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Licensee: Northern States Power Company
Plant Unit(s) and Docket No(s): Prairie Island 1 (05000282)
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Project Title:

L-PI-24-048 Prairie Island Nuclear Generating Plant (PINGP) Unit 1 Inservice Testing Proposed Alternative RR-10

Request Type:

10 CFR 50.55a(z)(2)

Inservice Inspection (ISI) or Inservice Testing (IST)

Inservice Testing (IST)

Requested Completion Date:

November 04, 2024

Proposed Alternative Number or Identifier:

IST Fifth Interval RR-10

Brief Description of Proposed Alternative

Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), hereby requests NRC authorization of this 10 CFR 50.55a alternative for the Prairie Island Nuclear Generating Plant (PINGP) Unit 1. The proposed alternative is to defer the quarterly and post-replacement testing of certain valves in the Auxiliary Feedwater (AFW) system until startup following the current refueling outage when plant conditions support performance of the tests.

This request makes no new commitments or changes to existing commitments.

Proposed Duration of Alternative (in terms of ISI/IST Program Interval with Start and End Dates):

The duration of this request will continue in the IST Fifth Interval until startup testing from the fall 2024 Unit 1 refueling outage is complete, which is scheduled for November 22, 2024.

Applicable ASME Code Requirements

ISTC-3310 Effects of Valve Repair, Replacement, or Maintenance on Reference Values. When a valve or its control system has been replaced, repaired, or has undergone maintenance that could affect the valve's performance, a new reference value shall be determined or the previous value reconfirmed by an inservice test run before the time it is returned to service or immediately if not removed from service. This test is to demonstrate that performance parameters that could be affected by the replacement, repair, or maintenance are within acceptable limits.

ISTC-3510 Exercising Test Frequency. Active Category A, Category B, and Category C check valves shall be exercised nominally every 3 months, except as provided by ISTC-3520, ISTC-3540, ISTC-3550, ISTC-3570, ISTC-5221, and ISTC-5222. Power-operated relief valves shall be exercise tested once per fuel cycle.

ISTC-3521 Category A and Category B Valves.

(a) full-stroke exercising of Category A and Category B valves during operation at power to the position(s) required to fulfill its function(s).

ISTC-3522 Category C Check Valves. Category C check valves shall be exercised as follows:

(a) During operation at power, each check valve shall be exercised or examined in a manner that verifies obturator travel by using the methods in ISTC-5221.

ISTC-3560 Fail-Safe Valves. Valves with fail-safe actuators shall be tested by observing the operation of the actuator upon loss of valve actuating power in accordance with the exercising frequency of ISTC-3510.

ISTC-3570, Valves in Systems Out of Service. For a valve in a system declared inoperable or not required to be operable, the exercising test schedule need not be followed. Within 3 months before placing the system in an operable status, the valves shall be exercised and the schedule followed in accordance with requirements of this Subsection.

ISTC-5131 Valve Stroke Testing.

(a) Active valves shall have their stroke times measured when exercised in accordance with ISTC-3500.

ISTC-5221 Valve Obturator Movement.

(a) The necessary valve obturator movement during exercise testing shall be demonstrated by performing both an open and a close test.

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(2) Check valves that have a safety function in only the open direction shall be exercised by initiating flow and observing that the obturator has traveled either the full open position or to the position required to perform its intended function(s) (see ISTA-1100), and verify closure.

Applicable American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPV Code), or ASME Operation and Maintenance of Nuclear Power Plants (OM Code), Edition and Addenda

ASME OM Code 2004, 2006 Addenda

Current ISI or IST Program Interval Number and Start/End Dates

Fifth IST Interval; started December 21, 2014, with the ten-year interval ending December 20, 2024, and a planned 12-month extension to December 20, 2025.

Applicable ASME Code Components and/or System Description

The AFW System supplies feedwater to the steam generators during normal transients, such as startups and shutdowns when the Main Feedwater System is not available. Each train can supply auxiliary feedwater to either or both steam generators as determined by the valve lineup. The capacity of the AFW System prevents the steam generators from boiling dry or the pressurizer relief and safety valves from lifting following a blackout or plant trip.

The AFW System provides three essential functions during abnormal conditions:

- a.) prevents thermal cycle of the steam generator tube sheet upon loss of main feedwater pump;
- b.) removes residual heat from the reactor coolant system until the reactor coolant system (RCS) temperature drops below 300-350 °F and the residual heat removal (RHR) system is capable of providing the necessary heat sink;
- c.) maintains a head of water in the steam generator following a loss of coolant accident.

The applicable components and their function/operation are as follows:

The 11 TDAFWP Main Steam Supply Control Valve, CV-31998, is a Category B air operated valve that must reposition for the Turbine-Driven AFW Pump (TDAFWP) to start and provide design basis flow.

The 11 TDAFWP Recirculation/Lube Oil Cooling Control Valve, CV-31153, is a Category B air operated valve that must open on automatic signals to allow recirculation flow to the lube oil coolers.

The 11 TDAFWP Recirculation Lube Oil Cooling Line Check Valve, AF-28-1, and the 12 Motor-Driven Auxiliary Feedwater Pump Recirculation Lube Oil Cooling Line Check Valve, AF-28-2, are Category C check valves that must

open to provide a minimum recirculation flow path to protect the associated pump from overheating during low flow conditions. AF-28-1 and AF-28-2 do not have safety functions in their closed positions. Note that the PINGP Fifth Interval IST Program IST Valve Data Sheets contain a documentation error indicating AF-28-1 and AF-28-2 have safety functions in the closed position. This error is documented in the PINGP Corrective Action Program.

Reason for Request

The valves subject to this request are tested per ISTC-3510 every 92 days including grace period allowed by Code Case OMN-20 as authorized by the NRC with PINGP Fifth Interval IST Program Relief Request RR-06 (References 3 and 4). The tests (last conducted July 18, 2024) will become overdue for testing on November 10, 2024 (92 days plus OMN-20 grace), during the refueling outage; however, the AFW system will be out of service at that time. These valves are normally tested at power and are not required to be tested during cold shutdowns or refueling outages. Testing AF-28-2, CV-31153, and CV-31998 per ISTC-3570 prior to declaring the AFW system operable would result in a hardship or unusual difficulty without a compensating increase in quality and safety as described herein. Post-replacement testing of AF-28-1 per ISTC-3310 prior to declaring the AFW system operable would result in a hardship or unusual difficulty without a compensating increase in quality and safety as described herein.

Full Description of Proposed Alternative

The proposed alternative is to extend the ISTC-3310 and ISTC-3570 required test interval for the subject valves until startup testing from the fall 2024 refueling outage is complete, which is scheduled for November 22, 2024. CV-31153, CV-31998 will be tested in accordance with ISTC-3521(a), ISTC-5131(a), and ISTC-3560 after Unit 1 reaches MODE 3 and conditions that support testing using normal test procedures. AF-28-1 will be replaced in the refueling outage and will be tested in accordance with ISTC-3310 upon reaching normal plant conditions for testing after Unit 1 reaches MODE 3. AF-28-2 will be tested in accordance with ISTC-5221(a)(2) after Unit 1 reaches MODE 3.

Description of Basis for Use

As detailed below, compliance with the specified requirements of the applicable OM Code sections for the affected components prior to Unit 1 reaching MODE 3 and declaring the AFW system operable would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

NSPM reviewed maintenance and testing history of the subject valves since 2018 (3 refueling outages excluding the current Unit 1 2024 refueling outage) and found:

For CV-31998, 11 TDAFWP Main Steam Supply Control Valve, seat leakage was identified in October 2020. A valve and actuator overhaul was performed in October 2022. The valve and actuator were repaired and tested satisfactorily. All subsequent testing has been satisfactory.

For CV-31153, 11 TDAFWP Recirculation/Lube Oil Cooling Control Valve, no maintenance has been performed and all testing has been satisfactory.

The quarterly test of the 11 TDAFWP Main Steam Supply Control Valve, CV-31998, is normally performed with high pressure steam. The actuator pressure is reduced at lower steam conditions to prevent valve seat damage.

The 11 TDAFWP Recirculation/Lube Oil Cooling Control Valve, CV-31153, is interlocked to actuate in tandem with CV-31998. New test equipment or plant modifications to provide motive force to the TDAFWP would be required to perform testing of the air operated valves prior to unit startup. As a result, testing per ISTC-3570 would result in a hardship without a compensating increase in the level of quality and safety.

For check valves AF-28-1 and AF-28-2, all testing has been satisfactory since 2018. In 2023, NSPM replaced AF-28-2 at its regularly scheduled preventative maintenance frequency. Subsequent quarterly open and closure tests have been satisfactory .

AF-28-1 is scheduled to be replaced in 2024 during the Unit 1 refueling outage due to results of a 2012 inspection that found that the disc/spring were in good condition, but that the valve seats were degraded. Return to service testing includes open and closure tests, which cannot be performed until Unit 1 is in MODE 3 without a system modification and/or special test equipment/procedures. Returning Unit 1 to MODE 3 requires the AFW system to be operable per the PINGP Technical Specifications.

Testing of the check valves in cold shutdown prior to declaring the AFW system operable would require removal of small sections of piping to create a test connection point or utilizing a cross-tie to Unit 2 and elevating the risk of the operating unit. These test methods would result in a hardship without a compensating increase in the level of quality and safety.

Include Any Additional Information

Precedents

References

1. ASME OM Code 2004, 2006 Addenda
2. Prairie Island Nuclear Generating Plant ASME Inservice Testing Program
3. NSPM Letter L-PI-14-015, 10 CFR 50.55a Requests RR-01, RR-03, RR-05, RR-06 and RR-07 Associated with the Fifth Ten-Year Interval for the Inservice Test Program, dated April 9, 2014. (ADAMS Accession Number ML14099A283)
4. NRC Letter re: Prairie Island Nuclear Generating Plant, Units 1 and 2 – Relief Requests for Fifth 10-Year Inservice Testing Program Interval (TAC Nos. MF3928 and MF3929), dated December 5, 2014. (ADAMS Accession Number ML14329A185)

Attachments