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March 12, 1971

J. P. O'Reilly, Chief, Reactor Testing and Operations Branch
Division of Compliance, Headquarters

NORTHERN STATES POWER COMPANY (MONTICELLO)
DOCKET NO. 50-263

The attached report of an inspection of the subject facility by Mr. Feierabend during the period February 15-18, 1971, is forwarded for information. No safety items or items of noncompliance were noted.

The inspector has reported on the status of feedwater system inspection, repair and testing at the site. He found that the items[1/] discussed in the meeting between the applicant and DRL in Headquarters on February 4, 1971, were accomplished and/or resolved. He also found that the items identified as outstanding in connection with the feedwater system[2/] in our memo dated January 5, 1971, have been completed and/or resolved. Accordingly, we forwarded a memo dated February 19, 1971, recommending removal of restrictions from POL DPR-22.

The inspector reviewed several unusual occurrences which have recently been reported by the licensee. He found that the licensee's reports were factual based on existing operating records and discussions with personnel at the site. We note that all three events involved failures of components of protective or safety related systems. We will observe for indicated trends in the performance of components of key systems.

1/ The above referenced items were contained in a memo from V. Benaroya to R. Boyd dated February 8, 1971.

2/ Memo from H. D. Thornburg to J. P. O'Reilly dated 1-15-71 titled: Status of Completion - Monticello.

IS/OR/Staff 4/1/71
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Subsequent to the subject inspection we have conducted a meeting with NSP management to discuss formalized QA/QC for the operating reactor. We encouraged the licensee to formulate such a program. We did not attempt to interpret 10 CFR 50, Appendix B.

Harold D. Thornburg
Senior Reactor Inspector

Attachment:
CO Rpt No. 263/71-3 by C. D. Feierabend
dtd 3-10-71 (2 cys)

cc: E. G. Case, DRS (3)
P. A. Morris, DRL
R. S. Boyd, DRL (2)
R. C. DeYoung, DRL (2)
D. J. Skovholt, DRL (3)
P. Howe, DRL (2)
A. Giambusso, CO:HQ
L. Kornblith, CO:HQ
R. H. Engleken, CO:HQ
Regional Directors, CO
REG Files

U. S. ATOMIC ENERGY COMMISSION
REGION III
DIVISION OF COMPLIANCE

Report of Inspection

CO Report No. 263/71-3

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|---|---|
| Licensee: | Northern States Power Company<br>Monticello Nuclear Generating Plant<br>License No. DPR-22<br>Category B |
| Dates of Inspection: | February 15-18, 1971 |
| Dates of Previous Inspection: | January 25 and 26, 1971 |
| Inspected By: C. D. Feierabend | Responsible Reactor Inspector 3-10-71 |
| Reviewed By: H. D. Thornburg | Sr. Reactor Inspector 3-11-71 |
| Proprietary Information: | None |

## SCOPE

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|---|---|
| Type: | Boiling Water Reactor |
| Power Level: | 1670 Mwt (Low Power License: 5 Mwt) |
| Location: | Monticello, Minnesota |
| Type of Inspection: | Announced |

The purpose of the inspection was to review the status of repairs to the feedwater minimum flow piping, to observe operation of the feedwater system and to determine acceptability of the feedwater pumps.

## SUMMARY

Safety Items - None.

Noncompliance Items - None.

Unusual Occurrences - During routine surveillance tests, plugged pulsation dampers were identified on two APR-ECCS low pressure interlock switches. The cause was identified as a combination of improper orifice size and foreign matter accumulation. (Section L.)

Status of Previously Reported Problems - None.

Other Significant Items - Review of the failure of a reactor low water level switch to respond to a test signal did not provide any indication of a possible generic problem. (Section F.)

Management Interview - A management interview was conducted with Mr. Larson at the conclusion of the inspection. The inspector stated that his review of the repairs of the feedwater pump minimimum flow piping did not identfy any deficiencies. He also stated that the feedwater system appeared satisfactory for continued testing, but that the fact that there were two different feedwater pump minimum flow control systems should be considered in the test program. Mr. Larson stated that the contractor has provided a second new style valve, and will install it at the earliest "convenient outage". He stated that NSP would prefer to install the valve now, however the limited availability of welders with current qualifications was such that this would cause undue delay. According to Mr. Larson, the present welders have been working extended overtime periods to complete the repairs.

The subject of quality assurance (QA) was also discussed. A summary of the discussions concerning QA is included in Section B. A meeting with NSP management has been tentatively scheduled for the week of February 22, 1971.

## DETAILS

### A. Persons Contacted

Northern States Power Company (NSP)

C. Larson, Plant Superintendent
M. Clarity, Assistant Plant Superintendent
C. Jacobson, Plant Results Engineer
M. Dinville, Test Engineer
P. Krumpos, Metalurgist

General Electric Company (GE)

J. Violette, Project Manager
J. Miller, Operations Manager
G. Matte, Operations Superintendent
V. Nast, Test Engineer

Bechtel Corporation (Bechtel)

W. Balodis, Chief, Startup Engineer
W. Warren, Quality Assurance NDT Inspector

B. Organization and Administration

There have been no recent personnel or organizational changes in the operating staff.

The inspector discussed the status of the "Operational QA Program" with Mr. Larson. Mr. Larson stated that a task force had been organized with the goal of establishing a formalized QA/QC program in accordance with 10 CFR 50, Appendix B, by the time the plant is accepted from GE. He stated that the task force had met and made some progress in planning. He also stated that the maintenance procedures recognize the need for QA inspections.

The inspector suggested that a meeting with a higher level of NSP management may be in order to assure that management understand the requirements so that appropriate allocation of personnel and priorities could be made. Mr. Larson stated that he was sure that NSP upper management would be happy to discuss the subject and to know of our concerns. Tentative plans were made to meet in Minneapolis during the week of February 22, 1971.

F. Reactivity Control and Core Physics

Reactor Low Water Level Switch

The inspector reviewed the failure of a reactor low water level switch, which was reported[1/] to DRL in accordance with technical specifications. The following additional information was obtained:

1. Plant Status

   At the time of the occurrence, the reactor was completely loaded, the reactor mode switch was in "Refuel", and all control rods were fully inserted.

2. Description

   In the process of calibrating LIS 2-3-57B in accordance with the surveillance test procedure, a reactor level of less than +9" was simulated. The scram and isolation level switch failed to open at the set point of +9" (downscale). The simulated signal was then lowered to -50", but the switch still failed to open.

1/ Letter, NSP to DRL, subject: Unsafe Failure of Protection System Sensor, dtd January 12, 1971.

The simulated signal was cycled through the trip point several times, without success. The simulated level signal was then adjusted to 0", and the switch was tapped lightly. The switch then opened. The simulated level was again cycled through the trip point several times, and the switch operated properly each time. The switch was replaced and the surveillance test was completed. The instrument was calibrated with the new switch installed.

3. Investigation by Licensee

The switch was closely examined without finding any apparent reason for a malfunction. The licensee contacted the engineering department of Yarway Corporation, the instrument vendor, and Mercoid Corporation, the switch manufacture, for further information and recommendations. No reason for the failure was identified, however both recommended replacement of an "apparently faulty switch".

The inspector examined the switch, and could see no apparent cause for failure. The switch has mercury wetted contacts. It is opened by a magnet. The only possibility that the inspector could see was that the hairspring positioning the contact mechanism may have been mechanically binding, however, no evidence of binding was apparent when the switch was actuated subsequently. Detailed examination is not possible because the spring and contacts are sealed within a glass envelope.

Based on the information from the instrument and switch suppliers and examination of the switch, the licensee feels that the failure does not have implication of a generic problem.

4. Corrective Action

A replacement switch was installed and functionally tested on the date the switch failure was discovered.

5. Continued Surveillance

This is the first failure of its kind in the operating history of Yarway level switches used in the plant. Probability of another failure appears unlikely. The low level switches are functionally tested monthly, during surveillance testing. This limits the time that any similar failure could go undetected.

H. Power Conversion System

1. Feedwater System (FW)

The last inspection report[2/] described the status of the FW system, including the discovery of cracks in the FW pump minimum flow piping. The licensee has subsequently discussed resolution of the system problems in a meeting with DRL in Headquarters on February 4, 1971. In this meeting the licensee described planned action to resolve FW system problems. These actions included the following:

a. Determine stresses generated in the FW piping by the erratic operation of the FW pump minimum flow control valves.

b. Conduct additional nondestructive testing (NDT) on all welds that could have experienced stresses in excess of code allowances.

c. Install restraints on the FW pump minimum flow lines.

d. Check minimum flow line vibration with the restraints installed.

e. Demonstrate acceptable performance of the "B" loop minimum flow system.

f. Install final ddesign pump rotor in FW pump 2A, and demonstrate satisfactory operation.

g. Review and/or report preoperational testing as necessary to demonstrate system operability.

2. Pipe Repairs and Quality Assurance

The cracks in the FW piping were removed by grinding. Repairs were completed by welding, using the procedures qualified by the contractor during original installation. In order to provide complete NDT coverage of the repairs, a section of each minimum flow line was removed to provide access to the root pass of the weld of the 14" FW line to the weldolet. Repairs included replacement of the removed sections (welds in the 6" recirculation line) in addition to the repairs of the cracked areas.

2/ CO Report No. 263/71-2.

Stress analyses identified four welds in the 14" FW pipe (the pump nozzle to discharge pipe and one additional weld on each loop) in addition to the welds in the minimum flow piping that could have received stresses in excess of code allowances. These welds were examined by ultrasonic testing and determined to be satisfactory. Dye penetrant (PT) examination of the FW pump discharge nozzle welds revealed some surface porosity. These were moved by grinding. Maximum depth of grinding was 0.140", which was determined to be within code allowable tolerances.

NDT was performed on all repairs and new welds in addition to those that could have received stresses in excess of code allowances. The inspector observed some of the welding and testing in progress. He reviewed the QA records for welding, stress relief and NDT for all work performed on the piping. Records reviewed included:

a. Weld procedures

b. Post weld heat treatment standards

c. NDT inspection procedures

d. Welder qualification records

e. NDT inspector qualification records

f. Material certification records for pipe flanges, valves and welding rod.

g. Weld records

h. Heat treatment records

i. NDT inspection results (UT, PT and X-ray film)

3. Pipe Restraints

Restraints were installed on both FW pump minimum flow recirculation lines to prevent any recurrence of excess pipe movement during testing of the minimum flow control valves. The inspector observed the piping during control valve testing, and noted no pipe movement during control valve operation. The inspector also observed that the restraints will not restrict the pipe during thermal expansion. He also verified that the results had been reviewed and verified

by qualified contractor NDT personnel and independently reviewed by the licensee. All reviews were complete with the exception of review of the final 6" welds in the recirculation piping by the GE Level 2 NDT QA inspector. The records for these welds, including all X-ray film had been inspected by the Bechtel Level 2 NDT QA inspector and reviewed by the NSP metallurgist.

4. Feedwater Pumps and Minimum Flow Control Valves

The inspector observed operation of both FW pumps. Pumps were operated at low and medium flow levels, and appeared to perform satisfactorily. Vibration of pumps and piping was noticeably less than previously observed, and decreased as flows were increased. Observation of vibration measurements in progress showed levels consistent with those recorded during the surveillance testing recently performed.

a. "B" Loop

A new design flow control valve (called a drag valve) was installed in the "B" loop. The valve was supplied by Control Components, Inc., Los Alamitos, California. The valve provides modulated flow control, vs. the original "on-off" control design, with sufficient capacity to increase minimum flows if this should become necessary.

The inspector observed system operation at flows between 1500 and 4000 gpm, and noted valve response to changes in system flow. The valve operated smoothly, and appears to provide good control. It provides an additional advantage of eliminating the orifice, as all system pressure is dropped in the valve. This also reduces the noise level.

A temporary brace was installed to support the new valve for initial testing. The permanent support was onsite and was being installed at the time the inspection was terminated.

b. "A" Loop

The final design (7 vane 1st stage impeller) rotor was installed in FW pump P-2A. After pipe repairs and stress relief were completed, an alignment check was performed prior to filling and venting the system. The inspector observed initial operation of the pump with the new rotor installed. Noise levels and vibration levels were similar to those for FW pump P-2B. Vibration measurements indicated acceptable levels.

The inspector observed operation of the minimum flow control valve, as the pump flow was decreased. The valve opened properly. Observation of the minimum flow piping showed no movement.

The inspector observed some vibration of the suction piping, however vibration at the pump suction nozzle was minimal. The licensee expects the vibrations to be less at increased flow, and will verify this during startup testing.

The licensee plans to replace the flow control valve and orifice on the "A" loop minimum flow line with a drag valve during the next "convenient" outage, so that both loops will have identical control valves. The new valve is now onsite, and is being prepared for installation.

c. Feedwater Pump Surveillance Testing

The licensee has initiated a surveillance test program, which will monitor FW pump performance. Monitoring will include data logging of temperatures, pressures and flows. In addition, an operator will visually check and record pressures, lube oil temperatures and pressures, cooling water temperatures and local flow indications. Vibration measurements of all bearings and shaft will be made daily.

After at least 100 hours of operation, one of the FW pumps will be disassembled and thoroughly inspected. The FW pump discharge line will be inspected with dye penetrant following any severe FW or recirculation piping disturbance and/or after 500 hours of operation. Minimum acceptance criteria has been specified.

K. Containment

Standby Gas Treatment System

Failure of a high efficiency particulate activity (HEPA) filter to pass an efficiency test during routine surveillance testing is described in a Compliance Inquiry Memorandum[3/]. Review with site personnel indicates that the memorandum accurately describes the occurrence. After reinstallation, the off-gas filter again failed to pass the DOP test. This filter has been taken out of service pending replacement. The active filter has successfully passed the DOP test with efficiency of 99.9%.

3/ CO:III Inquiry Memo: Filure of High Efficiency Particulate Filter to Pass Surveillance Test, dated February 17, 1971.

L. Emergency Core Cooling Systems (ECCS)

The inspector reviewed the occurrence of plugged pulsation dampeners (snubbers) on ECCS low pressure interlock switches (described in a CO Inquiry Memorandum[4/]) and discussed the snubbers with the instrument technician and engineer.

Failure of a switch to respond to the test signal, and subsequent investigation which identified the plugged snubbers confirm the value of surveillance testing. Discussions with the technician showed that the personnel are experienced, and recognize the potential for a generic problem to exist. He stated that all of the test signals include the snubber, whenever one is in the sensing line. He described the "debris" that plugged the snubber as appearing oily, such as a protective oil from tubing or possibly a residue from calibrating a switch with oil. All of the components were new, so any one or all of them could have contributed to the residue. Corrective action included cleaning and flushing all of the snubbers and the pressure instruments and tubing.

4/ CO:III Inquiry Memo: Plugged Snubbers on ECCS Low Pressure Interlock Switches, dated March 2, 1971.