

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

Report of Inspection

CO Report No. 263/70-19

Licensee: Northern States Power Company  
(Monticello)  
License No. DPR-22  
Category B

Dates of Inspection: November 30 - December 3, 1970

Dates of Previous Inspection: November 5, 1970

Inspected By: *C. D. Feierabend*  
C. D. Feierabend Reactor Inspector 12-17-70

Reviewed By: *J. H. D. Thornburg*  
J. H. D. Thornburg Senior Reactor Inspector 12-18-70

Proprietary Information: None

SCOPE

Type: Boiling Water Reactor

Power Level: 1670 Mwt (Low Power License: 5 Mwt)

Location: Monticello, Minnesota

Type of Inspection: Announced

This inspection was to observe the plants status and to review the progress of resolution of problems associated with the standby gas treatment and feedwater systems. Mr. Feierabend was accompanied by Mr. Robert Dean, Parameter, Inc., during a portion of this inspection. Mr. Dean assisted in the review of the feedwater system.

SUMMARY

Safety Items - None.

Noncompliance Items - None.

Unusual Occurrences - None.

Status of Previously Reported Problems - None.

Other Significant Items - The licensee is preparing to resume low power testing. (Section C)

During exercising of control rods it was possible to latch two rod select pushbutton switches. (Section F)

Another failure of a feedwater pump impeller occurred during testing of a modified impeller. (Section H)

Upgrading of the standby gas treatment system is progressing in a satisfactory manner. (Section K)

Management Interview - A management interview was conducted with Mr. Larson at the conclusion of the inspection. All of the items described in the inspection report were discussed. Mr. Larson stated that the Operations Committee would review plant status, including the status of the standby gas treatment system, prior to initial criticality. He stated that current plans were to install the operational sources and resume low power testing during the week of December 6, 1970.

Mr. Larson stated that the selection of two control rods had not yet been fully investigated, and that the occurrence would be reviewed and evaluated for safety significance prior to initial criticality.

Mr. Dean stated that performance of the feedwater pump during the test was not satisfactory as the vibration levels were excessive at low flows and, of course, the impeller failed. Mr. Larson replied that Northern States Power requires a reliable feedwater system prior to any power operation.

Mr. Feierabend stated that the progress on upgrading the standby gas treatment system appeared to be progressing.

Mr. Larson stated that the emergency power system could be defeated by a knowledgeable individual, and that simple manipulation of certain switches could do this without annunciation in the control room. Mr. Feierabend stated that he observed that this is the case, but that it may be possible to add locks to protect several switches from unauthorized operation; however, quick access for operation to protect equipment would be a factor that must be also considered.

Mr. Larson stated that Northern States Power is reviewing the plant security measures to determine where additional measures could provide greater assurances that security is maintained. Special attention will be given to the emergency power system, in addition to general plant security.

DETAILS

A. Persons Contacted

Northern States Power Company (NSP)

C. Larson - Plant Superintendent (Operations)  
M. Clarity - Assistant Plant Superintendent (Operations)  
G. Jacobson - Plant Results Engineer  
D. Antony - Test Engineer  
M. Dinville - Test Engineer

General Electric Company (GE)

R. Goettge - Site Manager  
J. Miller - Operations Manager  
V. Nast - Test Engineer

Bechtel Corporation (Bechtel)

W. Balodis - Chief Startup Engineer

DeLaval Turbine Company

W. Barron - Pump Specialist

B. Administration and Organization

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

The inspector reviewed the Operations Committee (OC) meetings minutes for meetings held since the low power license was issued. The OC met 13 times between September 8 and November 13, 1970. The OC periodically reviewed the status of fuel loading operations, the status of the standby gas treatment and feedwater systems and continued reviews of plant operating procedures and preoperational test results. Minutes appear complete and detailed, and reflect interest in plant safety.

C. Operations

Plant operation subsequent to completion of fuel loading has been restricted to preoperational and surveillance testing. The standby gas treatment system (SGTS) has been operated regularly during the system upgrading program to demonstrate improved reliability.

The licensee has requested that the operational sources be shipped to the site for installation in preparation for continuing low power testing. Initial criticality is scheduled for the week of December 6, 1970.

E. Primary System

1. Main Steam Isolation Valves (MSIV)

Local leak rate testing of the MSIV at 25 psig has been completed. The test results meet the technical specification criteria for allowable leakage. These test results will be included in the final integrated leak rate test report, which will be forwarded to DRL prior to power operation.

The valve timing surveillance test, subsequent to replacement of the pilot valves, showed that several valves exceeded the technical specification limit of 5 seconds. The valve timing will be adjusted and surveillance testing will be completed prior to power operation.

2. Relief/Safety (R/S) Valves

During local leak rate testing of the MSIV it was noted that two of the R/S valves were leaking through the seat. The valves were disassembled and inspected. The inspector observed the valve seat on one of the valves after disassembly. The seats appeared in good condition, however, the valve packing had been tight, and apparently tended to prevent the valve from seating. The maintenance performed should correct the problem.

F. Reactivity Control and Core Physics

Reactor Manual Control Systems (RMCS)

During exercising of control rods on December 1, an operator noted that two adjacent rod select pushbutton (RSPB) switches were latched. The system is designed with the switches interlocked such that only one RSPB switch can be latched at one time. The operator stopped control rod operation to preserve the abnormal condition for investigation by instrumentation personnel.

Preliminary investigation of the occurrence indicated that the two adjacent switches (42-19 and 46-19) could be latched at the same time only when the reactor mode switch was in the "refuel" position. Initial diagnosis was that the RSPB switch was defective, however, repeated test operation showed that the condition could be duplicated with some other adjacent switches. A review of the system schematic diagram failed to identify a design error that would allow two control rods to be selected. It was also found that operation of the mode switch to any position other than "refuel" immediately released one of the RSPB switches. It has not been possible to select more than two RSPB switches at one time. The licensee is investigating the occurrence, to determine the cause and to provide a correction.

## H. Power Conversion System

### Feedwater System

The inspector observed operation of feedwater pump P-2A on December 1 and again with Mr. Dean on December 2. In comparison with operation as previously observed, the feedwater piping vibrations and the accoustical noise levels were considerably reduced. Pump vibration levels at 3000 gpm were significantly improved, and were considered satisfactory by knowledgeable contractor personnel; however, with operation at flows of 1700 gpm, the pump vibrations were still excessive. Mr. Dean also observed some pipe vibration.

After operation at 1700 gpm on December 2, the flow was increased to 4000 gpm when the test engineer heard a noise in the pump and immediately tripped the pump. The noise was similar to previous indications of impeller failure. The pump was disassembled and inspected. It was found that a failure had occurred in the inboard disc of the first stage impeller.

The inspectors examined the failed impeller and the modifications to the impeller to reduce vibration at the tips of the impeller vanes. The modified vanes appeared sound.

The vendor's representative stated that the modification will prevent failure of the vanes. Examination of the failed area showed that the area of failure was quite thin compared to the original impeller. From subsequent discussions with site personnel it was learned that the impeller used for the above described test was not one of the impellers supplied for the Monticello project, but was one that was available in the vendor's shop.

The inspectors discussed the test and pump failure individually with several contractor representatives. It is the position of the licensee and his contractors that this test failure indicates that there are still problems to be resolved before the system can be operational. They were encouraged by reduction in piping vibrations and in the reduction in noise level.

## K. Containment

### Standby Gas Treatment System

Problems associated with operation of the SGTS have been described in previous inspection reports<sup>1/</sup>. System upgrading is in progress. Most of the recommendations identified by the design review have already been completed.

1. All strip heaters have been either disabled or removed.

<sup>1/</sup> CO Report Nos. 263/70-15, 263/70-16 and 263/70-18.

2. The main duct heaters have been modified as recommended.
3. The fire dampers have been removed.
4. Check valve springs have been replaced.
5. Over-temperature alarms have been installed.
6. Glove ports have been removed.
7. Quick exhaust air valves have been removed.
8. Five sample ports have been added to each train to improve DOP performance testing.
9. Temperature sensing elements have been relocated to provide better system control.

The systems have operated satisfactorily in all recent testing. Some additional work is scheduled to improve system reliability, however, it appears that the system will be reliable for continuing low power testing. The test program to demonstrate system reliability which was outlined in the recent management meeting<sup>2/</sup> will be performed prior to power operation.

N. Emergency Power

The inspector reviewed the emergency power system for security as outlined in PI 3000/1.

Plant security is maintained by controlling access to the facility. The security fence is now complete, with exception of power operators for the vehicle access gate. Access through the gate is controlled by Pinkerton guards. In addition, doors to the reactor and turbine buildings are locked during hours of darkness.

There are two plant operators on each shift who make periodic checks of all plant areas. The operators are instructed to challenge any unauthorized personnel in the plant. Physical access to the diesel generators and controls in the plant is not restricted in order to provide ease and safety of operation. Actuation of most electrical switchgear will provide abnormal indication in the control room. Some control switches would not be annunciated in the control room, however would probably be detected during routine shift surveillance within an eight-hour period. (These switches

<sup>2/</sup> CO Report No. 263/70-18

are not labeled to identify them with the emergency power system, so would have to be operated by a knowledgeable person.) Day tank fuel supply valves are locked open.

The longest period that the system could be inoperable without being detected would be the period until the next surveillance test (a maximum of 15 days if a test had just been completed for both diesels to be inoperable).