U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No: 50-282/82-11; 50-306/82-11(DPRP)

Docket No: 50-282; 50-306 License 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 55066

Inspection Conducted: July 1-31, 1982

Inspectors: C. D. Feierabend 8-16-82

B. L. Burgess 8-16-82

Approved By: T. Reyes, Chief 8/16/82
Reactor Projects Section 2C

Inspection Summary

Inspection on July 1-31, 1982 (Report No. 50-282/82-11; 50-306/82-11(DPRP))
Areas Inspected: Routine resident inspection of Operations Safety Verification; Updated Final Safety Analysis Report; Monthly Maintenance Observation; Monthly Surveillance Observation; Startup Testing After Refueling; Followup of Operating Events and TMI-2 Lessons Learned. The inspection involved a total of 147 inspector-hours onsite by 2 NRC inspectors including 31 inspector-hours onsite during off-shifts.
Results: Of the eight areas inspected, no apparent items of noncompliance or deviations were identified in seven areas. Two items of noncompliance were identified in the area of followup of operating events, (Failure to report inadvertent safety injection initiation via telephone within one hour; and failure to reduce power to less than 90% within 15 minutes when two operable excore channels deviated from the ± 5% excore target band - Paragraph 7).

DETAILS

1. Personnel Contacted

E. Watzl, Plant Manager
J. Brokaw, Plant Superintendent, Operations and Maintenance
D. Mendele, Plant Superintendent, Plant Engineering and Radiation Protection
*R. Lindsey, Superintendent, Operations
*A. Hunstad, Staff Engineer
J. Nelson, Superintendent, Maintenance
G. Miller, Superintendent, Operations Engineering
J. Hoffman, Superintendent, Technical Engineering
*K. Albrecht, Superintendent, Quality Engineering
M. Klee, Superintendent, Nuclear Engineering
S. Northard, Nuclear Engineer
K. Beadell, Engineer
M. Gruber, Engineer
G. Lenertz, Lead Production Engineer
M. Thomas, Engineer
J. Maki, Engineer
B. Frazer, Engineer
R. Hanson, Quality Control Engineer
D. Silvers, Quality Assurance Engineer
B. Held, Shift Supervisor
D. Cragoe, Shift Supervisor
G. Edon, Shift Supervisor
M. Wadley, Shift Supervisor
P. Ryan, Shift Supervisor
M. Balk, Shift Supervisor
R. Holthe, Shift Supervisor
P. Valtakis, Shift Supervisor

*Attended exit interview.

2. Operations Safety Verification

a. General

Unit 1 operated routinely throughout the month.

Unit 2 refueling outage was completed on July 16, 1982 and the unit was back on line on July 19, 1982.

b. Control Room Observations

The inspector observed control room operations, reviewed applicable logs, conducted discussions with control room operators, and observed shift turnovers. The inspector verified the operability of selected emergency systems, reviewed equipment control records, and verified the proper return to service of affected components.

c. Tours

Tours of the auxiliary, turbine and Unit 2 shield buildings and Unit 2 containment were conducted to observe plant equipment conditions, including potential fire hazards and to follow outage progress. The inspectors verified that equipment in need of maintenance had work requests issued for timely repair. The inspector observed that the physical security plan was being implemented, including confirmation that compensatory measures were employed, when required by a security system equipment failure.

d. Independent Verification

The inspector performed a walkdown of the accessible portions of the Auxiliary Feedwater System. Observations included confirmation of selected portions of the licensee's procedures, checklists, and plant drawings and verification of correct valve and power supply breaker positions to insure that plant equipment and instrumentation were properly aligned.

No discrepancies in valve or breaker positions were identified, however, the inspector noted that there was a discrepancy in the licensee's secure card log, associated with a quarterly audit conducted quarterly to maintain cards in a current status. The licensee will review and/or revise procedures for secure card control and audits. This was discussed during the exit interview.

No items of noncompliance were identified.

3. Updated Final Safety Analysis Report (USAR)

The licensee has submitted an updated USAR to NRR, with courtesy copies to RIII and the SRI, in accordance with the requirements of 10 CFR 50.71(e). The licensee plans to update the USAR annually on a schedule that will eliminate the need for a separate report describing changes, tests, and experiments made under the provisions of 10 CFR 50.59.

4. Monthly Maintenance Observation

a. Review of Work Request (WR's) and Work Request Authorization (WRA's)

The inspector selected and reviewed several SR's and WRA's to determine the status of safety related systems, to verify that proper priorities were given and to verify that design changes were initiated where appropriate.

1) Reviewed portions of DC 804118, Reactor Coolant System Venting, including WRA's F-3251-RC-Q and F-3252-RC-Q covering the preoperational testing and trouble shooting of the head vent solenoid valve system.

2) Reviewed portions of DC81L679 Containment Purge Blank Flange Installation, including WRA's F-3354-ZP-Q and F-3355-ZP-Q covering the installation, welding, testing and inspection of the flanges.

3) Reviewed F-3372-RI-Q covering rod position indication cold calibration.

b. Observations

The inspector observed portions of safety related maintenance activities to determine that the activities did not violate limiting conditions for operation (LCO's) that administrative approvals and equipment control tags were completed prior to initiating the work, that approved procedures were used (or activity was within the "skills of the trade"), that the procedures used were adequate to control the activity, and that proper Quality Control and Quality Assurance controls were used.

1) The inspector observed Local Leak Rate Testing (LLRT) of the recently installed Unit 2 containment purge blank flanges. The LLRT was also observed by the authorized code inspector and the system engineer. Test results were satisfactory.

2) The inspector observed portions of head vent system pre-operational testing. Initial testing had identified an apparent wiring problem. After rewiring, the head vent valves were retested and a problem was noticed with the outside head vent isolation valves jumping briefly (less than 1/10 sec.) off their closed seats when tested with high pressure nitrogen. The valve manufacturer (Target Rock) was contacted and was familiar with the problem. The licensee was informed that system testing with nitrogen was the cause for valve jumping and that the valve would be stable when the system was used during normal operation. The inspector reviewed a copy of testing performed by the manufacturer that was sent to the licensee and compared it with the test data to assure proper valve performance.

The Operations Committee had reviewed and approved the pre-operational test.

No items of noncompliance were identified.

5. Monthly Surveillance Observation

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 LCO's were not violated, that system and equipment restoration was completed, and that test results were acceptable to test and Technical Specification requirements.

Tests witnessed included:

a. SP-2089 Residual Heat Removal (RHR) Pumps Test

Test is performed each unit outage to verify RHR system valves cycling times and to demonstrate pump operability.

The test was completed satisfactorily on No.21 RHR pump but delayed to rectify a high suction pressure indication on No.22 RHR pump. Venting of the pump suction piping brought pressure to normal and the test was completed satisfactorily.

The high pressure was attributed to warm water added to the RHR pumps suction piping while operating pumps during cooldown of the RHR heat exchangers. The inspector observed licensee actions to reduce the suction pressure. The inspector reviewed the procedure and held discussions with plant operators and members of the plant staff. The inspector concluded that although the suction pressure was above normal, the high pressure would not hinder RHR pump operation and would not affect RHR pumps operability.

b. SP-2070 Reactor Coolant System Integrity Check

Test is performed each unit outage to meet inservice inspection (ISI) requirements related to visual inspection of the reactor coolant boundary and leak test of reactor coolant check valves.

The inspector observed plant operators' visual inspection of reactor coolant system pressure vessel boundries. The inspector noted that the operators were not aware of visual inspection requirements delineated in the surveillance procedure. The inspector related these concerns to the shift supervisor who had the operator in charge rebrief the operators on test visual inspection requirements and had the system reinspected.

The inspector reviewed the completed surveillance requirements and reviewed applicable code requirements and licensee commitments. The licensee has submitted to NRR[1/] a commitment which allows the use of uncertified test personnel for data taking assignments in ISI inspections, provided that a certified test person supervised or overlooked the test. NRR is currently evaluating the licensee's submittal. The inspector, as of the date of this inspection report, has not established the status of certification of personnel involved in this surveillance test. The inspector will review this item in a future inspection. (Open 50-306/82-11-01)

1/ NSP Response to NRR Generic Letter No. 81-01, dated August 4, 1981.

c. SP-2086 Fan Coil Unit Efficiency Test

Test is performed to determine fan coil efficiency by measuring temperature difference between air temperatures and cooling water temperatures.

The test was completed satisfactorily.

No items of noncompliance were identified.

6. Startup Testing After Refueling

The inspector observed portions of Unit 2, Cycle 7 low power physics testing including a review of test procedures, verification of procedural compliance, observation of test measurements, and comparison of test results with acceptance criteria.

Tests observed included:

a. D-31 Reactivity Computer Checkout Measurement

b. D-32 Temperature Coefficient Measurement

c. D-34 Boron Endpoint Measurement

d. D-33 Rod Worth and Boron Worth Measurement at Hot Zero Power

After test results were reviewed and feed pump and turbine generator repair completed, reactor power was raised to 20% for a flux map. The 20% flux map indicated a 3% radial flux tilt. Based on experience from a similar indication during startup for Cycle 6, the Operations Committee reviewed the 20% flux map and approved power operation to 100% of rated thermal power. Flux maps were taken at 60% and 100% power to trend the radial flux tilt. 60% and 100% flux maps showed the flux tilt was less at higher power, as predicted, and at an acceptable value of less than 2% at 100% power.

No items of noncompliance were identified.

7. Followup of Operating Events

a. Chemical and Volume Control System (CVCS) Leak

At 0330 on July 16, 1982 a leak from the Letdown Heat Exchanger Room was discovered by a plant operator. The leak was found to be from a weepage orifice above the diaphragm in the 150 pound relief valve 2VC-25-2 located downstream of the pressure control valve in the CVCS. Leak rate was calculated at 7 to 10 gallons per minute. An estimated 375 gallons leaked into a nearby floor drain. The floor drain is routed to the aerated waste collection tank for collection and processing.

Plant operators isolated the leak by isolating letdown and valving out the Volume Control Tank (VCT). Hydrogen gas was burped from the VCT and a temporary nitrogen blanket was used during operations to restore the system. Air samples and contamination swipes were taken during and after isolation to assess airborne and contamination levels. No airborne activity was detected and minimal contamination was found.

The leak was determined to have been caused by a valving error that occurred when shifting Hold Up Tanks (HUT's). The operator performing the valving operation had observed a valve position indicator which indicated "Open" when, in actuality, the valve was closed.

The inspector reviewed the Work Request (WR) F-3488-VC-Q to replace the relief valve and repair any additional diaphragm valves in the CVCS system. The system engineer is tracking diaphragm valve failures and will use this data for determination of changes in valve maintenance or valve replacement.

The licensee determined that the event did not require a report to NRC, but is investigating it as an internal Significant Operating Event (SOE) which is investigated and reported to the Operations Committee and to licensee management.

No items of noncompliance were identified.

b. Inadvertent Safety Injection Actuation

1) Initial Conditions

On July 7, 1982 at approximately 1644 Prairie Island Unit 2 was in cold shutdown. Fuel shuffle was completed and the reactor head had been replaced and the head studs torqued. No.22 RHR pump was operating and charging was connected for purification through the purification jumper. The cooling water pump and the diesel cooling water pump for Unit 2 were in pullout due to maintenance on the circulating water pumps. Safety injection pumps and containment spray pumps were in pullout as required by plant procedures. Letdown was isolated and the reactor coolant system had been drained to the centerline of the hot legs for inspection activities. Surveillance SP-2547 (Safeguards Logic Function Test) was in progress.

2) Sequence of Events

The instrument and control technician performing the surveillance SP-2547 was in the process of returning pressurizer pressure simulation to normal. Safety Injection (SI) was initiated when pressurizer pressure dropped below the SI initiation setpoint with Train "A" not in "block".

Control room operators recognized the SI as spurious and responded to stabilize plant conditions. Due to plant status only D-1 Diesel Generator, No.21 RHR Pump, and No.12 Diesel Cooling Water Pump responded to the safeguards signal. System valves that received the safeguards and containment isolation signals responded to their respective positions. Valve repositioning lined up No.21 Boric Acid Storage Tank (BAST) and the Refueling Water Storage Tank (RWST), gravity filling the No.21 BAST to 96% before operators could isolate the tank. No borated water was injected into the reactor vessel. After stabilizing plant conditions the operators returned system valves and components to normal system configuration.

Work Request F-3334-RP-Q was initiated to troubleshoot the cause for Train "A" SI block relay becoming unblocked during the surveillance. The relay was cycled without problem. All appropriate plant personnel were informed of this event. The licensee has completed initial event investigation of the event classified as a Significant Operating Event (SOE).

3) Investigation and Conclusion

The inspector was notified of the event on July 19, 1982 by the licensee. The inspector reviewed control room logs and the surveillance procedure. Discussions were held with plant operators, the shift supervisor, and the system engineer to reconstruct event details. Because of plant conditions, there was no apparent affect on any required safety related equipment, therefore the event had little safety significance. The No.21 BAST is not required to be operable when the unit is shut down. The BAST acid concentration was restored to meet T.S. requirements prior to startup after refueling.

The inspector determined that notification within one hour by telephone to the NRC was required and not made. Failure to do so is an apparent item of noncompliance with 10 CFR 50.72, as described in the Appendix to the letter forwarding this report. (NC 306/82-11-02)

c. Axial Flux Difference Deviation

1) Background

During the recent refueling, two excore detectors, N-43 and N-44 were replaced. Procedure D-30, Post Refueling Startup Testing, included core flux maps to establish the target flux differences. This was performed on July 16, 1982 at approximately 90% power, establishing a target flux difference of +2% at rated power. Technical Specification 3.10.B.4 requires that, except during physics test, operations above 90% be within $\pm$5% of the target flux, i.e. between -3% and +7%. This is periodically revised, based on surveillance testing throughout the fuel cycle.

When reactor power was initially raised to 100% for fuel conditioning the indicated flux difference for detectors N-43 and N-44 were indicating about 3% higher than for detectors N-41 and N-42, but within the ±5% criteria. On July 19, 1982, the flux deviation input to the computer failed, so the operators initiated a flux deviation log of each deviation meter every half hour, as required by T.S. 3.10.B.9. This log was maintained as required. Review of the flux deviation logs for the period July 19 through July 24 shows that N-43 flux difference was consistantly more than 3% higher than for N-41 and N-42 and that N-44 was nearly 3% higher than N-41 and N-42.

2) Sequence of Events

On July 25, reactor power was reduced to about 52% to allow maintenance on a feedwater pump. After completion of the maintenance, reactor power was stabilized at 88% to complete an in-core flux map and to obtain the data to calibrate the flux deviation monitors. (Target band limits are not required during the physics testing.) The physics testing was completed about 1832, and the operator began to raise power to 100%. At that time, N-43 indicated +9% and N-44 indicated +8.2%, both exceeding the allowable +7% flux difference. At approximately 2300, at shift change, the oncoming operator recognized that two of the flux difference channels were out of the target flux band, and immediately inserted control rods to reduce the difference, then started power reduction to 50% for 24 hours in accordance with T.S. 3.10.B.7.b. The reactor was subsequently returned to full power without incident.

The flux deviation channels were recalibrated on July 26, based on the physics test performed on July 25, with all four channels then in good agreement.

3) Investigation and Conclusions

The inspector was notified of the event on July 26 by the licensee. The inspector reviewed control room logs, recorder tracings, surveillance and operating procedures. Discussions were held with plant operators, the shift supervisor, and the nuclear engineer to reconstruct event details.

The cause appears to be failure on the part of the engineer performing the physics test, the shift supervisor and the operator to assure that the axial flux was within the target band at the conclusion of the test, prior to return to normal power operation.

Evaluation of the results of the physics testing by the nuclear engineering staff found that there were no problems associated with power distribution limits or with actual flux difference,

as the recalibration of channels N-43 and N-44 brought them into agreement with N-41 and N-42. Neither N-41 nor N-42 approached the target band limit during the event, thus there was no indication of any affect on the core. The physics test data also confirmed that the reactor protection system trip settings were conservative within allowalbe T.S. limiting values.

4) License Requirements

Thermal power was not reduced to less than 90% of rated thermal power within 15 minutes, with the indicated axial flux difference of two operable channels deviating from the target band. This was noncompliance with T.S. 3.10.B.5. (NC 306/82-11-03)

8. TMI-2 Lessons Learned Items

The inspector reviewed the status of licensee actions in response to NRC requirements as clarified by NUREG-0737. Paragraph identification relates to those paragraphs of NUREG-0737.

a. I.A.1.3 Shift Manning

The inspector confirmed that the licensee had met the schedule for complying with the requirements of NUREG-0737. NRR has completed evaluation of this item.[2/] (Closed)

b. II.E.1.1.2 Auxiliary Feedwater Systems Long Term Modification

Recommendation GL-4 which requires auxiliary feedwater pumps to be protected against loss of suction.

The licensee completed installation of loss of suction protection for Unit 2 Auxiliary feedwater pumps during this refueling outage as committed. (Closed, Unit 2 Only)

9. Exit Interview

The inspector attended an exit interview conducted by RIII inspector L. Hueter on July 23, 1982.

The inspector conducted interim interviews during the inspection period and met with Mr. Lindsey and other members of your staff, as identified in Paragraph 1, at the conclusion of the inspection.

The inspectors discussed the scope and results of the inspection. The inspector stated that although two items of noncompliance had been identified, neither occurrence posed a threat to health and safety but pointed out the need to emphasize strict adherence to the Technical Specifications and reporting requirements.

2/ NRR Letter to NSP, dated January 4, 1982.

After discussion of the requirement to report initiation of Engineered Safety Features as a significant event when the reactor was in cold shutdown condition, the inspector stated that 10 CFR 50.72 did not differentiate between plant conditions when assigning significance to the specific events, although Technical Specification operability requirements do address the differing requirements for differences in plant status.

The inspector discussed his observations related to secure card control and audits (Paragraph 2.d). The licensee stated that the procedures would be reviewed and revised to improve controls.

The inspectors also discussed the observations concerning the status of certification of personnel performing the reactor coolant system integrity check (Paragraph 5.b) and stated that this item will be resolved during a future inspection.