

NORTHERN STATES POWER COMPANY

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

SEPT. 6 TO SEPT. 9, 1981  
INSPECTION PERIOD 3

STEAM GENERATOR TUBE - EDDY CURRENT EXAMINATION

COMMERCIAL SERVICE  
DATE: 12-21-74

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M & SP Engineer

Lanny Dahlman,  
M & SP Specialist

REPORT DATE:  
10-29-81

Reviewed by:

Phillip J. Krumpal  
P. J. Krumpal, Supt.  
Material and Special  
Processes

Approved by:

Ray W. Anderson  
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General Superintendent  
Prod. Plant Maintenance

NORTHERN STATES POWER COMPANY  
PRAIRIE ISLAND NUCLEAR GENERATING PLANT UNIT II

- I N D E X -

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Inspection

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

Sept. 6 to Sept. 9, 1981

1.0 Introduction

This report is a summary of the steam generator tube eddy current examinations performed on the inlet side of steam generator No. 22, at Prairie Island Unit II. The examinations were performed during the period of Sept. 6 through Sept. 9, 1981, after a tube leak developed on August 19, 1981. Prairie Island Unit II began commercial operation on December 21, 1974.

2.0 Discussion of Results

The results of the visual examination of the tube sheet array in the hot leg side of the generator, while the secondary side was filled with water and under pressure, indicated that tube R36 C35 was leaking. No leaks were noted in the cold leg side and it was revealed that R36 C35 was plugged. A review of the eddy current results and plugging maps, from the previous outage, revealed that in the hot leg side R36 C35 was not plugged, but R37 C36 had been plugged by mistake.

Mechanical plugs were installed in the opposing ends of R36 C35 (hot leg) and R37 C36 (cold leg) to correct the leaking tube and ensure that proper correlation between hot leg and cold leg plugs was established.

Eddy current examinations were conducted on the leaking and the seven surrounding tubes with the following results:

| Row | Colm. | Sept. 1981<br>Indications | Extent      | Previous<br>Indications | Location |
|-----|-------|---------------------------|-------------|-------------------------|----------|
| 35  | 34    | None                      | U-Bend      | None                    | N/A      |
| 36  | 34    | None                      | U-Bend      | N/A                     | N/A      |
| 37  | 34    | None                      | Full length | N/A                     | N/A      |
| 35  | 35    | None                      | U-Bend      | N/A                     | N/A      |
| 36  | 35    | 100%                      | U-Bend      | #1 AVB 78%              | @ #1 AVB |
|     |       | 99%                       |             | #2 AVB 80%              | @ #2 AVB |
|     |       | 99%                       |             | #3 AVB 73%              | @ #3 AVB |
|     |       | 80%                       |             | #4 AVB <20%             | @ #4 AVB |
| 37  | 35    | None                      | U-Bend      | None                    | N/A      |
| 35  | 36    | None                      | U-Bend      | N/A                     | N/A      |
| 36  | 36    | None                      | U-Bend      | N/A                     | N/A      |

The steam generator tube sheet map is shown in Appendix A.

### 3.0 Examination Plan

The inspection program was conducted to verify the leaking tube location, and focused on tubes adjacent to the leaking tube for any signs of degradations that may have occurred due to the leaking tube.

### 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 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 B.

### 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 B.

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

APPENDIX A

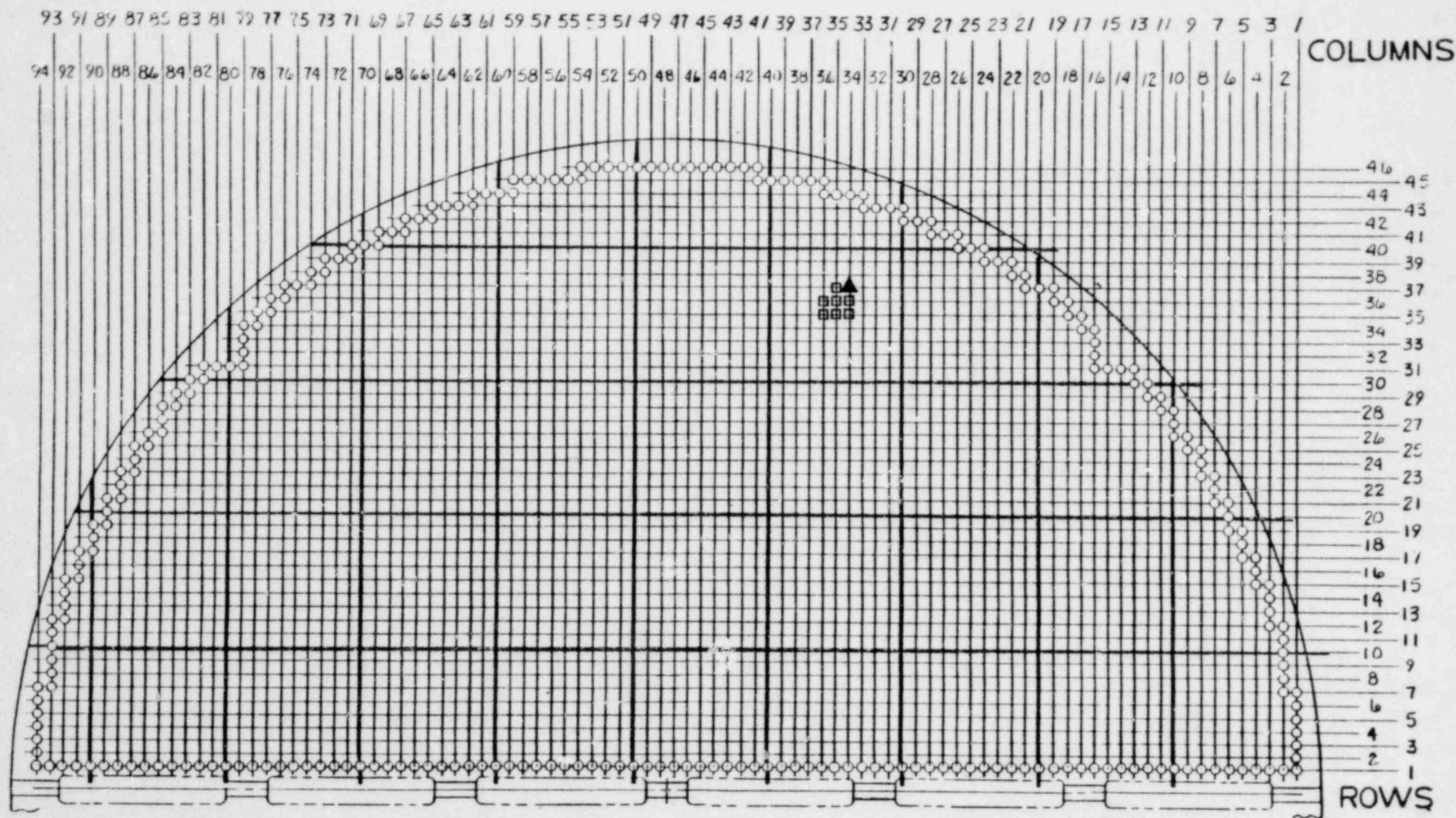
STEAM GENERATOR NO. 22

EDDY CURRENT EXAMINATION RESULTS

AND TUBE SHEET MAPS



# SERIES 51



← MANWAY

Prairie Island Nuclear Generating Plant Unit II  
Steam Generator No. 22 "Inlet"  
Multifrequency Examinations:

- U-Bend
- ▲ Full length

NOZZLE →

APPENDIX B

|           |   |                         |
|-----------|---|-------------------------|
| TABLE I   | - | PERSONNEL               |
| TABLE II  | - | PROCEDURE LISTING       |
| TABLE III | - | EQUIPMENT AND MATERIALS |

| EXAMINER      | TITLE                      | ORGANIZATION  | ASNT LEVEL<br>ET |
|---------------|----------------------------|---|------------------|
| HAZEN, R.P.   | TECHNICIAN                 | W <sup>(1)</sup>  | LEVEL II         |
| MILLS, J.E.   | TECHNICIAN                 | W   | LEVEL I          |
| FRANCIS, D.R. | TECHNICIAN                 | W   | LEVEL I          |
| TESTA, G.F.   | TECHNICIAN                 | W   | LEVEL II         |
| NEFF, A.S.    | EVALUATOR                  | ZETEC <sup>(2)</sup>                                      | LEVEL II A       |
| DAHLMAN, L.C. | M&SP SPEC.                 | NSP   |                  |
| HANSEN, D.B.  | ASSOCIATE<br>M&SP ENGINEER | NSP   |                  |
| WILLIAMS, J.  | ANII                       | HARTFORD<br>STEAM BOILER<br>INSPECTION &<br>INSURANCE CO. |                  |

FOOTNOTES: (1) ORGANIZATION: (1) WESTINGHOUSE ELECTRIC CORPORATION  
Nuclear Services Division  
P.O. Box 2728  
Pittsburgh, PA 15230

(2) ZETEC  
P.O. Box 140  
Issaquah, WA 98027



NORTHERN STATES POWER COMPANY  
PRAIRIE ISLAND UNIT II

PROCEDURE LISTING

APPENDIX B  
TABLE II  
PAGE 1 OF 1

| PROCEDURE NUMBER<br>AND REVISION | FIELD<br>CHANGE | PROCEDURE TITLE   | PLANT APPROVAL<br>DATE | FIELD CHANGE<br>REMARKS | CHANGE DESCRIPTION |
|----------------------------------|-----------------|---|------------------------|-------------------------|--------------------|
| MRS 2.4.2. GEN-23,<br>REVISION 2 | NONE            | MULTI-FREQUENCY<br>EDDY CURRENT INSPECTION OF<br>STEAM GENERATOR TUBING -<br>PRESERVICE AND INSERVICE | 7-3-80                 | NONE                    |                    |

NORTHERN STATES POWER COMPANY  
PRAIRIE ISLAND - UNIT 2  
EQUIPMENT AND MATERIALS

APPENDIX B  
TABLE III  
PAGE 1 OF 2

| MATERIAL OR EQUIPMENT      | TYPE OR SERIAL NUMBER | CALIBRATION DATE OR BATCH NUMBER | REMARKS |
|----------------------------|-----------------------|----------------------------------|---------|
| BRUSH RECORDER             | S/N 0059              | 9-04-81                          |         |
|                            | 0701                  | 6-17-81                          |         |
|                            | 0156                  | 8-12-81                          |         |
|                            | 0024                  | 8-12-81                          |         |
|                            | 0276                  | 7-02-81                          |         |
|                            | 0037                  | 6-17-81                          |         |
| TAPE RECORDER<br>HP 3968AZ | S/N 0545              | 6-29-81                          |         |
|                            | 0647                  | 6-29-81                          |         |
|                            | 0546                  | 7-06-81                          |         |
|                            | 1041                  | 7-07-81                          |         |
|                            | 1022                  | 7-21-81                          |         |
| MIZ 12 MAIN FRAME          | S/N 0690              | 6-30-81                          |         |
|                            | 0661                  | 6-29-81                          |         |
|                            | 0570                  | 6-26-81                          |         |
| FREQ. PLUG-IN              | S/N 0596              | 6-30-81                          |         |
|                            | 0561                  | 6-26-81                          |         |
|                            | 0670                  | 6-29-81                          |         |
|                            | 0565                  | 6-30-81                          |         |
|                            | 0695                  | 7-27-81                          |         |
|                            | 0575                  | 6-26-81                          |         |
|                            | 0558                  | 6-30-81                          |         |
|                            | 0577                  | 6-29-81                          |         |
|                            | 0711                  | 6-26-81                          |         |
|                            | 0568                  | 6-30-81                          |         |
|                            | 0549                  | 6-29-81                          |         |
|                            | 0541                  | 7-28-81                          |         |
| MIZ 12 MIXER PLUG-IN       | S/N 0641              | 6-30-81                          |         |
|                            | 0598                  | 6-26-81                          |         |
|                            | 0562                  | 6-30-81                          |         |
|                            | 0710                  | 6-30-81                          |         |
|                            | 0673                  | 6-30-81                          |         |
|                            | 0554                  | 6-26-81                          |         |
| MIZ 12 DISPLAY<br>MODULE   | S/N 0573              | 6-30-81                          |         |
|                            | 0613                  | 6-05-81                          |         |
| TEK 5111 STORAGE<br>SCOPE  | S/N 1056              | 7-27-81                          |         |
|                            | 0572                  | 6-30-81                          |         |
|                            | 0266                  | 6-05-81                          |         |
| VECTOR ANALYZER            | S/N 023               | 7-15-81                          |         |
| MIXER MODULE               | S/N 162               | 7-27-81                          |         |
|                            | 163                   | 7-27-81                          |         |

NORTHERN STATES POWER COMPANY  
 PRAIRIE ISLAND - UNIT 2  
 EQUIPMENT AND MATERIALS

APPENDIX B  
 TABLE III  
 PAGE 2 OF 2

| MATERIAL OR<br>EQUIPMENT | TYPE OR<br>SERIAL NUMBER | CALIBRATION DATE<br>OR BATCH NUMBER | REMARKS |
|--------------------------|--------------------------|-------------------------------------|---------|
| CALIBRATION<br>STANDARDS |                          |                                     |         |
| ICONEL 600               | I-32-W                   | IN-LINE STD                         |         |
| ICONEL 600               | NX-7735                  | ABSOLUTE STD                        |         |

APPENDIX C

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 2  
 Address Welch, Minnesota
- 3.) Plant Unit 2 4.) Owner (Certificate of Authorization) --
- 5.) Commercial Service Date 12-21-74 6.) National Board Number for Unit --
- 7.) Components Inspected

| <u>Component or Appurtenance</u>    | <u>Manufacturer or Installer</u> | <u>Manufacturer or Installer Serial No.</u> | <u>State or Province No.</u> | <u>National Board No.</u> |
|-------------------------------------|----------------------------------|---|------------------------------|---------------------------|
| <u>B3.11 Steam Generator tubing</u> |                                  |   |                              |                           |
| Steam Generator No. 21              | Westinghouse                     | 1182  | --                           | 68-40                     |
| <u>Inlet tube Amount</u>            | <u>Insp. Type</u>                | <u>Insp. Extent</u>                         |                              |                           |
| 6                                   | Multi-freq.                      | Around U-Bend                               |                              |                           |
| 1                                   | Multi-freq.                      | Full length                                 |                              |                           |

- 8.) Examination Dates 9-6-81 to 9-9-81 9.) Inspection Interval 12-21-74 to 12-21-84  
 10.) Abstract of Examinations. Include a list of examinations and a statement concerning status of work required for current interval.

This was the sixth inservice inspection conducted on steam generator tubes since the date of commercial operation. During this outage 8 tubes were examined for defects in steam generator No. 22.

- 11.) Abstract of Conditions Noted.

The results of eddy current examinations revealed that the leaking tube was the result of a misplaced plug. The plug was installed in R37C36 in lieu of R36C35.

- 12.) Abstract of Corrective Measures Recommended and Taken.

A total of 2 tubes were mechanically plugged this outage; R36C35 on the inlet side and R37C36 on the outlet side of steam generator No. 22

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 10-29 19 81 Signed NORTHERN STATES POWER CO. By J. C. Ashman  
 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 MSB I & I Co of Hartford Ct have inspected the components described in this Owner's Data Report during the period 9-6-81 to 9-9-81, 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 10-29-81 19 81

[Signature]  
 Inspector's Signature

Commissions NB 2667, MN 221  
 National Board, State, Province & No.