

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

January 29, 2009

**NRC REGULATORY ISSUE SUMMARY 2009-02
USE OF CONTAINMENT ATMOSPHERE GASEOUS RADIOACTIVITY
MONITORS AS REACTOR COOLANT SYSTEM LEAKAGE DETECTION
EQUIPMENT AT NUCLEAR POWER REACTORS**

ADDRESSEES

All holders of operating licenses for nuclear power reactors except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

All current and potential applicants for a combined license, manufacturing license, standard design certification, or standard design approval for a nuclear power plant under the provisions of Title 10 of the Code of Federal Regulations, Part 52 (10 CFR), "Licenses, Certifications, and Approvals for Nuclear Power Plants".

All applicants for nuclear power plant construction permits and operating licenses under the provisions of 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."

INTENT

The U.S. Nuclear Regulatory Commission (NRC) is issuing this regulatory issue summary (RIS) to communicate the NRC plan to address the situation created when some containment atmosphere gaseous radioactivity monitors are unable to meet technical specification (TS) requirements. The plan consists of integrating a streamlined license amendment process with the use of enforcement discretion, where appropriate. This RIS requires no action or written response on the part of an addressee.

BACKGROUND INFORMATION

In order to meet General Design Criterion 30, "Quality of reactor coolant pressure boundary," of Appendix A to 10 CFR Part 50, licensees typically include RCS leakage detection equipment in their plant designs because the equipment can be used to detect reactor coolant pressure boundary (RCPB) leakage. A typical RCS leakage detection system consists of a combination of the following:

- a containment atmosphere particulate radioactivity monitoring system
- a containment atmosphere gaseous radioactivity monitoring system
- containment sump-level and sump-pump instrumentation
- containment cooler condensate monitoring instrumentation

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Containment atmosphere gaseous radioactivity monitoring systems measure RCS leakage indirectly by detecting airborne radioactivity released from RCS leakage. Response time is the length of time required for these monitoring systems to detect a given volume of RCS leakage. Response time is dependant on RCS radioactivity concentration, as well as other variables. For a given volume of leakage, with all other variables held constant, a higher RCS radioactivity concentration will yield a shorter response time for these monitoring systems. The design analyses for the containment atmosphere gaseous radioactivity monitoring systems used in the licensing bases for most plants typically assume a RCS radioactivity concentration approximately equivalent to 0.1 percent failed fuel in the core. Improvements in fuel cladding integrity and RCS chemistry controls have significantly reduced RCS radioactivity concentration at most plants. As a result, the monitors for operating units may have longer response times than they would with 0.1 percent failed fuel in the core because the actual RCS radioactivity concentration is less than it would be with 0.1 percent failed fuel in the core.

Most plants have TS Limiting Conditions for Operation requirements for containment atmosphere gaseous radioactivity monitoring systems used as part of RCS leakage detection equipment. The TS requirements for the monitoring systems' response times are based on the design analysis that is part of a plant's licensing basis. If the monitors fail to meet these requirements, the monitors are inoperable. When the monitors are inoperable the licensee is required to take remedial actions as permitted by their TS or to shut down the reactor.

Information Notice (IN) 2005-24, "Nonconservatism in Leakage Detection Sensitivity" (ADAMS Accession No. ML051780073), communicated the issue created by differences between actual and assumed RCS radioactivity concentrations to all licensees. The purpose of IN 2005-24 was to have licensees review information related to problems with containment atmosphere gaseous radioactivity monitors used as part of RCS leakage detection equipment and consider appropriate actions as applicable to their plants. Information Notices do not require any action by licensees.

In September 2008, NRC inspectors at the Diablo Canyon Power Plant identified a non-cited violation for not complying with TS requirements for RCS leakage detection equipment. In November 2008, the licensee for the Watts Bar Nuclear Plant and the Sequoyah Nuclear Plant requested exigent license amendments from the NRC after taking remedial actions as permitted by their TS because of a concern that the containment atmosphere gaseous radioactivity monitor channels of the RCS leakage detection system were inoperable.

To address the issue, licensees working through the industry-sponsored Technical Specifications Task Force (TSTF) have attempted to create generic TS changes, model License Amendment Requests (LARs), model safety evaluations, and model proposed no-significant-hazards consideration determinations using the NRC TS Consolidated Line Item Improvement Process (CLIIP). See RIS 2000-10, "Consolidated Line Item Improvement Process For Adopting Standard Technical Specifications Changes for Power Reactors" (ADAMS Accession No. ML003693442) for more information on the NRC CLIIP.

SUMMARY OF ISSUE

Improvements in fuel cladding integrity and RCS chemistry controls result in lower RCS radioactivity concentrations during operational activities, including situations where there is RCS leakage. Thus, containment atmosphere gaseous radioactivity monitoring systems which are designed on the basis of higher assumed RCS radioactivity concentrations will not provide accurate indication of RCS leakage in the required length of time due to the longer response time of the monitoring system, and must be considered inoperable.

The NRC considers the longer response times of the containment atmosphere gaseous radioactivity monitors to be of very low safety significance. The monitors would still be able to detect degradation in the RCPB long before components fail in a manner that would affect plant safety. Additionally, plants also have multiple diverse and redundant methods available to detect RCS leakage and to provide licensees with a means to detect significant RCPB degradation and to take appropriate action to ensure the continued protection of public health and safety. Finally, nuclear power plants are designed to provide adequate core cooling following postulated loss-of-coolant accidents up to and including a break equivalent in size to the double-ended rupture of the largest pipe in the RCS. This design feature, coupled with the extremely low likelihood of unstable crack growth resulting in a loss-of-coolant accident, leads the NRC to conclude that the risk significance of this issue is very low.

The NRC plans to address the issue of inoperable containment atmosphere gaseous radioactivity monitoring systems in an integrated fashion by: (i) working with the TSTF to develop revised generic TS for the monitoring system, and facilitating licensee implementation of the revised generic TS through a streamlined license amendment process; and (ii) issuing guidance on NRC's exercise of enforcement discretion involving inoperable containment atmosphere gaseous radioactivity monitoring systems.

The NRC will review the generic TS changes that the TSTF proposes for pressurized-water reactors (PWRs) and boiling-water reactors (BWRs). If the generic TS changes are found to be acceptable, the NRC will make the generic model LARs, model safety evaluations, and model no-significant-hazards consideration determinations available to licensees using the NRC CLIIP. Licensees are free to submit LARs for TS changes to address the issue. If licensees deem further action regarding the issue is unwarranted, they can choose to take no action.

On November 14, 2008, the TSTF submitted TSTF-513, "Revise Operability Requirements and Actions for RCS Leakage Instrumentation," to the NRC for review. TSTF-513 proposes generic TS changes for PWRs. The TSTF plans to submit TSTF-514 to the NRC in January 2009. TSTF-514 will propose generic TS changes for BWRs. Licensees are free to submit LARs to address the issue using TSTF-513 or TSTF-514; or they can propose alternative solutions.

In certain circumstances involving inoperable containment atmosphere gaseous radioactivity monitoring systems, enforcement discretion is available. Specific guidance for this enforcement discretion is described in EGM-09-001 (ADAMS Accession No. ML090300467) and is available on the NRC's web site at www.nrc.gov.

BACKFIT DISCUSSION

The intent of this RIS is to inform addressees of the NRC's plan to address the failure of containment atmosphere gaseous radioactivity monitors used as RCS leakage detection equipment to meet TS requirements.

The staff is not imposing any new positions on licensees. This RIS is not providing any new regulatory positions. This RIS only conveys the NRC's plan to address the issue of RCS leakage detection equipment failing to meet TS requirements because of the difference between actual and assumed RCS radioactivity concentrations. This RIS requires no action or written response and, therefore, is not a backfit under 10 CFR 50.109, "Backfitting." Consequently, the staff did not perform a backfit analysis.

FEDERAL REGISTER NOTIFICATION

A notice of opportunity for public comment on this RIS was not published in the *Federal Register* because it is informational and pertains to a staff position that does not represent a departure from current regulatory requirements and practice. However, a public meeting to discuss this RIS was held on January 8, 2009. The meeting summary is available under ADAMS Accession No. ML090130583. The NRC intends to work with industry representatives, members of the public, and other stakeholders in developing final guidance and in modifying related guidance documents.

CONGRESSIONAL REVIEW ACT

This RIS is not a rule as designated by the Congressional Review Act (5 U.S.C. §§ 801–808) and, therefore, is not subject to the Act.

PAPERWORK REDUCTION ACT STATEMENT

This RIS does not contain any information collections and, therefore, is not subject to the requirements of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501, et seq.).

PUBLIC PROTECTION NOTIFICATION

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

CONTACT

Please direct any questions about this matter to the technical contact listed below or to the appropriate 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 Electronic Reading Room/Document Collections.

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