 16; 21 through & including 28; 78 through & including 83	2	19
28	11 through & including 16; 78 through & including 82	0	11
29	11 through & including 16; 76 through & including 82	0	13
30	12 through & including 16; 76 through & including 81	0	11
31,32,33	15,16; 76,77,78	1	14
34	16; 52 through & including 58; 76	0	9
35	76; 46 through & including 58	2	12
36,37	39 through & including 58	4	36
38,39	39 through & including 54	7	25
40	42 through & including 54	6	7
41	31 through & including 38	0	8
42	31 through & including 38; 54,55,56,57,58,59	1	13
43	32 through & including 59	5	23
44	35 through & including 58	2	22
45	39 through & including 54	3	13
	Totals	44	470

OUTLET

Total number of tubes to be inspected	1917
Total number of plugged tubes	200
Percentage of total unplugged tubes to be inspected	63%

1. Inspect all tubes in Group 3 from the outlet tubesheet to the first support plate.
2. Inspect all tubes in Group 4 from the outlet tubesheet to the sixth support plate.
3. Inspect each tube in a second row third column grid (starting with R2C1), which is not included in Groups 3 and 4, from the outlet tubesheet to the sixth support plate. (Total number of tubes to be inspected = 226).

Group 3

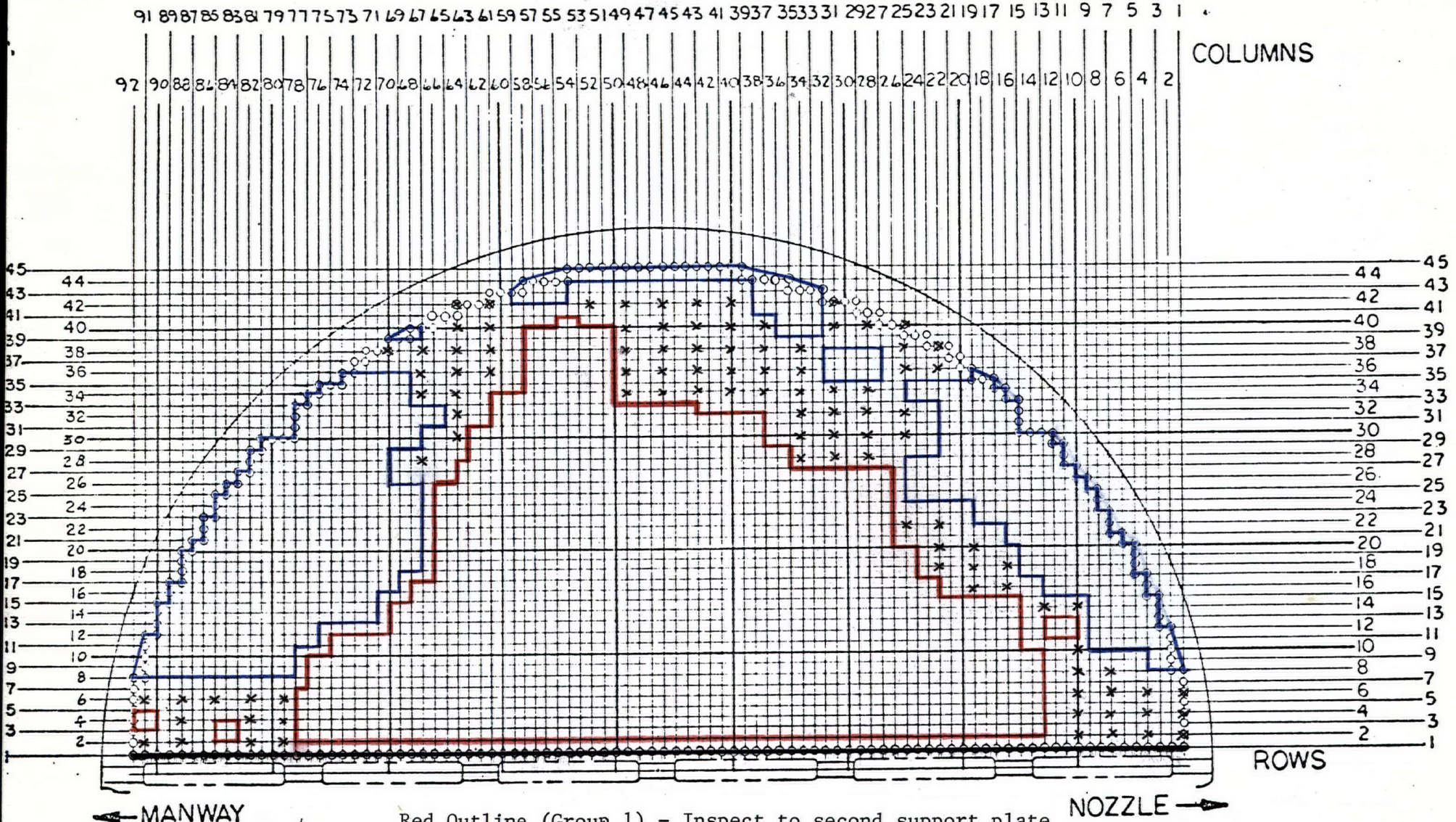
Row(s)	Column(s)	No. of Plugged Tubes	No. of Tubes to be Inspected
2,3,4	9 through & including 77	14	193
5,6	9 through & including 73	7	123
7,8,9,10,11,12,13			
14,15,16,17,18	15 through & including 73	26	682
19,20	19 through & including 73	10	100
21,22,23	19 through & including 71	1	158
24,25,26	29 through & including 71	8	121
27,28,29	37 through & including 71	1	104
30	37 through & including 58	1	21
31,32,33	55 through & including 59	0	15
	Totals	68	1517

Group 4

Row(s)	Column(s)	No. of Plugged Tubes	No. of Tubes to be Inspected
8	1,2,3,4,5; 89,90,91,92	0	9
9,10,11,12	2,3,4,5; 89,90,91	0	28
13,14,15	3,4,5; 89,90	0	15
16	4,5; 89	0	2
17	4,5	0	2
28	76 through & including 82	0	7
29	11 through & including 17; 76 through & including 82	0	14
30	12 through & including 17; 76 through & including 81	0	12
31,32,33	15,16,17; 76 through & including 81	1	17
34	16,17; 76,77	1	3
35	17; 77	0	2
42	30 through & including 39; 54 through & including 61	1	17
43	32 through & including 39; 54 through & including 61	5	11
44	35 through & including 58	2	22
45	39 through & including 54	3	13
	Totals	13	174

SERIES 44

"A" S/G INLET



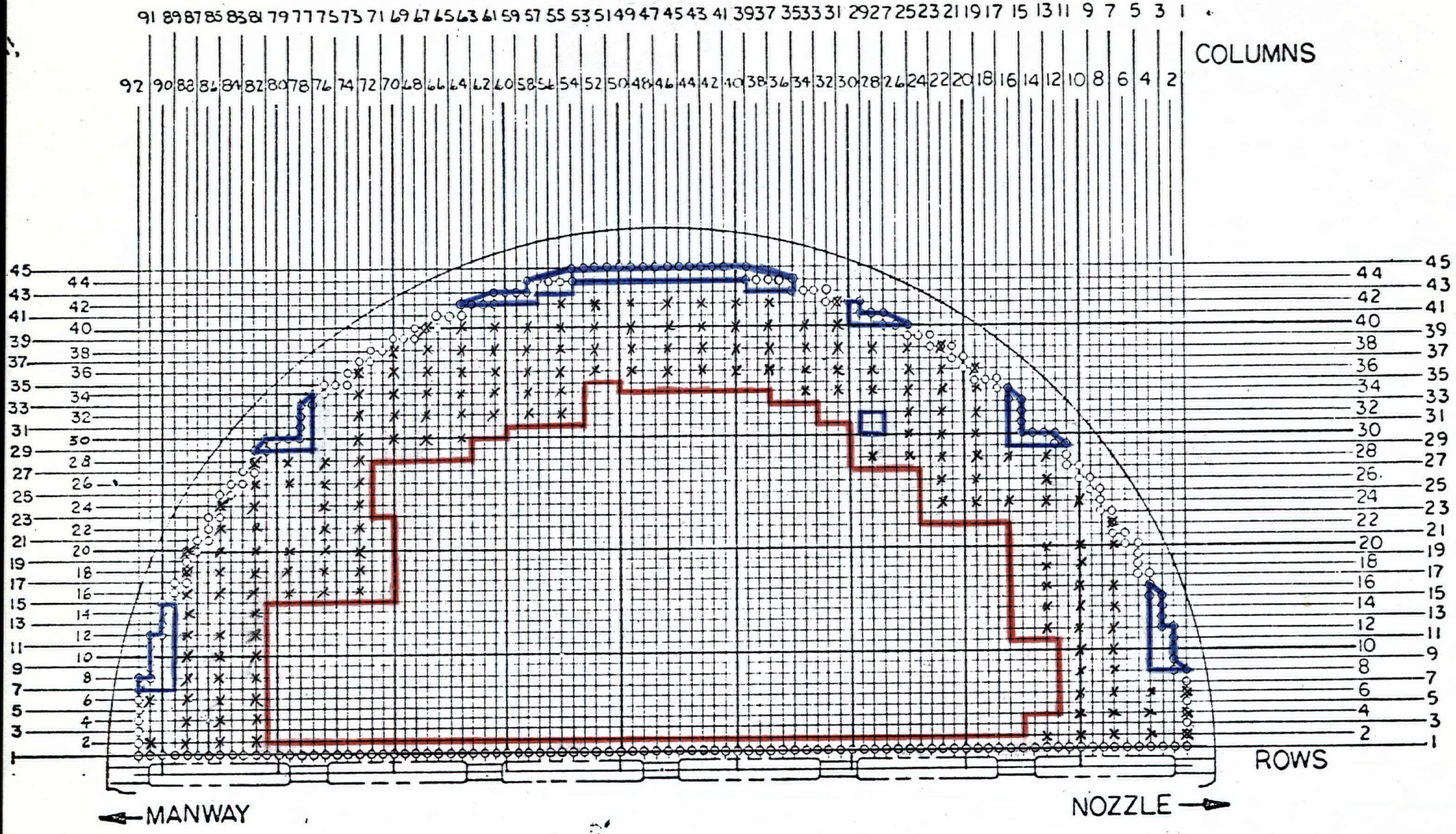
Red Outline (Group 1) - Inspect to second support plate

Blue Outline (Group 2) - Inspect to sixth support plate on outlet side

X-Grid - Inspect to sixth support plate ~~on outlet side~~

SERIES 44

"A" S/G Outlet



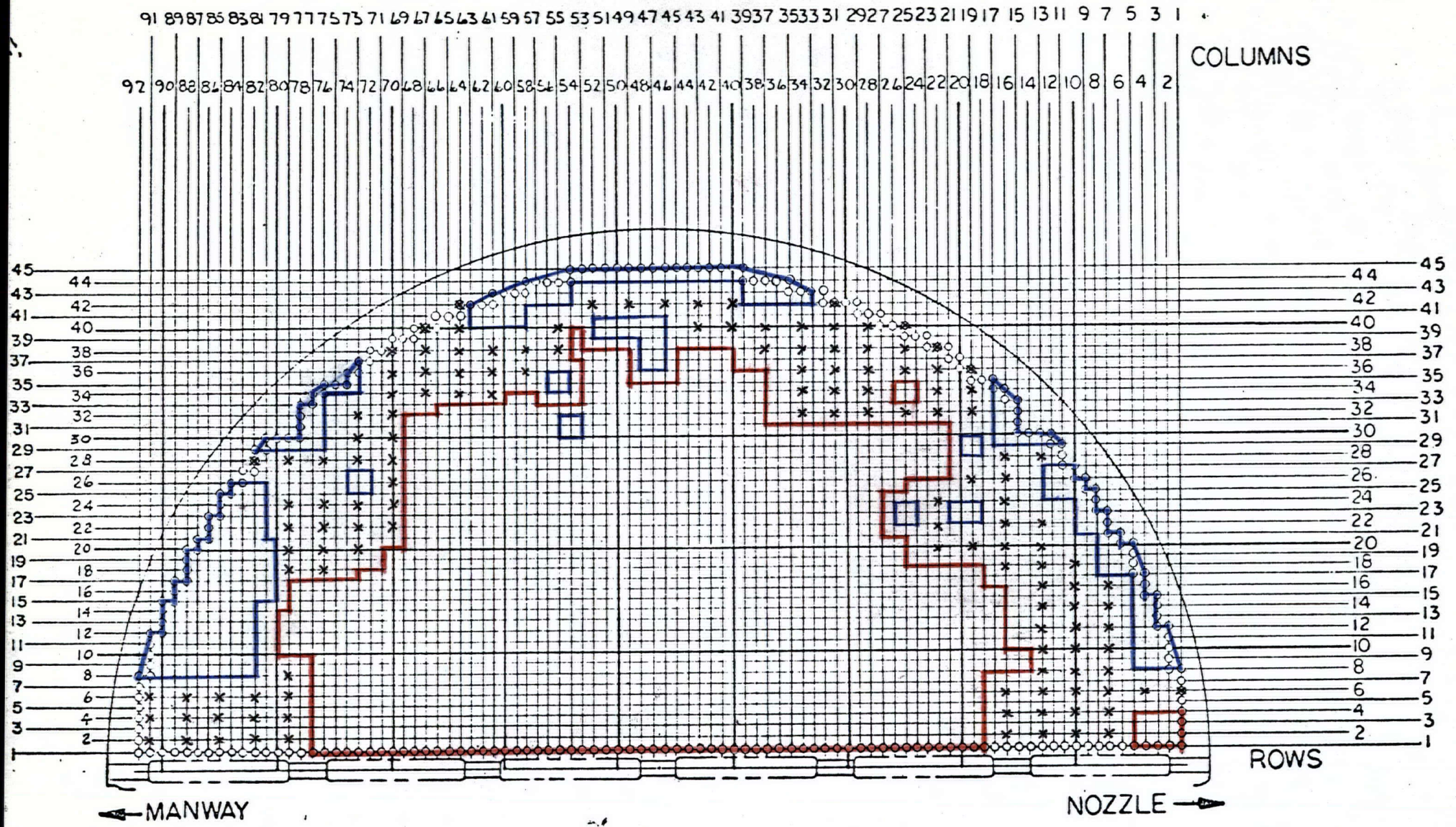
Red Outline (Group 3) - Inspect to first support plate

Blue Outline (Group 4) - Inspect to sixth support plate

X-Grid - Inspect to sixth support plate

SERIES 44

"B" S/G Inlet



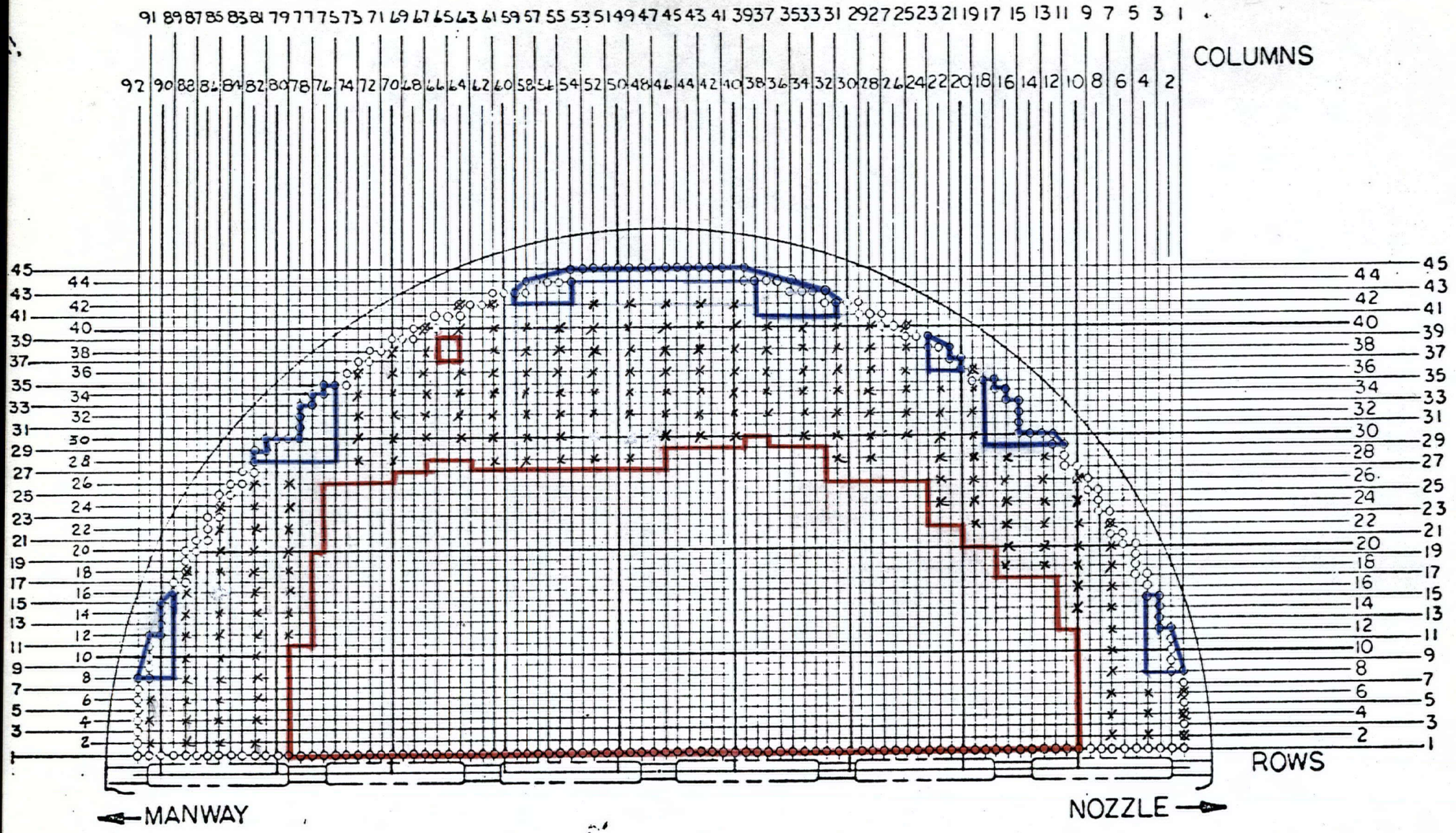
Red Outline (Group 1) - Inspect to second support plate

Blue Outline (Group 2) - Inspect to sixth support plate on outlet side

X-Grid - Inspect to sixth support plate on outlet side

SERIES 44

"B" S/G Outlet



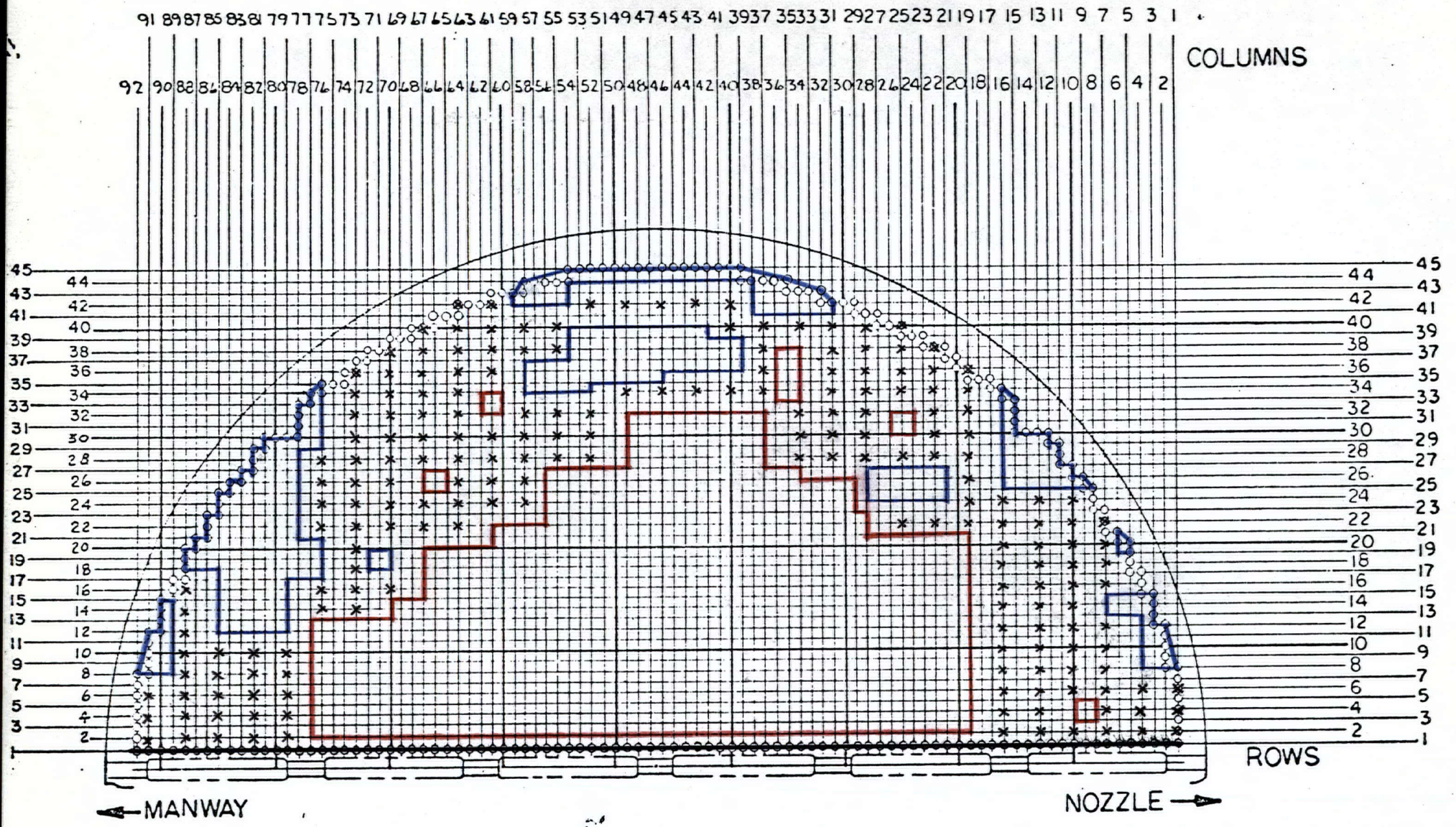
Red Outline (Group 3) - Inspect to first support ~~plate~~

Blue Outline (Group 4) - Inspect to sixth support plate

X-Grid - Inspect to sixth support plate

SERIES 44

"C" S/G Inlet



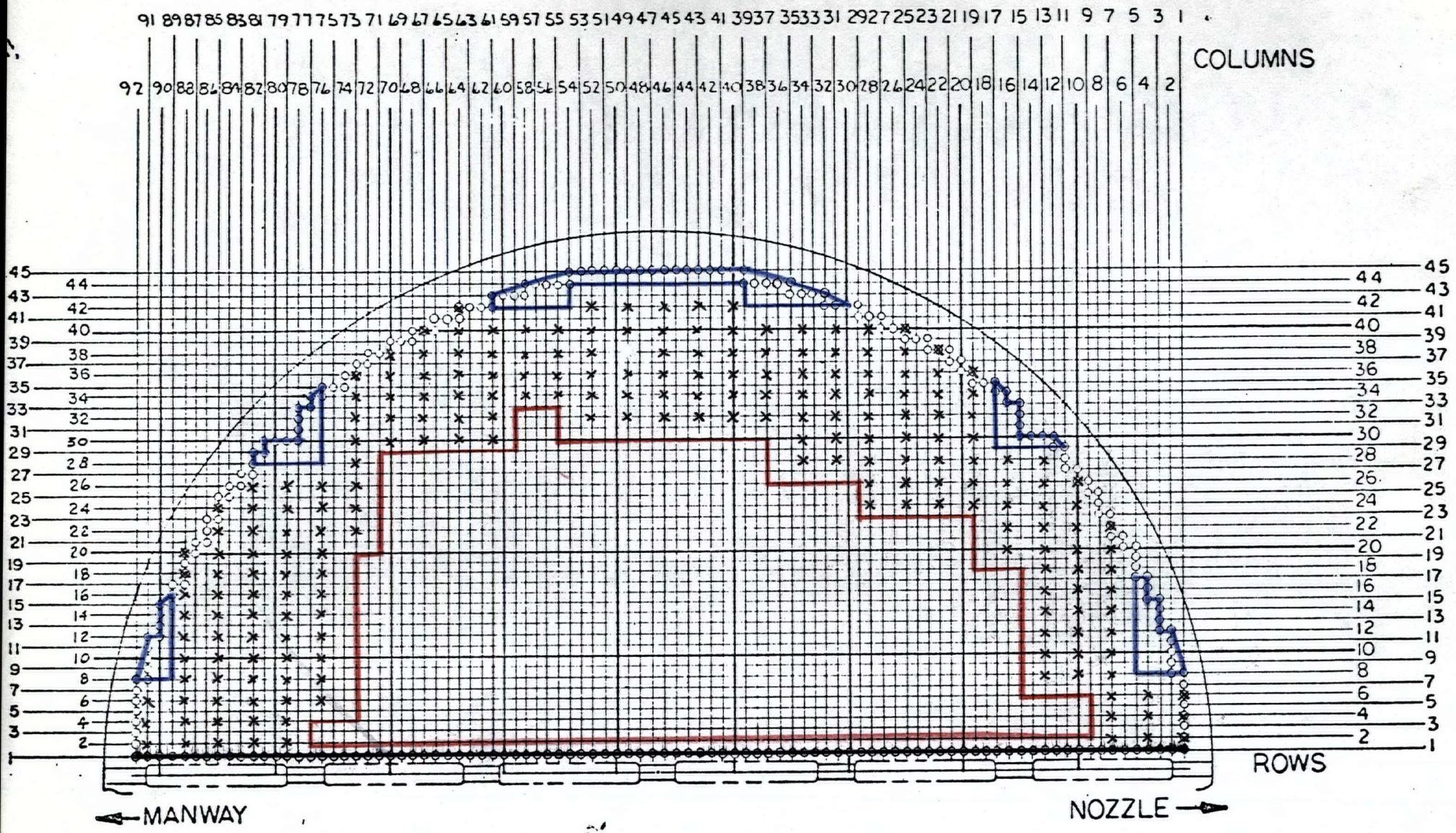
Red Outline (Group 1) - Inspect to second support plate

Blue Outline (Group 2) - Inspect to sixth support plate on outlet side

X-Grid - Inspect to sixth support plate on outlet side

SERIES 44

"C" S/G Outlet



Red Outline (Group 3) - Inspect to first support plate

Blue Outline (Group 4) - Inspect to sixth support plate

X-Grid - Inspect to sixth support plate