U.S. NUCLEAR REGULATORY COMMISSION

REGION III

REPORT NO. 50-282/95012; 50-306/95012

FACILITY
Prairie Island Nuclear Generating Plant, Units 1 and 2

License Nos. DPR-42; DPR-60

LICENSEE
Northern States Power Company
414 Nicollet Mall
Minneapolis, MN 55401

DATES
August 22 through October 10, 1995

INSPECTORS
R. Bywater, Acting Senior Resident Inspector
C. Orsini, Resident Inspector
A. Dunlop, Reactor Inspector
P. Lougheed, Reactor Inspector
J.D. Smith, Reactor Inspector
G. Pirtle, Physical Security Inspector

APPROVED BY

M. J. Jordan, Chief
Reactor Projects Branch 7

10/26/95
Date

AREAS INSPECTED

A routine inspection of operations, engineering, maintenance, and plant support was performed. Safety assessment and quality verification activities were routinely evaluated. Follow-up inspection was performed for non-routine events and for certain previously identified items. A specialized inspection of your inservice testing program was also performed (Inspection Procedure 73756). Additionally, an inspection was performed of your service water system operational performance self-assessment (Temporary Instruction 2515/118 and Inspection Procedure 40501).

RESULTS

Assessment of Performance

OPERATIONS: Your decision to conduct a power reduction of Unit 1 and investigate the cause of the increasing bearing temperature on No. 12 feedwater pump was conservative. There was good teamwork among the operating crews and other departments during repair and restart efforts.

MAINTENANCE: On two occasions, you identified and promptly repaired leakage of cooling water from No. 11 containment fan coil unit. The NRC inspector identified a minor violation of your procedure for control of heavy loads in the turbine building.

ENGINEERING: Your efforts in preparing for the cooling water (CL) [service water] system self-assessment and conducting the self-assessment were excellent. NRC Temporary Instruction 2515/118 remains open pending a follow-up inspection after issuance of the assessment report.

PLANT SUPPORT: No new strengths or weaknesses were identified in this area.

Summary of Open Items

Violations: None were identified in this report
Unresolved Items: None were identified in this report
Inspection Follow-up Items: None were identified in this report
Non-cited Violations: One was identified in Section 2.2

INSPECTION DETAILS

1.0 OPERATIONS

NRC Inspection Procedure 71707 was used in the performance of an inspection of ongoing plant operations. No violations were identified. A power reduction of Unit 1 was conservatively initiated to investigate a slow upward trend in feedwater pump gearbox bearing temperature. Good teamwork among the operating crews and other departments was noted during repair and restart efforts.

1.1 Initiation of Unit 1 Power Reduction was Conservative and Good Teamwork was Identified

The licensee identified a slow upward trend in temperature for a pinion bearing in No. 12 feedwater pump "step-up" gearbox. Even though the bearing temperature was not excessive, the licensee elected to reduce power and remove the pump from service to investigate the temperature increase rather than attempt to continue operating until the January refueling outage. The pump was removed from service on October 5, 1995, gearbox pinion bearing wear was noted, and all bearings were replaced. Lubricating oil sample test results were satisfactory. The inspector noted good teamwork among the operating crew, maintenance, and engineering personnel during performance of pump restart activities and the troubleshooting of high bearing temperatures on October 6. Full power operation was again achieved on October 7.

1.2 Retraction of 10 CFR 50.72 Notification

As discussed in Inspection Report 282/95011; 306/95011, the licensee reported as an engineered safety features (ESF) actuation the unexpected closure of the supply and return isolation valves for the Unit 2 containment gas and particulate radiation monitoring system. Following review of this event with the licensee, the inspector discussed the circumstances and cause of the event with staff in the NRC Office for the Analysis and Evaluation of Operational Data. The event was determined to not require reporting per 10 CFR 50.72 because the event did not involve a train of ESF and actuation logic for the ESF was not satisfied. The licensee retracted its notification of this event on September 25, 1995, and has revised its administrative procedures to reflect the above guidance.

1.3 Plant Properly Responds to Lockout of One Offsite Power Source

On September 7, 1995, a ground fault on a substation feeder cable terminal to the Unit 2 station auxiliary transformer (2RY transformer) resulted in a loss of one source of offsite power to Unit 2 safeguards bus No. 25 and an automatic transfer to a backup offsite power source. No autostart of an emergency diesel generator occurred or was required. The plant response was as per design and control room operators were efficient in their response to the event. A Licensee Event Report (LER) was issued for this event and is discussed below.

1.4 Licensee Event Report Follow-up

(Closed) LER 306/95004: Lockout of 2RY Transformer Resulted in auto-Start of No. 22 Component Cooling Water (CCW) Pump. The No. 22 CCW pump autostarted per design on low system pressure following the trip of the operating CCW pump. Following the event, the licensee restored a second separate path from the grid to the Unit 2 safeguards power distribution system by utilizing a bus-tie breaker from a Unit 1 offsite power source. The licensee replaced all six substation feeder cable terminals to the 2RY transformer (only one had failed) and restored the transformer to service on October 13, 1995. The inspector considered the licensee's activities in problem diagnosis, maintenance, and testing prior to restoration a strength. This LER is closed.

2.0 MAINTENANCE

NRC Inspection Procedures 62703 and 61726 were used to perform an inspection of maintenance and testing activities. No cited violations were identified. Performance in the areas inspected was excellent. However, the inspector identified that the licensee had historically underestimated the weight of the high-pressure turbine enclosures when transporting them with the overhead crane.

2.1 Performance of Maintenance and Surveillance Testing Activities During the Inspection Period was Excellent

The inspectors observed or reviewed the following routine preventive and corrective maintenance and surveillance activities to ascertain that they were conducted in accordance with approved procedures, regulatory guides, industry codes or standards, and in conformance with Technical Specifications:

- SP 1106A 12 DDCLP Monthly Run
- WO 9505335 Repair D1 Diesel #12 Cylinder Temperature Instrument
- WO 9506031 Hydro D1 Diesel Cooling Water Piping
- SP 1093 D1 Diesel Monthly Run
- SP 1102 11 TDAFW Pump Test
- WO 9504589 11 RHR Pump Annual PM
- WO 9504752 Preoperational Test of No. 21 Battery Charger
- WO 9509481 No. 12 Feedwater Pump Gearbox Repairs
- SP 1090 Containment Spray Pump and Spray Additive Valve Test

In all cases, the work was performed well. Only minor comments were provided to the licensee.

2.2 Underestimated the Weight of High-Pressure Turbine Enclosures

The center of the turbine building deck, above the Unit 1 safeguards bus rooms, was identified with floor markings as a "no heavy load area." On October 3, 1995, the licensee placed the Unit 1 high-pressure turbine enclosure in this area using the overhead crane, in preparation for

dismantlement and disposal. The inspector referred to maintenance procedure D58, "Control of Heavy Loads," and asked the licensee if this was an acceptable storage location for the enclosure. Procedure D58 specifies that laydown of any turbine building load is acceptable over the safeguards bus area, however, loads greater than 8000 pounds must be procedurally controlled as a heavy load. This lift was not procedurally controlled as the lift of a heavy load. The licensee had historically estimated that the enclosures weighed less than 8000 pounds, but following discussion with the licensee, the enclosure was weighed and determined to be approximately 9000 pounds. Although the load was overweight, it was safely transported at an elevation less than 1 foot above the floor. This was done to prevent safeguards bus room ceiling concrete spalling in the event of a load drop, an action required by procedure D58. This failure to comply with the requirements of Procedure D58 is a violation. The violation, however, is of minor significance and is identified as a Non-Cited Violation, consistent with Section IV of the NRC Enforcement Policy.

2.3 Containment Fan Coil Leaks Promptly Repaired

On September 13 and October 5, 1995, a cooling water leak was identified in different "H-bend" joints on No. 11 containment fan coil unit (FCU) coils. In both cases, the leaking joint was repaired, the FCU tested and returned to service the next day. The Technical Specifications allow one FCU to be inoperable for 7 days. The licensee has planned to replace the FCU coils during the next refueling outage in January 1996.

2.4 Follow-up of Previous Inspection Findings

(Closed) Inspection Follow-up Item 282/94017-01: Repetitive trips of No. 12 charging pump. As discussed in Inspection Report 282/94017; 306/94017, the licensee initiated a nonconformance report to evaluate these events. The inspector reviewed the licensee's root cause evaluation report which identified that the circuit breaker trip unit poles were installed in the breaker frame using screws that were too long for this application. The resultant loose connection was responsible for the breaker prematurely tripping. The licensee has initiated corrective actions to review the maintenance history of other breakers installed in the plant with the same model trip unit to determine those that have potentially been installed with the incorrect screws. Any identified that are suspect will be prioritized according to safety importance and inspected. Additional corrective actions included conducting training for station electricians on this issue and updating the technical manual with the latest revision from the vendor. The inspector will review any further developments identified from this issue. This item is closed.

3.0 ENGINEERING

NRC Inspection Procedure 37551 was used to perform an onsite inspection of the engineering function. No violations were identified and performance of the activities inspected was considered excellent. Specialized inspections were

performed of the licensee's cooling [service] water system self-assessment and inservice testing (IST) program.

3.1 Cooling Water System Self-Assessment was Excellent (TI 2515/118 and IP 40501)

3.1.1 Assessment Team

The licensee performed an assessment of their cooling water (CL) [service water] system from August 14 to September 15, 1995. An independent outside contractor was engaged by the licensee to perform the self-assessment. The team included expertise in the areas of metallurgy, electrical, and instrumentation and control (I&C), as well as in the areas specified by the NRC Inspection Manual Temporary Instruction (TI) (operations, mechanical design, maintenance, surveillance/testing, and quality assurance). This team composition met the standards set forth in TI 2515/118.

The team's professional qualifications and experience level met the standards set forth in TI 2515/118. The inspectors determined through observation and interviews that the team members were extremely knowledgeable of their assessment areas.

The inspectors reviewed the assessment plan prepared by the licensee and the assessment team and found it to be appropriate. The plan covered all areas required by the TI, including assessment of licensee actions in response to Generic Letter (GL) 89-13; assessment of CL operational controls, maintenance, surveillance, testing, personnel training, licensee quality verification efforts; and verification that the CL system was capable of fulfilling its thermal and hydraulic performance requirements and was operated consistent with its design basis. Additionally, the assessment plan addressed the electrical and I&C components of the CL system.

The inspectors evaluated the assessment implementation by reviewing selected assessor concern write-ups, interviewing the assessors during the inspection, observing assessor interactions with each other at the licensee's team meetings, observing interactions between the assessors and licensee personnel, and attending the assessment team's exit. The team demonstrated a high level of professionalism as well as technical expertise throughout the inspection. All areas of the TI were addressed.

The assessment team's exit presentation logically and clearly portrayed the team findings. The more safety significant issues were emphasized. The presentation concluded that the CL system was operable. However, the team identified that the containment fan coolers were degraded and that further licensee efforts were necessary to fully demonstrate continued cooler operability under all conditions.

The assessment team identified strengths in plant material condition, all areas of operation, the inservice testing program, the Generic

Letter 89-13 performance testing of containment fan coolers, the conduct of maintenance and maintenance training, control of biofouling and erosion/corrosion, and system trending. Excellent communications among departments was also noted. The team also recognized the extensive efforts planned to resolve CL system flow model deficiencies.

Weaknesses included: design flow model inadequacies, the lack of flow balancing or testing, inadequate testing of the CL pump discharge check valves, poor implementation of post maintenance testing, and documentation of positions on several testing issues.

3.1.2 Licensee Efforts -- Preparations and Response Team

In preparation for the assessment, the licensee performed an internal self-assessment of the CL system. This effort, which began nearly a year before the formal assessment occurred, addressed all of the TI assessment areas and identified a number of deficiencies in the CL system design. The licensee appropriately reported the degraded conditions, developed an action plan to resolve the issues and took suitable corrective actions. The inspectors considered this preliminary assessment effort to be extremely proactive and indicative of an excellent safety consciousness.

During the assessment, the licensee had approximately 10 people assigned full time to respond to the questions of the assessment team. The response team skillfully addressed questions and concerns raised. The responses indicated an excellent understanding of the issues being addressed. However, on occasion, a written response was not complete and required additional clarification to fully resolve the issue.

The inspectors informed the licensee that a one week follow-up inspection would be performed following issuance of the assessment team's report. The intent of this inspection was to independently review selected assessment areas and to review the corrective actions taken, or planned to be taken, by the licensee on the assessment findings.

3.2 Inservice Testing Program (IST) During the Inspection Period was Effectively Implemented (73756)

Implementation and oversight of the licensee's IST program was inspected. The inspector reviewed a recent quality assurance audit of the IST program. The use of the IST coordinator from the Monticello plant added valuable ASME Code knowledge to the audit and was considered a good initiative. Several good issues were identified by the audit that required corrective actions. The proposed corrective actions appeared adequate.

The NRC Safety Evaluation Report (SER) for the licensee's IST program, dated August 11, 1995, was reviewed to assess the intended actions proposed by the licensee for the listed action items. The action items were being appropriately addressed and were being incorporated into the

IST program. In addition, the cold shutdown and refueling outage justifications identified in the SER were determined to be appropriate to postpone the required quarterly testing of specific components.

3.3 Follow-up of Previous Inspection Findings

(Closed) Violation 282/94005-01; 306/94005-01: This item concerned the failure to implement portions of the IST program as required by ASME Code requirements. The three concerns were resolved as follows:

- The residual heat removal (RHR) pump test procedures were revised to ensure the fixed reference value (flow rate) was adequately obtained during each test.

- The local leak rate procedure was revised to ensure corrective actions were taken when an IST valve exceeded the leak rate limit established by the licensee.

- The test procedures for check valves SI-7-1 and SI-7-2 were revised to incorporate adequate acceptance criteria to test the valves' open safety function.

This item is closed.

(Closed) Inspection Follow-up Item 282/94005-02; 306/94005-02: This item concerned the weak development and implementation of the check valve program. The licensee developed a check valve program based on the results from the check valve basis document and a design review of those check valves susceptible to degradation. A disassembly/inspection (D/I) schedule was developed to verify the condition of check valves. The program would be revised based on the results of these inspections. In addition, the licensee intended to use non-intrusive testing (NIT) techniques to assess valve condition once valve conditions were baselined. The program was implemented during the 1995 Unit 2 outage. Eighteen valves were inspected and based on the results of the inspections, the disc of one valve was replaced.

The check valve program was considered acceptable and should be capable of identifying valve degradation. Two enhancements to the program were identified. The first involved the documentation of inspection results. Sufficient documented information would be beneficial to the check valve engineer when optimizing the program based on previous inspection results. Although sufficient information was obtained during the inspection, including photographs of the valve internals, documentation in the D/I procedure in some cases appeared minimal. The licensee stated the lack of documentation was the result of the specific inspection points in the D/I procedure and the good condition of valve internals. The second involved the performance of a seat leak check (eg. blue check, light check, paper test) when valves were disassembled. Performance of a seat leak test could identify a seating problem not readily seen during the inspection. The performance of a seat leak test

was left to the skill of the craft personnel performing the inspection. This issue is considered closed.

(Closed) Unresolved Item 282/92026-01; 306/92026-01: Backward Installation of Valves. The inspector determined that the valves in question were manually operated gate or globe valves. None of the valves served a containment isolation function or had specified leakage limits. Thus, valve installation, in either the preferred or non-preferred direction, was a function of maintenance convenience, weighing the need for complete component isolation against the need to repack the valve while the system was in operation. No violation of NRC requirements occurred. This item is closed.

(Closed) Violation 306/94008-01: Hanger Repaired Outside Modification Process. The licensee retroactively completed the modification paperwork, including a safety evaluation, for hanger 2-RHCH-36, with no problems identified. Additionally, the licensee modified the administrative work instruction for nonconformances and the hanger procedure to ensure that future hanger repairs are performed as modifications. The inspector reviewed these corrective actions and found them acceptable. This item is closed.

(Closed) Unresolved Item 282/95009-01; 306/95009-01: Emergency Core Cooling System (ECCS) Sump Performance. The inspector had a concern regarding the potential operability impact of small miscellaneous items inside of containment, such as component labels, on the residual heat removal (RHR) system during post-LOCA long term recirculation. The licensee performed a qualitative evaluation of ECCS sump, debris screen, and RHR pump design to evaluate any consequences of small debris on system operability due to screen clogging or pump ingestion. Methods of debris generation and transport of debris other than pipe insulation (which had been previously evaluated) were considered and the licensee concluded that the presence of debris would not adversely affect the operability of the system. The inspector reviewed the licensee's evaluation and had no further concerns. This item is closed.

4.0 PLANT SUPPORT

NRC Inspection Procedure 71750 was used to perform an inspection of Plant Support Activities. No violations were identified. Performance in the areas inspected was considered excellent.

4.1 No deficiencies Were Noted During the Performance of Routine Radiological Controls Activities

The inspector verified that personnel were following health physics procedures for dosimetry, protective clothing, frisking, posting, etc., and randomly examined radiation protection instrumentation for use, operability, and calibration. No deficiencies were identified.

4.2 No Deficiencies Were Noted During the Performance of Personnel During Routine Security and Safeguards Activities and an Effective Planning Meeting was Held During the Inspection Period

During routine activities or tours, the inspector monitored the licensee's security program to ensure that observed actions were being implemented according to the approved security plan. The inspector noted that persons within the protected area properly displayed photo-identification badges and those individuals requiring escorts were properly escorted. Additionally, the inspector observed that personnel and packages entering the protected area were searched by appropriate equipment or by hand.

During this inspection period, the inspector held a meeting with the licensee's security superintendent and others to update the resident staff on recent developments, events, and plans regarding security.

4.3 Performance of Personnel During Emergency Plan Exercise was Excellent

The inspector participated in the licensee's emergency plan exercise on September 19, 1995, in the control room simulator. The inspector concluded that the licensee was capable of responding to a plant emergency in accordance with its emergency plan.

4.4 Follow-up of Previous Inspection Findings

(Closed) Unresolved Item 282/95011-04; 306/95011-04: This unresolved item pertained to tamper seals being required to be placed on spent fuel storage casks for special nuclear material (SNM) control and accountability purposes. NRC evaluation of this issue concluded that tamper indicating seals need not be applied to spent fuel storage casks for the purpose of satisfying SNM control and accountability requirements provided: (1) the casks are stored within the licensee's protected area; (2) the licensee has an NRC approved security plan that addresses the physical protection provided to the protected area; (3) mechanical equipment, other than small hand tools, would be needed to gain access to the spent fuel within the cask; and (4) the irradiated fuel within the cask is self-protecting in that its unshielded radiation level is at least 100 Rem per hour at a distance of 1.0 meter. All of the above conditions are satisfied. This item is closed.

5.0 **PERSONS CONTACTED AND MANAGEMENT MEETINGS**

The inspector contacted various licensee operations, maintenance, engineering, and plant support personnel throughout the inspection period. Senior personnel are listed below.

At the conclusion of the inspection on October 11, 1995, the inspector met with licensee representatives (denoted by *) and summarized the scope and findings of the inspection activities. The licensee did not identify any of the documents or processes reviewed by the inspector as proprietary.

M. Wadley, Plant Manager
*K. Albrecht, General Superintendent, Engineering
*G. Lenertz, General Superintendent, Maintenance
*D. Schuelke, General Superintendent, Radiation Protection and Chemistry
*J. Sorensen, General Superintendent, Plant Operations
*J. Goldsmith, General Superintendent, Design Engineering
J. Hill, Manager, Generation Quality Services
*R. Fraser, Superintendent, Technical Programs Engineering
J. Maki, Superintendent, Electrical Systems Engineering
*C. Mundt, Superintendent, Instrumentation and Controls Systems Engineering
*T. Breene, Superintendent, Nuclear Engineering
B. Stephens, Superintendent, Mechanical Systems Engineering
*A. Hunstad, Staff Engineer
D. Anderson, Production Engineer
M. Agen, Emergency Planning Senior Consultant
*D. Schlintz, Quality Services Auditor
*S. Richter, I&C Specialist