

LICENSEE EVENT REPORT

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

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REPORT		SOURCE		DOCKET		NUMBER		68		69		EVENT		DATE		74		75		REPORT		DATE		80																											

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

On 4-20-81 an 800 psid secondary-to-primary leak check was performed in each steam generator during the Unit 2 Refueling 7 outage. One leaking plug was detected in the "A" steam generator. On 4-26-81 final results of the steam generator eddy current examination indicated the existence of some degraded and defective tubes in each steam generator. This event is similar to others and reportable per Technical Specification 15.6.9.2.A.3.

SYSTEM CODE		CAUSE CODE		CAUSE SUBCODE		COMPONENT CODE						COMP. SUBCODE		VALVE SUBCODE																					
C	B	E	D	H	T	E	X	C	H	F	Z																								
11		12		13		14						15		16																					
LER/RO REPORT NUMBER		EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE		REPORT TYPE		REVISION NO.																									
8	1			0	0	2	0	1	T		0																								
33		34		35		36		37		38		39		40		41		42		43		44		45		46		47		48		49		50	
ACTION TAKEN		FUTURE ACTION		EFFECT ON PLANT		SHUTDOWN METHOD		HOURS		ATTACHMENT SUBMITTED		NPRD-4 FORM SUB.		PRIME COMP. SUPPLIER		COMPONENT MANUFACTURER																			
B	Z	Z	Z	0	0	0	0	0	Y	Y	N	W	1	2	0																				
18		19		20		21		22		23		24		25		26																			

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

Essentially all of the tubes in the "A" steam generator and about 75% in the "B" steam generator were inspected through the first support plate, in addition to inspections required by Technical Specifications. 25 pluggable tubes were found in "A" and 16 were found in "B". One of these tubes was pulled for analysis. All tubes were plugged as of 4-30-81.

FACILITY STATUS		% POWER		OTHER STATUS		METHOD OF DISCOVERY		DISCOVERY DESCRIPTION	
G	0	0	0	N/A	C	Eddy current examination			
28		29		30		31		32	
ACTIVITY CONTENT RELEASED OF RELEASE		AMOUNT OF ACTIVITY		LOCATION OF RELEASE					
Z	Z	N/A	N/A	N/A					
33		34		35		36			
PERSONNEL EXPOSURES NUMBER		TYPE		DESCRIPTION					
0	0	0	Z	N/A					
37		38		39					
PERSONNEL INJURIES NUMBER		DESCRIPTION							
0	0	0	N/A						
40		41							
LOSS OF OR DAMAGE TO FACILITY TYPE		DESCRIPTION							
Z	N/A								
42		43							
PUBLICITY ISSUED		DESCRIPTION							
N	N/A								
44		45							

PUBLICITY ISSUED		DESCRIPTION		NRC USE ONLY					
N	N/A								
44		45		68		69		80	

57-926 GPO

ATTACHMENT TO LICENSEE EVENT REPORT NO. 81-002/01L-0

Wisconsin Electric Power Company
Point Beach Nuclear Plant Unit 2
Docket No. 50-301

On April 20, 1981, an 800 psig secondary-to-primary leak check was performed in each steam generator. Detailed inspections of the tubesheets with remote television equipment showed leakage from the explosive plug in the tube R32C15 in the "A" steam generator. The leakage rate was about two drops per minute. Another plug in the "A" steam generator (R31C52) was heavily coated with boric acid but no water was present. After considering the location of the leaking plug, which is in the tubesheet periphery, and the effect that repair of the plug would have on exposure, critical path, and problems associated with repairs in the area, the decision was made not to repair the plug during this outage. An additional consideration was the fact that the primary-to-secondary leakage rate in the steam generator was only one gallon per day before the outage.

The initial eddy current inspection programs for the "A" and "B" steam generators consisted of inspection through the U-bend of 1% of the tubes in each steam generator plus all previously degraded tubes, in accordance with Technical Specification requirements. Additionally, the "A" steam generator program included a full length inspection for a previous indication in the cold leg and inspections through the U-bend of about 190 tubes in connection with tube degradation at contact with anti-vibration bars (AVB) reported by other plants. The program for the "B" steam generator inlet included inspecting 33 previously degraded tubes through the U-bend and 172 randomly located tubes to meet Technical Specification requirements and for AVB tube degradation. The program for the "B" steam generator outlet consisted of inspection through the first support plate of all previously degraded tubes, inspection through the first support plate of about 200 tubes in problem areas determined by previous inspections, and inspection through the third support plate of about 170 tubes around the periphery, in connection with tube degradation in these areas reported at Prairie Island. The programs in the inlets of both steam generators were later expanded in accordance with Technical Specifications resulting in inspection of essentially all tubes in the "A" steam generator through the first support plate and approximately 75% of the tubes in the "B" steam generator through the first support. A summary of the extent of the inspection and the results are given in Table 1. A summary of eddy current indications by size and location is given in Table 2 and illustrated in Figures 1, 2, and 3.

Results of the eddy current inspections showed 25 pluggable tubes in the "A" steam generator and 16 pluggable tubes in the "B" steam generator. One of the tubes in the "A"

steam generator, R15C73, was pulled for detailed analysis and the hole was weld plugged on April 30, 1981. A degraded tube in the "B" steam generator, R24C25, had interference preventing insertion of a mechanical plug. The tube entrance area was re-rolled and then successfully plugged. Plugging of all tubes was completed on April 30, 1981. Photographs of the tubesheets taken later the same day verified plugging of the proper tubes. A list of eddy current indications of all pluggable tubes found in the steam generators is provided in Table 3. For a map showing all tubes plugged to date, see Figures 4 and 5. No evidence of AVB tube degradation or degradation of the type experienced at Prairie Island was observed in any of the tubes inspected.

To determine if tube degradation is progressing, a two-part comparison was done. The first part consisted of comparing the indication size reported in 1981 for all unplugged indications reported in 1980. The results of this comparison are shown in Table 4. After considering the inherent inaccuracies in evaluating and categorizing small volume eddy current indications which occur at or near the top of the tubesheet, the results indicate that the majority of the indications did not change. There is some indication of growth based just on the reported size of the indication. The second part of the comparison was performed by having a level IIA evaluator directly compare the 1980 and 1981 eddy current signals for the tubes with 40% or greater tube wall degradations in the "A" steam generator. This comparison was biased in that it concentrated on tubes which had a large change in the reported eddy current signal in 1981 as compared to 1980. Table 5 provides the result of this comparison. It too shows that there may be some growth in tube degradation but less than that implied by Table 4. A similar comparison for the "B" steam generator was not conducted since only four of the tubes with 40% or greater tube wall degradation in this outage had been inspected in 1980.

The results of earlier inspections of the "A" steam generator as previously reported to the NRC were also examined for those tubes having greater than 40% indications in 1981. This comparison is reported in Table 6. A similar comparison for the "B" steam generator indicated that only five of the tubes in the 40% or greater category had been inspected prior to 1980 and no degradation was reported in those inspections. The single frequency eddy current inspections in 1977, 1976 and 1974 indicated that many of these same tubes had either distorted tubesheet entry signals or indications of <20% wall degradation. Accordingly, we believe that the majority of the tubes plugged in this inspection had tube wall degradation for a significant period of time. The tube which was removed will provide additional information on the method of degradation. However, the indications being detected are believed to be the result of phosphate wastage and/or stress corrosion cracking. The results of previous steam generator inspections, as summarized in Table 7, have shown the existence of numerous eddy current indication and distorted tubesheet signal in the past. The continued use

and development of multi-frequency eddy current has given the evaluator the capability to identify and quantify small volume indications which were previously masked by the tubesheet entrance signal. A report on the results of the tube analysis will be provided at a later date.

This event is reportable in accordance with Technical Specification 15.6.9.2.A.3. .

TABLE 1

SUMMARY OF EDDY CURRENT EXAMINATION

<u>Type</u>	<u>Extent</u>	<u>"A"</u> <u>Inlet</u>	<u>"B"</u> <u>Inlet</u>	<u>"B"</u> <u>Outlet</u>
Multi-frequency	U-Bend	491	208	
Multi-frequency	First Support	2,693	2,061	307
Multi-frequency	Third Support			163
Multi-frequency	Full Length	1		
	Total	3,185	2,269	470

Results

90-100%	2	0	0
80-89%	0	0	0
70-79%	0	0	0
60-69%	0	2	0
50-59%	5	3	0
40-49%	20	11	0
30-39%	123	60	1
20-29%	150	62	30
Subtotal	300	138	31
<20%	309	81	253
Distorted	110	195	0
No Defect Detected	2,466	1,855	186
Total	3,185	2,269	470

TABLE 2

POINT BEACH NUCLEAR PLANT UNIT 2, APRIL, 1981, INSPECTION
EDDY CURRENT INDICATIONS BY SIZE AND LOCATION

	<u><20%</u>	<u>21-29%</u>	<u>30-39%</u>	<u>40-49%</u>	<u>50-59%</u>	<u>60-69%</u>	<u>70-79%</u>	<u>80-89%</u>	<u>90-100%</u>
1. "A" Hot Leg									
Top of Tubesheet	300	146	119	20	4	0	0	0	0
Deep Crevice	0	0	0	0	0	0	0	0	2
½" Above Tubesheet	9	2	0	0	1	0	0	0	0
17" Above Tubesheet	0	1	0	0	0	0	0	0	0
First Support Plate	0	1	3	0	0	0	0	0	0
Second Support Plate	0	0	1	0	0	0	0	0	0
Total	309	150	123	20	5	0	0	0	2
2. "B" Hot Leg									
Top of Tubesheet	70	55	58	11	3	2	0	0	0
½" Above Tubesheet	9	7	1	0	0	0	0	0	0
1" Above Tubesheet	1	0	1	0	0	0	0	0	0
2" Above Tubesheet	1	0	0	0	0	0	0	0	0
Total	81	62	60	11	3	2	0	0	0
3. "B" Cold Leg									
	<u><20%</u>	<u>20-29%</u>	<u>30-39%</u>	<u>>40%</u>					
Top of Tubesheet	0	0	0	0					
½" Above Tubesheet	174	19	0	0					
1" Above Tubesheet	64	7	0	0					
1½" Above Tubesheet	15	4	1	0					
Totals	253	30	1	0					

("Top of tubesheet" equals indication at top of tubesheet or within 1/2" above or below top of tubesheet.)

TABLE 3

TUBES PLUGGED DURING THIS OUTAGE

"A" Steam Generator

<u>Tube Identification</u>	<u>Indication Size, %</u>	<u>Indication Location</u>
R12C22	52	Top of tubesheet
R10C24	44	Top of tubesheet
R20C24	41	Top of tubesheet
R19C29	55	Top of tubesheet
R26C31	59	½" above tubesheet
R17C33	92/26	6" above tube end/Top of tubesheet
R19C39	92	9-13" above tube end
R12C41	46	Top of tubesheet
R20C41	41	Top of tubesheet
R23C41	45	Top of tubesheet
R12C43	42	Top of tubesheet
R13C44	45	Top of tubesheet
R19C44	51	Top of tubesheet
R21C44	51	Top of tubesheet
R22C44	49	Top of tubesheet
R10C45	43	Top of tubesheet
R11C45	41	Top of tubesheet
R23C45	47	Top of tubesheet
R33C49	43	Top of tubesheet
R25C55	42	Top of tubesheet
R21C62	47	Top of tubesheet
R19C66	46	Top of tubesheet
R12C71	41	Top of tubesheet
R17C71	41	Top of tubesheet
R15C73*	41	Top of tubesheet

"B" Steam generator

R06C17	60	Top of tubesheet
R07C17	66	Top of tubesheet
R06C18	41	Top of tubesheet
R06C19	41	Top of tubesheet
R06C20	46	Top of tubesheet
R06C22	46	Top of tubesheet
R14C22	46	Top of tubesheet
R22C25	46	Top of tubesheet
R24C25	46	Top of tubesheet
R26C25	41	Top of tubesheet
R26C26	41	Top of tubesheet
R22C29	44	Top of tubesheet
R15C32	54	Top of tubesheet
R09C64	53	Top of tubesheet
R06C74	46	Top of tubesheet
R08C76	50	Top of tubesheet

*Pulled and weld plugged.

TABLE 4

COMPARISON OF 1980 EDDY CURRENT RESULTS WITH 1981

	1980	1981						
	<u><20%</u>	<u>Still <20%</u>	<u>No Defect Detected</u>		<u>Increased <10%</u>	<u>Increased 10-20%</u>	<u>Increased >20%</u>	<u>Signal Distorted</u>
"A" SG Inlet	253	130	28		69	16	2	8
"A" SG Outlet	9 ¹	1	0		0	0	0	0
"B" SG Inlet	48	13	18		6	4	1	6
"B" SG Outlet	406 ²	208	5		9	0	0	0
	<u>20-29%</u>	<u>Same ±3%</u>	<u>No Defect Detected</u>	<u>Decreased >3%</u>	<u>Increased 4-10%</u>	<u>Increased 11-20%</u>	<u>Increased >20%</u>	<u>Signal Distorted</u>
"A" SG Inlet	118	42	3	8	36	22	3	4
"A" SG Outlet	0							
"B" SG Inlet	24	9	1	5	5	1	1	2
"B" SG Outlet	28	15	0	9	4	0	0	0
	<u>30-39%</u>	<u>Same ±3%</u>	<u>No Defect Detected</u>	<u>Decreased >3%</u>	<u>Increased 4-10%</u>	<u>Increased 11-20%</u>	<u>Increased >20%</u>	<u>Signal Distorted</u>
"A" SG Inlet	80 ³	26	0	12	21	7	0	4
"A" SG Outlet	0							
"B" SG Inlet	8	2	0	3	3	0	0	0
"B" SG Outlet	4	0	0	4	0	0	0	0

¹ Eight tubes not inspected in 1981.

² 184 tubes not inspected in 1981.

³ 10 tubes were plugged in 1980.

TABLE 5

COMPARISON OF 1981 AND 1980 EDDY CURRENT SIGNALS
"A" STEAM GENERATOR INLET - POINT BEACH UNIT 2

<u>Tube</u>	<u>1981 Reported</u>	<u>1980 Reported</u>	<u>Signal Comparison</u>
R12C22	52	35	VC and DC
R10C24	44	37	Prob. NC
*R20C24	41	<20	DC and VC
R17C26	40	34	NC
R18C26	40	37	NC
R19C29	55	25	DC (small volume)
*R26C31	59	ND	DC and VC
R17C33	92	UI	NC (6" above tube end)
R19C39	92	ND	New (9" to 13" above tube end)
R12C41	46	35	NC
R20C41	41	25	NC
R23C41	45	31	NC
R12C43	42	35	NC
R13C44	45	32	NC
R19C44	51	34	NC
R21C44	51	33	NC
R22C44	49	<20	NC
R10C45	43	34	NC
R11C45	41	ND	DC and VC
R23C45	47	26	NC
R33C49	43	36	NC
R25C55	42	26	DC and VC
*R21C62	47	35	DC and VC
*R19C66	46	21	DC and VC
*R12C71	41	31	DC and VC
*R17C71	41	32	DC and VC
*R15C73	41	36	DC and VC (pulled)

Codes:

DC = Depth change
 VC = Volume change
 NC = No change
 ND = No degradation reported
 UI = Undefinable indication

Comparison of the Above Tubes:

The depth and/or volume changes in the eddy current test results from 1980 to 1981 range from small to moderate. Those tubes with asterisks (*) exhibit the most change from 1980 to 1981 in depth and/or volume. The test results are all analyzed off the mixing of 400 KHZ and 100 KHZ to suppress the tubesheet signal and deposits on the OD of the tubing. The reevaluation of the 1980 test was done using the same mix as was used in 1981.

TABLE 6
STEAM GENERATOR A INLET
COMPARISON OF 1981 EDDY CURRENT RESULTS
WITH PREVIOUS EDDY CURRENT INSPECTION RESULTS

Inspection Results Reported

<u>Tube</u>	<u>1981</u>	<u>1980</u>	<u>1979</u>	<u>1978</u>	<u>1977</u>	<u>1976</u>	<u>1974*</u>
R12C12	52/TTS	35/TTS	--	--	--	--	--
R10C24	44/TTS	37/TTS	--	--	--	--	--
R20C24	41/TTS	<20/TTS	--	--	--	--	--
R19C29	55/TTS	25/TTS	--	ND	DTS	--	ND
R26C31	59/½	ND	--	ND	ND	ND	ND
R17C33	92/Crev.	<20/½	--	ND	<20/½	<20/½	<20/½
R19C39	92/Crev.	ND	--	ND	<20/½	<20/1	<20/1
R12C41	46/TTS	35/TTS	--	ND	DTS	<20/TTS	ND
R20C41	41/TTS	25/TTS	--	ND	<20/TTS	<20/TTS	<20/TTS
R23C41	45/TTS	31/TTS	--	ND	<20/TTS	<20/TTS	<20/TTS
R12C43	42/TTS	35/TTS	--	ND	ND	ND	ND
R13C44	45/TTS	32/TTS	--	ND	DTS	DTS	ND
R19C44	51/TTS	34/TTS	Cu	ND	ND	<20/TTS	21/TTS
R21C44	51/TTS	33/TTS	--	ND	DTS	DTS	ND
R22C44	49/TTS	<20/TTS	--	ND	DTS	DTS	ND
R10C45	43/TTS	34/TTS	--	ND	DTS	DTS	ND
R11C45	41/TTS	ND	--	ND	DTS	DTS	ND
R23C45	47/TTS	26/TTS	--	ND	DTS	ND	ND
R33C49	43/TTS	36/TTS	--	--	--	ND	--
R25C55	42/TTS	26/TTS	--	ND	DTS	DTS	ND
R21C62	47/TTS	35/TTS	--	ND	DTS	DTS	ND
R19C66	46/TTS	21/TTS	--	ND	DTS	--	--
R12C71	41/TTS	31/TTS	--	--	--	--	--
R17C71	41/TTS	32/TTS	--	--	--	--	--
R15C73	41/TTS	36/TTS	--	--	--	--	--

- A/B = Percent Degradation/Location Above Tubesheet In Inches.
TTS = Top of Tube Sheet
Cu = Copper
ND = No Degradation Reported
DTS = Distorted Tubesheet Signal
-- = Not Inspected

*In 1975 the Unit 2 "A" Steam Generator was not eddy current inspected.

TABLE 7

SUMMARY OF PREVIOUS STEAM GENERATOR
EDDY CURRENT INSPECTION RESULTS
POINT BEACH NUCLEAR PLANT UNIT 2

<u>Year Of Inspection</u>	<u>Number Of Tubes Inspected</u>		<u>> 40% A/B</u>	<u>Number Of Tubes Recorded With Following Degradations</u>			<u>DTS A/B</u>
	<u>A Inlet</u>	<u>B Inlet</u>		<u>39-30% A/B</u>	<u>29-20% A/B</u>	<u>< 20% A/B</u>	
1974	1090	442	12/8	8/5	14/2	169/110	NR
1975	0	722	-/3	-/0	-/4	-/1	NR
1976	1223	1120	14/3	14/6	29/5	174/73	186/25
1977	1056	1457	0/4	12/7	28/5	153/51	493/997
1978	1335	796	1/0	6/7	18/5	19/7	NR
1979	570	455	0/1	6/3	5/3	20/10	NR
1980	3138	717	26/0	80/8	118/23	253/9	NR

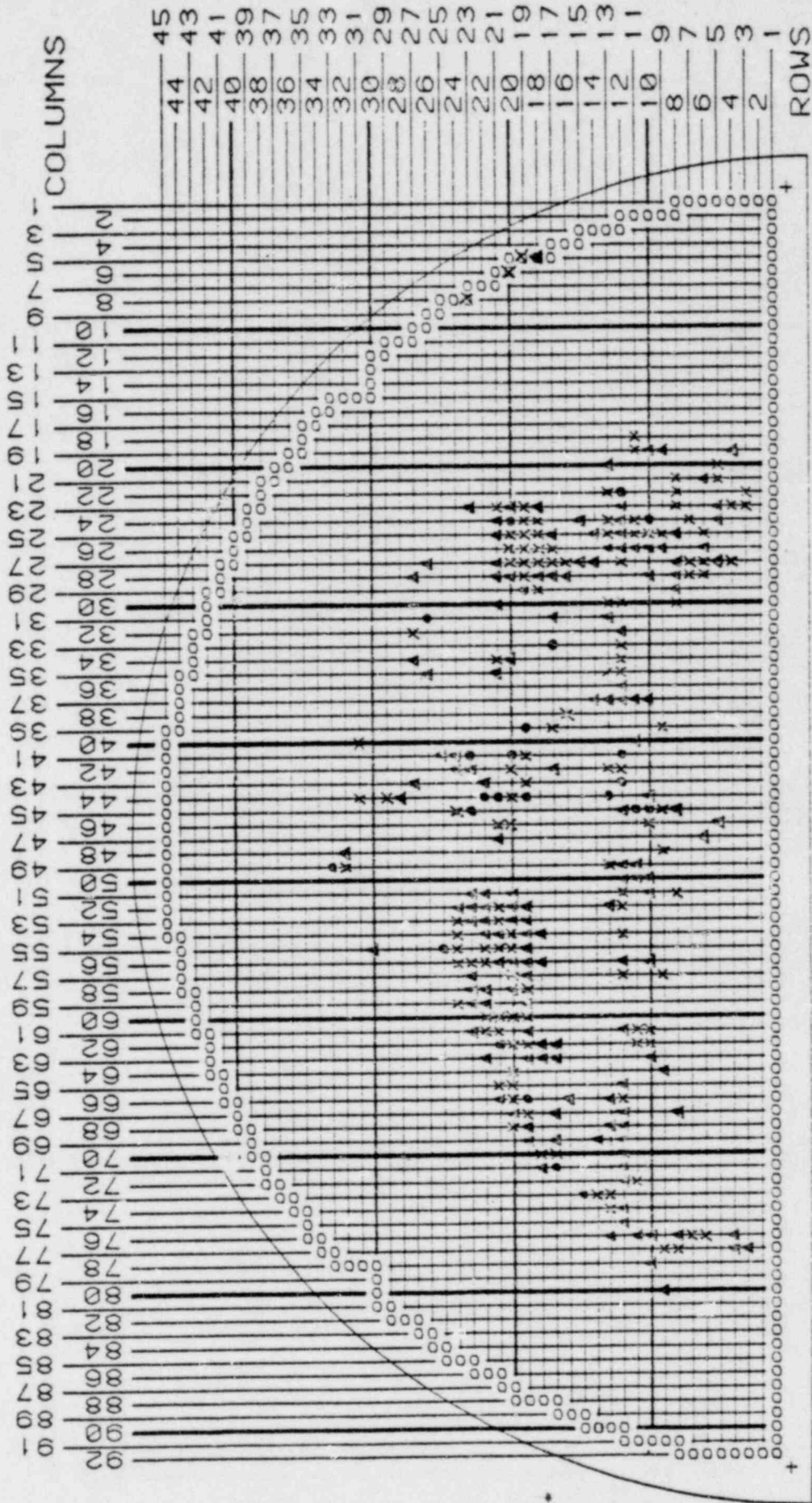
DTS = Distorted Tube Sheet Signal

NR = None Reported

FIGURE 1

- ▲ 31 THROUGH 39% INDICATION
- X 50 THROUGH 40% INDICATION
- 41% OR GREATER INDICATION

SERIES 44
UNIT 2
'A' INLET



← --- MANWAY EDDY CURRENT INDICATIONS - REFUELING 7, APRIL, 1981 NOZZLE --- →

POOR ORIGINAL

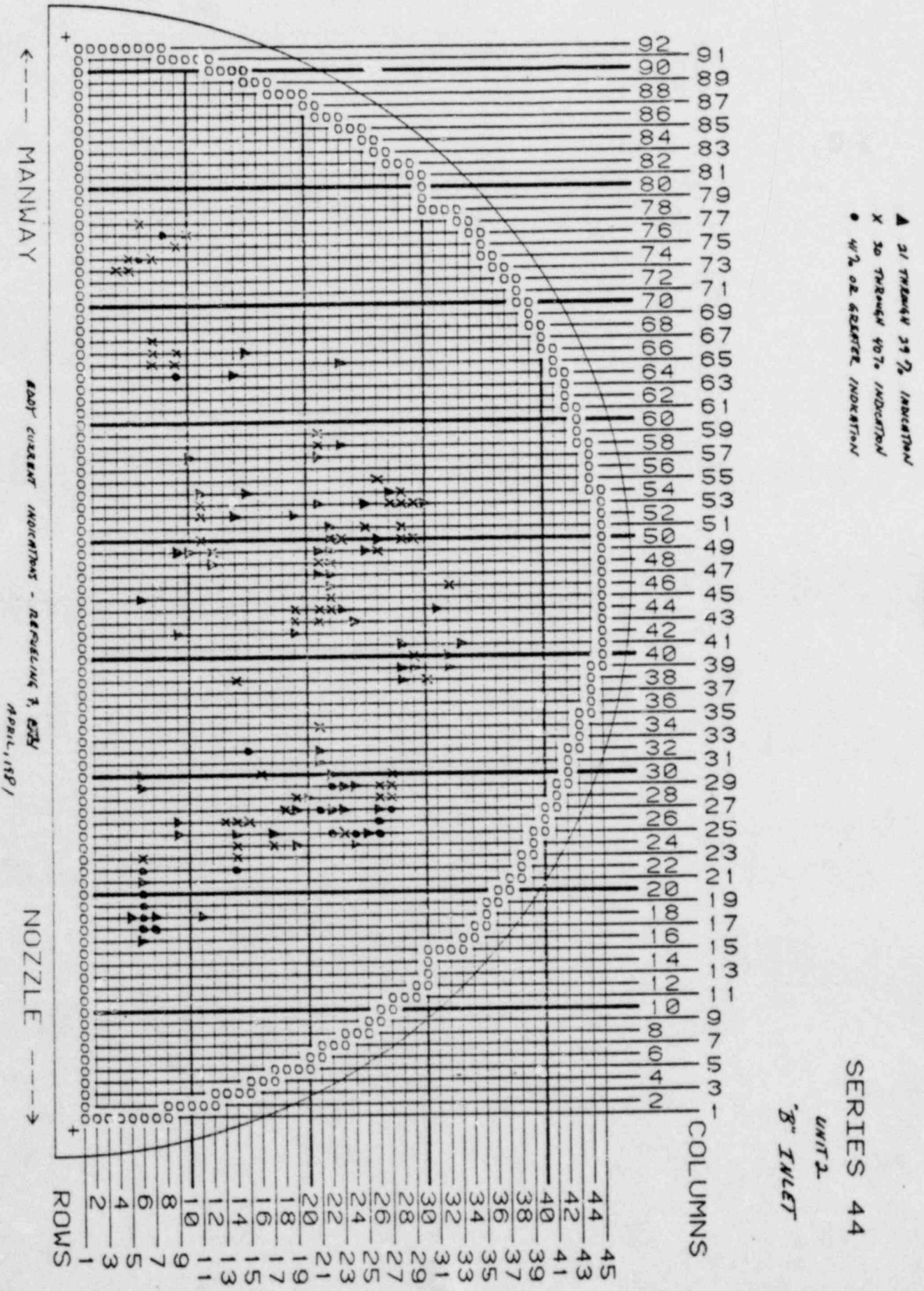
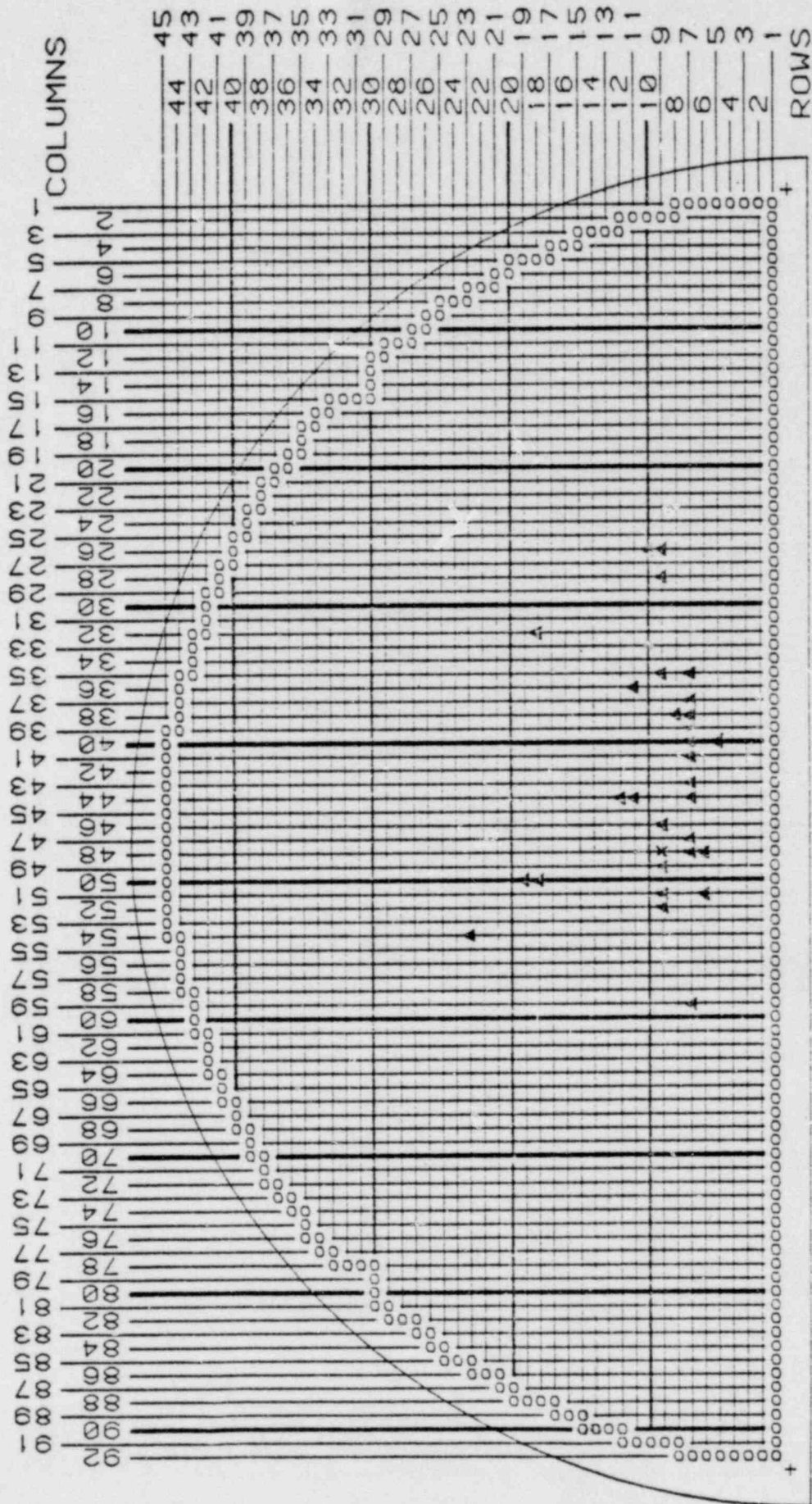


FIGURE 2

FIGURE 3

A 31 THROUGH 292 INDICATION
X 30 THROUGH 402 INDICATION

SERIES 44
UNIT 2
3" OUTLET



POOR ORIGINAL

FIGURE 4

"A" Steam Generator

Unit 2

9/81

SERIES 44

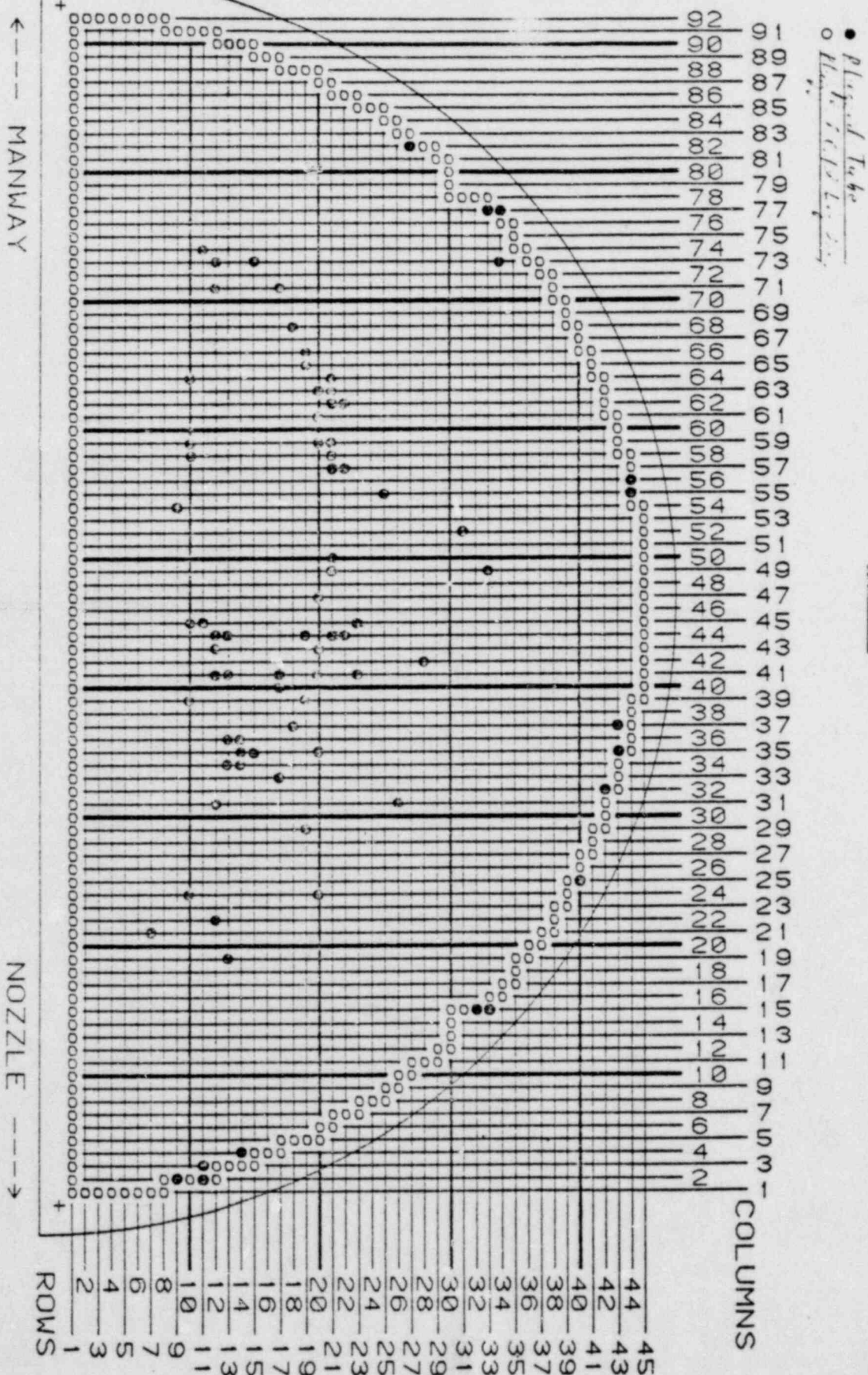


FIGURE 5

"B" Steam Generator
Unit 2
4/81

SERIES 44

