

## Regulatory Guide Periodic Review

Regulatory Guide Number: **4.1, Revision 2**

Title: **Radiological Environmental Monitoring for Nuclear Power Plants**

Office/division/branch: **NRR/DRA/ARCB**  
Technical Lead: **Steve Garry**

Recommended Staff Action: **Reviewed with issues identified for future consideration**

**1. What are the known technical or regulatory issues with the current version of the Regulatory Guide (RG)?**

Regulatory Guide 4.1 Revision 2 was issued in June 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML091310141) and provides guidance for establishing and conducting an environmental monitoring program at nuclear power plants. The guidance continues to be applicable for radiological environmental monitoring of nuclear power plants.

The basis for the regulatory requirements should be added to the RG, as follows:

Criterion 64—Monitoring radioactivity releases.

*Means shall be provided for monitoring the reactor containment atmosphere, spaces containing components for recirculation of loss-of-coolant accident fluids, effluent discharge paths, and the plant environs for radioactivity that may be released from normal operations, including anticipated operational occurrences, and from postulated accidents.*

10 CFR 50, Appendix I - In addition, text should be added to describe the 10 CFR 50, Appendix I requirement incorporated through Technical Specifications to include a requirement for environmental monitoring as follows:

*Provide data on measurable levels of radiation and radioactive materials in the environment to evaluate the relationship between quantities of radioactive material released in effluents and resultant radiation doses to individuals from principal pathways of exposure; and to identify changes in the use of unrestricted areas (e.g., for agricultural purposes) to permit modifications in monitoring programs for evaluating doses to individuals from principal pathways of exposure.*

An issue has been raised about monitoring the environmental impacts of use of potassium hydroxide (KOH) in lieu of lithium hydroxide in reactor coolant for chemistry control. This issue has been raised by the Regional Health Physics inspectors. However, RG 4.1 itself does not discuss the specifics of monitoring individual radionuclides. Therefore, this issue is outside the scope of RG 4.1.

RG 4.1 Revision 2 was also reviewed in 2014 (ADAMS Accession No. ML14268A548), and the staff had determined there were issues identified for future consideration. These other issues to be addressed in the future are minor editorial ones in Section A, Introduction, and Section D, Implementation, to bring the RG into conformance with the current RG format. These formatting issues are minor and do not in themselves warrant revision of the RG at this time.

**2. What is the impact on internal and external stakeholders of not updating the RG for the known issues, in terms of anticipated numbers of licensing and inspection activities over the next several years?**

For licensing activities, new license applications are anticipated in the near future. However, existing guidance is RG 4.1, Rev. 2 is sufficient. Thus, there is no immediate need for revising the guide at this time to address their licensing.

For inspection activities, an issue has been raised about monitoring the environmental impacts of use of potassium hydroxide (KOH) in lieu of lithium hydroxide in reactor coolant for chemistry control. This issue has been raised by the Regional Health Physics inspectors. However, RG 4.1 itself does not discuss the specifics of monitoring individual radionuclides. This issue is being reviewed by staff and will likely be addressed by other means, if necessary.

**3. What is an estimate of the level of effort needed to address identified issues in terms of full-time equivalent (FTE) and contractor resources?**

To address these issues would take about 0.5 FTE and there is no need for contractor assistance.

**4. Based on the answers to the questions above, what is the staff action for this guide, i.e., reviewed with no issues identified, reviewed with issues identified for future consideration, revise, or withdraw)?**

Reviewed with issues identified for future consideration.

**5. Provide a conceptual plan and timeframe to address the issues identified during the review.**

The staff does not plan to address these issues in the near term.

**NOTE: This review was conducted in February 2025 and reflects the staff's plans as of that date. These plans are tentative and subject to change.**