U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-263/88027(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: December 6, 1988 through January 26, 1989

Inspectors: P. L. Hartmann

P. B. Moore

M. J. Farber

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

2-10-89
Date

Inspection Summary

Inspection on December 6, 1988 through January 23, 1989 (Report No. 50-263/88027(DRP))

Areas Inspected: A routine, unannounced inspection by the resident inspectors of previous inspection findings; operational safety verification; maintenance observation; surveillance observation; and management visit.

Results: During the inspection period, the plant operated at full power continuously until December 16, 1988, when a reactor scram occurred. The plant had operated for 363 continuous days up to that point. The previous operation record was 198 days of continuous operation. The plant has operated continuously since the reactor scram, beginning a fuel coastdown on January 15, 1989. Of the four areas inspected, one violation involving the calibration and use of special test equipment was identified. An unresolved item involved a procedure change for not using a special tool for maintenance work. Regional management attended a licensee meeting on modification concerns at the plant site. This is under review by the NRC.

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DETAILS

1. Persons Contacted

*L. R. Eliason, General Manager, Nuclear Plants
*W. A. Shamla, Plant Manager
M. H. Clarity, Assistant to the Plant Manager
D. E. Nevinski, General Superintendent, Operations
R. L. Scheinost, General Superintendent, Quality, Security & Administration
*B. D. Day, Acting General Superintendent, Engineering & Rad. Prot.
L. L. Nolan, Superintendent, Nuclear Technical Services
S. A. Engelke, Superintendent, Technical Services Engineering
*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 on January 27, 1989.

2. Licensee Action on Previous Inspection Findings (92701, 92702)

a. (Open) Open Item (263/88013-01): Discrepancies noted in RHR system instrumentation modification.

As discussed in Paragraph 7.c of Inspection Report No. 50-263/88017(DRP), the licensee's corporate Quality Assurance group conducted an extensive audit of selected modifications implemented at Monticello since 1980. The majority of the modifications selected were performed between 1980 and 1984; 1984 being the point in time when changes to the modification process were implemented. Two post-1984 modifications were audited to evaluate the effectiveness of the changes made to the process. Thirteen modification packages associated with eleven systems were audited:

*	81M052	Core Spray AC Interlock Instrumentation
*	87Z002	Safety Relief Valve Air Supply System Upgrade
*	83M112	Appendix J Modification
*	81Z021	Scram Discharge Volume Modification
*	81Z075	High Pressure Coolant Injection/Reactor Core Isolation Cooling System Cable Separation
*	83M016	Residual Heat Removal Auxiliary Air Compressor Modification
*	80Z059	Containment Atmosphere Monitoring System
*	81Z067	Containment Atmosphere Monitoring System
*	84Z048	250 Volt Battery Charger Upgrade
*	84M057	Auto Fast Start Logic Modification to No. 11 and 12 Standby Diesel Generators

* 85Z013 Reactor Vessel Level Instrumentation
* 83Z117 Reactor Vessel Level Instrumentation
* 80M038 Change Source of Power for HPCI Flow Control Circuits

The purpose of the audit was to verify that the functional operability of the systems had not been adversely affected by the modification process by examining technical adequacy, documentation of design, as-built status, post-modification testing, and turnover to operations. As audit concerns were identified, they were assigned to one of the above categories and were then forwarded to plant staff engineering for evaluation and resolution.

The audit team concluded that the functional operability of the systems was not compromised by the modification process, that the process was effective when properly implemented, and that the 1984 changes had improved the modification process. Problem areas that were noted were with; attention to detail, organizational interfaces, temporary procedure changes, timeliness of close-out, and administrative control of modification packages. When the audit was completed 107 modification related concerns and 22 non-modification related concerns had been forwarded to the plant engineering staff for resolution. As each concern was received by the plant engineering staff, it was recorded on a special form (No. 3150, Modification Review Program Concern Tracking System) which contains provisions for characterizing the concern, evaluating potential operability impacts, equaluation for root cause and generic impact, specifying corrective actions, and requiring supervisory review and approval.

The inspector examined modification package 84M057, Auto Fast Start Logic Modification to No. 11 and 12 Standby Diesel Generator, to assess the thoroughness of the licensee's audit. No deficiencies, other than those identified by the licensee, were noted. At the time of the inspection, the plant engineering staff had addressed 79 of the 129 concerns. Of the 129 concerns, initial evaluation identified 35 potential operability impacts. These have undergone further review and all were determined not to have rendered the affected system inoperable, although in one case, supports for the the Scram Discharge Volume header required preparation of a formal "Safety Review Item" by the engineering staff with review by the Operations Committee. The inspector reviewed the 79 completed special forms (No. 3150) to assess the effectiveness of the engineering staff evaluation and resolution and made the following general and specific observations:

1) Root cause assessments were weak in several of the evaluations. The assessments were restatements of the concern rather than an explanation of why the discrepancy occurred.

2) A significant number of the concerns involved discrepancies in the as-built drawings.

3) Since this issue emerged the inspector has not able to identify any provisions in the program where the Quality Assurance audit team would review and concur in the plant engineering staff's disposition of the concerns.

4) Other than the 3150 form, which has not been proceduralized, there does not appear to be a method for tracking identified corrective actions to ensure completion.

5) The response to a concern over pipe dimensions in 83M112, Appendix J Modification, addressed potential problems with Appendix J testing and stress analysis but did not address potential seismic impacts.

6) The response to a concern over loose fasteners on a pipe support in Modification 81Z021, Scram Discharge Volume, specified the cause as vibration and retightening the nuts as a corrective action, but did not address, how to prevent recurrence or what the ramification would be if the nuts completely unthreaded.

7) The response to a concern over anchor bolt embedment and bolt hole placement in Modifications 80Z059/81Z067, Containment Atmosphere Monitoring, did not address the portion of the concern related to bolt hole placement.

8) The response to a concern over out of specification stroke times for a valve in Modification 81Z075, HPCI/RCIC System Cable Separation, addressed the technical issue of the stroke time but did not address the programmatic problem with the failure to identify and correct the problem when it occurred.

The inspector concurred with the licensee's findings that although the modification process had some problem areas, the functional operability of the affected systems was maintained and that the changes made in 1984 to the process had resulted in improvements to the conduct of modifications.

The inspector met with licensee management to discuss the observations emerging from the review:

1) The licensee agreed that some of the root cause assessments were weak. Since none of the 3150 forms had final approval, root cause assessments would be carefully reviewed for accuracy before final signature by the General Superintendent of Engineering and Radiation Protection (GSERP).

2) The licensee was aware of problems with as-built drawings prior to the audit and had in place, as part of the Configuration Management Program, an on-going effort to correct the problem.

3) Plant management stated that the corporate QA audit team would be given the opportunity to review and comment on the resolutions to the concerns; in a separate discussion the audit team leader stated that it was his intention to review the engineering resolutions.

4) The corrective actions identified on the 3150 forms would be entered in the licensee's plant item tracking system to ensure completion.

5) The licensee noted the details of the specific observations (nos. 5, 6, 7, and 8 above) and agreed that further review was needed to ensure proper resolution.

These observations remain open pending the issuance of the audit team's final report, disposition of all audit concerns with final sign-off by the GSERP, audit team concurrence with the engineering dispositions, and completion of the corrective actions specified on the 3150 forms.

b. (Closed) Unresolved Item (263/88017-02): Adequacy of Emergency Diesel Generator (EDG) Room Ventilation Damper Design.

An enforcement conference was held on the subject and is discussed at length in Inspection Report 263/88028. No violations were identified. Additional actions were committed to by the licensee. These actions will be reviewed by the inspector and the issue tracked as Open Item 263/88028-01.

c. (Closed) Open Item (263/87005-01): Core Spray Pump net positive suction head calculations.

The NRC inspection team performed a detailed review of the calculations and setpoints of the core spray pump curves. Based on a review of the licensee emergency operating procedures, technical specifications, updated safety analysis report, and various internal and BWR Owners Group memoranda, the team concluded that NPSH concerns were adequately addressed by the licensee and recommended closure.

Based on this review, this open item is closed.

3. Operational Safety Verification (71707)

a. Routine Inspection

The plant operated at near full power throughout the inspection period with the exception of one reactor scram discussed below.

The plant initiated a power coastdown on January 15, 1989 for a refueling outage commencing August 19, 1989.

The inspectors observed control room operations, reviewed applicable logs, and had 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 performed to observe plant equipment conditions; including, potential fire hazards, fluid leaks, and excessive vibrations.

The inspectors observed activities associated with the intake structure which involved clearing away debris and licensee actions taken to prevent the clogging of the intake with ice. The licensee took actions to prevent problems before they occurred. These actions included pumping water from the cooling towers to the intake to melt ice buildup and using divers to remove logs that had settled to the bottom of the trash rakes.

The inspectors also observed the execution of procedure 8142, Revision 6, "Shipping Irradiated Hardware With GA Model FSV-1 Cask." These activities were observed with particular attention paid toward plant housekeeping and the implementation of radiation protection controls.

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.

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

b. Reactor Scram

On December 16, 1988, the plant experienced a scram from 100% power. This scram occurred on day 363 of operation. The reactor scram signal initiated on the turbine control valve fast closure signal. The scram was the result of a turbine trip from a false high reactor level indication.

Actual reactor level dropped to a low of -20 inches (narrow range). The following actuations occurred when the low level (+9 inches) was reached: SBGT start; group 2 and 3 isolations. The plant was stabilized and all safety systems functioned as required.

The root cause of the scram was a false high reactor level vessel indication on the 'D' (B_2 channel) instrument. The ATWS logic was satisfied because a half scram had been inserted into the 'A' channel due to a calibration surveillance procedure. The 'B' channel tripped providing its representative half-scram during restoration of the 'C' (A_2 channel) ATWS level instrument. When the metering valve was opened, internal pressure passed across the valve

seat quickly. This caused a drop in the reference leg pressure for the associated (B_2) ATWS level instrument, reaching the high level trip point. The A_2 and B_2 reference legs share a common instrument sensing line. With the high level setpoint causing a half-scram on 'B', and the 'A' channel in half-scram for the surveillance, the ATWS high level turbine trip occurred.

The metering valve was removed and tested. With the senior resident inspector observing, the testing rig demonstrated that the metering valve was functioning improperly, reducing pressure erratically and too rapidly. The metering valve was replaced and a surveillance completed on the same day. This event will be followed by the inspector during review of the associated Licensee Event Report (LER) 263/88007.

At 1:48 pm on the same day, an operator had turned the mode switch from Refueling to Startup in an attempt to clear a rod block. The operator inadvertently made partial contact with the Run position. This action resulted in a Group 1 isolation with the reactor less than 840 psig causing a scram (no rod motion). The C05 panel individual scram indications experienced a partial malfunction wherein some of the indicator lights failed to illuminate. Licensee investigation indicated a problem with a blown fuse and limit switch operation which was resolved prior to start up. This second reportable event will be followed by the associated LER 263/88008. Both of the above events were reported to the NRC operations center within the required time requirements.

The operators starting pulling rods at 9:10 pm and the reactor was critical at 1:00 am the following morning, synchronized to the grid at 10:20 am, and reached 100% power at 5:40 pm on December 17.

No problems were encountered during the startup. The resident inspectors observed initial plant response to the scram, followed troubleshooting efforts, attended an operating committee meetings related to the scram, and observed criticality and startup.

4. Monthly Maintenance Observation (62703)

Inspectors reviewed selected maintenance activities on the Control Rod Drive (CRD) System which included the repair of a check valve on the CRD Motor Pump discharge line and the inspection and reassembly of a Nitrogen/Water accumulator replacement in the CRD system. Observations were made of the actual work being performed as well as a review of the associated paperwork and equipment used in the execution of the WRA. One potential violation was identified in this area and is documented in the following paragraphs.

a. WRA 88-08326 was initiated on December 27, 1988, to replace accumulator 02-31 which had been leaking. Licensee personnel defined the work scope as the removal of the old accumulator and the installation of a rebuilt one. The inspector performed a review of

the pedigree of the accumulators and found adequate documentation to establish the origin, quality, and condition of the accumulators.

Direct observation of Preventive Maintenance (PM) Procedure No. 4010, "Hydraulic Control Unit (HCU) Water Accumulator Overhaul", Revision 1 was performed in the maintenance shop. The inspector observed the replacement and lubrication of the gaskets, the open system inspection by a Q.C. inspector, the placement of the piston in the accumulator, and the threading and securing of the end plugs in the accumulator. Steps 24 through 26 of the procedure direct the technician to perform the following actions:

- Thread the accumulator piston insertion tool to the threads at the open end of the accumulator.
- Carefully slide the piston into the accumulator so that the seals and O-ring are contained by the inside wall of the accumulator.
- Remove the accumulator piston insertion tool from the accumulator.

The technicians and the Q.C. inspector were not aware of or know how to obtain the piston insertion tool. They failed in their efforts to locate the tool, so the Q.C. inspector performed a temporary change to the procedure wherein the two steps that referred to the installation and removal of the piston insertion tool (Steps 24 and 26) were deleted by lining them out, dating the change, noting it on the cover page of the procedure, and acquiring two signatures in accordance with the temporary change procedure (4-ACD-15.02).

Work continued on the remainder of the WRA and the new accumulator, S/N H2252, was installed for CRD 02-31. During the performance of the repair activities, rod 02-31 was fully inserted into the core thus satisfying the requirements of Technical Specification 3.3.D. Control Rod Accumulators.

The personnel involved in the maintenance activity revealed that they were unaware of the existence or need for the piston insertion tool other than it made it easier to insert the piston into the cylinder; an activity they did not appear to have much difficulty performing without the piston insertion tool.

The inspector identified two concerns from the observation of this activity: 1) Past performance of the procedure without the piston insertion tool or a temporary change being enacted: and 2) whether the tool is necessary for the proper maintenance of the equipment.

Review of the licensee's past maintenance records indicated that this section of PM #4010 had been performed at least three times in the past. These dates and the associated WRA numbers are as

follows: WRA 85-0448 performed on January 24, 1985; WRA 85-1632 on June 7, 1985; and WRA 86-5318 on April 4, 1986. Neither the inspectors nor the licensee have been able to locate or demonstrate that the tool has ever been appropriated or used.

Following the installation of the rebuilt accumulator, the licensee did perform a functional test of the accumulator wherein it was recharged with water. The functional test includes a verification that the nitrogen pressure increased to about double its initial pressure. While this test assures that the piston is free to move, it does not address the potential degradation that may have occurred to the seals and/or teflon.

The adequacy of the PM procedure is unresolved pending inspector review of the licensee's explanation for rebuilding the HCU accumulator without the piston insert tool (Unresolved Item 263/88027-01).

While discussing the procedure and past instances with the licensee, it was noted, by the licensee, that the procedure PM 4010, had the incorrect revision number on it. The procedure had been revised on April 24, 1986. The past instances of the performance of Steps 24 through 26 were not affected by this change and it appears that the change was made to revise stock numbers, and add a space to record a Radiation Work Permit (RWP) number. The inspector will verify that this typographical error is corrected.

b. Repair of No. 12 Control Rod Drive Check Valve

WRA 88-08325 was generated on December 27, 1988, against Control Rod Drive pump No. 12 discharge check valve to investigate and repair backleakage through the valve. The work package was adequate to perform the maintenance, the RWP written for the job was in order, equipment clearances were properly established and controlled, and the work observed was conducted in accordance with procedures contained in the WRA. After the valve had been repaired, the inspector observed licensee personnel placing the valve back in the discharge line. The system was inspected by QC prior to placing of the end cap over the valve to close the system. The technicians, in accordance with the WRA were to torque the end cap closed as directed by the technical manual. In order to minimize the stresses in the discharge piping, the licensee employed a torque multiplier, TM-019. During this activity the inspector witnessed licensee personnel using TM-019, with a 6" x 3" card attached to it that read "DEFECTIVE."

Further investigation revealed that the last calibration performed on TM-019 was on October 10, 1987. This tool is required to be calibrated once a year. The inspectors interest in the tool initiated a dialogue with a licensee representative where it was determined the tool had not been calibrated within the year and was on its way to the M&TE shop for a followup calibration. The torque

multiplier, which is manufactured by Snap-On Tools, indicated a multiplication factor of 3.48, well below the value of 4 that it indicates. This setting is normal for this model of torque multiplier and is a conservative bias. This calibration of the multiplication factor required maintenance personnel to return to the work area, dress out in protective clothing, and retorque the end cap to its required value.

Licensee Procedures 4 Administrative Work Instruction (AWI)-6.4.2, Rev. 0, Calibration and Control of Electrical and Mechanical Inspection, Measuring, and Test Equipment (M&TE) and 4 ACD-06.04, Rev. 5, Calibration and Control of Electrical and Mechanical Inspection, Measuring, and Test Equipment provides guidance and the requirements for controlling this equipment.

4 AWI 6.4.2, Section 6.3 states: If an instrument is found damaged or out of calibration, a "Defective Tag", shall be placed on the instrument immediately. This tool was past its calibration date, but not out of calibration. Hanging the Defective Tag on the torque multiplier simply because it was past its calibration date was not strictly in accordance with this procedure. The procedure does not address what to do with equipment that is past calibration.

4-Administrative Control Document (ACD)-06.04, Section 6.4.2 states: Either a calibration or calibration verification shall be performed at the scheduled interval or prior to use. The equipment was past its calibration date and a verification was not performed until after the use of the equipment. Section 6.7.5 states: M&TE found out of calibration shall be clearly identified with a Defective Tag and be segregated to prevent its use. The equipment was never found to be out of calibration and if the licensee maintains that it was acceptable to hang a Defective Tag on the torque multiplier, then it should of been segregated to prevent its use.

The major concern is that the licensee is not maintaining strict control of their M&TE which could easily place them in a situation where equipment that was genuinely defective could be used in the performance of maintenance activities. Discussions with the licensee indicated that all of the parties involved were aware that the torque multiplier was past its calibration date and the failure to perform a calibration prior to use was due to time and manpower requirements. This situation represents a failure to adhere to the procedures that govern the calibration of M&TE. This is a violation of 10 CFR 50, Appendix B, Criteria V. (50-263/88-027-02)

c. Replacement of Circuit Breaker 4347

In response to IEB 88-10, Molded Case Circuit Breakers, the licensee was conducting a review of installed circuit breakers in the plant to verify that they met the requirements of the USAR and design documents. During the review the licensee identified an installed circuit breaker that was non safety-related (S/R) where a S/R circuit breaker

should have been installed. The circuit breaker involved is 4347 located in motor control center (MCC) 143. The loads off of this motor control center (MCC) are the Hydrogen Oxygen analyzers, the Continuous Air Monitoring and Post Accident Sampling heat tracing, and the alarms associated with the heat tracing. Whether or not this breaker specially performs a S/R function is not clear at this point. So the licensee conservatively treats it as S/R.

The circumstances that led to the installation of the non S/R circuit breaker were as follows: On June 8, 1987, WRA 87-50078 was issued to replace breaker 4347 because a toggle broke on the installed breaker while returning MCC 143 to service. The breaker was replaced with a 40 amp breaker model No. GE THED-136040. Subsequent investigation following the discovery of this breaker revealed that the licensee had acquired this breaker as a construction spare for a modification to the Guardhouse. Between the acquisition of the non S/R breaker and its installation, the licensee computerized their stock items and the vendor superseded the original part No. GE THEF-136040, with a new number: THED-136040, the same as the part that had been ordered for a construction spare for the guardhouse modification, except the breakers ordered as replacements for THEF-136040 came with all of the required pedigree for qualification to use in a S/R application.

The licensee computerized their stock part system. When this was accomplished their were no safety-related 40 amp breakers in stock, and the non-S/R THED-136040 got inadvertently classified as being S/R. The licensee ordered spare 40 amp breakers as replacement parts on PO No. D93174MQ, requesting part no. THEF-136040. The licensee received on April 14, 1986, 3 S/R 40 amp breakers but with one difference, the vendor had changed the THEF part number to THED, the same as the non-S/R construction spare, but with the proper papers verifying their acceptability for use in S/R applications. These three S/R THED-136040 breakers were placed with the single non S/R THED-136040 in storage. When WRA 87-50078 was performed, the single non-S/R (which according to the new computer system was S/R) was taken out of stores and placed in MCC 143.

In performing the actions requested in IEB 88-10, the licensee was successful in identifying the fact that this part was not S/R, and the root cause of the error. Currently, the licensee is evaluation potential corrective action to prevent recurrence. The implications of this error on the Change over to the computerized stock parts system will be reviewed by the inspector as Open Item 263/88-027-03.

5. Monthly Surveillance Observation

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:

- Reactor High Pressure Scram Instrument Test and Calibration;
- RCIC High Steam Flow Sensor Test and Calibration, and Group 5 Isolation Valve Closure Test.
- HPCI Steam Line High Area Temperature Test and Calibration, and Group 4 Isolation Valve Closure Test.

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

6. Management Visit

On January 11, 1989, Messrs. W. L. Axelson and I. N. Jackiw visited the plant. A meeting was held with the licensee regarding the results of a Corporate Q.A. audit of completed modifications. The results presented to the NRC are discussed in Paragraph 2.a. of this report. The visit included a plant tour.

7. Exit Interview

The inspectors met with the licensee representatives denoted in Paragraph 1 at the conclusion of the inspection on January 27, 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.