

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

OCT 31 1975

Northern States Power Company
ATTN: Mr. Leo Wachter, Vice President
Power Production and System
Operation
414 Nicollet Mall
Minneapolis, Minnesota 55401

Docket No. 50-263

Gentlemen:

This refers to the inspection conducted by Mr. C. M. Erb of this office on September 29-30 and October 16-17, 1975, of activities at Monticello Nuclear Generating Plant, authorized by License No. DPR-22 and to the discussion of our findings with Mr. Larson and others of your staff at the conclusion of the inspection.

A copy of our report of this inspection is enclosed and identifies the areas examined during the inspection. Within these areas, the inspection consisted of a selective examination of procedures and representative records, interviews with plant personnel, and observations by the inspector.

No items of noncompliance with NRC requirements were identified within the scope of this inspection.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room. If this report contains any information that you or your contractors believe to be proprietary, it is necessary that you make a written application to this office, within twenty days of your receipt of this letter, to withhold such information from

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OCT 31 1975

public disclosure. Any such application must include a full statement of the reasons for which it is claimed that the information is proprietary, and should be prepared so the proprietary information identified in the application is contained in a separate part of the document. Unless we receive an application to withhold information or are otherwise contacted within the specified time period, the written material identified in this paragraph will be placed in the Public Document Room.

No reply to this letter is necessary; however, should you have any questions concerning this inspection, we will be glad to discuss them with you.

Sincerely yours,

E. L. Jordan
Senior Inspector
Reactor Operations Branch

Enclosure:
IE Inspection Rpt No. 050-263/75-16

bcc w/encl:
PDR
Local PDR
NSIC
TIC
Anthony Roisman, Esq., Attorney

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report of Construction Inspection

IE Inspection Report No. 050-263/75-16

Licensee: Northern States Power Company
414 Nicollet Mall
Minneapolis, Minnesota 55401

Monticello Nuclear Generating Plant
Monticello, Minnesota

License No. DPR-22
Category: C

Type of Licensee: BWR 1670 MWt (GE)

Type of Inspection: In service and special, announced

Dates of Inspection: September 29-30 and October 16-17, 1975

Principal Inspector: *for* *D M Hennicutt*
C. M. Erb

10/30/75
(Date)

Accompanying Inspectors: None

Other Accompanying Personnel: None

Reviewed By: *for* *D M Hennicutt*
J. C. LeDoux
Senior Inspector
Construction and Engineering
Support Branch

10/30/75
(Date)

SUMMARY OF FINDINGS

Inspection Summary

Inspection of September 29 and 30 (75-16): Review of quality documentation and replacement piping to be installed in both four-inch recirculation bypass lines. Reviewed procedures and records for the in-service inspection program performed by Nuclear Services Company (NSC). Reviewed quality documentation for two-inch drain line installation. No items of noncompliance.

Inspection of October 16 and 17: Review of repair plan for the feedwater sparge units and nozzle area. Review of design changes made in the replacement sparger assemblies and thermal sleeves. Entrance into the vessel to inspect the repair areas around the nozzles.

Enforcement Items

None.

Licensee Action on Previously Identified Enforcement Items

Not applicable.

Other Significant Items

A. Systems and Components

1. The licensee found cracks in the feedwater sparger during underwater inspection. Upon dropping the vessel water level and after removing the spargers, cracks were found in the feedwater nozzle cladding.
2. The in-service inspection has included ultrasonic testing of over 40 welds, with no indications of a serious nature. No radiographic evaluation was necessary during this in-service inspection.
3. Certain welds in the removed four-inch bypass lines will be sectioned and examined metallurgically to determine if any serious defects have been initiated since the last UT inspection.

B. Facility Items

None.

C. Managerial Items

None.

D. Noncompliance Identified and Corrected by Licensee

Not applicable.

E. Deviations

None.

F. Status of Previously Reported Unresolved Items

Not applicable.

Management Interview

A. The following persons attended the management interview at the close of the inspections:

Northern States Power Company (NSP)

C. E. Larson, Plant Manager

M. Clarity, Superintendent - Engineering and Radiation

C. H. Harmsen, Supervising Engineer - Plant Engineering and Construction Department

P. Krumpas, Operations Quality Assurance Engineer

B. Matters discussed and comments on the part of management personnel, were as follows:

1. Four-inch Bypass Replacement Piping - Bulletins RO 75-10 and 75-10A

The inspector stated that he had examined the quality documentation and completed piping welds and found them to meet the requirements of B31.1.0. He said he understood that the licensee would section and metallurgically examine two welds from the piping which have been removed from the bypass lines. A nondestructive test has been performed to the requirements of ASME Section V, Summer Addendum.

2. In-service Inspection Overall Status

The inspector noted that he had received a summary of in-service pipe weld inspections to date. The present in-service inspection is the fourth one to be performed since commercial startup. Certain dissimilar welds have been inspected the second time. Dosimeters were removed after 1½ years of operation, and the surveillance impact test specimens will be removed for a test seven years from

the date of commercial operation.

3. Replacement Drain Line

The inspector stated that he had examined the quality documentation for the two-inch drain line and found it to meet B31.1.0. The welds were socket type and were visually checked and penetrant tested. The inspector did not examine the hardware because of control rod drive operations in the area.

4. Repair of Sparge Units and Removal of Cracks in Nozzle Areas

The inspector stated that approval of the authorized inspector would be required for any repairs to the nozzles. A stress reanalysis would be required wherever grinding intruded into the pressure boundary base metal. Such reanalysis should be approved by the licensee and his consultant. See attached Inquiry Report.

REPORT DETAILS

Persons Contacted

In addition to the staff members present at the management interview, the following individuals were contacted during the inspection:

Northern States Power Company (NSP)

*D. E. Gilberts, General Manager - Power Production
**J. G. Bollenson, Project Superintendent
**R. I. Nelsen, Quality Control Engineer - Level III, RT
*P. Pochop, Quality Control Engineer

Cherne Company (Cherne)

**F. Mutter, Project Manager
***R. Richter, Supervisor - Quality Control
***R. Wagner, Production Foreman
***R. Johnson, General Foreman

Nuclear Service Corporation (NSC)

***D. McGill, Nondestructive Testing - Level III, UT

Hartford Steamboiler Insurance Company (Hartford)

**C. Tahnk, Inspector

General Electric Company (GE)

*D. Rybarik, Project Manager
***P. McGuire, Senior Engineer

*October 16, 1975 ***September 30, 1975
September 29, 1975 *October 17, 1975

Results of Inspection

1. Replacement of Four-inch Bypass Lines

These two piping loops are being replaced by Type 304-L stainless steel pipe and fittings, except for the weldolets at each end of the loops and the shut-off valve in each loop. Cherne has contracted to fabricate and install the piping, with Peabody Testing (Peabody) the source for NDE. The inspector examined the following documentation

and found the materials, fabrication procedures, and NDE results to meet Code requirements.

- a. Procedure No. 3.23.A.1 - Penetrant Test
- b. Material Certifications - Penetrant, Batches 5A018, 5A041, 5A065
- c. Procedure No. 3.20.A.2 - Radiography
- d. Heat JBTH - Six 90° ells, Midco
- e. Heat JBDG - Two T fittings, Midco
- f. Heat 5E14A - Coated electrode, Arcos Company
- g. Heat E4786 - Bare electrode, Weldwire Company
- h. Heat 482038 - Pipe, Sandvik
- i. Heat 00658 - Pipe, Allegheny Ludlum

2. Summary of In-service Pipe Weld Inspection by Ultrasonics

System	Identifi- cation	Dissimilar Welds	Stainless Welds	Carbon Steel Welds	Total Welds Examined
<u>Core Spray</u>					
TW7	"A" Loop	4	7	8	19
TW11	"B" Loop	4	6	7	17
<u>RHR</u>					
TW20	LPCI	3	4	15	22
TW30	LPCI	3	4	15	22
TW36	Reactor Head Spray	1	0	20	21
REW10	Shutdown Coolant	1	4	14	19
<u>CRD Return</u>					
	CRD 7	2	9	32	43
<u>Reactor Cleanup</u>					
		1	2	14	17

Systems	Identification	Dissimilar Welds	Stainless Welds	Carbon Steel Welds	Total Welds Examined
<u>Reactor Recirculation</u>					
12" Riser		10	40	-	50
Manifold		-	13	-	13
Recirc. "A"		1	18	-	19
Recirc. "B"		1	19	-	20
Bypass "A"			19		19
Bypass "B"			19		19
<u>Main Steam</u>					
PS1	"A" Loop	-	-	32	32
PS2	"B" Loop	-	-	32	32
PS3	"C" Loop	-	-	32	32
PS4	"D" Loop	-	-	32	32
<u>Feedwater</u>					
	FW2A & 2B	-	-	44	44
	FW2C & 2D	-	-	42	42
HPCI		2	-	14	1
Totals		33	164	356	553

3. Summary of Plan and Status of Work for Repair of Feedwater Nozzle Areas and placement of Feedwater Spargers

See attachment to this report.

Attachment:

IE Inquiry Report No. 050-263/75-01Q

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION III

IE Inquiry Report No. 050-263/75-01Q (CDR)

Subject: Northern States Power Company

Minneapolis, Minnesota

License No. DPR-22 - Monticello Nuclear Plant

Rework and Repairs - Feedwater Nozzles and Sparger Units

Prepared by:

C. M. Erb

Oct 21, 1975
(Date)

Date and Manner NRC was Informed:

On September 25, 1974, Region III was notified, by telephone, that cracks had been found in the feedwater sparger. On October 14, 1975, the region was informed, by telephone, that cracks had been found in the feedwater nozzles. An inspection was conducted at Monticello by C. M. Erb on October 16-17, 1975.

Description of Particular Event or Circumstance:

Approximately 200 crack indications have been found on the inside of the vessel where the four horizontal ten-inch feedwater nozzles merge into the vertical wall of the reactor vessel. The indications were generally concentrated in the upper and lower quadrants as shown on the attached drawing (figure 1). The locations of the cracks as marked by crayon for grinding are shown on the photograph of the 60° nozzle (figure 2). The vertical axis is represented by the 0-180° line. All four nozzles had some indications, but the nozzle at 60° appeared to show more indications. The indications were parallel or nearly parallel to the axis of the pipe as shown on the photograph with penetrant applied, of the 60° nozzle at 330° orientation (figure 3).

Action by the Licensee:

This inquiry report contains information on the progress, to date, of the grinding program on the nozzles and the status of fabrication on the sparger units. The grinding program will probably be complete by October 22, 1975.

1. History

Other plants, including Dresden, Quad-Cities and Millstone 1, have experienced cracks in their feedwater sparger assemblies and in the stainless cladding on the inside of the vessel where the horizontal ten-inch nozzle opening merges into the vertical vessel wall. Northern States Power Company (NSP) opened the vessel and found cracks in the sparger unit, and further penetrant examination revealed cracks in the cladding as described in paragraph B. The licensee already had on order redesigned sparger units and thermal sleeves, because the problem of cracking in the sparger unit had been encountered in other BWR plants.

2. Apparent Cause

The licensee stated that excessive vibration existed in the sparger units, and the sparger unit failures were probably of a fatigue nature. The cracking of cladding in the nozzle area appeared to be caused by thermal fatigue. As originally designed, a thermal sleeve was fitted into the nozzle with a slip-type fit, which allowed some water flow around the outside of the sleeve.

3. Planned Design Change

The redesign is set up for an interference fit, using a short length of Inconel pipe welded to stainless pipe in the interference area for a better match to the expansion and contraction thermal properties of the vessel. Other design changes to improve water mixing and to minimize cracking are: (1) junction box made up by welding two half forgings together instead of the original weldment; (2) increasing the thickness of the sparger pipe from five-inch, Schedule 40, to five-inch, Schedule 80; and (3) new design sparger pipe incorporates a single row of holes of varying sizes directed at 90° to the core axis, instead of the old sparger pipe which had two rows of holes, with one row directed as above, and the other pointed down at an angle.

4. Observations and Status

The inspector was lowered to a working platform in the vessel to inspect the work done up to Thursday, October 16, 1975. General Electric Company (GE) personnel had supplied the procedures and general plan of work. Using carbide burrs and air motors, they were grinding areas shown by penetrant indications. The plan involved grinding 1/16 inch deep and a penetrant test, followed by a mapping plan of crayon marking so that the grinders would know the length of the indication.

It was decided on Friday, October 17, that the grinding of individual indications would be discontinued where the greatest concentration occurred, and that the entire area of indications would be removed with a grinding wheel. At the 1/4 inch depth of grinding (nominal thickness cladding) a nital etch would be employed to determine areas of stainless and areas of base metal remaining.

In a telephone conversation on October 20, 1975, with the station superintendent, 15 cracks were reported still to exist in the four nozzles. He stated that measurements indicated a penetration of base metal in the deepest areas of 1/4 inch to 5/16 inch.

The inspector asked the licensee if the authorized inspector (Hartford Steam Boiler Insurance Company) was knowledgeable of the situation, and he stated they were.

The licensee stated that an outside review of the GE calculations and analyses would be made by an independent consultant. The intent is to leave the area as ground and blended 4:1 edges. Welding on the vessel is not a practical thing for large areas, particularly base metal.

The working conditions on this job are very difficult, since the exposure amounts to about 2R per hour, and full masks with breathing air are required. Over 200 outside men (boiler makers and pipe fitters) have been trained (grinding and radiation protection) to date for this job.

Attachment:
Figures 1 and 2

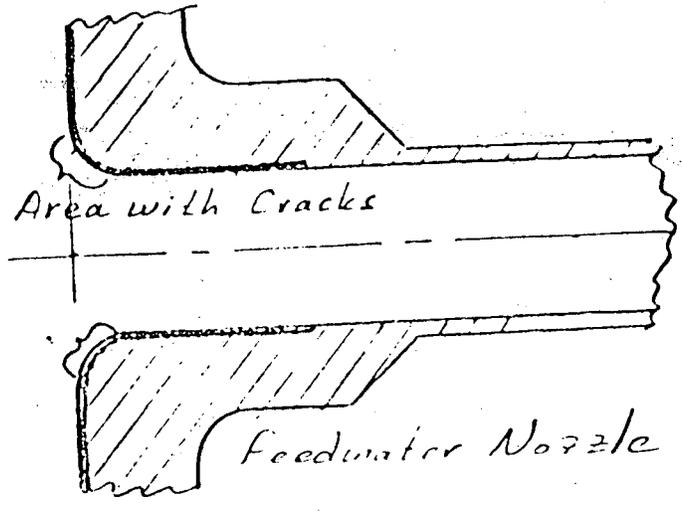
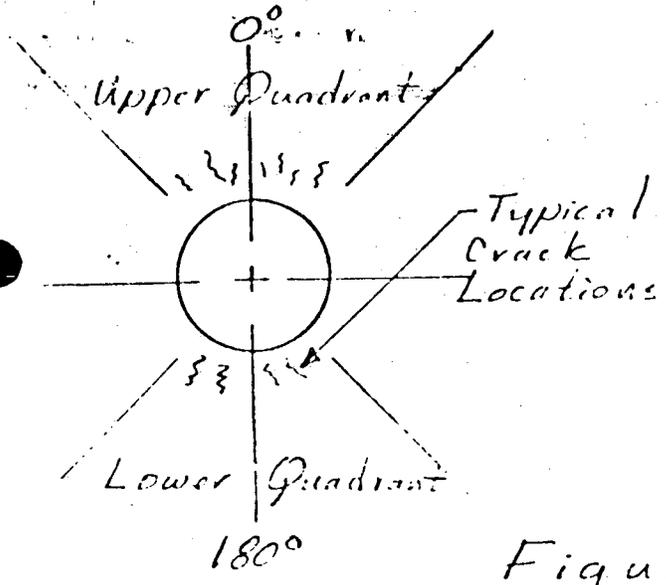


Figure 1

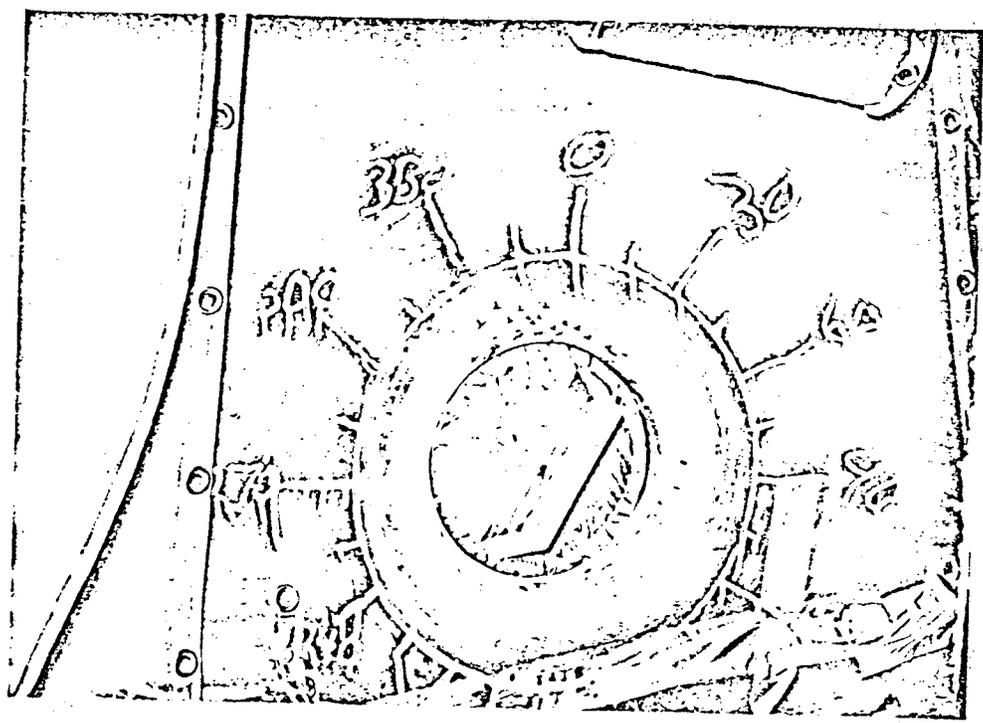


Figure 2
60° Nozzle

Figure 3
60° Nozzle
0-330° Sector

