

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
OFFICE OF NEW REACTORS
WASHINGTON, DC 20555-0001

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NRC INFORMATION NOTICE 2019-03: INADEQUATE IMPLEMENTATION OF
CLEARANCE PROCESSES RESULTS IN
CONFIGURATION CONTROL ISSUES

ADDRESSEES

All holders of an operating license for a nonpower reactor (i.e., research reactor, test reactor, or critical assembly) under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," except those that have permanently ceased operations.

All holders of an operating license or construction permit for a nuclear power reactor under 10 CFR Part 50, except those that have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

All holders of and applicants for a combined license under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants."

PURPOSE

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice (IN) to inform addressees of several recent events in which operators failed to ensure the proper implementation of plant processes governing clearance activities that resulted in configuration control issues that affected the operability of safety-related systems. The NRC expects that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar issues. However, the suggestions in this IN are not NRC requirements; therefore, no specific action or written response is required.

DESCRIPTION OF CIRCUMSTANCES

Cooper Nuclear Station

On September 29, 2016, during planned maintenance on the Division 1 residual heat removal (RHR) system during a scheduled refueling outage at Cooper Nuclear Station, the RHR minimum flow isolation valves were danger-tagged in the closed position, as required by a clearance order.

On October 7, 2016, when the clearance order was lifted, licensee personnel failed to reposition the RHR minimum flow isolation valves for RHR pumps A and C to the open position before reinstalling the valve sealing devices. The clearance order directed that the valves be repositioned to open, then sealed in the open position as part of restoration to reduce the chances that the valves could be inadvertently shut. The clearance order also required a

second, independent verification of the valve restoration. Both the individual responsible for repositioning and sealing the valves, and the individual responsible for verifying the valve position, confirmed through their signatures that the rising-stem manually operated valves were sealed in the open position.

A quarterly sealed valve audit conducted from November 23–29, 2016, verified that the seals on the valves were correctly installed. However, the procedure did not require verification of the position of the valves; it only required verification that the seals were intact. The incorrect position was not noted at the time. On February 5, 2017, during the next quarterly sealed valve audit, the operator performing the audit noted that the position of the rising stems indicated that the valves appeared closed and notified the control room. Personnel were directed to reposition the valves and seal them open, restoring operability of the Division 1 RHR system.

The licensee determined that the affected pumps had been operated 15 times while the minimum flow line was isolated and that the longest time any pump was continuously operated in this condition was 2 minutes and 18 seconds. After demonstrating satisfactory performance of the affected pumps using the 2-year comprehensive surveillance test procedure and performing a detailed analysis of the 2-year comprehensive surveillance data by comparing test results from October 2007 through February 6, 2017, the licensee's evaluation of operability concluded that the Division 1 RHR pumps had not degraded.

The NRC chartered a special inspection in response to this event and identified a noncited violation of technical specification requirements for the operability of the emergency core cooling system. Cooper Licensee Event Report 05000298/2017-001-01, "Residual Heat Removal Minimum Flow Valves out of Position Results in Loss of Safety Function and Condition Prohibited by Technical Specifications," Revision 1, dated December 15, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17354A150), and NRC Special Inspection Report 05000298/2017009, dated June 27, 2017 (ADAMS Accession No. ML17179A282), provide further details on this event.

Clinton Power Station

During a scheduled refueling outage at Clinton Power Station, the licensee hung tags under several clearance orders, including on the Division 2 emergency diesel generator (EDG) and associated support systems, for planned work on the 1B1 electrical bus. On May 9, 2018, one of the clearance orders, which included the Division 2 EDG air receiver isolation valves, was completed, with instructions to remove tags and restore the systems involved to standby status. However, a note in the control room log stated that system restoration was not completed and needed to be performed after other ongoing work associated with the Division 2 shutdown service water system was finished. The clearance order was closed out with only the control room log entry tracking the abnormal (closed) position of the Division 2 EDG air receiver isolation valves.

The following day, a control room operator directed a portion of the clearance order for the EDG system restoration procedure to be completed to restore the Division 2 EDG lubrication system. The operator who directed the restoration turned over the shift before completion of the activity. When the partially completed restoration procedure was returned to the control room, the new control room operator incorrectly believed that all restoration activities for the Division 2 EDG had been completed and declared the EDG operable early on May 11, 2018.

Three days later at 12:30 a.m. on May 14, 2018, the Division 1 EDG was declared inoperable for scheduled maintenance on the 1A1 electrical bus. At this point, with the Division 2 EDG air receiver isolation valves still in the closed position, both EDGs were inoperable. Had a loss of offsite power event occurred, an immediate station blackout event would have taken place. The impact would have been mitigated by the availability of diverse and flexible coping strategies (FLEX) equipment, the smaller Division 3 EDG that could have been cross-tied to selected Division 2 loads, and two diesel-driven fire pumps that could have worked in conjunction with safety relief valves to provide feed-and-bleed cooling to the reactor core if necessary.

The licensee discovered the out-of-position air receiver isolation valves on the Division 2 EDG during shift rounds on May 17, 2018. It restored the valves to the open position and declared the EDG operable at 9:04 p.m. that evening.

The NRC chartered a special inspection in response to this event and identified a violation of Criterion V, "Instruction, Procedures, and Drawings," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50 and the technical specification requirements for EDG operability. Clinton Licensee Event Report 05000461/2018-002, "Division 2 Diesel Generator Inoperability due to Air Receiver Remaining Isolated Following Clearance Removal Resulting in Unplanned Shutdown Risk Change," dated July 16, 2018 (ADAMS Accession No. ML18199A106); NRC Special Inspection Report 05000461/2018050, dated August 23, 2018 (ADAMS Accession No. ML18235A170); NRC Inspection Report 05000461/2018051, dated November 6, 2018 (ADAMS Accession No. ML18311A151); and NRC Inspection Report 05000461/2018092, dated April 1, 2019 (ADAMS Accession No. ML19092A212), provide further details on this event.

Watts Bar Nuclear Plant, Unit 1

On July 21, 2018, the licensee for Watts Bar Nuclear Plant performed work to repair a leak on a 7.6-centimeter (3-inch) pipe in the high-pressure fire protection (HPFP) system. Before beginning the work, the licensee generated a clearance order to isolate and tag out the affected portion of the system. The "Remarks" section of the clearance order specified a drain valve and two vent valves that were to be used to drain that portion of the system; however, the valves were not written into the tagging portion of the clearance order. Therefore, the order did not assign any information or danger tags to these valves. Licensee personnel attempting to drain the piping found that the valves identified on the clearance order were insufficient for the task. Additional drain locations were identified through an e-mail from the fire marshal, and they proved adequate for draining the system. However, the clearance order was not modified to identify these additional drains.

After completing the pipe repair, the licensee restored the system based on the tags identified in the clearance order. The licensee personnel responsible for restoration did not recognize that either the drain or vents identified in the "Remarks" section of the clearance order or the drains identified in the fire marshal's e-mail were still open. As a result, the clearance order was released with these components still open. As the HPFP system was returned to operation, water discharged through the open vent and drain paths and flooded portions of the Unit 1 auxiliary building and the Unit 1 auxiliary equipment building.

The flooding caused the annunciation of alarms in the control room from (1) high sump levels, (2) erratic indications to the source range and intermediate-range nuclear instruments caused by water intrusion to electrical equipment associated with the instruments, and (3) grounds on the Unit 1 vital battery boards. The licensee isolated the affected portions of the HPFP header,

performed walkdowns to identify potentially affected equipment, and evaluated the continued operability of the equipment.

The event resulted in a noncited violation of technical specification requirements for implementing procedures. NRC Integrated Inspection Report 05000390/2018003 and 05000391/2018003, dated November 1, 2018 (ADAMS Accession No. ML18308A007), provides further details.

DISCUSSION

Operability of systems required by plant technical specifications depends on operator awareness of the current configuration of system components to ensure compliance with the plant-specific licensing basis. Plant procedures that govern clearance activities allow for the systematic isolation, tagging, and subsequent restoration of components and systems for maintenance and testing activities. Performing these activities in a deliberate manner establishes an instrumental administrative barrier that helps to ensure the safety of plant personnel by providing proper isolation of high-energy systems and ensuring the operability of equipment relied on for safe plant operation.

The events described above illustrate how the clearance process can break down. Valve manipulations outside the documented scope of work, inadequate communications during the turnover of ongoing work across multiple shifts, actions taken based on assumptions made without adequate verification, and informal methods of tracking abnormal component configurations on systems with the ability to impact safety were contributing factors to these events. Rigorous adherence to process requirements for tracking components in an abnormal configuration, even when current plant conditions allow such a configuration, helps maintain awareness for potential impacts to operability and facilitates communication for work that continues across multiple shifts.

CONTACT

This IN requires no specific action or written response. Please direct any questions about this matter to the technical contacts listed below or to the appropriate NRC Office of Nuclear Reactor Regulation (NRR) project manager.

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Note: NRC generic communications may be found on the NRC public Web site,
<http://www.nrc.gov>, under NRC Library.

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