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

Report of Inspection

CO Report No. 263/70-16

Licensee:

Northern States Power Company Monticello License No. DPR-22 Category B

Dates of Inspection:

Dates of Previous Inspection: Inspected By: E. fordan

Reviewed By:

Proprietary Information:

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Thornburg

September 23, October 1 and 2, 1970 August 31 & September 9, 1970 Reactor Inspector 10-13-70 Reactor Inspector 10-13-70 Responsible Inspector 10-15-70

Senior Reactor Inspector 10-15-70

None

# SCOPE

Type:

Power Level:

Location:

Type of Inspection:

Boiling Water Reactor 1670 Mwt (Low Power License: 5 Mwt) Monticello, Minnesota Announced

Mr. Thornburg reviewed fuel loading status and the performance of the standby gas treatment system during an inspection performed on September 23. Messrs. Jordan and Boyd reviewed a reported item of noncompliance, surveillance testing and fuel loading during an inspection performed on October 1 and 2.

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#### SUMMARY

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#### Safety Items - None.

Noncompliance Items - Three instances of noncompliance with Technical Specification 3.10A, which requires that the refueling interlock be operable during core alterations, occurred during core loading operations. None of the occurrences caused a hazardous condition to exist. A Form AEC-592 was issued on October 7, 1970. (Section 0.)

Unusual Occurrences - The following events were found to have occurred during the reporting interval from September 8 to October 2. The licensee has reported the first five events according to Section 6.6 of the Technical Specification and has stated that the sixth event will also be reported.

- Standby gas treatment system air heater controller failed on September 8 due to an electrical short circuit in the heater. (Section K.1)
- Standby gas treatment system ventilation damper failed to operate on September 10. (Section K.2.)
- Standby gas treatment system air flow damper controller failed on September 11. (Section K.3.)
- 4. Emergency power bus No. 16 (4.16 kv) failed to automatically reenergize during a test on September 20. (Section N.)
- 5. Standoy gas treatment system train "A" charcoal filter bank was damaged by a localized fire on September 21. (Section K.4.)
- Standby gas treatment damper failed to open during a test on September 29. (Section K.5.)

The licensee is performing a design review of the standby gas treatment system to identify causes. CO will follow up on the review and upgrading of the system to prevent future malfunctions. (Section K.)

Status of Previously Reported Problems - None.

Other Significant Items - Feedwater pump impeller failures have occurred on both pumps during testing. The licensee is investigating. (Section H.)

<u>Management Interview</u> - Persons present during the management interview were:

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- C. Larson Plant Superintendent
- M. Clarity Assistant Plant Superintendent
- G. Jacobson Plant Results Engineer
- D. Boyd CO:III Reactor Inspector
- E. Jordan CO:III Reactor Inspector

The inspectors stated that corrective actions, which were recommended by the licensee as a result of the September 16 Technical Specification violation which consisted of bypassing of a refueling interlock, should be reexamined in view of the additional similar bypassing which was found to have occurred on September 11 and 13. (Section 0)

Mr. Larson stated that the three bypass instances would be reviewed and corrective action formalized by the Operations Committee.

The inspectors asked the licensee to consider including the RPIS test fixture in the jumper inventory control. Mr. Larson stated that the test fixture would be controlled as a jumper.

The inspectors stated that no discrepancies were found in the review of surveillance testing to date and the system appeared to be satisfactory. (Section B.)

The inspectors asked the licensee to consider performing each surveillance test as soon as normal operating conditions are established for that particular system during power ascension. Mr. Clarity stated that he understood that the consideration was to assure that each surveillance test procedure was satisfactory. The inspector stated that this was the intent. Mr. Larson stated that generally, this would be done as soon as practical for each system.

The inspectors asked the licensee what corrective actions were planned for the standby gas treatment system in view of the failures experienced to date. Mr. Larson stated that a design review of the entire system was in progress and Northern States Power would evaluate the results of the review before further operations requiring the standby gas treatment system are conducted. (Section K.)

# DETAILS

#### A. Persons Contacted

#### Northern States Power Company (NSP)

C. Larson - Plant Superinter lent M. Clarity - Assistant Plant Superintendent G. Jacobson - Plant Results Engineer
L. Eliason - Radiation Protection Engineer
D. Antony - Test Engineer

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### General Electric Company (GE)

H. Daughtery - Assistant Operations Manager R. Hobson - Test Design and Analysis Engineer

# B. Administration and Organization

### 1. Review of Logs

The inspectors reviewed the shift engineer's log, the operations log and the jumper log for the period from September 7 to September 30. The logs were found to be well maintained. The operations log contained sufficient detail to reconstruct the loading sequence and was especially useful in the review of the reported technical specification violation. The assistant superintendent identified the technical specification violation of September 16 during a routine review of the control room log on September 17. (Section 0) As a result of the preliminary review of the occurrence by the licensee, an addition to the jumper log procedure was instituted to require a review of the technical specifications before the application of any jumper. Those jumpers installed after September 25 were found to have a notation in the jumper log indicating that a review had been performed.

# 2. Surveillance Test Review

The inspector reviewed the station surveillance procedure record file. Approximately 205 surveillance procedures are included in the file. One hundred and sixteen of these procedures were performed specifically to satisfy the requirements of Table 8 of the procedure. The inspector reviewed a random sample of the completed tests in detail, including a cross-check against the technical specification requirements. No omissions or discrepancies were found.

The inspector discussed the scheduling of surveillance tests during power ascension testing and asked the licensee to consider performing each test that was power or operation dependent when the test condition was attained. This consideration would assure that the surveillance test proc. We was valid before full power operation. An example of such a test would be the performance of a quarterly turbine stop valve closure during early turbine operation even though the preoperational surveillance test was current. Mr. Clarity stated that he would consider the matter.

# C. Operations

Initial fuel loading was completed on September 23. (Section 0). The schedule for initial criticality has been delayed due to difficulties encountered with the standby gas treatment system (Section K) and a delay in shipment of the operational sources. The operational Sb-Be sources were activated by irradiation in the GETR to an activity in excess of the Monticello license authorization. The sources will have decayed sufficiently to be received on the license during the week of October 19. The licensee has elected to postpone initial criticality. In the interim, the licensee is continuing the startup tests which do not require criticality.

#### D. Facility Procedures

#### Hot Functional Test

The inspectors reviewed revision 4 of the hot functional test procedure dated September 23. The procedure was found to contain a section on "Integrated Systems Operation" which specifies a minimum of three days of steady state operation at approximately 7% power, reproducing all routines performed during normal plant operation, to test operating procedures and provide additional operating experience. The hot functional test procedure was found to have been reviewed and approved by the Operations Committee and appears to satisfy previous CO comments.

# F. Reactivity Control and Core Physics

The licensee has completed cold depressurized control rod drive testing during and subsequent to fuel loading. Testing included friction tests, stall flow tests, drive flow tests and scram times. Base line data for all control rod times are well within design requirements.

### H. Power Conversion System

# Feedwater System

The inspectors found that both feed pumps were in the process of disassembly to examine impellers for possible damage. Both pumps were found to have failed impellers. The licensee was investigating the impeller failure with the pump vendor. CO will follow up on this matter.

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### K. Contairment

#### Stardby Gas Treatment System (SGTS)

Abnormal occurrences associated with the SGTS were identified in a previous inspection report.

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A total of five instances of component failure caused one train of the SGTS to be classed inoperable for short periods during the reporting interval. The licensee has reported, or is in the process of reporting, each event as required by the technical specification. It shou' noted that one SGTS train was available during all periods secondary containment was required. The licensee was found to have performed the required supplementar, testing during periods wher one SGTS train was operable. A summary of the SGTS difficulties following issuance of the operating license on October 7 is given below:

# 1. Heater Controller Failure (9/8/70)

During performance of prestartup checks on September 8, a selenium control rectifier and current limiting transformer associated with the A-train of the SGTS were foun' by the licensee to have failed due to an electrical shor: 'rcuit in one of the air heater circuits.

Repairs were effected by September  $10\frac{2}{...2}$ 

2. Damper Failure (9/10/70)

A damper failed to upon in a related ventilation system on September 10 due to a fault in control logic which resulted in low flow through train B of the SGTS. Repairs were effected and the B-train was tested and declared operable on September  $12\frac{4}{7}$ 

# 3. Flow Controller Failure (9/11/70)

The flow controller for train A failed on September 11 due to a signal transient. The circuit was modified on September 12 to reduce its vulnerability to signal transients. Fuel loading was suspended September 11 until the repairs were effected and the system tested and declared operable on September 12?

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1/ CO Report No. 263/70-15

2/ Ibid

3/ NSP Letter to DRL dtd 9-18-70

4/ Ibid

5/ Ibid
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# 4. Charcoal Filter Fire (9/21/70)

Charcoal filters in A train of the SGTS were found by the licensee on September 21 to be smoldering. Investigation indicated that theleads to one of the strip heaters surrounding the filter frame had shorted out causing overheating of a companion series connected strip heater. The charcoal combusted was observed by Mr. Thornburg on September 23 to be confined to portions of three of the twelve filter units in the A train. The defective heaters and the damaged filter units were replaced. A freen test of the charcoal and a DOP test of the HEPA filters showed them to be satisfactory on September 25. Additional corrective measures which were implemented include installation of a thermal cutout (set at 400 F) on each of the four charcoal filter strip heaters. All heater leads were inspected and insulated with asbestos tape where a possible short circuit could occur?

# 5. Inlet Valve Failure (9/28/70)

The inlet valve to the A train of the SGTS failed to open during a routine test of the system on September 28. Messrs. Jordan and Boyd reviewed the corrective action for the malfunction with Mr. Antony on October 1, and found that the failure of the valve to operate was due to improper adjustment of the bleedoff valve. The improper adjustment was attributed to a piece of teflon pipe-seal tape which was recovered from the bleedoff valve. The licensee stated that the occurrence would be reported to DRI. in accordance with Section 6.6.B.2 of the Technical Specification.

On September 11, following the third unusual or abnormal occurrence associated with the SGTS, NSP suspended fuel loading operations to obtain assurance that the system would be reliable. Proposed actions included measures to resolve and repair known problems and to perform sufficient testing to demonstrate that the identified problems had been resolved and that the system will operate as designed. In eldition, NSP requested that its contractors perform a design review of the system (the repairs and testing to be completed prior to resumption of fuel loading).

Repairs to the systems and repeated operational tests were completed on September 12. The system was returned to service and fuel loading operations were resumed. Concurrently, the licensee initiated an operational reliability test program, starting each train daily for a minimum of five minutes for one week.

6/ NSP Letter Report to DRL dated 9-29-70

This test program was satisfactorily completed.

On September 18, NSP held a management meeting with GE and Bechtel to discuss SGTS performance. GE and Bechtel are performing a design review to determine system adequacy and provide for any necessary upgrading of the system. The design review was not complete at the time of this inspection. CO will review the licensee's actions and verify satisfactory system operation prior to power operation.

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# N. Emergency Power

# Diesel Generator Auto-load Transfer Failure (9/20/70)

The licensee reported a failure of aucomatic load transfer that occurred during a routine loss of-power test on September 20. The diesel generato. (No. 12) was found to have started properly and could have been transferred manually. The difficulty was traced to the under voltage relaying of the No. 16 bus. The alternate diesel generator (No. 11) was operable and capable of feeding the No. 17 4 kv bus. Temporary repairs were completed on September 21 consisting of adding another relay in parallel with the present under-voltage relay. The inspecto reviewed a copy of the licensee's abnormal occurrence report during the inspection. Installation of new under-voltage relays and completion of a testing program for the new relays have been identified by the ricensee as outstanding items to be completed before power operation.

# Fiel Handling

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## 1. Initial Fuel Loading

Fiel loading was begun at 9 p.m. on September 8 following license insuance earlier the same day? Fuel loading was carried out during the hours from 7 p.m. to 7 a.m. daily (except September 11), until a fuel loading of 484 elements was obtained at 5:49 a.m. on September 23.

The initial count rate for the four source range detectors averaged 180 cps. The maximum multiplied source count rate was of the order of 5 x 10° cps with 60 fuel assemblies. The fully loaded (484 fuel assemblies) count rate was approximately 40 cps. Signal-to-noise ratio remained statisfactory throughout the loading. Reciprocal multiplication plots were maintained for each detector throughout the loading. Detector moves were performed

7/ NSP Letter Report to DRL dated 3-29-70 8/ CO Report 263/70-15, Section IT.N. singly, and shutdown margin tests were performed at the time specified in startup test No. 3. Deviations from the specified loading sequence were found to have occurred when bent poison curtains were encountered, which delayed loading in those cells one shift while the curtains were straightened. The loading sequence deviations were satisfactorily documented and reviewed.

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One item of noncompliance with Technical Specification 3.10.A was reported by telecon to Mr. Thornburg by Mr. Larson on September 17. Subsequent review of fuel loading records and operating logs at the site identified two additional instances in which core alterations were performed with cartain refueling interlocks bypassed.

# a. Bypass of All Control Rods In Interlock

At 9 p.m., September 16, the all-rods in interlocks was bypassed to permit continued fuel transfer while interlock logic condition showed "all control rods not fully inserted." The licensee had ascertained that the logic condition was erroneous and, concurrently with fuel transfer, attempted to locate the source of the condition. Mr. Jacobson stated that administrative controls to prevent bridge movement over the core while a control rod was withdrawn were implemented.

Licensee personnel failed to recognize the bypass condition as a violation of Technical Specification 3.10.A until the following morning, September 17. The licensee promptly reported the event by telephone to CO III on September 17. The licensee continued to investigate the erroneous logic condition and traced the problem to one of two printed circuit cards in the rod position information system. Corrective measures, consisting of connection cleaning and checking, were performed and an integrated circuit chip was replaced.

# b. Bypass of Single Control Rod Interlock

The licensee was found to have installed a jumper on control rod 30-35 full-in interlock to permit removal of a bent poison curtain from cell 30-33 with the refueling grapple. The poison curtain was slightly bowed during attempted installation of a fuel assembly. The sequence of removal for the poison curtain required that the control rod in the cell be withdrawn, the blade guide removed and then the poison curtain removed. The control-rod-full-in interlock was bypassed at 7:35 a.m. and remained bypassed during removal and re-insertion of the poison curtain. The poison curtain was logged installed at 6:30 p.m. and the bypass removed at 7:15 p.m.

The licensee straightened the poison curtain and NSP and GE startup engineers inspected the curtain before reinstallation. The licensee performed a shutdown margin test in the cell adjacent to the removal poison curtain while the curtain was removed to verify that satisfactory margin existed. The inspectors discussed the occurrence with Mesars. Jacobson and Clarity who stated that the bypass was & result of overlooking the requirements of Section 3.10.A of the Technical Specifications and using the fuel handling grapple rather than the auxiliary hoist to remove the poison curtain. The operation had been approved by the appropriate supervisors. The licensee agreed that the technical specifications had been violated.

A similar situation occurred on September 13 when the licensee installed a jumper on the ali-rods-in interlock to permit removal of a bent poison curtain from cell 23-34 while control rod 22-35 was fully withdrawn. The bypass was installed at 10:40 a.m. and removed at 12:34 p.m. The poison curtain was removed, straightened and reinstalled during the interim.

A Form AE3-592 for the noncompliance items was forwarded to the licensee on Octob x 7, 1970.

# Q. Radioactive Waste Systems

The inspector examined radwaste logs and found that no liquid effluent had been released during the reporting interval.

U. Miscellaneous

# Outstanding Items Preceding Power Operation

The inspectors discussed the outstanding items for power licensing with Mr. Larson. Completion of the review of the standby gas treatment system and resolution of feedwater pump problems were given as the critical items for schedule by the licensee. A projected schedule for the completion of the two items was obtained by telecon on October 24. The licensee estimates that procedures and preoperational lesting will be complete by October 31.

9/ CO:III Letter to NSP dated 10-7-70. 10/ Telecon on October 6, C. Feierabend to C. Larson.

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