U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-263/89011(DRP)

Docket No. 50-263 License No. DPR-22

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

Facility Name: Monticello Nuclear Generating Station

Inspection At: Monticello Site, Monticello, Minnesota

Inspection Conducted: March 7 through April 17, 1989

Inspectors: P. L. Hartmann

P. B. Moore

D. L. Schrum

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

5-4-89
Date

Inspection Summary

Inspection on March 7 through April 17, 1989 (Report No. 50-263/89011(DRP)
Areas Inspected: A routine, unannounced inspection by the resident inspectors of previous inspection items; operational safety verification; maintenance; surveillance; and closed TI 2515/90.
Results: During the inspection period, the plant operated at coastdown to refueling, which is scheduled for August 19, 1989. A short duration maintenance outage was conducted by the licensee. No violations or deviations were identified. The licensee continues to operate the plant in a safe and conservative manner. An example of this conservative operation is the decision to shut down and repair a leaking safety relief valve before reaching any technical specifications limit. An additional example is the comprehensive troubleshooting effort to discover the root cause of a HPCI high steam flow isolation. The licensee responded well to an NRC request by committing to install weepholes in drywell junction boxes prior to startup following the short duration maintenance outage. Paragraph 6 of this report discusses an event relating to the operability of the RCIC system with water in the steam supply line to the turbine. This issue is currently being considered for potential escalated enforcement action.

DETAILS

1. Persons Contacted

*W. A. Shamla, Plant Manager
M. H. Clarity, Assistant to the Plant Manager
B. D. Day, General Superintendent, Engineering & Rad. Prot.
D. E. Nevinski, General Superintendent, Operations
*R. L. Scheinost, General Superintendent, Quality, Security & Admin.
L. L. Nolan, Superintendent, Nuclear Technical Services
S. A. Engelke, Superintendent, Nuclear Technical Services
S. J. Hammer, Superintendent, Operations Engineering

The inspector also contacted other licensee employees including members of the technical and engineering staffs, and reactor and auxiliary operators.

*Denotes the licensee representatives attending the management exit interviews.

2. Licensee Action on Previous Inspection Findings (92701)

(Open) Unresolved Item (263/88003-02): Reactor Core Isolation Cooling (RCIC) System.

During the inspection period, the licensee supplied the inspector with the results of an engineering analysis of the operability of the RCIC system with its steam line flooded. The conclusion is the RCIC turbine would have tripped on high exhaust pressure, which is capable of being reset from the control room. NRC management is considering this event for enforcement action, and it will be resolved by a future inspection report. Additional details are given in section 6 of this inspection report.

3. Operational Safety Verification (71707)

a. Routine Inspection

The inspector observed control room operations, reviewed applicable logs and conducted discussions with control room operators during the inspection period. The inspector verified the operability of selected emergency systems, reviewed tagout records, and verified proper return to service of affected components. Tours of the radwaste building, reactor building, intake structure, and turbine building were conducted to observe plant equipment conditions, including, potential fire hazards, fluid leaks, and excessive vibrations.

These reviews and observations were conducted to verify that facility operations were in conformance with the requirements established under technical specifications, the Code of Federal Regulations, and administrative procedures.

The licensee conducted an unannounced Fire Drill on 4/1/89. The scenario involved a fire in the RCIC room. The inspector also reviewed procedure No. 2176, Fire Drill Procedure, Revision 6, which included a self evaluation of the drill completed by the participants which discussed items; such as, ventilation, access to a fire in the RCIC room, and potential hazards associated with fighting the fire.

b. ESF Actuation

On March 30, 1989, while at 77.9% power, a partial Group II isolation and standby gas treatment (SBGT) initiation occurred at 11:13 p.m. The cause appeared to be from loss of air flow during performance of the daily operability surveillance for the plant stack and reactor building wide range gas monitors (WRGM). The root cause of the loss of air flow appeared to be due to personnel error. It is suspected that the operator performing the surveillances inadvertently depressed the sample pump on/off button versus the "item" button. The deenergization of the sample pump resulted in the loss of flow. The WRGMs were returned to service, the Group II isolation was reset, and the SBGT was returned to auto-standby status at 11:35 p.m. the same day. The event was reported to the NRC operations duty officer as required. This item will be followed by Licensee Event Report 263/89004.

c. High Pressure Coolant Injection Inoperability

On April 3, 1989, the licensee was performing their RCIC operability test and found a relief valve, RV-2097, on the lube oil cooler line did not completely reseat. The minor leakage due to this relief valve was estimated at 0.75 gpm. Because of a misunderstanding that this valve was covered by technical specifications, the licensee initiated actions to declare RCIC inoperable and to subsequently verify its backup system, HPCI operable. Less than two hours following the RCIC test the licensee performed a HPCI system start where the HPCI steam isolation valves closed on high steam flow. Following this trip the licensee initiated a plant shutdown as required by technical specifications.

A short time later the licensee determined that the failure of the RCIC valve to reseat was not a technical specification concern. The confusion was prompted by a note in the procedure designating a step in the procedure that included this valve as a technical specification and ASME concern, whereas the valve itself is only an ASME concern and does not adversely affect the operability of the RCIC system. Following this clarification the licensee declared RCIC operable and resumed full power operation.

The licensee initiated actions to return HPCI to an operable status by performing two I&C procedures in an effort to detect any problems that may have led to the high steam line flow isolation.

These calibration procedures found no discrepancies. The licensee tested the system and HPCI functioned properly. The licensee declared the system inoperable pending evaluation of the results. Since this second test revealed no discrepancies, the licensee decided to perform a full dynamic test wherein the system parameters and signals were recorded on strip charts. This third test was performed on April 4, 1989, and the system again functioned properly. The test was run subsequently each day for a total of seven runs, six of them successful. Preliminary review of the collected data by the licensee and General Electric revealed no problems with the system. The inspector watched two of the cold startups of HPCI and observed no anomalies.

The HPCI system was declared inoperable until the maintenance outage on April 7, 1989. Additional review of HPCI performance with troubleshooting was conducted, and no problems were found. The licensee declared HPCI operable on April 9, 1989, while returning to power from the outage after HPCI had satisfied all of startup operability testing. This event will be followed by the inspector as a LER 263/89005.

d. Maintenance Outage

The licensee conducted a short outage during the inspection period. On April 8, 1989, at 3:57 a.m., the generator was off line and the reactor was shut down with all rods inserted at 7:50 a.m. Major outage work items were: replacement of the G safety relief valve topworks assembly; repair of the "B" torus to drywell vacuum breaker limit switch assembly; repair of various steam leaks; and installation of weepholes for electrical junction boxes in the drywell and high radiation areas. The reactor was critical at 3:59 a.m. on April 9, 1989, and the generator was on line at 11:58 p.m. the same day.

During the plant startup, the Residual Heat Removal Service Water (RHR SW) inlet valve to the "A", RHR heat exchanger (RHR 4-1), was found in the throttled position versus the full open position as required. The licensee verified that the bypass was full open and the adequacy of the low pressure coolant injection flow was verified. The inspectors will follow corrective action for this event. (Open Item 263/89011-01)

4. Monthly Maintenance Observation (62703)

Station maintenance activities of safety-related systems and components listed below were observed/reviewed to ascertain that they were conducted in accordance with approved procedures, regulatory guides and industry codes or standards and in 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; parts and materials used were properly certified; radiological controls were implemented; and, fire prevention controls were implemented.

Work requests were reviewed to determine status of outstanding jobs and to assure that priority is assigned to safety-related equipment maintenance which may affect system performance.

The following maintenance activities were observed/reviewed:

- Replacement and Calibration of RCIC Pressure Gauge RX 2093
- Replacement of HPCI-3 Steam Trap Isolation Valves
- Replacement of High Temperature Detectors

No violations or deviations were identified in the review of this program area.

5. Monthly Surveillance Observation (61726)

The inspectors observed surveillance testing and verified that testing was performed in accordance with adequate procedures, that limiting conditions for operation were met, that removal and restoration of the affected components were accomplished, that test results conformed with technical specifications and procedure requirements and were reviewed by personnel other than the individual directing the test, and that any deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel.

The inspector reviewed/observed the following test activities:

- Test No. 0051, Calibration No. 0052, Revision 11, Main Steam Line Hi Flow Group Isolation and Instrumentation Test and Calibration Procedure;
- Test No. 0391, Calibration 0392, Revision 2, Shutdown Cooling Isolation Interlock Instrumentation Test and Calibration Procedure;
- Test No. 0098, Calibration No. 0099, Revision 5, Core Spray Header Differential Pressure Test and Calibration Procedure;
- Monitoring of Traversing Incore Probe Shear Valve Squib Lifetimes, 0255-18-IC, Revision 4.

All of the surveillances above were satisfactory with the exception of the Squib valve (explosive charge) testing. These valves are designed to act as a containment isolation valve if necessary while the TIP is inserted in the core. While the TIP is out of the core, a normally closed ball valve fulfills the isolation function.

The squibs are designed to fire upon receipt of a 4 amp current. While testing the squibs in accordance with the procedure, the licensee gradually increased the voltage and found that the coil burned out at 2.5 amps without firing the charge. Discussions with the manufacturer, Holex Co., indicated that there is a problem testing the squibs on a steadily increasing current that leads to a desensitizing of the bridge circuit rendering the squib inoperable. The manufacturer discussed a new test setup that would properly test the squib and the licensee intends to modify their procedure accordingly.

No violations or deviations were identified in the review of this program area.

6. RCIC Turbine Steam Line Flooded

(Open) Unresolved Item No. (50-263/88003-02) RCIC Steam Line Flooding

The following section is a summary of events for the RCIC steam line flooding that occurred on February 8, 1988.

With the HPCI system inoperable, the licensee discovered the RCIC steam supply line full of water. The steam line apparently filled with water during performance of Procedure No. 7140, RCIC Steam Supply Drain Pot Hi Level, which required the closing of the RCIC steam line drain valve. No time limit exists for the completion of this test and as a result, the drain was left closed to accumulate water in the piping which will set off the alarm and complete the test. During the time allowed to permit the smaller pipe and drain pot to fill with water the RCIC Turbine Steam Line also filled with water. The licensee's immediate corrective action was to drain the water out of the line. The operators called plant management and made a decision to call RCIC operable based on the belief that water was in the line on a previous RCIC operability test run and had functioned adequately. It was later determined that the line had been drained prior to the test. The licensee proceeded to analyze the reason no alarm was received for water in the RCIC steam line by testing the system using the RCIC System Instrument Maintenance Procedure. The licensee allowed the steam line to fill two more times in a controlled manner. It was discovered that the alarm instrument had been isolated, preventing the alarm from functioning. It was also determined that the switch for the alarm was mechanically bound, so the alarm would not have functioned even if the line had not been isolated.

The licensee obtained data from General Electric and NUTECH on the survivability of the RCIC turbine and system piping. Based on these results, the licensee's position is that the piping and turbine would have survived the water slug. The licensee recently obtained data that the RCIC turbine would have tripped on high exhaust pressure. The GE example was of a HPCI system that survived 100-800 gallon chugs of water. An estimate of the quantity of water in the Monticello RCIC steam piping was 130 gallons. Based on reviews of data, it is highly likely that: the RCIC system probably would not have been damaged by the slug of water; may have tripped on overspeed; and would have tripped on high exhaust pressure. The exhaust pressure trip can be reset from

the control room, but the overspeed trip would require several minutes for an operator to locally reset the overspeed trip. The licensee is also making a procedure change to ensure that RCIC is not declared operable during the system water alarm test, which was allowed by the previous procedure.

Based on a detailed review of this event by the resident inspector and a regional project inspector, it appears that for approximately 22 hours on February 8, 1988, while the HPCI system was inoperable, the licensee rendered the RCIC system inoperable by allowing the RCIC steam supply piping to become flooded and the licensee did not take action to correct the RCIC system deficiency or initiate compensatory actions. This appears to be a violation of Technical Specification 3.5.D.2 and 4 which requires the immediate initiation of an orderly reactor shutdown and reducing reactor pressure to below 150 psig within 24 hours when both RCIC and HPCI are not operable. A LER will be issued by the licensee.

Root Cause

The root cause of the problem appeared to be a procedure that allows the RCIC system to be operable during system water level alarm testing. A temporary change to the procedure prevents the alarm testing at this time.

NRC Concerns

1. The licensee made an operational decision on an assumption that RCIC had run with water a previous time, which was in error.

2. The licensee had not completed SOE 88-02, which has been upgraded to a reportable event upon recent receipt of information.

3. The fact that the instrument isolation valves were mispositioned has been addressed previously by the resident inspectors. These valves have been added to the revised instrumentation valve checklist which the licensee has committed to implement by June 1, 1989. The inspector verified that procedure, Plant Prestart Checklist Process Instrumentation Form 2161, has been revised.

This event is being evaluated for possible escalated enforcement.

7. Temporary Instructions

(Closed) Temporary Instruction 2515/90 - Inspection of Licensee's Implementation of Multiplant Action Item B-58, Scram Discharge Volume Capability.

The following paragraphs document the results of inspections performed for TI 2515/90. This instruction was a request to perform an inspection

to follow up the boiling water reactor licensee's activities to ensure scram discharge volume (SDV) capability in accordance with their long term commitments concerning Multiplant Action Item B-58.

All of the items reviewed during the inspections met the requirements for an adequate scram discharge volume as listed in the Criterion portion of TI 2515/90.

a. 04.01 Scram Discharge Header Size

Criterion: The scram discharge headers shall be sized in accordance with GE OER-54 and shall be hydraulically coupled to the instrumented volume(s) in a manner to permit operability of the scram level instrumentation before loss of system function.

The following information was documented in Supplemental Information Concerning Addendum No. 1 to Licensee Amendment Request dated October 10, 1980:

Table 1

	East Volume	West Volume
Volume in existing 4" and 6" diameter headers	96.5 gal	97.06 gal
Volume in 12" diameter header leading to the SDIV	144.0 gal	207.04 gal
Volume in SDIV above worst case scram setpoint (57 gal)	56.65 gal	41.1 gal
Volume in SDIV below worst case scram setpoint	57 gal	57 gal
Total Volume	354.15 gal	402.2 gal
Total Volume above worst case scram setpoint	297.15 gal	345.2 gal
Required Scram Volume to provide a minimum scram volume of 3.34 gallons per drive	200.4 gal	203.74 gal

The scram discharge volume is adequate in size to contain all of the water in a scram even in the case of the worst case scram setpoint.

An automatic scram function exists for high instrument volume water level. This is shown in Monticello drawing No. M-119, "Control Rod Hydraulic System."

c. 04.03 Instrument Taps Not on Connected Piping

Criterion: Instrumentation taps shall be provided on the vertical IV and not on the connected piping.

The inspector verified by inspection that the instrumentation is on the IV only and not on connected piping.

d. 04.04 Detection of Water in the Instrument Volume (IV)

Criterion: The scram instrumentation shall be capable of detecting water accumulation in the IVs assuming a single active failure in the instrumentation system or the plugging of an instrument line.

The Monticello scram discharge volume has diverse instrumentation. Each scram discharge instrument volume has four level sensing instruments that provide inputs to the scram circuitry. The SDIVs have two float type and two thermally activated instruments. The plant instrumentation is tied in with both sets of instruments.

e. 04.05 Vent and Drain Valves System Interfaces

Criterion: Vent and drain functions shall not be adversely affected by other system interfaces. The objective of this requirement is to preclude water backup in the scram discharge IV, which could cause a spurious scram.

The IVs drain into a reactor building floor drain storage tank. The tank contains a vent that would allow overflow and thus prevent a backup of water into the IV.

f. 04.06 Vent and Drain Valves Close on Loss of Air

Criterion: The power-operated vent and drain valves shall close under loss of air and/or electric power. Valve position indication shall be provided in the control room.

Monticello Drawing No. M-119, "Control Rod Hydraulic System", shows that the vent and drain valves fail closed on a loss of air and the valve position is indicated in the control room.

g. 04.07 Operator Aid

Criterion: Instrumentation shall be provided to aid the operator in the detection of water accumulation in the IVs before scram initiation.

An inspection determined that there is an alarm in the control room to indicate the presence of water in the IV. The plant has a detection system to block rod withdrawal. The light that indicates water accumulation is No. 5-B-30, "Discharge Volume Not Drained." Control room response procedures exist for operator action if water is detected in the IV.

h. 04.08 Active Failure in Vent and Drain Lines

Criterion: Vent and drain line valves shall be provided to contain the scram discharge water with a single active failure and to minimize operational exposure.

Redundant vent and drain valves that fail in the closed position exist in the Monticello system to prevent a single active failure from defeating isolation of the vent and drain valves. These are shown on Drawing No. M-119, "Control Rod Hydraulic System."

i. 04.09 Periodic Testing of Vent and Drain Valves

Criterion: Vent and drain valves shall be periodically tested.

The vent and drain valves are periodically tested by Test No. 0337, "Scram Discharge Volume Vent and Drain Valve Surveillance Test." The procedure verifies that the valve closure time is less than 30 seconds. Test No. 0255-01-IA, "CRD Hydraulic System Quarterly Valve Exercise," demonstrates CRD scram discharge volume control valve operability. Technical Specification 4.3.F.1 requires the scram discharge volume drain and vent valves be cycled quarterly and Technical Specification 4.15 requires this test to be conducted in accordance with Section XI of the ASME Boiler and Pressure Vessel Code. The test is conducted on a periodic basis and following system maintenance as delineated in Section XI of the ASME Boiler and Pressure Vessel Code.

j. 04.10 Periodic Testing of Level Detection Instrumentation

Criterion: Level detection instrumentation and verifying level detection instrumentation shall be periodically tested in place.

The level detection instrumentation is tested periodically in place by Monticello Test Procedures No. 0006, No. 0334, No. 0025, and No. 0335.

k. 04.11 Periodic Testing Operability of the Entire System

Criterion: The operability of the entire system as an integrated whole shall be demonstrated periodically and during each operating cycle by demonstrating scram instrument response and valve function at pressure and temperature at approximately 50% control rod density.

The procedure that tests the operability of the entire system as an integrated whole for the above stated conditions is Monticello Test Procedure No. 1254, "Scram Shutdown Procedure."

8. Exit Interview (30703)

The inspectors met with the licensee representatives denoted in Paragraph 1 on April 21, 1989. The inspectors discussed the purpose 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 inspectors during the inspection. The licensee did not identify any documents/processes as proprietary.