

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

February 25, 2014

NRC INFORMATION NOTICE 2014-02: FAILURE TO PROPERLY PRESSURE TEST  
REACTOR VESSEL FLANGE LEAK-OFF LINES

**ADDRESSEES**

All holders of an operating license or construction permit for a nuclear power reactor under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

All holders of and applicants for a power reactor early site permit, combined license, standard design certification, standard design approval, or manufacturing 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 instances in which inspections of reactor vessel flange leak-off lines as required by Section XI of the American Society of Mechanical Engineers (ASME) Code and, therefore, 10 CFR 50.55a were not performed or were inadequately performed. The NRC expects 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 IN are not NRC requirements; therefore, no specific action or written response is required.

**DESCRIPTION OF CIRCUMSTANCES**

Palo Verde Nuclear Generating Station (Palo Verde), Unit 2

During an inservice inspection (ISI) at Palo Verde, Unit 2, NRC inspectors identified that the licensee had not adequately performed the required system leakage test of the reactor vessel flange leak-off lines, as described by ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components." The licensee entered the issue into its corrective action program and submitted a proposed alternative examination to the Office of Nuclear Reactor Regulation (NRR) for review and authorization. The proposed alternative employed a VT-2 visual examination of the accessible areas of the vessel flange leak-off lines while they were subjected to the static pressure head of water when the reactor cavity was filled, a pressure less than that required by ASME Code, Section XI, IWC-5220. The NRC authorized the use of the proposed alternative in the licensee's ISI program (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13085A254).

**ML13193A002**

Additional information appears in “Palo Verde Nuclear Generating Station - NRC Integrated Inspection Report 05000528/2012005, 05000529/2012005, and 05000530/2012005,” dated February 7, 2013 (ADAMS Accession No. ML13038A565).

### Arkansas Nuclear One (ANO), Unit 2

During an ISI at ANO, Unit 2, NRC inspectors questioned whether the reactor vessel flange seal leak-off line was included in the licensee’s ISI program for Unit 2. Even though the flange leak-off line was classified as ASME Code Class 2, the licensee failed to incorporate the flange leak-off line into their ISI program and failed to perform the system leakage test and associated VT-2 visual examination, required by subparagraph IWC-5221 of ASME Code, Section XI, during prior 10-year intervals. The licensee performed a VT-2 visual examination of the accessible areas of the vessel flange leak-off line while the reactor vessel head was removed and the reactor cavity was filled to its normal refueling water level. Since the static pressure head developed by the refueling water level was less than the pressure required by ASME Code, Section XI, the licensee requested and received authorization of this alternative from the NRC (ADAMS Accession No. ML13161A241).

Additional information appears in “Arkansas Nuclear One - NRC Integrated Inspection Report 05000313/2012005 and 05000368/2012005,” dated February 13, 2013 (ADAMS Accession No. ML13045A520).

## **BACKGROUND**

### Related NRC Requirements & Industry Standards

As required by 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) must meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in Section XI of the ASME Code, to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations also require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code, incorporated by reference in 10 CFR 50.55a(b), “Standards approved for incorporation by reference,” 12 months prior to the start of the 120-month ISI program interval, subject to the limitations and modifications listed therein.

The ASME Code, Section XI, Tables IWB-2500-1, IWC-2500-1, and IWD-2500-1 require that a system leakage test be conducted in accordance with IWB-5220, IWC-5220, and IWD-5220 for Class 1, 2, and 3 pressure retaining components, respectively, prior to plant startup following each refueling outage.

Subarticle IWA-5200 of Section XI of the ASME Code specifies the system test requirement for pressure-retaining components and states that the system leakage tests shall be conducted at the pressure and temperature for Class 1, Class 2 and Class 3 components specified in IWB-5000, IWC-5000 and IWD-5000, respectively.

## DISCUSSION

The reactor head flange is sealed to the vessel flange by two concentric, self-energizing, metallic O-rings positioned inboard of the reactor vessel closure stud circle. Potential O-ring leakage is monitored by the O-ring leak detection system that is comprised of the O-ring flange leak-off lines and supporting components. The portions of the detection system that are classified as ASME Code Class components are subject to pressure testing as described by the applicable paragraphs of the ASME Code, Section XI, and, therefore, inadequate testing fails to be in compliance with NRC regulations as provided by 10 CFR 50.55a(g)(4). This IN provides examples of instances where the licensee did not perform, or inadequately performed, a system pressure test of the reactor vessel flange leak-off lines.

## 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 project manager.

*/RA/*

Lawrence E. Kokajko, Director  
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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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