NORTHERN STATES POWER COMPANY

INSERVICE INSPECTION - EXAMINATION SUMMARY FOR THE PRAIRIE ISLAND NUCLEAR GENERATING PLANT - UNIT I

JULY 5 TO JULY 18, 1980
INSPECTION PERIOD 2

STEAM GENERATOR TUBE - EDDY CURRENT EXAMINATION

COMMERCIAL SERVICE
DATE: 12-16-73

Prepared by: D. B. Hansen, Asst. M & SP Engineer

Lanny Dahlman, M & SP Specialist

REPORT DATE:
7/28/80

Reviewed by: Phillip J. Krumpos
P. J. Krumpos, Supt. Material and Special Processes

Approved by: Ray W. Anderson
Ray W. Anderson, Gen. Superintendent, Prod. Plant Maintenance

NORTHERN STATES POWER COMPANY

PRAIRIE ISLAND NUCLEAR GENERATING PLANT UNIT I

- I N D E X -

INSERVICE INSPECTION EXAMINATION SUMMARY
FOR THE
PRAIRIE ISLAND NUCLEAR GENERATING PLANT
UNIT I

JULY 5 to JULY 18, 1980

1.0 Introduction

This report is a summary of the steam generator tube eddy current examinations performed on the inlet and outlet of both steam generators at Prairie Island Unit I. The examinations were performed during the period of July 5 through July 18, 1980, after a tube leak developed on June 29, 1980. Prairie Island Unit I began commercial operation on December 16, 1973.

The results of the eddy current examinations indicated that the leaking tube was an isolated case of tube wall deterioration within the tube sheet crevice, and that the general integrity of the steam generator tubes have been maintained.

The Eddy Current examination program of the steam generator tubes was established and conducted with the following objectives:

(1) to identify the leaking tube
(2) to detect any further tube degradation in the steam generator, and
(3) to determine the general condition of the steam generator.

This was the seventh inservice inspection conducted on steam generator tubes since the date of commercial operation. Eddy Current examinations were performed on both steam generators during 1974, 1975, 1976, 1977, and 1979; and on steam generator No. 12 during 1978.

The steam generator tube sheet maps, examination method and results are summarized in the tables of the attached appendices as follows:

Appendix A - Steam Generator No. 11
Eddy current examination results and tube sheet maps

Appendix B - Steam Generator No. 12
Eddy current examination results and tube sheet maps

Appendix C - Steam Generator No. 11 and 12
Accumulative eddy current examination and
tube sheet maps

2.0 Discussion of Results

The identification of the leaking tube was accomplished by pressurizing the secondary side of the steam generator to 740 psig and visually inspecting the inlet and outlet sides through the manways for evidence of leakage. Leakage was found in tube, Row 2 Column 21, of the inlet side of steam generator No. 12. This was later confirmed by eddy current examination as a 100% through wall defect, approximately 1-3/4" in length and located within the tube sheet crevice about 10" into the sheet.

The examination of the surrounding 163 inlet tubes, to the leaking tube, revealed no signs of tube degradation within the tube sheet crevice. Further examination of other inlet tubes for both No. 11 and No. 12 steam generators, revealed no indication of tube degradation in either the tube sheet crevice, the legs or U-bends of the tubes.

The examination of the outlet tubes for both steam generators revealed no indication of tube degradation in the crevice area of the tube sheet. However, there were two outlet tubes (Row 35 Column 78, and Row 22 Column 86) in steam generator No. 11 that were detected to have tube wall degradation (34-35%) at either the first or second tube support, and one outlet tube (Row 28 Column 84) that had a small indication (<20%) at the 1st tube support for steam generator No. 12. These indications resembled those discovered in the outlet tubes of Unit 2 steam generators. (Refer to Prairie Island Unit 2 Inservice Inspection-Examination Summary, January 2 to February 4, 1980; and Licensee Event Report RO-80-03, including Update Reports No. 1 and No. 2).

A detailed listing of all indications and a comparison to previous examinations is included in Appendix A and B, for Steam Generator No. 11 and 12 respectively.

The one defective tube (Row 2 Column 21, steam generator No. 12) was mechanically plugged, after completion of eddy current examinations, per Westinghouse mechanical plugging procedure by Westinghouse personnel.

3.0 Examination Plan

The inspection program was conducted to comply with the requirements of Prairie Island Technical Specification, and focused on the tubes adjacent to the leaking tube, the wedge area tubes, the tight radius U-bend tubes, and the periphery tubes of the outlet side. A total of 937 tubes in steam generator No. 11 and 1109 tubes in steam generator No. 12 were examined. (Refer to the tube sheet maps of Appendix A and B for details of the examination.)

The type and extent of tube examinations that were performed during this inspection are as follows:

	Exam Amount	Exam Frequency	Exam Extent	Tube Percentage
Steam Generator No. 11 Inlet	176	Multi-freq.	full length + tight radius U-bends	5.19%
	137	Multi-freq.	full length + U-bends	4.04%
	1	Multi-freq.	Past 7th Support	.02%
No. 11 Outlet	616	Multi-freq.	Past 7th Support	18.18%
	7	Multi-freq.	Past 6th Support	.21%
Steam Generator No. 12 Inlet	176	Multi-freq.	full length + tight radius U-bends	5.19%
	140	Multi-freq.	full length U-bends	4.13%
	7	Multi-freq.	Past 7th Support	.21%
	163	Multi-freq.	Past 1st Support	4.81%
No. 12 Outlet	617	Multi-freq.	Past 7th Support	18.21%
	6	Multi-freq.	Past 6th Support	.18%

4.0 Examination Method

Westinghouse, along with technical support from Zetec Corporation, was contracted to perform and evaluate the data from eddy current examinations. The examinations were performed using Westinghouse's

multi-frequency eddy current testing system. A differential coil multi-frequency is used for the inspection to detect localized degradation and to measure the extent of wastage, if any, occurring on the outside diameter of the tube surface. By employing four imposed frequencies, 400 KHZ (tube wall degradation), 100 KHZ (low gain to minimize/eliminate "unwanted" support plate and tube sheet signals), 100 KHZ (high gain for detection of cracks in the tube sheet) and 100 KHZ absolute (tight radius U-bends), on the probe during examination, information over and above minimum requirements were acquired and recorded for record purposes and for future evaluation to clarify tube conditions.

5.0 Equipment and Materials

All equipment and expendable materials used in the examinations are listed by either serial number or type along with their respective calibration date or batch number in Table III of Appendix D.

6.0 Personnel

Northern States Power Company contracted Westinghouse, with technical eddy current examination support from Zetec Corporation, to perform and evaluate the eddy current examinations. Hartford Steam Boiler Insurance and Inspection Company, representing ANI, provided the Authorized Inspection.

All personnel involved in the performance or evaluation of examinations are listed, along with their title, organization and ASNT level of certification, in Table I of Appendix D.

Certifications for examination personnel are maintained on file by Northern States Power Company.

APPENDIX A

STEAM GENERATOR NO. 11

EDDY CURRENT EXAMINATION
RESULTS AND TUBE SHEET MAPS

EDDY CURRENT EXAMINATION RESULTS

AND COMPARISON TABLE

PRAIRIE ISLAND UNIT I
STEAM GENERATOR NUMBER 11
INLET OR OUTLET Inlet
EXAMINATION FREQUENCY multi-freq

APPENDIX A
PAGE 1 OF 7
DATE 7-22-80

ROW	COL	INDICATION	LOCATION	COMPARISON	PRIOR EXAMINATION INDICATION	DATE
17	15	DTSS	TS	---	N/A	---
24	20	DTSS	TS	---	N/A	---
10	25	DTSS	TS	---	N/A	---
10	30	DTSS	TS	---	NONE	9/74
17	30	DTSS	TS	---	NONE	9/74
43	30	DENT & DTSS	#6 TSP & TS	#6 NO CHANGE	DENT #6 TSP	10/79
43	31	DENT	#6 TSP	#6 NO CHANGE	DENT #6 TSP	10/79
43	32	DENT	#6 TSP	#6 NO CHANGE	DENT #6 TSP	10/79
43	33	DENT	#6 TSP	#6 NO CHANGE	DENT #6 TSP	10/79
44	33	DENT & DTSS	#6 TSP & TS	#6 NO CHANGE	DENT #6 TSP	10/79
44	34	DENT	#6 TSP	#6 MINOR CHANGE	DENT #6 TSP	10/79
10	35	DTSS	TS	---	NONE	9/74
17	35	DTSS	TS	---	NONE	9/74
44	35	DENT	#6 & #7 TSP	#6 MINOR CHANGE #7 NO CHANGE	DENT #6 & #7 TSP	10/79
44	36	DENT	#6 TSP	#6 MINOR CHANGE	DENT #6 TSP	10/79
45	36	DENT	#6 TSP	#6 NO CHANGE	DENT #6 TSP	10/79

ABBREVIATIONS:

LOCATION:

C.L. - Cold Leg
H.L. - Hot Leg
O.D. - Outside Dia.
T.E. - Tube End
T.S. - Tube Sheet
TSP - Tube Support Plate
CTR - Center
BTW - Between
$\wedge$ - Above
$\vee$ - Below

INDICATION:

P.V. - Permability Variation
DTSS - Distorted Tube Sheet Signal
DENT - $<$2.5 Mils

EXTENT:

1 - 1st Supp.
3 - 3rd Supp.
7 - 7th Supp.
U - U-Bend
TRU - Tight Radius
FL - Full Length

EDDY CURRENT EXAMINATION RESULTS

AND COMPARISON TABLE

PRAIRIE ISLAND UNIT I
STEAM GENERATOR NUMBER 11
INLET OR OUTLET Inlet
EXAMINATION FREQUENCY multi-freq

APPENDIX A
PAGE 2 OF 7
DATE 7-22-80

ROW	COL	INDICATION	LOCATION	COMPARISON	PRIOR EXAMINATION INDICATION	DATE
45	37	DENT	#6 TSP	#6 NO CHANGE	DENT #6 TSP	10/79
10	40	DTSS	TS	---	DTSS-TS	10/79
17	45	DTSS	TS	---	NONE	9/74
17	60	DTSS	TS	---	NONE	5/75

ABBREVIATIONS:

LOCATION:

C.L. - Cold Leg
H.L. - Hot Leg
O.D. - Outside Dia.
T.E. - Tube End
T.S. - Tube Sheet
TSP - Tube Support Plate
CTR - Center
BTW - Between
^ - Above
v - Below

INDICATION:

P.V. - Permability Variation
DTSS - Distorted Tube Sheet Signal
DENT - < 2.5 Mils

EXTENT:

1 - 1st Supp.
3 - 3rd Supp.
7 - 7th Supp.
U - U-Bend
TRU - Tight Radius
FL - Full Length

EDDY CURRENT EXAMINATION RESULTS

AND COMPARISON TABLE

PRAIRIE ISLAND UNIT I
STEAM GENERATOR NUMBER II
INLET OR OUTLET Outlet
EXAMINATION FREQUENCY multi-freq

APPENDIX A
PAGE 3 OF 7
DATE 7-22-80

ROW	COL	INDICATION	LOCATION	COMPARISON	PRIOR EXAMINATION INDICATION	DATE
8	2	DTSS	TS	---	N/A	----
9	2	DTSS	TS	---	N/A	------
9	3	DTSS	TS	---	N/A	-----
8	4	DTSS	TS	---	N/A	----
9	4	DTSS	TS	---	N/A	----
42	28	DTSS	TS	---	NONE	9/74
42	29	DTSS	TS	---	NONE	9/74
42	30	DTSS	TS	---	NONE	9/74
43	30	DTSS	TS	---	NONE	9/74
43	31	DTSS	TS	---	NONE	9/74
43	32	DTSS	TS	---	DENT @3 AVB	4/75
43	33	DTSS	TS	---	NONE	9/74
44	33	DTSS	TS	---	DENT 5" V#7TSP	4/75
44	34	DTSS	TS	---	NONE	9/74
45	38	DENT	#6 & #7 TSP	#7 CHANGED	DENT #6 & #7 TSP	10/79
45	39	DENT	#6 & #7 TSP	#7 CHANGED FOR THE BETTER	DEN #6 & #7 TSP	10/79

ABBREVIATIONS:

LOCATION:

C.L. - Cold Leg
H.L. - Hot Leg
O.D. - Outside Dia.
T.E. - Tube End
T.S. - Tube Sheet
TSP - Tube Support Plate
CTR - Center
BTW - Between
∧ - Above
∨ - Below
AVB- Anti-Vibration Bar

INDICATION:

P.V. - Permability Variation
DTSS - Distorted Tube Sheet Signal
DENT -< 2.5 Mils

EXTENT:

1 - 1st Supp.
3 - 3rd Supp.
7 - 7th Supp.
U - U-Bend
TRU - Tight Radius
FL - Full Length

EDDY CURRENT EXAMINATION RESULTS

AND COMPARISON TABLE

PRAIRIE ISLAND UNIT I
STEAM GENERATOR NUMBER 11
INLET OR OUTLET Outlet
EXAMINATION FREQUENCY multi-freq

APPENDIX A
PAGE 4 OF 7
DATE 7-22-80

ROW	COL	INDICATION	LOCATION	COMPARISON	PRIOR EXAMINATION INDICATION	DATE
43	40	DENT	#6 TSP	---	N/A	----
44	40	DENT	#6 & #7 TSP	---	N/A	----
45	40	DENT	#6 & #7 TSP	#7 NO CHANGE	DENT #6 & #7 TSP	10/79
44	41	DENT	#6 TSP	---	N/A	----
45	41	DENT	#6 & #7 TSP	#6 & #7 NO CHANGE	DENT #6 & #7 TSP	10/79
46	41	DENT	#5, #6,& #7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
		DENT	34" & 38" ^ TS	---	N/A	----
44	42	DENT	#6 TSP	---	N/A	----
45	42	DENT	#7 TSP	---	NONE	10/79
46	54	DENT	#7 TSP	---	NONE	10/79
44	55	DENT	#7 TSP	---	N/A	----
45	55	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
43	56	DENT	#7 TSP	---	N/A	----
44	56	DENT	#7 TSP	---	N/A	----
45	56	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
42	57	DENT	#7 TSP	---	N/A	----
43	57	DENT	#7 TSP	---	N/A	----

ABBREVIATIONS:

LOCATION:

C.L. - Cold Leg
H.L. - Hot Leg
O.D. - Outside Dia.
T.E. - Tube End
T.S. - Tube Sheet
TSP - Tube Support Plate
CTR - Center
BTW - Between
^ - Above
v - Below

INDICATION:

P.V. - Permability Variation
DTSS - Distorted Tube Sheet Signal
DENT - < 2.5 Mils

EXTENT:

1 - 1st Supp.
3 - 3rd Supp.
7 - 7th Supp.
U - U-Bend
TRU - Tight Radius
FL - Full Length

EDDY CURRENT EXAMINATION RESULTS

AND COMPARISON TABLE

PRAIRIE ISLAND UNIT I
STEAM GENERATOR NUMBER 11
INLET OR OUTLET Outlet
EXAMINATION FREQUENCY multi-freq.

APPENDIX A
PAGE 5 OF 7
DATE 7-22-80

ROW	COL	INDICATION	LOCATION	COMPARISON	PRIOR EXAMINATION INDICATION	DATE
44	57	DENT	#7 TSP	---	N/A	----
45	57	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
42	58	DENT	#7 TSP	---	NONE	10/79
44	58	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
42	59	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
44	59	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
42	60	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
43	60	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
44	60	DENT	#6 TSP	---	N/A	----
41	61	DENT	#7 TSP	---	N/A	----
42	61	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
43	61	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
44	61	DENT	#6 TSP	---	N/A	10/79
41	62	DENT	#6 & #7 TSP	---	N/A	10/79
42	62	DENT	#6 & #7 TSP	---	NONE	10/79
43	62	DENT	#6 & #7 TSP	#7 CHANGED	DENT #7 TSP	10/79
44	62	DENT	#6 & #7 TSP	#7 MINOR CHANGE	DENT #7 TSP	10/79

ABBREVIATIONS:

LOCATION:

C.L. - Cold Leg
H.L. - Hot Leg
O.D. - Outside Dia.
T.E. - Tube End
T.S. - Tube Sheet
TSP - Tube Support Plate
CTR - Center
BTW - Between
^ - Above
v - Below

INDICATION:

P.V. - Permability Variation
DTSS - Distorted Tube Sheet Signal
DENT - < 2.5 Mils

EXTENT:

1 - 1st Supp.
3 - 3rd Supp.
7 - 7th Supp.
U - U-Bend
TRU - Tight Radius
FL - Full Length

EDDY CURRENT EXAMINATION RESULTS

AND COMPARISON TABLE

PRAIRIE ISLAND UNIT I
STEAM GENERATOR NUMBER 11
INLET OR OUTLET Outlet
EXAMINATION FREQUENCY multi-freq.

APPENDIX A
PAGE 6 OF 7
DATE 7-22-80

ROW	COL	INDICATION	LOCATION	COMPARISON	PRIOR EXAMINATION INDICATION	DATE
39	63	DENT	#7 TSP	---	N/A	----
41	63	DENT	#6 & #7 TSP	---	N/A	----
42	63	DENT	#6 & #7 TSP	#7 CHANGED	DENT #7 TSP	10/79
38	64	DENT	#7 TSP	---	N/A	----
41	64	DENT	#6 & #7 TSP	---	N/A	----
42	64	DENT	#6 & #7 TSP	#7 CHANGED	DENT #7 TSP	10/79
43	64	DENT	#6 & #7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
41	65	DENT	#6 & #7 TSP	---	N/A	----
42	65	DENT	#6 & #7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
43	65	DENT	#6 & #7 TSP	#7 CHANGED	DENT #7 TSP	10/79
41	66	DENT	#6 & #7 TSP	---	N/A	----
42	66	DENT	#6 TSP	---	N/A	----
41	67	DENT	#6 & #7 TSP	#7 MINOR CHANGE	DENT #7 TSP	10/79
42	67	DENT	#6 TSP	#6 NO CHANGE	DENT #6 TSP	10/79
39	68	DENT	#7 TSP	---	N/A	----
41	68	DENT	#6 & #7 TSP	#7 CHANGED	DENT #7 TSP	10/79
35	78	34%	#2 TSP	---	N/A	----

ABBREVIATIONS:

LOCATION:

C.L. - Cold Leg
H.L. - Hot Leg
O.D. - Outside Dia.
T.E. - Tube End
T.S. - Tube Sheet
TSP - Tube Support Plate
CTR - Center
BTW - Between
∧ - Above
∨ - Below

INDICATION:

P.V. - Permability Variation
DTSS - Distorted Tube Sheet Signal
DENT - < 2.5 Mils

EXTENT:

1 - 1st Supp.
3 - 3rd Supp.
7 - 7th Supp.
U - U-Bend
TRU - Tight Radius
FL - Full Length

EDDY CURRENT EXAMINATION RESULTS

AND COMPARISON TABLE

PRAIRIE ISLAND UNIT 1
STEAM GENERATOR NUMBER 11
INLET OR OUTLET Outlet
EXAMINATION FREQUENCY multi-freq.

APPENDIX A
PAGE 7 OF 7
DATE 7-22-80

ROW	COL	INDICATION	LOCATION	COMPARISON	PRIOR EXAMINATION INDICATION	DATE
28	82	P.V.	BTW #2 & #3 TSP	---	N/A	---
22	86	35%	#1 TSP	---	N/A	---

ABBREVIATIONS:

LOCATION:

C.L. - Cold Leg
H.L. - Hot Leg
O.D. - Outside Dia.
T.E. - Tube End
T.S. - Tube Sheet
TSP - Tube Support Plate
CTR - Center
BTW - Between
∧ - Above
∨ - Below

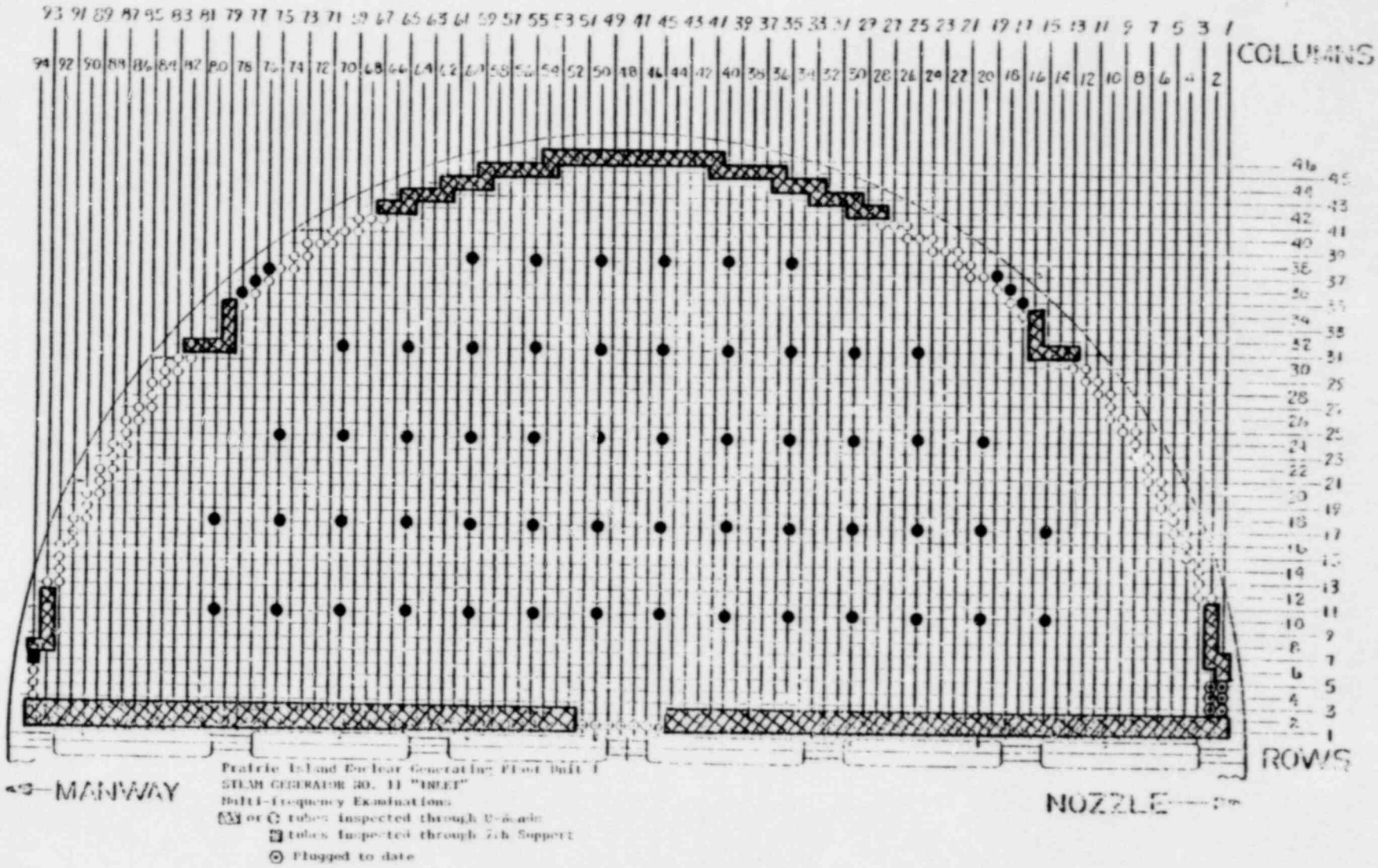
INDICATION:

P.V. - Permability Variation
DTSS - Distorted Tube Sheet Signal
DENT - <2.5 Mils

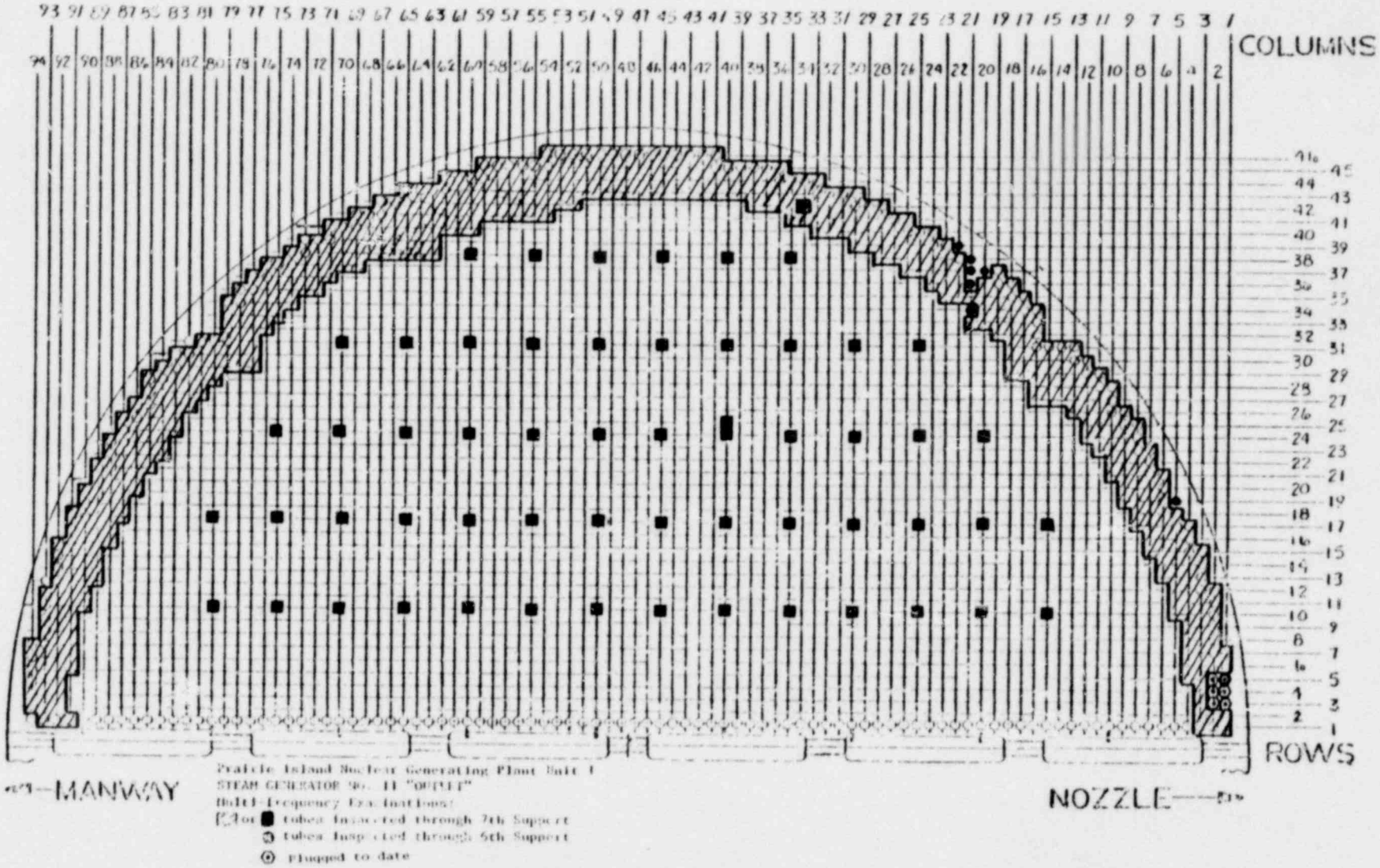
EXTENT:

1 - 1st Supp.
3 - 3rd Supp.
7 - 7th Supp.
U - U-Bend
TRU - Tight Radius
FL - Full Length

SERIES 51


COLUMNS
ROWS
MANWAY
NOZZLE
Prairie Island Nuclear Generating Plant Unit 1
STEAM GENERATOR NO. 11 "INLET"
Multi-frequency Examination:
tubes inspected through U-Bend
tubes inspected through 7th Support
Plugged to date

SERIES 51


COLUMNS
ROWS
MANWAY
NOZZLE
Prairie Island Nuclear Generating Plant Unit 1
STEAM GENERATOR No. 11 "OUTLET"
Multi-Frequency Examinations:
tubes inspected through 7th Support
tubes inspected through 5th Support
Plugged to date

APPENDIX B

STEAM GENERATOR NO. 12

EDDY CURRENT EXAMINATION
RESULTS AND TUBE SHEET MAPS

EDDY CURRENT EXAMINATION RESULTS

AND COMPARISON TABLE

PRAIRIE ISLAND UNIT I
STEAM GENERATOR NUMBER 12
INLET OR OUTLET Inlet
EXAMINATION FREQUENCY multi-freq.

APPENDIX B
PAGE 1 OF 6
DATE 7-22-80

ROW	COL	INDICATION	LOCATION	COMPARISON	PRIOR EXAMINATION INDICATION	DATE
17	35	DENT	TS	---	NONE	9/74
17	40	DENT	TS	---	NONE	9/74
45	41	DENT	#7 TSP	---	SIGNAL DISTORTED	10/79
17	45	DENT	TS	---	NONE	9/74
17	50	DENT	TS	---	NONE	9/74
17	55	DTSS	TS	---	NONE	9/74
2	75	P.V.	18"∧#4 TSP	---	P.V.18"∧#4TSP	10/79
17	80	DTSS	TS	---	N/A	----
16	83	DTSS	TS	---	N/A	----
14	84	DTSS	TS	---	NONE	3/76
16	84	DTSS	TS	---	N/A	----
16	85	DTSS	TS	---	N/A	----
9	93	DTSS	TS	---	NONE	9/74
2	21	100%	10" in TS	---	NONE	10/79

ABBREVIATIONS:

LOCATION:

C.L. - Cold Leg
H.L. - Hot Leg
O.D. - Outside Dia.
T.E. - Tube End
T.S. - Tube Sheet
TSP - Tube Support Plate
CTR - Center
BTW - Between
∧ - Above
∨ - Below

INDICATION:

P.V. - Permability Variation
DTSS - Distorted Tube Sheet Signal
DENT - <2.5 Mils

EXTENT:

1 - 1st Supp.
3 - 3rd Supp.
7 - 7th Supp.
U - U-Bend
TRU - Tight Radius
FL - Full Length

EDDY CURRENT EXAMINATION RESULTS

AND COMPARISON TABLE

PRAIRIE ISLAND UNIT I
STEAM GENERATOR NUMBER 12
INLET OR OUTLET Outlet
EXAMINATION FREQUENCY multi-freq.

APPENDIX B
PAGE 2 OF 6
DATE 7-22-80

ROW	COL	INDICATION	LOCATION	COMPARISON	PRIOR EXAMINATION INDICATION	DATE
16	7	P.V.	3" TS	---	N/A	----
18	7	P.V.	#5 TSP	---	N/A	----
24	10	P.V.	25"∧ #4 TSP	---	N/A	----
25	11	P.V.	BTW #5 & #7 TSP	---	N/A	----
17	15	DENT	T.S.	---	N/A	----
36	19	P.V.	7"∧ #5 TSP	---	N/A	----
17	20	DENT	TS	---	N/A	----
25	20	P.V.	46"∧ #4 TSP	---	N/A	----
24	25	DENT	TS	---	NONE	5/75
10	30	DTSS	TS	---	NONE	9/74
20	30	DENT	TS	---	NONE	9/74
21	30	DENT	TS	---	NONE	3/76
24	30	DENT	TS	---	NONE	9/74
42	30	DENT	#1 TSP	---	N/A	----
20	31	DENT	TS	---	NONE	9/74
21	31	DENT	TS	---	NONE	9/74
22	31	DENT	TS	---	NONE	9/74

ABBREVIATIONS:

LOCATION:

C.L. - Cold Leg
H.L. - Hot Leg
O.D. - Outside Dia.
T.E. - Tube End
T.S. - Tube Sheet
TSP - Tube Support Plate
CTR - Center
BTW - Between
∧ - Above
∨ - Below

INDICATION:

P.V. - Permability Variation
DTSS - Distorted Tube Sheet Signal
DENT - < 2.5 Mils

EXTENT:

1 - 1st Supp.
3 - 3rd Supp.
7 - 7th Supp.
U - U-Bend
TRU - Tight Radius
FL - Full Length

EDDY CURRENT EXAMINATION RESULTS

AND COMPARISON TABLE

PRAIRIE ISLAND UNIT I
STEAM GENERATOR NUMBER 12
INLET OR OUTLET Outlet
EXAMINATION FREQUENCY multi-freq.

APPENDIX B
PAGE 3 OF 6
DATE 7-22-80

ROW	COL	INDICATION	LOCATION	COMPARISON	PRIOR EXAMINATION INDICATION	DATE
42	31	DENT	#1 TSP	---	N/A	---
42	32	DENT	#1 TSP	---	N/A	---
44	34	DENT	#1 TSP	---	N/A	---
10	35	DTSS	TS	---	NONE	3/77
17	35	DENT	TS	---	NONE	9/74
24	35	DENT	TS	---	NONE	3/77
31	35	DENT	TS	---	N/A	---
43	35	DENT	#1 TSP	---	N/A	---
44	37	DENT	#1 TSP	---	N/A	---
10	40	DENT	TS	---	NONE	9/74
17	40	DENT	TS	---	NONE	9/74
24	40	DENT	TS	---	NONE	9/74
45	40	DENT	#7 TSP	---	NONE	10/79
10	45	DENT	TS	---	NONE	9/74
17	45	DENT	TS	---	NONE	9/74
24	45	DENT	TS	---	NONE	9/74
31	45	DENT	TS.	---	N/A	---

ABBREVIATIONS:

LOCATION:

C.L. - Cold Leg
H.L. - Hot Leg
O.D. - Outside Dia.
T.E. - Tube End
T.S. - Tube Sheet
TSP - Tube Support Plate
CTR - Center
BTW - Between
∧ - Above
∨ - Below

INDICATION:

P.V. - Permability Variation
DTSS - Distorted Tube Sheet Signal
DENT - < 2.5 Mils

EXTENT:

1 - 1st Supp.
3 - 3rd Supp.
7 - 7th Supp.
U - U-Bend
TRU - Tight Radius
FL - Full Length

EDDY CURRENT EXAMINATION RESULTS

AND COMPARISON TABLE

PRAIRIE ISLAND UNIT I
STEAM GENERATOR NUMBER 12
INLET OR OUTLET Outlet
EXAMINATION FREQUENCY multi-freq.

APPENDIX B
PAGE 4 OF 6
DATE 7-22-80

ROW	COL	INDICATION	LOCATION	COMPARISON	PRIOR EXAMINATION INDICATION	DATE
10	50	DTSS	TS	---	N/A	----
17	50	DENT	TS	---	N/A	----
24	50	DENT	TS	---	N/A	----
31	50	DTSS	TS	---	N/A	----
10	55	DENT	TS	---	N/A	----
17	55	DENT	TS	---	N/A	----
31	55	P.V.	32"^ #4 TSP	---	N/A	----
45	55	DENT	#7 TSP	---	NONE	10/79
45	56	DENT	#7 TSP	---	NONE	10/79
44	57	DENT	#7 TSP	---	N/A	----
45	57	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
43	58	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
44	58	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
45	58	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
42	59	DENT	#7 TSP	---	NONE	10/79
43	59	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
44	59	DENT	#7 TSP	#7 NO CHANGE	DENT #7' TSP	10/79

ABBREVIATIONS:

LOCATION:

C.L. - Cold Leg
H.L. - Hot Leg
O.D. - Outside Dia.
T.E. - Tube End
T.S. - Tube Sheet
TSP - Tube Support Plate
CTR - Center
BTW - Between
^ - Above
v - Below

INDICATION:

P.V. - Permability Variation
DTSS - Distorted Tube Sheet Signal
DENT - < 2.5 Mils

EXTENT:

1 - 1st Supp.
3 - 3rd Supp.
7 - 7th Supp.
U - U-Bend
TRU - Tight Radius
FL - Full Length

EDDY CURRENT EXAMINATION RESULTS

AND COMPARISON TABLE

PRAIRIE ISLAND UNIT I
STEAM GENERATOR NUMBER 12
INLET OR OUTLET Outlet
EXAMINATION FREQUENCY multi-freq.

APPENDIX B
PAGE 5 OF 6
DATE 7-22-80

ROW	COL	INDICATION	LOCATION	COMPARISON	PRIOR EXAMINATION INDICATION	DATE
45	59	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
10	60	DENT	TS	---	NONE	3/77
17	60	DENT	TS	---	N/A	----
42	60	DENT	#7 TSP	---	NONE	10/79
43	60	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
44	60	DENT	#7 TSP	#7 NO CHANGE	DENT #7 TSP	10/79
42	61	DENT	#7 TSP	---	SIGNAL SATURATED	10/79
43	61	DENT	#7 TSP	---	SIGNAL SATURATED	10/79
44	61	DENT	#7 TSP	#7 CHANGED	DENT #7 TSP	10/79
42	62	DENT	#7 TSP	#7 CHANGED	DENT #7 TSP	10/79
43	62	DENT	#7 TSP	#7 CHANGED FOR THE BETTER	DENT #7 TSP	10/79
42	63	DENT	#7 TSP	---	NONE	10/79
43	63	DENT	#7 TSP	---	NONE	10/79
42	64	DENT	#7 TSP	---	NONE	10/79
42	65	DENT	#7 TSP	---	NONE	10/79
43	65	DENT	#7 TSP	---	NONE	10/79
34	78	DENT	#6 TSP	---	N/A	----

ABBREVIATIONS:

LOCATION:

C.L. - Cold Leg
H.L. - Hot Leg
O.D. - Outside Dia.
T.E. - Tube End
T.S. - Tube Sheet
TSP - Tube Support Plate
CTR - Center
BTW - Between
∧ - Above
∨ - Below

INDICATION:

P.V. - Permability Variation
DTSS - Distorted Tube Sheet Signal
DENT - <2.5 Mils

EXTENT:

1 - 1st Supp.
3 - 3rd Supp.
7 - 7th Supp.
U - U-Bend
TRU - Tight Radius
FL - Full Length

EDDY CURRENT EXAMINATION RESULTS

AND COMPARISON TABLE

PRAIRIE ISLAND UNIT I
STEAM GENERATOR NUMBER 12
INLET OR OUTLET Outlet
EXAMINATION FREQUENCY multi-freq.

APPENDIX B
PAGE 6 OF 6
DATE 7-22-80

ROW	COL	INDICATION	LOCATION	COMPARISON	PRIOR EXAMINATION INDICATION	DATE
28	84	< 20%	O.D. #1 TSP	---	N/A	----

ABBREVIATIONS:

LOCATION:

C.L. - Cold Leg
H.L. - Hot Leg
O.D. - Outside Dia.
T.E. - Tube End
T.S. - Tube Sheet
TSP - Tube Support Plate
CTR - Center
BTW - Between
∧ - Above
∨ - Below

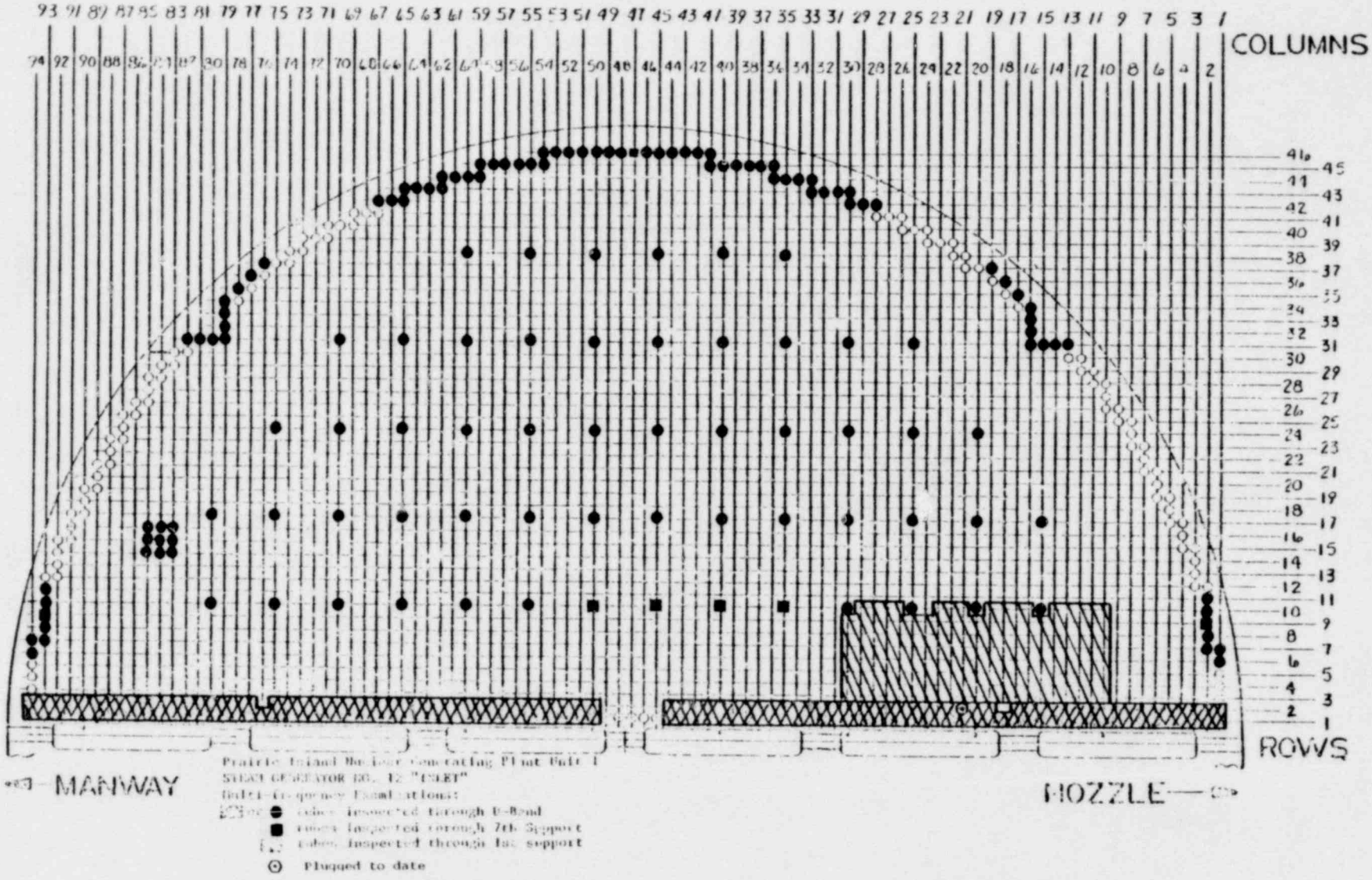
INDICATION:

P.V. - Permability Variation
DTSS - Distorted Tube Sheet Signal
DENT - < 2.5 Mils

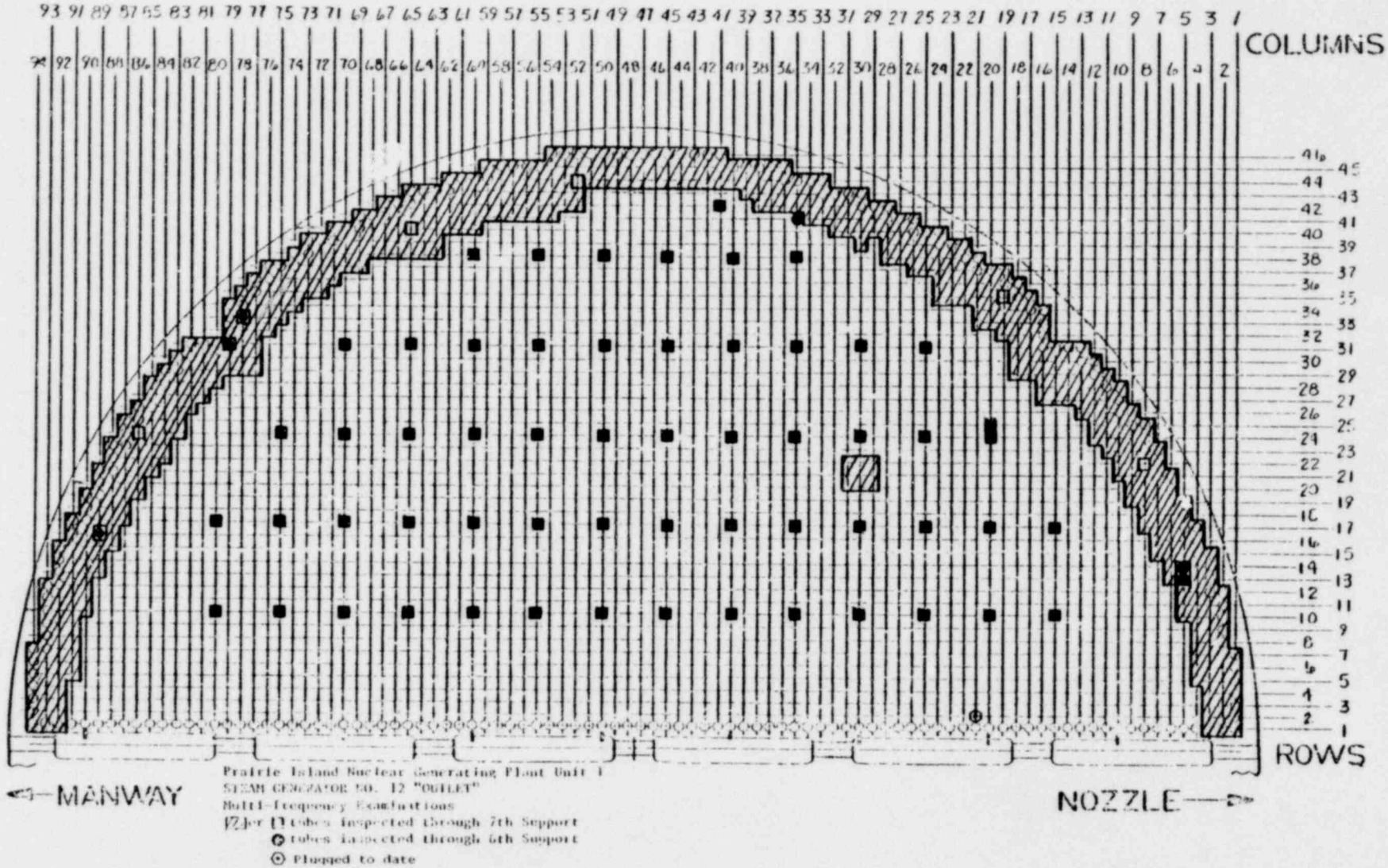
EXTENT:

1 - 1st Supp.
3 - 3rd Supp.
7 - 7th Supp.
U - U-Bend
TRU - Tight Radius
FL - Full Length

SERIES 51


COLUMNS
ROWS
MANWAY
NOZZLE
Prairie Island Nuclear Generating Plant Unit 1
STEAM GENERATOR NO. 12 "INLET"
Eddy-Frequency Examinations:
tubes inspected through 8-Band
tubes inspected through 7th Support
tubes inspected through 1st support
Plugged to date

SERIES 51

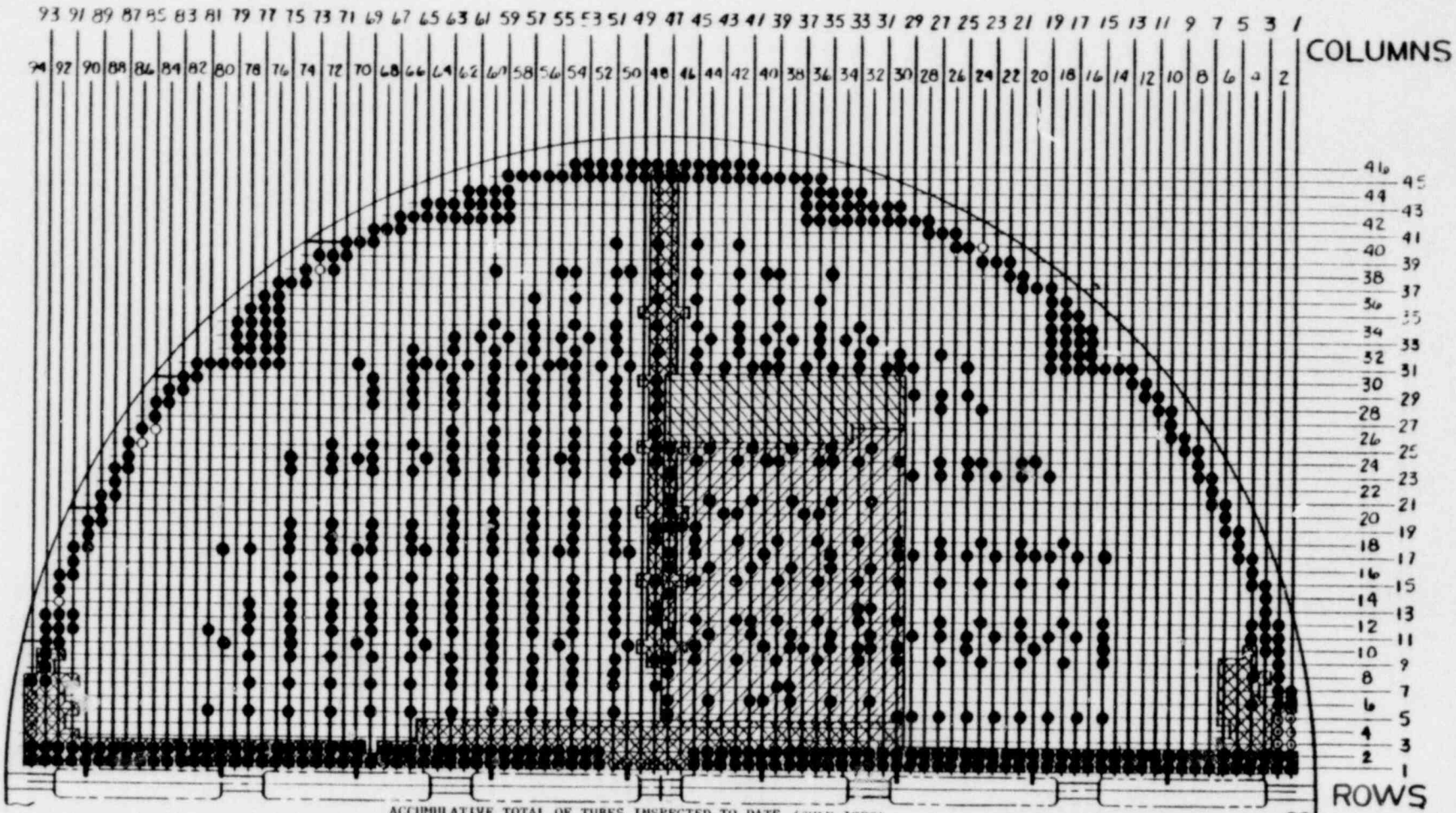

COLUMNS
ROWS
MANWAY
NOZZLE
Prairie Island Nuclear Generating Plant Unit 1
STEAM GENERATOR 50. 12 "OUTLET"
Multi-frequency Examinations
Per Tubes inspected through 7th Support
tubes inspected through 6th Support
Plugged to date

APPENDIX C

STEAM GENERATOR NO. 11 & 12

ACCUMULATIVE EDDY CURRENT
EXAMINATION TUBE SHEET MAPS

SERIES 51



ACCUMULATIVE TOTAL OF TUBES INSPECTED TO DATE (JULY 1980)

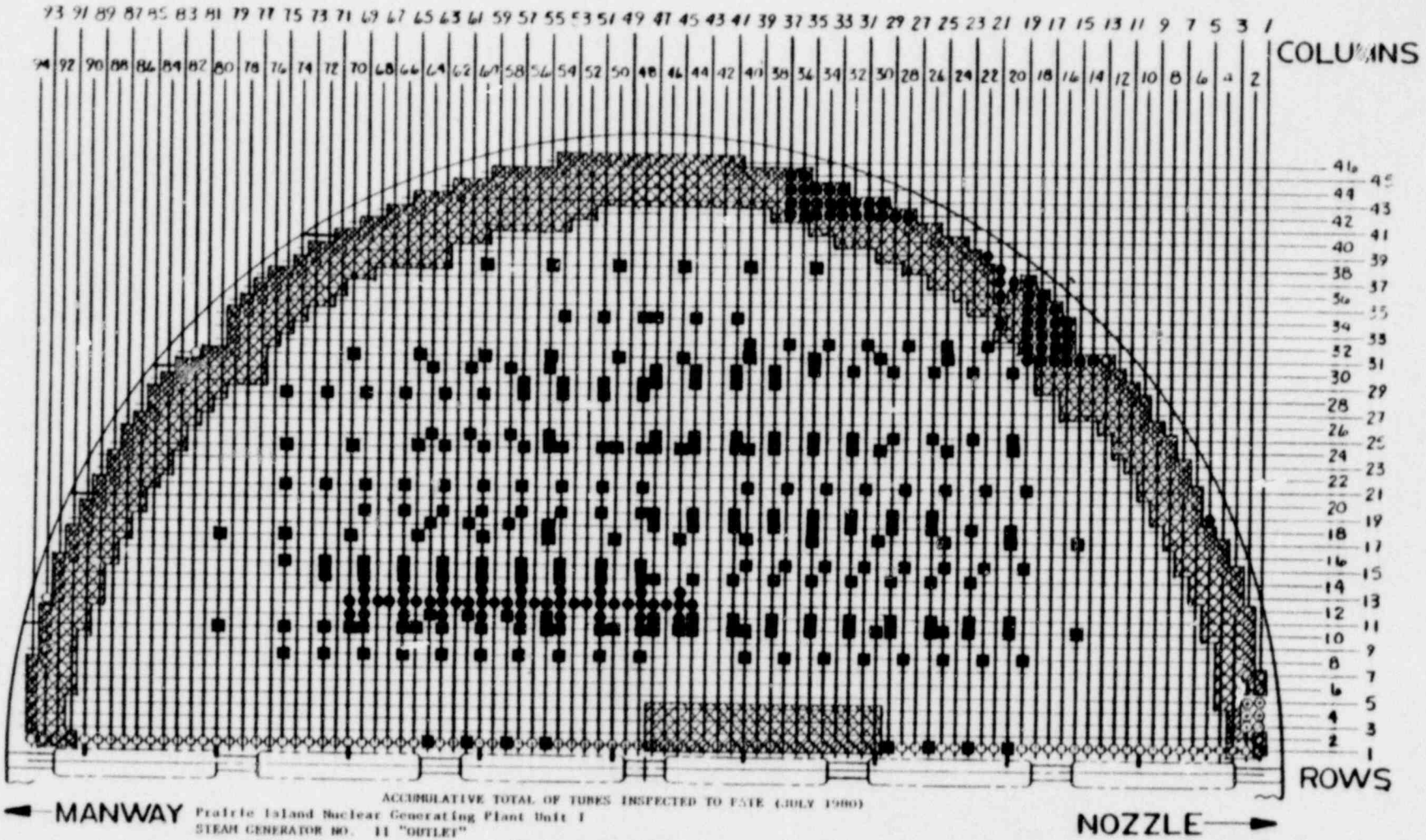
Prairie Island Nuclear Generating Plant Unit 1

STEAM GENERATOR NO. 11 "INLET"

400 KHz Examinations:
& Multi-frequency

or ● Tubes Inspected through U-Bend
or ■ Tubes Inspected to Top (7th) Support
Tubes Inspected to First Support
Tubes Plugged to Date

SERIES 51

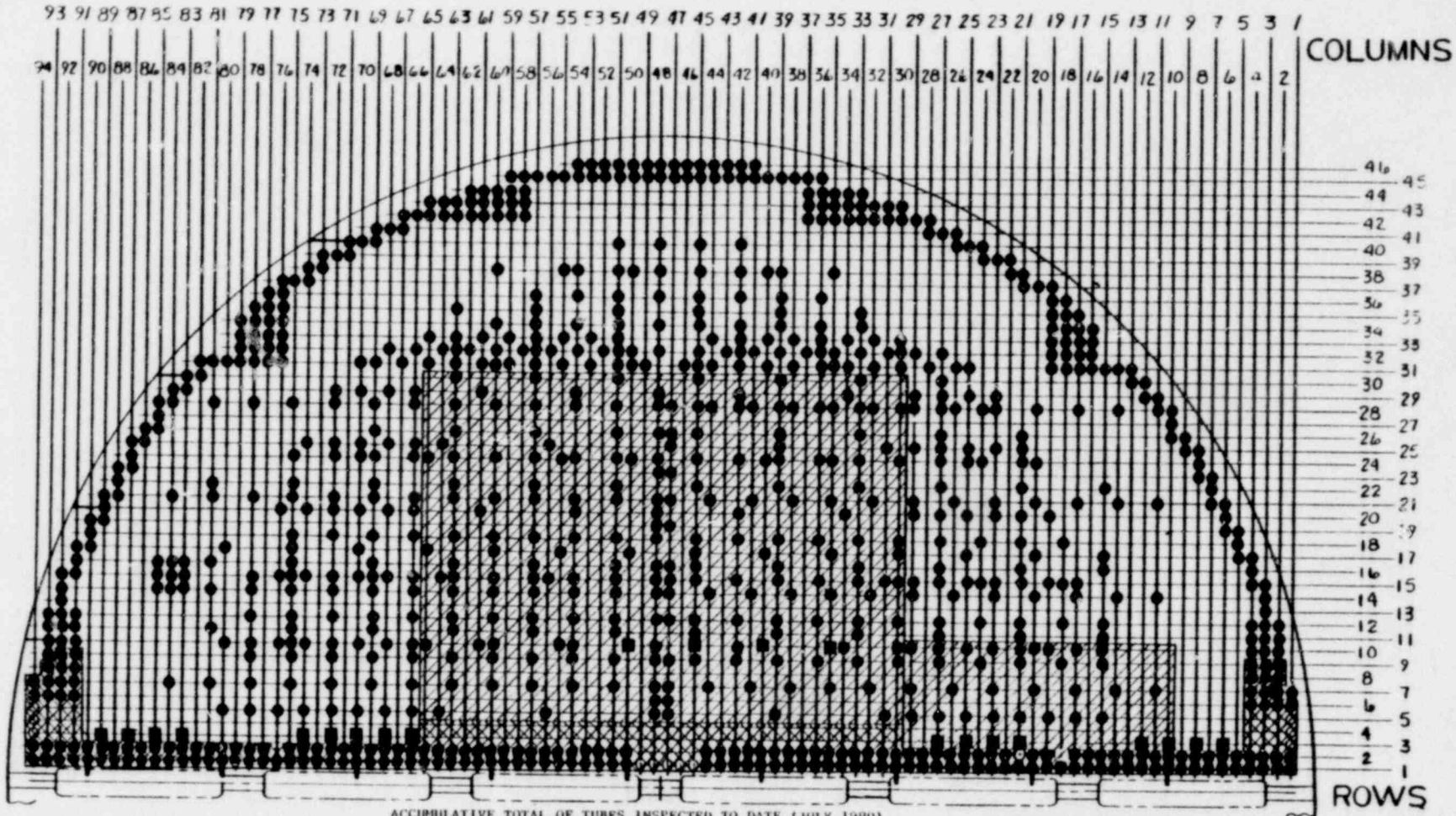


ACCUMULATIVE TOTAL OF TUBES INSPECTED TO DATE (JULY 1980)

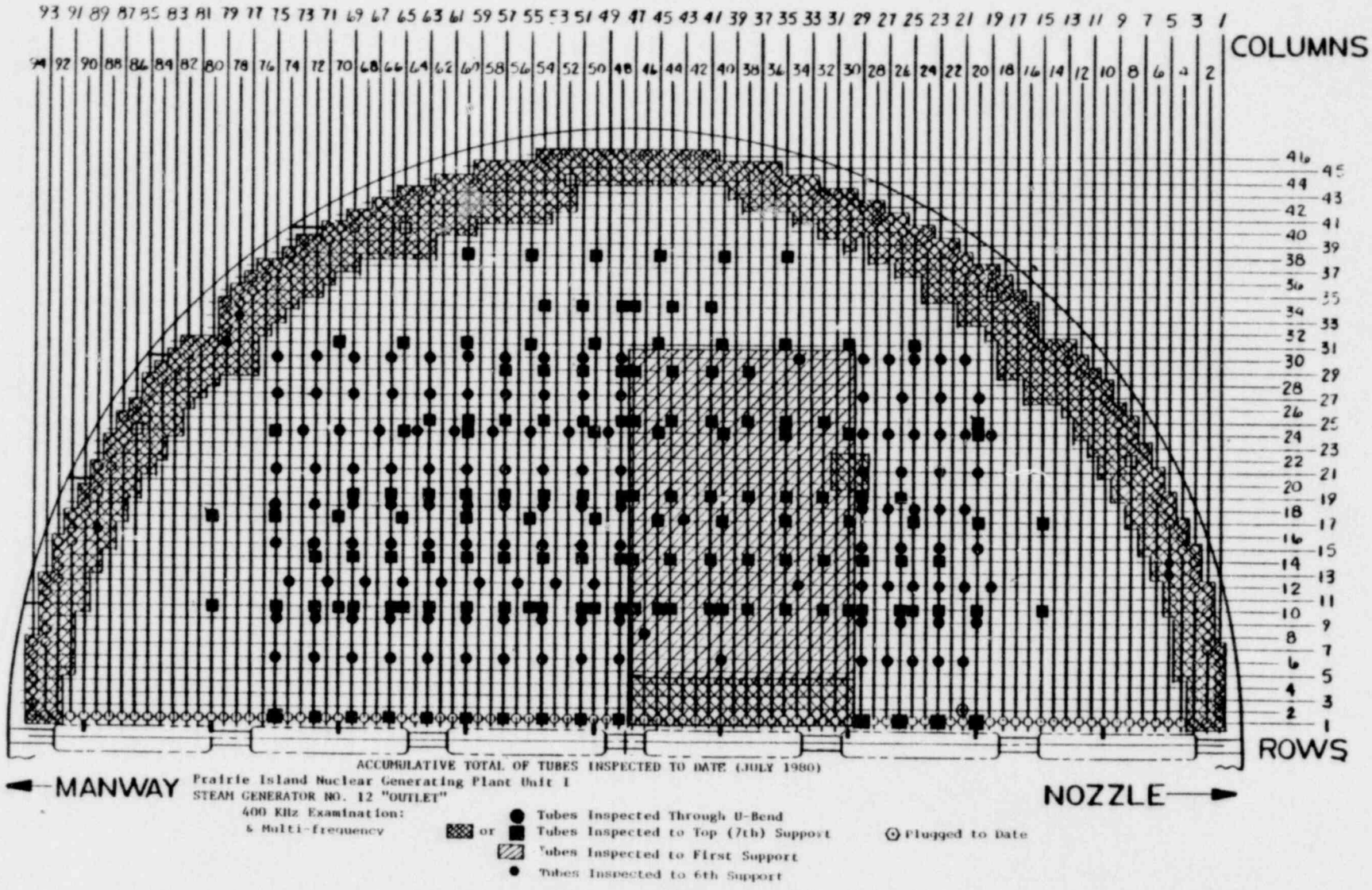
Prairie Island Nuclear Generating Plant Unit 1
STEAM GENERATOR NO. 11 "OUTLET"
400 Hz Examinations:
& Multi-frequency

- Tubes Inspected Through U-Bend
- or Tubes Inspected to Top (7th) Support
- Tubes Inspected to First Support
- Tubes Inspected to 6th Support
- Plugged to Date

SERIES 51


COLUMNS
ROWS
MANWAY
NOZZLE
ACCUMULATIVE TOTAL OF TUBES INSPECTED TO DATE (JULY 1980)
Prairie Island Nuclear Generating Plant Unit 1
STEAM GENERATOR NO. 12 "INLET"
400 KHz Examinations:
& Multi-frequency
or
Tubes Inspected Through U-Bend
Tubes Inspected to Top (7th) Support
Tubes Inspected to First Support
Plugged to Date

SERIES 51


COLUMNS
ROWS
MANWAY
NOZZLE
ACCUMULATIVE TOTAL OF TUBES INSPECTED TO DATE (JULY 1980)
Prairie Island Nuclear Generating Plant Unit 1
STEAM GENERATOR NO. 12 "OUTLET"
400 KHz Examination:
& Multi-frequency
or
Tubes Inspected Through U-Bend
Tubes Inspected to Top (7th) Support
Tubes Inspected to First Support
Tubes Inspected to 6th Support
Plugged to Date

APPENDIX D

T\BLE I - PERSONNEL LISTING

TABLE II - PROCEDURE LISTING

TABLE III - EQUIPMENT AND MATERIALS

NORTHERN STATES POWER COMPANY
PRAIRIE ISLAND UNIT I
PERSONNEL LISTING

APPENDIX D
TABLE I

EXAMINER	TITLE	ORGANIZATION	ASNT LEVEL ET
V.P. BURKE	COORDINATOR	W (1)	I
M.B. CORTESE	TECHNICIAN	W	I
G.J. FERENCHAK	TECHNICIAN	W	II
D.R. FRANCIS	TECHNICIAN	W	I
T.A. PFARR	TECHNICIAN	W	I
C. SWANGO	TECHNICIAN	W	II
G. TESTA	TECHNICIAN	W	I
D.J. TOMMARELLO	TECHNICIAN	W	I
E.J. HAKO	EVALUATOR	ZETEC (2)	IIA
E.O. McKEE	EVALUATOR	ZETEC	IIA
L.C. DAHLMAN	M&SP SPEC.	NSP	
D.B. HANSEN	ASSIT M&SP ENGINEER	NSP	
J. WILLIAMS	ANII	HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO.	

FOOTNOTES:

(1) Organization: Westinghouse Electric Corporation
Nuclear Services Division
P.O. Box 2728
Pittsburgh, Pa. 15230

(2) Organization: ZETEC
P.O. Box 140
Issaquan, Washington 98027

NORTHERN STATES POWER COMPANY
PRAIRIE ISLAND UNIT I
PROCEDURE LISTING

APPENDIX D
TABLE II

PROCEDURE NUMBER AND REVISION	FIELD CHANGE	PROCEDURE TITLE	PLANT APPROVAL DATE	FIELD CHANGE REMARKS	CHANGE DESCRIPTION
MRS 2.4.2 Gen-23 Rev. 2	NONE	Multi-frequency Eddy-Current Inspection Of Steam Generator Tubing-Preservice and Inservice	7-03-80	N/A	
MRS 2.4.2 Gen - 19 Rev. 0	NONE	Installation and removal Of Eddy Current Positioning Devices	7-03-80	N/A	

NORTHERN STATES POWER COMPANY
PRAIRIE ISLAND UNIT I
EQUIPMENT AND MATERIALS

APPENDIX D
TABLE III
PAGE 1 OF 2

MATERIAL OR EQUIPMENT	TYPE OR SERIAL NUMBER		CALIBRATION DATE OR BATCH NUMBER	REMARKS
MIZ 12 Main Frame	S/N	0668	4-11-80	
		0557	2-12-80	
		0661	4-10-80	
MIZ 12 Freq. Plug In	S/N	0669	4-11-80	
		0670	4-11-80	
		0671	4-11-80	
		0672	4-11-80	
		0539	2-15-80	
		0561	2-12-80	
		0574	2-11-80	
		0665	4-10-80	
		0663	4-10-80	
		0662	4-10-80	
		0664	4-10-80	
		0576	2-11-80	
MIZ 12 Mixer Plug In	S/N	0673	4-11-80	
		0674	4-11-80	
		0562	2-11-80	
		0563	2-11-80	
		0666	4-10-80	
		0667	4-10-80	
MIZ 12 Display Mod.	S/N	0643	4-1-80	
		0642	4-1-80	
		0678	4-1-80	
TEK 5111 Stor. Scope	S/N	0266	4-3-80	
		0151	4-23-80	
		0459	4-8-80	
Tape Recorder HP 3968AZ	S/N	0649	4-1-80	Recal. on Site 7-11-80
		0648	4-1-80	
Brush MK 220	S/N	0645	4-1-80	
		0644	4-1-80	
		0154	3-21-80	
		0589	5-16-80	
Standards				
Inconel 600	S/N	I-32-W	Heat # 8791	
Inconel 600	S/N	0100	Heat # 8939	
Inconel 600	S/N	Z831	Heat # 1019	
Zetec				
Vector Ana.	S/N	006	3-28-80	Model 3
MIZ 12 Mixer Plug In	S/N	057	3-28-80	
		056	3-28-80	

MATERIAL OR EQUIPMENT	TYPE OR SERIAL NUMBER	CALIBRATION DATE OR BATCH NUMBER	REMARKS
Zetec cont. MIZ 12 Display Plug In	S/N 027	7-3-80	
Ocilloscope	S/N B119925	7-3-80	TEK 5111
Tape Recorder	S/N 004	3-17-80	HP 3768AZ

APPENDIX E

FORM NIS-1

OWNERS' DATA REPORT FOR INSERVICE INSPECTION

FORM NIS-1 OWNERS' DATA REPORT FOR INSERVICE INSPECTIONS

(As Required by the Provisions of the ASME Code Rules)

1.) Owner NORTHERN STATES POWER COMPANY

Address 414 NICOLLET MALL; MINNEAPOLIS, MINNESOTA

2.) Plant PRAIRIE ISLAND NUCLEAR GENERATING PLANT - UNIT I

Address WELCH, MINNESOTA

3.) Plant Unit I 4.) Owner (Certificate of Authorization) -----

5.) Commercial Service Date 12-16-73 6.) National Board Number for Unit ------

7.) Components Inspected

Component or Appurtenance	Manufacturer or Installer	Manufacturer or Installer Serial No.	State or Province No.	National Board No.
STEAM GENERATOR TUBING S/G No. 11	Westinghouse	1101	--------	68-24

INLET TUBE AMOUNT	EXAMINATION FREQUENCY	EXAMINATION EXTENT	EXAMINATION PERCENTAGE
176	multi-freq.	Tight Radius U-Bends	5.19%
137	multi-freq.	Around U-Bends	4.04%
1	multi-freq.	Past 7th Support	.02%
OUTLET TUBE AMOUNT			
616	multi-freq.	Past 7th Support	18.18%
7	multi-freq.	Past 6th Support	.21 %

Component or Appurtenance	Manufacturer or Installer	Manufacturer or Installer Serial No.	State or Province No.	National Board No.
STEAM GENERATOR TUBING S/G No. 12	Westinghouse	1102	---------	68-25

INLET TUBE AMOUNT	EXAMINATION FREQUENCY	EXAMINATION EXTENT	EXAMINATION PERCENTAGE
176	multi-freq.	Tight Radius U-Bends	5.19%
140	multi-freq.	Around U-Bends	4.13%
7	multi-freq.	Past 7th Support	.21%
163	multi-freq.	Past 1st Support	4.81%
OUTLET AMOUNT			
6	multi-freq.	Past 6th Support	.18%
617	multi-freq.	Past 7th Support	18.21%

FORM NIS-1 (back)

8.) Examination Dates 7/5 to 7/18/80 9.) Inspection Interval 12/16/73 to 12/16/83

10.) Abstract of Examinations. Include a list of examinations and a statement concerning status of work required for current interval.

This was the seventh inservice inspection conducted on steam generator tubes since the date of commercial operation. During this outage 937 tubes were inspected for defects on Steam Generator No. 11; and, 1109 tubes were inspected for defects on Steam Generator No. 12. The examinations completed the Eddy Current Examination requirements in accordance with Prairie Island Technical Specification, Section T.S. 4.12.

11.) Abstract of Conditions Noted.

A visual examination revealed one leaking tube (Row 2 Column 21) on the inlet side of Steam Generator No. 12. Eddy Current Examinations revealed Row 35 Column 78 tube had an indication of 34% reduction in wall thickness; Row 22 Column 86 tube had an indication of 35% reduction in wall thickness in Steam Generator No. 11, and Row 28 Column 84 had a possible indication of <20% reduction in Steam Generator No. 12. Visual and Eddy Current Examinations revealed no other tubes with degradation.

12.) Abstract of Corrective Measures Recommended and Taken.

A total of 1 tube was plugged during this outage, the leaking tube (R2C21), in Steam Generator No. 12.

We certify that the statements made in this report are correct and the examinations and corrective measures taken conform to the rules of the ASME Code, Section XI.

Date August 11 19 80 Signed Northern States Power By D B Hansen
Owner

Certificate of Authorization No. (if applicable) --- Expiration Date ---

CERTIFICATE OF INSERVICE INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of Minnesota and employed by Hartford Steam Boiler Ins. & Ins. Co. of Hartford Ct. have inspected the components described in this Owner's Data Report during the period 7-5-80 to 7-18-80, and state that to the best of my knowledge and belief, the Owner has performed examinations and taken corrective measures described in this Owners' Data Report in accordance with the requirements of the ASME Code, Section XI.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the examinations and corrective measures described in this Owners' Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or loss of any kind arising from or connected with this inspection.

Date August 11 19 80

Inspector's Signature

Commissions NB# 8667 MN# 221
National Board, State, Province & No.