U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No: 50-263/90025(DRS)

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, MN 55362 Inspection Conducted: December 17-21, 1990

Inspector: Differentian

NRR Personnel: A. Keller J. Colaccino

Approved By:

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D. H. Danielson, Chief Materials and Processes Section

Inspection Summary

<u>Inspection on December 17-21, 1990 (Report No. 50-263/90025(DRS))</u> <u>Areas Inspected</u>: Routine announced inspection of the implementation of inservice testing (IST) of pumps and valves including a review of administrative procedures, performance of testing, implementing procedures, program documents and licensee initiated quality assurance audits (73756); also a review of licensee action on previously identified items (92702). <u>Results</u>: Non-cited violations were identified in Paragraphs 3.b.(1)-(6) and 3.d. Based on the results of the inspection, the NRC inspectors also noted the following:

The administrative control document governing the conduct of IST was comprehensive, clear, and defined responsibilities for individuals. The licensee's staff was technically competent and professional. These items were considered strengths.

As noted in Paragraph 3, several IST program deficiencies were identified including: Failure to establish controls for the required five minute pump run times; failure to request relief from the ASME Code, Section XI, for deviating

from the required methods of measuring vibration, bearing temperatures, and use of reference values; inadequate HPCI pump testing procedure; and the failure to follow procedures. These deficiencies did not result in significant adverse technical problems.

DETAILS

Persons Contacted

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3.

Northern States Power Company (NSP)

*W. Hill, Plant Manager

*M. Brant, Site Superintendent; Operations

*T. Harlan, Superintendent, Materials Engineering

*K. Skillingstad, Supervisor, Technical Services

*T. Pickens, Principal Licensing Engineer

*T. Cass, Nuclear Safety and Technical Services Engineer

*D. Carstens, Operations Engineering

*B. Day, General Superintendent, Engineering and Radiation Protection

*S. Hammer, Superintendent, Operations Engineering

*P. Tobin, Senior Production Engineer

*A. Wojchouski, Lead Production Engineer

*L. Wilkerson, Acting Superintendent, Quality Engineering

U. S. Nuclear Regulatory Commission (NRC)

*S. Ray, Senior Resident Inspector

*Denotes those present attending the exit interview on December 21, 1990.

The NRC inspectors also contacted other licensee personnel during the course of the inspection.

Licensee Action on Previously Identified Items (92702)

(Closed) Violation (50-263/87005-33): Failure to implement the IST Pump and Valve program per the ASME Code. Specific concerns identified as part of this violation were addressed by the licensee in the course of work performed to address Generic Letter (GL) 89-04 "Guidance on Developing Acceptable IST Programs." Vibration measurements for the pumps in the program were taken in velocity units, and testing was performed in accordance with the Code, except for those problems noted in Paragraph 3 of this report. Additionally, valves CST-104-1 and CST-96 were in the licensee's IST program and tested as required. Position indication testing (PIT) was also performed for valves with remote position indicators. Therefore, this item is considered closed.

Pump and Valve IST Program Implementation (73756)

The Monticello IST program was based on the requirements of the ASME Code and the guidance provided in GL 89-04. licensee recently revised the IST program to conform with The

the guidance provided in GL 89-04. IST of pumps and valves was implemented through the use of surveillance tests performed as required by the Code.

Conduct of IST was administered by the licensee through the use of Administrative Control Document (ACD) 4 AWI-05.04.01. This ACD assigned specific responsibilities to persons or organizations for its implementation. The ACD provided detailed guidance for the various aspects of IST including the guidance provided in GL 89-04. The comprehensive ACD was considered a strong point of the licensee's IST program.

a. <u>Valve Testing Program</u>

In the introduction to the valve testing section of the Monticello IST Program is a reference to using baseline values to compare stroke time data. This was a deviation from ASME Code IWV-3400, but was considered to be a better method to evaluate a change in valve performance. GL 89-04 provides a vehicle for using this Code deviation for valves with normal stroke times of less than ten seconds without submitting a relief request, but this should be noted in the program either as a relief request pre-approved by GL 89-04 or as a note in the introduction without the words "requests relief." Valves with normal stroke times greater than ten seconds are not addressed in GL 89-04 and therefore require an evaluated and approved relief request for implementation of the baseline method of evaluation.

The NRC inspectors noted that the licensee had established baseline values of stroke times and specified the alert ranges and limiting values of stroke time. These values were noted in the licensee's surveillance procedures and in the ACD.

The licensee agreed that the program would be revised to more clearly reflect their practice for valves where a baseline would be established to compare stroke time data and determine component operability.

Pump Testing Program

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The licensee's program had been approved, subject to conditions, in GL 89-04. The NRC inspectors reviewed various procedures, completed surveillances, and the program/relief requests for pumps in the licensee's IST program to determine the extent to which the licensee was following the guidance provided in GL 89-04. The following observations were noted.

(1) <u>Duration of Tests</u>

In order to allow for pump data to be taken in a consistent manner, the ASME Code, IWP-3500, "Duration of Tests," requires pumps to be run at least five minutes under conditions as stable as the system permits prior to recording the quantities specified. The licensee's ACD specified only a two minute run time prior to recording data. The NRC inspectors reviewed procedures and noted that some pumps in the IST program were tested with no controls on establishing a run time. Generally, from a review of completed surveillances, the actual run times during IST could not be established. This is contrary to the requirements of IWP-3500, "Duration of Test," and is considered a violation. Additionally, the licensee did not request relief from this requirement. The licensee's personnel indicated that they were using the run time specified in ASME OM-6, even though the IST program was not based on ASME OM-6. The licensee initiated corrections to the ACD and all pump procedures to reflect the requirements of IWP-3500.

(2) <u>Vibration and Bearing Temperature Relief Requests</u>

Table IWP-3100-1 "Inservice Test Quantities" illustrates the quantities that are to be measured or observed during a pump test. Quantities specified include the vibration amplitude and bearing temperature. The units for measuring vibration specified by the Code are mils. The IST program at Monticello uses units of velocity to measure vibration with ASME OM-6 as the standard for the allowable ranges of vibration, and does not measure bearing temperatures. Although these alternatives are generally acceptable to the NRC, a request for relief from the Code requirements must be submitted as required by 10 CFR 50.55a(g). The licensee had not submitted a relief request to NRC; instead the testing philosophies were only noted in the program and therefore this issue was considered a violation of 10 CFR 50.55a(g). The licensee stated that relief requests would be submitted to the NRC.

(3) <u>Pump Reference Curves</u>

The Monticello Pump Testing Program Section 3.2.3, specifies conditions in which generating multiple



sets of reference values are allowed to "more fully describe pump hydraulic condition." Based on discussions with the licensee, the NRC inspectors noted that IWP-3112, "Inservice Test Procedure to Establish an Additional Set of Reference Values," was interpreted by the licensee to allow a pump "reference curve" to be generated in order to evaluate pump condition. This method has been used for the four Emergency Service Water (ESW) pumps and two Combustible Gas Control System (CGCS) pumps for approximately two years. According to the licensee, neither of these systems can be throttled during testing. Monticello pump IST procedures call for the pump flow to be measured and the resulting differential pressure to be recorded for comparison with the limits established based on the reference curve. The pump reference curve was generated using approximately 20 test points and would be regenerated if a reference value or set of values may have been affected by repair or routine pump maintenance. There was no test procedure written to generate the pump reference curve.

The intent of Section IWP-3112 was to allow licensees to establish more than one set of reference values. However, when IST is performed on these pumps, the resistance of the system should be varied until the measured parameter established during the test compares directly to the corresponding reference value. Monticello's use of pump reference curves allows interpolation between reference points versus establishing repeatable reference values. This is contrary to the requirements of IWP-3100 and is therefore considered a violation of 10 CFR 50.55a(g). In order to deviate from Code requirements, a request for relief must be submitted to the NRC justifying the use of pump reference curves for each pump where it would be used. In addition, the NRC inspectors noted that procedures or guidance establishing a method to generate the curves should be created and implemented. The licensee stated that relief requests would be submitted for the pumps where a reference curve was established.

(4) <u>Justification for Vibration Measurement When Using</u> <u>Pump Reference Curves</u>

Since pumps using reference curves for IST will not require generating repeatable test points, vibration data may not necessarily be taken at the same performance point during subsequent testing. Based on this fact, Monticello should supply justification of the vibration acceptance criteria used for each pump when the reference curve method is used; however, the NRC inspectors found no justification. The NRC inspectors recommended that Monticello aggressively pursue a good IST procedure, that is, establishing a repeatable reference point for both vibration testing and flow testing of pumps.

(5) <u>Pump Test Ranges</u>

Section 3.2.2 of the Monticello Pump Testing Program states that the upper pump flow and differential pressure (dp) allowable ranges would be 105 percent of the reference value for the alert range and 107 percent of the reference value for the required action range for all pumps in the program. Table IWP-3100-2, "Allowable Ranges of Test Quantities," specifies that the alert range is from 1.02 to 1.03 times the reference value. When valves are greater than 1.03 times the reference value action is required. The licensee indicated that the intent of raising these ranges was to allow for acceptable variations in pump performance, if it was noted (the point where the pump has degraded, but would still operate within the design basis). However, expanding ranges for all pumps is not acceptable. Justification would be necessary for each case where an expanded range was to be implemented.

A review of trend data for the High Pressure Coolant Injection (HPCI) pump yielded a pump dp Value of 104 percent of the reference value in January of 1990, which is above the 103 percent required action range currently specified in Table IWP-3100-2. The licensee did not take any action because per their pump IST program, the alert range was 1.05. Monticello also indicated that the increased ranges were justified because they were below the upper ranges specified in ASME OM-6.

The licensee should not alter their IST program in anticipation of changes in the Code unless relief is requested. Also, inaccuracy of instrumentation shall not be deemed as justification for expansions of pump test ranges. The licensee stated that the current Code specified ranges would be implemented.

(6) <u>HPCI Pump Testing</u>

IWP-3100 "Inservice Test Procedure" states that IST shall be conducted with the pump operating at nominal motor nameplate speed or at a speed adjusted to the reference speed for variable speed drives. The resistance of the system shall be varied until either the measured flow rate or differential pressure equals the corresponding reference value, and then the other quantities measured.

The surveillance procedure currently used by the licensee did not accomplish IST in accordance with the method specified in IWP-3100. Both flow and dp were established and verified to be within the acceptable ranges by the current procedure revision used by the licensee, versus establishing the d/p and measuring the flow. The consequence of performing testing by the licensee's current procedures is that system degradation and trending are not readily discernable. This failure to perform IST as required by IWP-3100 without a relief request is a violation of 10 CFR 50.55a(g). Operability of the system; however, was demonstrated satisfactorily by the licensee's test.

The licensee was exploring other test methods to perform a satisfactory inservice test and estimated that a revised test procedure would be implemented within two months from the date of this inspection.

Pump Relief Requests PR-1 and PR-4

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Relief Request PR-1 involves the licensee's request for relief from measuring pump inlet pressures and their justification and alternative test for the ESW, Residual Heat Removal Service Water (RHRSW), and the Standby Liquid Control (SLC) pumps. The licensee has revised the test method for the SLC pumps contrary to the method described in the current revision of the IST program. The NRC inspectors informed the licensee that Relief Request PR-1 needed to be updated to reflect the current test method and resubmitted to the NRC for approval. The licensee stated that Relief Request PR-1 would be updated to reflect current test methodology. This was acceptable to

the NRC inspectors.

PR-4 was submitted by the licensee to request relief from the requirements of IWP-3100 to observe the lubricant level for all pumps during IST. The NRC inspectors informed the licensee that this relief was inappropriate because the surveillance procedures reviewed by the NRC inspectors already required the personnel performing the test to verify the lubricant level. However, this does not preclude the licensee from submitting relief requests if a specific problem exists. The licensee stated that relief request PR-4 would be removed from the program.

c. <u>Completed Surveillance Review</u>

The NRC inspectors reviewed procedures and completed surveillances to evaluate the licensee's program implementation adequacy and effectiveness. The following procedures and completed surveillances were reviewed:

Core Spray System test Nos. 0255-03-IA-1 (Monthly Valve Test) and 0255-03-III (Monthly Pump Test) both completed January 26, 1989, and February 23, 1989.

Emergency Service Water test No. 0255-11-IA6 completed February 5, 1990, May 8, 1989, and February 6, 1989.

Combustible Gas Control System "B" test No. 0255-21-III-2, completed January 24, 1990.

Emergency Service Water #14 pump flow test 0255-11-III-4 performed February 5, 1990.

The reference values for pumps were recorded in the procedures. Acceptance criteria for pumps and valve operability determinations were also a part of the procedures. Acceptance criteria for the allowable ranges of the test parameters were adequate and the recorded values of the appropriate measured pump parameters and of valve stroke times were within acceptable levels. Pump run times were not documented in the procedures (see Paragraph 3.b(1)).

d. <u>Test Observation</u>

The NRC inspector witnessed the performance of tests 0255-10-IA-1, 5, and 0255-24-IA-3, "Primary Containment

Isolation Valve Exercise." The purpose of the surveillance was to demonstrate the operational readiness of primary containment isolation valves associated with the Primary Containment Nitrogen and Atmospheric Control Systems. The work was performed in a professional manner and the operations staff was knowledgeable. However, the following observations were noted.

The surveillance consisted primarily of valve stroke time tests. The surveillance procedure stroke timed the valves, had acceptable bands for stroke times, and a limiting stroke time for valve operability specified. If a valve stroke time fell out of the acceptable band, it was the responsibility of the operator performing the test to notify the shift supervisor, who would declare the valve inoperable. At one point in the test, the operator stroked a valve several times because the valve light indication did not show that the valve completed its stroke. That is, when the valve was being stroke timed from the open to the closed direction, both lights remained illuminated. After repeated strokes, the valve operated properly. The operator took actions to ensure that maintenance was initiated on the valve to investigate the problem. However, the shift supervisor was not informed of the problem after the valve failed its stroke initially. The shift supervisor should have been notified immediately that the valve was not operating properly, and then corrective action taken. The failure to notify the shift supervisor after the initial failure does not support the timely determination criteria specified in the licensee's program and the procedure. The failure to make an operability determination as required by the licensee's procedures is considered a violation of 10 CFR 50, Appendix B, Criterion V. The licensee discussed the matter with the involved personnel and drafted a memorandum regarding the need to notify the shift supervisor of any discrepancy encountered during surveillance testing. Plans were being developed to provide operators additional training in the area of IST. The failure to follow the requirements of the IST program has been adequately addressed.

During the test, the NRC inspectors questioned frequent indicating light problems. Following a valve stroke to the open position from the normally closed position and then back to the closed position, the green indicating light failed on several different valves. The licensee could not provide an immediate justification for the numerous indicating light failures, but stated that in

the event of an accident, there were alternative means of determining valve positions, if the indicating lights were lost. The NRC inspectors noted that not all indicating lights had alternate control room. indication and that it appeared that an underlying problem still existed. The licensee stated that an evaluation of the excessive loss of light indication to determine if a voltage problem existed would be performed. The NRC inspectors were concerned that light indication failures in the control room, during critical periods where they are needed, could have adverse effects on the safe operation of the plant and that the problem should have been addressed before being observed by the NRC inspectors. The review of the light indication failures to determine the appropriate corrective action will be considered an unresolved item (50-263/90025-1).

The foregoing discussions provided in Paragraphs 3.b.(1)-(6)illustrate examples of violations of various requirements of the ASME Code, Section XI and 10 CFR 50.55a(g). Additionally, an example of a failure to follow procedures was noted in Paragraph 3.d. The licensee initiated actions to correct the conditions at the time of the inspection and in general, no deleterious technical consequences resulted. As a result, no Notice of Violation is being issued in accordance with 10 CFR 2, Appendix C, Section V. However, the combination of all the noted problems was indicative of a weak IST program.

Unresolved Items

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Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. An unresolved item disclosed during the inspection is discussed in Paragraph 3.d. of this report.

Exit Meeting

The inspectors met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on December 21, 1990, to discuss the scope and findings of the inspection. In addition, the inspectors discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents or processes as proprietary.