

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION  
WASHINGTON, D.C. 20555-0001

April 4, 1997

**NRC INFORMATION NOTICE 97-16: PRECONDITIONING OF PLANT STRUCTURES,  
SYSTEMS, AND COMPONENTS BEFORE ASME  
CODE INSERVICE TESTING OR TECHNICAL  
SPECIFICATION SURVEILLANCE TESTING**

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to the potential for maintenance activities performed before surveillance testing ("preconditioning" or "grooming") to adversely affect the validity of the surveillance test results for structures, systems, and components (SSCs or equipment). It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Background

The NRC has had a longstanding concern about unacceptable preconditioning or grooming of various SSCs before the performance of Technical Specification (TS) surveillance tests or testing required by the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (the ASME Code) and the adverse effect such activity might have on the validity of the test results.

Description of Circumstances

In recent years, inspection findings and notices of violation have revealed that licensees are performing unacceptable preconditioning activities. The following examples are summaries of inspection findings; additional details on each example can be found in the referenced inspection reports.

**Circuit Breakers**

NRC Inspection Report (IR) 50-298/94-16 (Accession No. 9409150141) for Cooper Nuclear Station identified that electrical loads were removed from a number of 480-volt circuit breakers before surveillance testing was performed. The NRC staff identified this as an

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example of unacceptable preconditioning, a concern addressed in NRC Confirmatory Action Letter issued on July 1, 1994. This concern formed part of the basis for a Severity Level III violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," issued on December 12, 1994 (Accession No. 9412140006). In addition, IR 50-298/94-16 discussed a surveillance procedure that contained instructions requiring technicians to inspect, clean, and lubricate several breakers before performing the "as-found" testing of several breaker functions. Since these functions (e.g., trip force of the operating mechanism, undervoltage trip, time delay attachments, etc.) could have been affected by the cleaning and lubrication, the test results did not represent the as-found condition of the breakers.

In NRC IR 50-298/94-31 (Accession No. 9506280604) for Cooper station, the NRC staff evaluated the effectiveness of the licensee's corrective actions in response to the preconditioning issues identified in IR 50-298/94-16. In order to address this violation, the licensee had reviewed over 6,400 procedures, including maintenance procedures, and found approximately 168 procedures that contained potential preconditioning activities. The inspectors verified that the licensee had revised these procedures to address these concerns.

#### **Emergency Diesel Generators**

NRC IR 50-315/316-95010(DRP) (Accession No. 9511280025) for D.C. Cook identified that the licensee's policy was to use the air start system to turn over (roll) the emergency diesel generator (EDG) crankshafts with the cylinder petcocks open to purge (blow down) any accumulated water or oil before the surveillance test was performed. Since this activity was performed to prevent potential damage caused by hydrolocking during the surveillance test starts, the safety benefit of rolling the diesels outweighed the benefit of testing in the as-found condition. However, the staff was concerned that air start valves were used (unnecessarily) to roll the EDGs when this activity could have been performed manually by "barring over" the crankshaft. Barring over the crankshaft would have avoided the possibility of preconditioning the air start valves and would have ensured that they were being tested in an as-found condition. NRC IR 50-315/316-95013(DRP) (Accession No. 9602200321) identified the practice of using the air start system to roll the EDGs prior to surveillance testing as a failure to test safety-related equipment under suitably controlled conditions and in accordance with design and licensing bases. This failure was cited as a violation of 10 CFR Part 50, Appendix B, Criterion II, "Quality Assurance Program."

#### **Hydrogen Analyzer Calibration**

NRC IR 50-416/95-21 (Accession No. 9602290202) for the Grand Gulf Nuclear Station identified that the containment and drywell hydrogen analyzer calibration surveillance procedure required technicians to check reagent gas flow before calibration of the analyzer and to make an adjustment, if necessary, to the previous test value before obtaining the "as-found" calibration data. Since adjusting the reagent gas flow could change the as-found condition of the analyzer and invalidate the surveillance test results, the inspectors

determined that the test procedure was inadequate and cited it as a violation of TS 5.4.1.a., which requires that specific written procedures be established for surveillance tests as described in Regulatory Guide 1.33, "Quality Assurance Program Requirements."

#### **Turbine Driven Auxiliary Feedwater Pumps**

NRC IR 50-315/316-95013(DRP) (Accession No. 9602200321) for D.C. Cook Units 1 and 2 identified the practice of operating the turbine-driven auxiliary feedwater pumps immediately before performing the surveillance tests and the practice of venting the residual heat removal pumps immediately before performing surveillance tests as examples of unacceptable preconditioning. The failure to test safety-related equipment under suitably controlled conditions and in accordance with design and licensing bases was cited as a violation of 10 CFR Part 50, Appendix B, Criterion II.

#### **High-Pressure Coolant Injection and Reactor Core Isolation Cooling**

NRC IR 50-298/95-04 (Accession No. 9505230003) for Cooper Nuclear Station indicated that plant operators had recognized that performing a series of different high-pressure coolant injection system and reactor core isolation cooling surveillance tests in sequence, without allowing sufficient time for the systems to cool down between tests, would constitute unacceptable preconditioning. However, the operators did not identify nor document the full extent of the preconditioning concerns, nor did they initiate appropriate corrective actions to ensure that preconditioning would not be repeated. The failure of the operators to fully recognize and initiate action to correct preconditioning concerns was cited as a violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings."

#### **Motor Operated Valves**

NRC IR 50-335/96-11, 50-389/96-11 (Accession No. 9609170377) for the St. Lucie reactor facility identified that the four containment spray flow control valves (two for each unit) were being unacceptably preconditioned prior to surveillance testing. Specifically, the valve stems were being lubricated prior to performing stroke time testing. The failure of the licensee's administrative procedures to ensure that these stroke time tests were performed under suitably controlled conditions was cited as a violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control."

#### **Discussion**

As illustrated in the above-mentioned examples, some licensees are continuing to perform maintenance activities or to take other preconditioning actions that were found to be unacceptable. When performing technical specification surveillance and ASME Code inservice testing, the equipment is typically tested in the as-found condition. However, experience has demonstrated that some surveillance testing cannot be performed without disturbing or altering the equipment (e.g., attachment of test leads, pneumatic or hydraulic supply lines). For example, circuit breakers may be required to be racked out and installed on a test rig in order to perform some surveillance tests. However, cycling, cleaning, and

lubrication were not necessary in order to perform the surveillance test. Similarly, other equipment, such as valves, pumps, and motors may require disconnection, realignment, installation of jumpers, or other alterations in order to perform the surveillance tests.

Any such disturbance or alteration would be expected to be limited to the minimum necessary to perform the test and prevent damage to the equipment.

In certain cases, the safety benefit of some preconditioning activities may outweigh the benefits of testing in the as-found condition. For example, the staff has approved the practice of routine checking of EDG cylinders for water accumulation before performing surveillance tests in order to prevent the damage caused by hydrolocking. In the previously described EDG example, the concern was that use of the air start valves was not needed to roll the EDG and purge the cylinders.

The following guidance has been provided to NRC inspectors:

1. Inspection Procedure (IP) 61726, "Surveillance Operations," directs inspectors to conduct a detailed technical review of the licensee's surveillance procedure and evaluate its adequacy to demonstrate that the system components will function under design-basis conditions and that any preconditioning required by the procedure is acceptable.
2. IP 62707, "Maintenance Observation," cautions inspectors to verify that preventive maintenance (PM) activities are not routinely being scheduled to "precondition" equipment before performing surveillance tests in order to ensure that the test is passed satisfactorily. It directs inspectors to examine the sequence of PM activities to determine whether the licensee routinely schedules PM activities before surveillance tests.
3. NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," Section 3.5, notes that the as-found condition is generally considered to be the condition of a valve without pre-stroking or maintenance and that most inservice testing is performed in a manner that generally represents the condition of a standby component if it were actuated in the event of an accident (i.e., no preconditioning before actuation).

#### Related Generic Communications

The NRC staff has addressed the issue of preconditioning in previous generic communications including Information Notice (IN) 96-24, "Preconditioning of Molded-Case Circuit Breakers Before Surveillance Testing," and IN 93-63, "Periodic Testing and Preventive Maintenance of Molded-Case Circuit Breakers."

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

*Thomas T. Martin*  
Thomas T. Martin, Director  
Division of Reactor Program Management  
Office of Nuclear Reactor Regulation

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Information Notice No.	Subject	Date of Issuance	Issued to
97-15	Reporting of Errors and Changes in Large-Break Loss-of-Coolant Accident Evaluation Models of Fuel Vendors and Compliance with 10 CFR 50.46(a)(3)	04/04/97	All holders of OLs or CPs for nuclear power reactors and all reactor fuel vendors
97-14	Assessment of Spent Fuel Pool Cooling	03/28/97	All holders of OLs or CPs for nuclear power reactors
97-13	Deficient Conditions Associated with Protective Coatings at Nuclear Power Plants	03/24/97	All holders of OLs or CPs for nuclear power reactors
97-12	Potential Armature Binding in General Electric Type HGA Relays	03/24/97	All holders of OLs or CPs for nuclear power reactors
92-27, Supp. 1	Thermally Induced Accelerated Aging and Failure of ITE/ Gould A.C. Relays Used in Safety-Related Applications	03/21/97	All holders of OLs or CPs for nuclear power reactors
97-11	Cement Erosion from Containment Subfoundations at Nuclear Power Plants	03/21/97	All holders of OLs or CPs for nuclear power reactors

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original signed by T.R. Quay

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