

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report Nos. 50-282/85012(DRS); 50-306/85009(DRS)

Docket No. 50-282  
Docket No. 50-306

License No. DPR-42  
License No. DPR-60

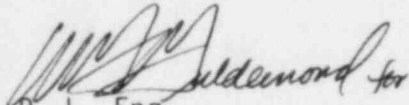
Licensee: Northern States Power Company  
414 Nicollet Mall  
Minneapolis, MN 55401

Facility Name: Prairie Island Nuclear Generating Plant, Units 1 & 2

Inspection At: Red Wing, MN

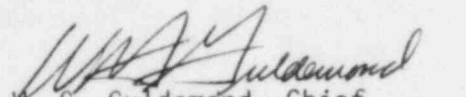
Inspection Conducted: June 10 through June 20, 1985

Inspector:

  
P. L. Eng

7-3-85  
Date

Approved By:

  
W. G. Guldemon, Chief  
Operational Programs Section

7-3-85  
Date

Inspection Summary

Inspection on June 10 through June 20, 1985 (Report No. 50-282/85012(DRS); 50-306/85009(DRS)):

Areas Inspected: Routine, announced inspection by two region based inspectors of licensee actions on previous inspection findings; followup of IE Bulletin 84-03; general employee training; implementation of the licensee's inservice testing program; inservice testing data; and performance of inservice testing. The inspection involved 96 inspector-hours onsite by two NRC inspectors including 10 inspector-hours onsite during off-shifts and 1 inspector-hour in the Regional Office.

Results: Of the six areas inspected, no violations or deviations were identified in four areas. Two violations were identified in the two remaining areas ( failure to implement an inservice testing program per Section XI requirements - Paragraph 5a; failure to use controlled equipment for surveillance testing - Paragraph 6a).

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## DETAILS

### 1. Persons Contacted

E. L. Watzl, Plant Manager  
\*D. J. Mendele, Plant Superintendent, Engineering and Radiation Protection  
\*M. J. Balk, Superintendent, Operations  
S. Hiedeman, Engineer II  
\*R. L. Lindsey, Plant Superintendent Operations and Maintenance  
\*G. Miller, Superintendent, Operations Engineering  
\*B. F. Stephens, Surveillance Coordinator  
D. Swenson, I & C Coordinator, Unit 2  
W. Gauger, I & C Supervisor

\*Denotes those attending the exit interview on June 20, 1985.

Additional plant technical and administrative personnel were contacted by the inspector during the course of the inspection.

### 2. Action on Previous Inspection Findings

- a. (Open) Open items (282/84-08-02(DRS); 306/84-07-01(DRS)): Trending of leak rates for Category A valves. This item remains open as the licensee has not developed a formal trending mechanism nor explicitly identified valves requiring such trending.
- b. (Closed) Open items (282/84-08-03(DRS); 306/84-07-02(DRS)): SP 1070 MOV 32164 and 32230 1/4" stem rise. The inspector reviewed the licensee's revised procedure and noted that the subject valves are now opened until RCS pressure is indicated on a pressure gage. This item is considered to be closed.
- c. (Closed) Open items (282/84-08-04(DRS); 306/84-07-03(DRS)): Valve lineup verification consistency. The inspector reviewed procedure SP-1070 and determined that the procedure had been revised to require independent verification of valve positions based on a consistent set of criteria which the inspector found acceptable. This item is considered closed.
- d. (Closed) Open items (282/84-08-05(DRS); 306/84-07-04(DRS)): Unmonitored leak path into safety injection system. The inspector reviewed the revised procedure and determined that the identified leak path would be locally inspected for evidence of leakage. This item is considered closed.
- e. (Closed) Open items (282/84-08-06(DRS); 306/84-07-05(DRS)): Approximate leak rate determination - SP 1070. The inspector reviewed the revised procedure and verified that the licensee has developed and implemented a valid method to quantify the leakage past valves as required.
- f. (Closed) Unresolved items (282/84-08-07(DRS); 306/84-07-06(DRS)): Trending of Appendix J containment isolation valve leak rates. The

inspector informed the licensee of the Office of Nuclear Reactor Regulation's (NRR) position with regards to leak rate trending. The licensee agreed to address the necessity of trending leak rates as discussed in Paragraph 5e of this report. This item is considered closed.

No violations or deviations were identified.

3. Followup of IE Bulletin 84-03: Refueling Cavity Water Seal

On August 24, 1984, the NRC issued the IE Bulletin (IEB) 84-03 to all power reactor facilities. The IEB, which described the events surrounding a refueling cavity water seal failure at the Haddam Neck facility, required licensees to evaluate the potential for and consequences of a seal failure and submit a summary report supporting their conclusions.

On September 17, 1984, the licensee submitted the required report. In this report the licensee provided the design of their seal system, their postulated worst case seal failure, the capacity of available makeup systems, an assessment of no fuel damage, and a description of alarms and procedures in place to mitigate the consequences of such an event.

During the inspection, the inspector reviewed the licensee's response and supporting information in addition to the potential for loss of refueling cavity and/or spent fuel pit water inventory by mechanisms other than seal failure with the following results:

- a. The gap between the refueling floor and the reactor vessel is nominally 2 inches. During refuelings, this gap is filled by a single inflatable seal. Seal ejection is prevented by the installation of a number of discrete holddown plates. As such, the seal configuration is considerably different than that at Haddam Neck, and the potential for misalignment does not exist.
- b. New seals, procured and inspected to appropriate quality standards, are installed for each refueling. Consequently, use and age-related degradation have been eliminated as potential failure modes. Receipt inspections assure that the seals conform to purchase specifications and are free of observable defects.
- c. The seal design has been tested and shown to remain leaktight even if deflated.
- d. While segments of the seal are exposed to impact damage from above, the two inch gap dimension renders the probability of impact damage acceptably small.
- e. The licensee's postulated seal failure involves the tearing away of a section of the seal beneath a removed holddown plate. This type of failure could occur if an object was dragged across the seal area. It was assumed that the remaining portions of the seal remain in place and essentially leaktight.

As the hold down plates would prevent the remaining portions of the seal from being pulled out of the gap between the refueling cavity floor and the reactor vessel and the seal has been shown to remain leaktight when deflated, the postulated failure mechanism is not unrealistic. With this failure, the licensee calculated an initial leak rate of 4200 gallons/minute. A leak rate of the same order of magnitude was calculated by the inspector.

- f. A combination of containment sump level, spent fuel pit level, and radiation monitoring alarms is available to alert the operating staff to a seal leak.
- g. The relative elevations of the spent fuel pit, the fuel storage structures in the reactor cavity, and the seal are such that with a seal failure and cavity draindown to the level of the seal, only fuel suspended from either the manipulator crane or the spent fuel handling crane could be uncovered. All remaining active fuel would remain covered by at least seven inches of water, sufficient to ensure adequate cooling.
- h. Procedures are in place directing that fuel suspended from either of the aforementioned cranes be placed in an appropriate location to prevent uncover. These actions could be completed before damage occurs or radiation levels become excessive as the refueling areas in containment and in the spent fuel pit are continuously manned whenever fuel is being transferred or suspended from a crane.
- i. Additional time for mitigation should be available based on a combined makeup rate of 820 gallons/minute from the Chemical and Volume Control system and a recirculation rate of between 2000 and 4000 gallons per minute from the containment sump via the RHR pumps.

Based on the above, it is concluded that system design is such that the probability of catastrophic seal failure is acceptably low. In the event that such a failure should occur, fuel damage is not anticipated based on existing procedural requirements associated with fuel handling and adequate time available to implement those requirements. Therefore, it is concluded that the licensee has adequately resolved the issues identified in IEB 84-03 and the IEB is considered closed.

During the inspection, a review was conducted to determine if other potential mechanisms for loss of water from the refueling system existed. Short of structural failure, no credible mechanism was identified for loss of spent fuel pit water inventory. It was identified that the licensee permits primary side steam generator work during refueling conditions utilizing nozzle dams with dual inflatable seals to provide a leakage barrier; however, the licensee has demonstrated by test that should the seals on the dams become deflated, a leakage rate of only one gallon per minute would be encountered. This is well within the capacity

of available makeup systems. Other potential leakage paths including instrument installations, cavity drain lines, and access covers were evaluated to the extent that it was determined that the leakage rate would be less than that calculated for the postulated reactor cavity seal failure.

It is thus concluded that the issue of loss of refueling system water inventory is adequately resolved.

No violations or deviations were identified.

#### 4. General Employee Training

On June 17, 1985, the inspector attended a session of the licensee's General Employee Training. The session covered general facility layout, security, quality assurance, work control, safety tagging, fire protection, personnel safety, emergency planning, radiation protection, radiation work permits, risks of radiation exposure including risks to females of childbearing age, and individual training in the use of anticontamination clothing and contaminated area work practices. At the conclusion of major sections of the session, written examinations were administered. The following observations were made:

- a. The training facility was fully adequate.
- b. The slide presentations, while containing sufficient information, were somewhat dim and difficult to read from the back of the room.
- c. Good handout material was provided to the students.
- d. The instructor used good instruction techniques and was sufficiently familiar with the subjects.
- e. While prepared subject plans were utilized, certain material was not adequately covered as evidenced by the fact that the examinations contained questions on material not covered during the presentations.

While course objectives were met, the licensee is encouraged to rectify the deficiencies noted above.

No violations or deviations were identified.

#### 5. Inservice Testing Program Implementation

##### a. Inservice Testing Relief Requests

The inspector reviewed the licensee's implementation of their inservice testing program for pumps and valves including selected test procedures and relief requests. During the program review, the inspector noted that the licensee was employing two practices which were at variance with the testing requirements delineated in the ASME Code and for which the licensee had not submitted relief



requests. These were failure to measure the speed of the Turbine Driven Auxiliary Feedwater Pump (TDAFP) per the requirements of IWP-4400 and failure to allow pumps to stabilize for five minutes prior to obtaining inservice test data per the requirements of IWP-3500. Discussions with members of the plant staff revealed that although the Maintenance Department measured pump speed during the annual maintenance activities associated with the TDAFP, speed was not measured under the auspices of the inservice testing program. During the performance of the Containment Spray pump inservice test, the inspector observed, and subsequent discussions with plant personnel confirmed, that the licensee did not routinely allow five minutes for pump parameter stabilization prior to taking pump inservice test data. Failure to comply with Code required testing requirements without the submission and approval of relief requests, is considered to be a violation (50-282/85012-01(DRS); 50-306/85009-01(DRS)).

The inspector noted that the licensee had temporary instructions addressing these two deficiencies in place prior to the exit meeting and commended the licensee on their timely response to the inspector's concerns. During the inspection, the licensee committed to revise the appropriate procedures to reflect the requirements of IWP-3500. Based on this commitment and the fact that the licensee issued temporary memos to the procedures requiring a pump run 5 minutes prior to taking data, no response to this portion of the violation is required. Permanent measures to be taken in order to assure future compliance with the Code with respect to measuring the speed of the TDAFP have not yet been identified; a response is required.

b. Reference Values

The inspector noted that the licensee did not have a clearly defined method of documenting changes to reference values. The licensee stated that such a mechanism was being pursued and would be defined prior to the next change to reference values.

c. Interface with Technical Specifications

The inspector noted that although the inservice testing program required normal testing on a quarterly basis, the licensee was testing their components on a monthly frequency per the requirements of the Technical Specifications. The licensee stated that monthly testing is no longer required by the Code and that a proposed technical specification amendment would likely be prepared and submitted to the Commission deleting the monthly testing requirement. It was also noted that the technical specifications require that pumps be run for a minimum of 15 minutes during surveillance testing. The licensee stated that this was no longer necessary and the 15 minute run requirement and the monthly test requirements would be deleted in the same amendment.

d. Increased Frequency Testing

The inspector inquired as to the licensee's policy and practices regarding increased frequency testing and subsequent return to quarterly testing. The licensee stated that increased frequency testing would continue until component test data returned to normal, i.e. previous reference value ranges, data stabilized at a new reference value evidenced over three successive tests, or the component was repaired. This is acceptable.

e. Valve Leak Testing

While reviewing the licensee's actions on previously identified items, the inspector noted that no action regarding the trending of valve leak rates had been taken by the licensee. The inspector discussed interpretations by the Office of Nuclear Reactor Regulation of various Code requirements associated with inservice testing, one of which clearly states that exemption from the leak testing methods described in IWV-3420, does not implicitly include relief from trending and corrective action requirements of the Code. The inspector also noted that the licensee had not submitted a request for relief for leak testing of containment isolation valves (CIVs); however, the safety evaluation report issued by NRR states that leak testing CIVs using test methods delineated in 10 CFR 50, Appendix J, was acceptable. The licensee acknowledged the inspector's comment and agreed to submit a relief request addressing the leak testing, trending, and corrective action requirements of the Code for CIVs. Submittal of a relief request addressing the leak testing of containment isolation valves will be tracked as an open item (50-282/85012-02(DRS); 50-306/85009-02(DRS)).

No other violations or deviations were identified.

6. Inservice Testing Data

a. Test Instrumentation

The inspector reviewed test data for the Containment Spray pumps for Unit 2, and the Safety Injection pumps for Unit 1. During the review, the inspector noted that the instrument used to obtain vibration data was not consistently identified by equipment number as required by the procedure. Administrative Control Directive 5 ACD 3.14 requires that for test instruments found to be out of calibration, an evaluation of component test data obtained using said instrument since the last calibration shall be reviewed for validity. Since the instrument identifiers are not routinely recorded, and the licensee owns several IRD-306 instruments, such an evaluation would be extremely difficult. In addition, it was learned that the vibration measurement instruments were not considered to be measuring and test equipment and therefore not subjected to accuracy and traceability requirements. The inspector noted that vibration is one of the parameters used to determine the operability of many safety related components. Criteria XI and XII of 10 CFR 50, Appendix B, as implemented by the Prairie Island Quality Assurance Plan and 5 ACD 3.12, require that operational testing be conducted with adequate

traceable test instruments which are subjected to periodic calibration in a manner conducive to past data evaluation. Failure to meet these requirements is considered to be a violation (50-282/85012-03(DRS); 50-306/85009-03(DRS)).

b. Test Documentation

During the review of the completed tests and data, the inspector identified several deficiencies with regard to the test documentation. In several cases the licensee failed to identify component test data which warranted increased frequency testing, the acceptability of the inservice test, and whether testing indicated the need for a work request. Components were, in fact, tested at increased frequency due to the Technical Specification required monthly testing discussed previously; however, the fact that components entered the alert range was not noted as required by both licensee administrative procedures and IWP-6000. In several cases, the need for work requests was identified in the body of the procedure but not in the space provided on the cover sheet of the procedure.

In addition, the inspector was unable to determine whether the licensee had evaluated the operational readiness of components for those cases when vibration data fell in the alert range. The licensee was able to provide evidence that they had evaluated the vibration test data and that they had responded in an appropriate manner. The inspector noted that these records were not considered to be a part of the component history and were not treated as a quality record. The licensee acknowledged the inspector's comments and stated that the staff would be requested to exercise greater care with regards to test documentation and records classification.

No other violations or deviations were identified.

7. Performance of Inservice Testing

a. Valve Stroke Timing

The inspector inquired as to the licensee's method of valve stroke timing. Discussions with members of the licensee's staff indicated that two methods were in use. The inspector noted that the Code defines full stroke time as the "time interval from initiation of the actuating signal to the end of the actuating cycle." The licensee acknowledged the inspector's observation and agreed that a clear instruction on how to stroke time a valve in the appropriate test procedures would assure that data was obtained in a consistent fashion. The licensee agreed to include an explicit instruction on valve stroke timing into the appropriate procedures. Incorporation of valve stroke timing methodology into procedures containing valve stroke requirements will be tracked as an open item (50-282/85012-04(DRS); 50-306/85009-04(DRS)).

b. Procedure Adherence

During the performance of SP-1088, "Safety Injection Pumps Test",



and SP-2090, "Containment Spray Pump and Spray Additive Valve Test", the inspector noted that the licensee did not follow the procedural steps in order. It appeared that the operating staff was familiar with both the plant and the test procedures to the point of not consistently following each procedural step as written. In both cases, the procedural variance did not compromise plant safety, however, the inspector expressed concern with regards to adherence to procedures, particularly should temporary instructions be attached to the procedure or the procedure revised. The licensee acknowledged the inspector's comments and stated that these concerns would be pursued.

No violations or deviations were identified.

8. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. Open items disclosed during the inspection are discussed in Paragraphs 5e and 7a.

9. Exit Interview

The inspectors met with licensee representatives (denoted in Paragraph 1) on June 20, 1985, to discuss the scope and findings of the inspection. The licensee acknowledged the statements made by the inspectors with respect to items discussed in the report. The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection. The licensee did not identify any such documents/ processes as proprietary.

The inspector also noted that the licensee had been extremely cooperative and responsive to the concerns of the inspector, and, where possible, had issued temporary instructions to the staff as interim measures to preclude further instances of the violations identified during the inspection.