

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-282/86009(DRP); 50-306/86011(DRP)

Docket Nos. 50-282; 50-306

Licenses No. DPR-42; DPR-60

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

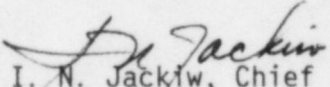
Facility Name: Prairie Island Nuclear Generating Plant

Inspection At: Prairie Island Site, Red Wing, MN

Inspection Conducted: June 22, 1986 through August 16, 1986

Inspectors: J. E. Hard

M. M. Moser

Approved By:   
I. N. Jackiw, Chief  
Reactor Projects Section 2B

9-5-86  
Date

Inspection Summary

Inspection on June 22, 1986 through August 16, 1986 (Reports No. 50-282/86009(DRP); 50-306/86011(DRP))

Areas Inspected: Routine, unannounced inspection by resident inspectors of previous inspection findings, plant operational safety, maintenance, surveillance, ESF systems, facility modifications, fire protection, offsite sirens, corporate management concerns, followup of Licensee Event Reports, and IE Bulletins and TMI followup items.

Results: Two violations were identified in the ten areas inspected. The violations involved failure to maintain a penetration fire barrier operable and to restore operability within 14 days and failure to notify the NRC within four hours of an unplanned ESF actuation. Also identified was yet another event involving a failure to control modification work which continues to be an area of concern.

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## DETAILS

### 1. Persons Contacted

\*\*D. McCarthy, Chairman of the Board and CEO  
\*\*C. Larson, Vice President, Nuclear Generation  
\*\*G. Neils, General Manager, Headquarters Nuclear Groups  
\*\*D. Musolf, Manager, Nuclear Support Services  
\*\*K. Albrecht, Director, Power Supply Quality Assurance  
\*\*R. Zerban, Manager, Corporate Security  
\*\*G. Hudson, Administrator, Nuclear Security Services  
\*\*P. Kamman, Superintendent, Nuclear Operations Quality Assurance  
\*E. Watzl, Plant Manager  
\*D. Mendele, Plant Superintendent, Engineering and Radiation Protection  
R. Lindsey, Plant Superintendent, Operations and Maintenance  
\*A. Hunstad, Staff Engineer  
A. Smith, Senior Scheduling Engineer  
M. Balk, Superintendent, Operations  
D. Schuelke, Superintendent, Radiation Protection  
G. Lenertz, Superintendent, Maintenance  
J. Hoffman, Superintendent, Technical Engineering  
K. Beadell, Superintendent, Quality Engineering  
M. Klee, Superintendent, Nuclear Engineering  
R. Conklin, Supervisor, Security and Services  
D. Vincent, Project Manager, Nuclear Engineering and Construction  
J. Goldsmith, Superintendent, Nuclear Technical Services  
A. Vukmir, Site Services Representative, Westinghouse

The inspectors interviewed other licensee employees, including members of the technical and engineering staffs, shift supervisors, reactor and auxiliary operators, QA personnel, and Shift Technical Advisors.

\*Denotes those present at the exit interview on August 19, 1986.

\*\*Denotes Corporate personnel who were visited on July 10, 1986.

### 2. Licensee Action on Previous Inspection Findings

(Closed) Unresolved Items (50-306/86006-02(DRP)): Failure of motor operated valve 32129 to open during a residual heat removal (RHR) system surveillance. Further investigation has determined that the MOV 32129 would have operated as required during an emergency situation. The large differential pressure across the valve with both component cooling pumps running (a condition for the surveillance) combined with valve stem binding resulted in the valve failing to open. The valve did operate with one component cooling pump running and in-place maintenance has since eliminated the valve stem binding.

(Closed) Open Items  
282/85021J01 through J06  
306/85019J01 through J06

These Open Items are the six recommendations for improving control of the modification process which are discussed in the inspection report noted above. Licensee has taken action addressing each of the recommendations. A summary of licensee actions and commitments is contained in a letter to C. J. Paperiello dated July 30, 1986. Though problems with plant modifications continue to occur as detailed elsewhere in this report and continue to be monitored by the resident inspection staff, the licensee has accepted and implemented the NRC recommendations listed above.

3. Operational Safety Verification (71707)

Unit 1 and Unit 2 were base loaded at 100% power except for reductions for surveillance testing and special maintenance.

The inspection observed control room operations, reviewed applicable logs, conducted discussions with control room operators, and observed shift turnovers. The inspector verified operability of selected emergency systems, reviewed equipment control records, and verified the proper return to service of affected components. Tours of the auxiliary building, turbine building and external areas of the plant were conducted to observe plant equipment conditions, including potential fire hazards, and to verify that maintenance work requests had been initiated for equipment in need of maintenance.

At 7:26 a.m. on July 2, 1986, a Unit 1 power reduction was begun for the purpose of repair of a feedwater leak near 12 feedwater pump. The leak was through a crack in a 3/4 inch drain line. Unit power was reduced to 50%, 12 pump secured, the location of the leak drained, and the leak weld repaired. Full power operation was resumed later in the day. On July 28, 1986 with Unit 1 and Unit 2 and 100% power, and while performing a monthly Unit 2 safeguards logic test, one train of safety injection (SI) was inadvertently activated. A reactor trip was signalled and was caused by a failure to perform the testing steps in the proper sequence due to poor communications between the individuals performing the test. All systems responded as expected to the reactor trip. A small amount of concentrated boric acid may have been injected into the reactor coolant system. The affected SI line was flushed to remove any concentrated solution which may have been present. The reactor was restarted at 7:56 p.m. on July 28 and the generator was placed on line at 12:21 a.m. on July 29.

At 8:08 a.m. on Friday, August 1, the 21 motor driven auxiliary feedwater (MDAFW) pump auto started while electricians were attempting to isolate a 21 battery ground. This was an unplanned and inadvertent start of the MDAFW pump and it was promptly secured three minutes later. 10 CFR 50.72 requires the licensee to notify the NRC within four hours of the occurrence of any event that results in an unplanned ESF actuation.



The licensee did not notify the NRC of this unplanned start until the following Monday, August 4 and is in violation of 10 CFR 50.72 for exceeding the four hour notification requirement. See Notice of Violation (306/86011-01).

Inspection of Battery Rooms 12 and 22 during this report period has noted rather high ambient room temperatures ranging from 103 degrees to 107 degrees F. Discussions with staff personnel indicate that the cooling ventilation is marginal for these spaces during the summer months and that this condition has existed since original construction. It is suspected that the high ambient room temperatures have contributed to reduced battery service life (i.e., ten years actual life from batteries nominally rated for 25 years) as well as higher inverter and battery charger electronic component failures. The inspectors are concerned with the adverse effect this condition places upon the batteries and other components and will be monitoring the licensee's efforts to implement improvements in the cooling system.

4. Maintenance Observation (62703)

Routine maintenance activities (on safety-related systems and components) listed below were observed/reviewed to ascertain that they were conducted in accordance with approved conformance with Technical Specifications. The following items were considered during this review: the limiting conditions for operation were met while components or systems were removed from service, approvals were obtained prior to initiating the work, activities were accomplished using approved procedures and were inspected as applicable, functional testing and/or calibrations were performed prior to returning components or systems to service, quality control records were maintained, activities were accomplished by qualified personnel, radiological controls were implemented, and fire prevention controls were implemented.

Portions of the following maintenance activities were observed/reviewed during the inspection period:

- 21 motor driven auxiliary feedwater pump preventive maintenance
- Diesel generator D1 preventive maintenance and inspection
- Adjustment and testing of the 22 residual heat removal heat (RHR) exchanger inlet motor operated valve (MV-32129)

No violations or deviations were identified.

5. Surveillance (61726)

The inspector witnessed portions of surveillance testing of safety-related systems and components. The inspection included verifying that the tests were scheduled and performed within Technical Specification requirements, observing that procedures were being followed by qualified operators, that Limiting Conditions for Operation (LCOs) were not violated, that system and equipment restoration was completed, and that test results were acceptable to test and Technical Specification requirements.

Portions of the following surveillances were observed/reviewed during the inspection period:

- SP 1698 chlorine monitors weekly check
- SP 2032 safeguards logic test
- SP 1054 turbine stop, governor, and intercept valve test
- SP 1255 hydrogen recombiner test
- SP 2093 diesel generator functional test
- SP 1074 auxiliary building special ventilation test

No violations or deviations were identified.

6. ESF System Walkdown (71710)

The inspector performed a complete walkdown of the accessible portions of both safety injection (SI) systems. Observations included confirmation of selected portions of the licensee's procedures, checklists, plant drawings, verification of correct valve and power supply breaker positions to ensure that plant equipment and instrumentation are properly aligned, and review of control room and local system indication to ensure proper operation within prescribed limits.

No violations or deviations were identified.

7. Facility Modifications (37700, 37701)

On July 22, 1986, a one inch safety injection pipe run that was no longer needed was to be removed as part of an extensive facility modification. The pipe cutting began but was stopped when it was discovered that the pipe was pressurized and it was realized that the cut was being made in the wrong place (i.e., on the opposite side of a closed valve from where it should have been made). Repairs were promptly made and it was determined that no technical specifications were violated and that two independent flow paths for boric acid injection were available at all times. Results of the investigation which followed identified that the root cause of this error was failure to utilize and follow the procedures and detailed pipe removal drawings which were available. It was also found that supervision was not familiar with the specifics of this job. In addition, the organization performing the work, Nuclear Engineering and Construction (NE&C), was not keeping the system engineer apprised of work being done on his systems as required by a June 4, 1986 guideline issued to remedy similar instances which have been detailed in previous inspection reports. The inspectors note continued concern with the control of modification work and will continue to monitor this area closely.

As noted in the previous inspection report, there has been recent interest in the reliability of the emergency diesel generators (Fairbanks Morse) and in ways of improving crankshaft bearing life. The licensee is implementing improvements in two ways. First, an administrative program to monitor more closely bearing wear resulting from automatic (i.e., "dry") starts is being established and will require

that a bearing inspection be performed after every fifth dry start. Secondly, a design modification to the lubrication system is being developed which will maintain heated lube oil circulation through the lower crankline while the engine is in the standby condition. This modification is to be completed on both diesel generators by early 1987.

No violations or deviations were identified.

8. Fire Protection (64704)

During an 18-month surveillance of all penetration fire barriers in fire area boundaries during the week of July 28, 1986, an open six-inch sleeve penetration between two fire areas was found. The sleeve is one of the penetrations in the ceiling of the Unit 2 Containment Spray Pump Room and is identified as Penetration 1657. A fire watch was immediately established and the penetration permanently sealed on July 30.

Technical Specification 3.14G requires "All penetration fire barriers in fire area boundaries protecting equipment required to be operable shall be operable" and that inoperable penetration fire barriers be returned to operable status in 14 days or a report submitted within 30 days "outlining the cause of the inoperability and the plans and schedule for restoring the barriers to operable status." Review of surveillance and maintenance records for penetration 1657 revealed that the penetration was unsealed in excess of these requirements and may have been unsealed since removal of a pipe in 1982. This situation is a violation of these Technical Specification requirements. See Notice of Violation (306/86011-02).

9. Offsite Sirens (82301)

During routine testing of the Pierce County, Wisconsin offsite notification sirens at 1:00 p.m. on July 2, 1986, the sirens did not operate. Retesting was done at 2:00 p.m.; the sirens then operated as expected. The licensee and the licensee's siren contractor, Nelson Radio Communications, conclude that there may have been an error involved in activating the sirens. This is a repeat situation in that on September 5, 1984, a similar situation involving personnel error was involved. In neither case were the sirens actually inoperable.

10. Licensee Event Reports Followup (92700)

Through direct observations, discussions with licensee personnel, and review of records, the following event reports were reviewed to determine that reportability requirements were fulfilled, immediate corrective action was accomplished, and corrective action to prevent recurrence had been accomplished in accordance with Technical Specifications:

- (Closed) 306/86003-LL Inadvertent safety injection actuation and reactor trip
- (Closed) 282/86005-02 Core exit thermocouples improperly assembled
- (Closed) 282/85016-03 Accidental opening of breaker 12 M



11. Meetings with Corporate Management (30702)

On July 10, 1986 the Chief, Reactor Projects Section 2B and the Senior Resident Inspector met with NSP officials at the corporate offices. Subjects discussed included:

1. The modification control process
2. Operational QA
3. Security items
4. Diesel-generator reliability
5. Other areas

12. IE Bulletin, Generic Letter Followup (92703)

Generic Letters

A centralized system is in place for appropriate handling of these letters. The following letters and action resulting therefrom were reviewed by the resident inspectors:

- GL85-05, Inadvertent Boron Dilution Events - Received and reviewed by licensee. Assessment performed by the plant.
- GL85-06, QA Guidance for ATWS Equipment That is Not Safety-Related - Licensee responded in a letter to NRR dated October 11, 1985.
- GL85-07, Implementation of Integrated Schedules for Plant Modifications - Licensee responded in a letter to NRR July 17, 1985.
- GL85-13, Transmittal of NUREG-1154 Regarding Davis-Besse Loss of Main and Auxiliary Feedwater Event - Received and reviewed by licensee. Corporate level task force formed to review.
- GL85-14, Commercial Storage at Power Reactor Sites of Low-Level Radioactive Waste Not Generated by the Utility - Received by licensee. No action required.
- GL85-22, Potential for Loss of Post-LOCA Recirculation Capability Due to Insulation Debris Blockage - Received and reviewed by licensee. No further action required.

13. TMI Followup Items (92701)

Item 2.F.2. - Inadequate Core Cooling Instrumentation

Core Exit Thermocouples - The 35 core exit thermocouples (TCs) in Unit 1 are used as follows. Eight TCs are wired to the Subcooled Margin Monitors in the control room - four to Channel A, four to Channel B. The temperatures indicated by each of these can be determined individually at the Subcooled Margin Monitors. In addition, should the redundant Subcooled Margin Monitors (which are fully operational) become disabled for some reason, outputs from these eight core exit thermocouples can be read in nearby bus rooms using a portable instrument.

The other 27 exit TCs in Unit 1 are wired to the P250 computer which prints out in the control room and are also wired to displays on the in-core panel in the control room. These TC outputs also can be read in nearby bus rooms using a portable instrument.

In addition to the 35 TCs discussed above, three additional TCs are located in the reactor upper head area. The outputs from these read out on the in-core panel in the control room and can be read in nearby bus rooms using a portable instrument.

The Unit 2 arrangement is similar to Unit 1's except that there are 36 rather than 35 core exit thermocouples and also except that the three upper head TCs have not yet been installed. (Installation scheduled for Fall 1986).

Further upgrading related to core exit TCs is planned. See NRR memo to Northern States Power Co., dated May 8, 1986.

14. Exit Interview (30703)

The inspectors met with licensee representatives denoted in Paragraph 1 at the conclusion of the the inspection on August 19, 1986. The inspectors discussed the purpose and scope of the inspection and the findings.

The inspectors also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any document/processes as proprietary.