

REGULATORY ANALYSIS

DRAFT REGULATORY GUIDE DG-4025 ASSESSMENT OF RADIONUCLIDE DISCHARGES IN GROUND-WATER TO THE UNRESTRICTED AREA AT NUCLEAR POWER PLANT SITES (Proposed New Regulatory Guide)

1. Statement of the Problem

Based on reviews of abnormal, inadvertent releases of tritium (H-3) at nuclear power plant sites by regional inspectors, it became apparent that there is a need to provide a simple model which can be used by regional inspectors for assessing inadvertent releases in ground water to unrestricted areas.

The need became apparent as commercial nuclear power plants began to undergo decommissioning in the late 1990s to early 2000s, because in several instances subsurface and/or ground water contamination were identified. Several operating facilities also identified ground water contamination resulting from spills and leaks or equipment failure. In one instance, low levels of licensed material were detected in a private well located on property adjacent to a nuclear power plant. Although the releases were not a significant public health hazard, they needed to be addressed. To respond to this need, the NRC formed the Liquid Radioactive Release Lessons Learned Task Force to evaluate the inadvertent releases to the subsurface in ground water and to make recommendations. The task force summarized the result of their evaluation in September 2006 (ADAMS Accession Number ML ML062650312) and offered recommendations for addressing the inadvertent releases. Among them was a recommendation that NRC should consider the development of guidance on evaluation of radionuclide transport in ground water. It went on to note that ANSI/ANS 2.17-1980, "Evaluation of Subsurface Radionuclide Transport at Commercial Nuclear Power Plants," provided guidance and it was being extensively updated at the time of the recommendation. The update was subsequently released as ANSI/ANS 2.17-2010. The ANSI/ANS standard provides a graded, risk-informed approach for evaluating the effects of subsurface radionuclide transport, but it does not provide a specific model for NRC staff and licensees to use for assessing radionuclide discharges to the unrestricted area. Accordingly, Office of Nuclear Regulation licensing staff and regional inspectors submitted a User Need request to RES in August 2012 for development of a simple model for H-3 migration with guidance (ML12193A060). This request was based on the premise that the vast majority of abnormal releases to ground water involved H-3 with little to no other radionuclides.

2. Objective

The objective of this regulatory action is to assess the need to develop guidance assessing radioactive releases in ground water at nuclear power plant sites.

3. Alternative Approaches

The NRC staff considered the following alternative approaches:

1. Do not develop formal guidance (a Regulatory Guide)

2. Develop a Regulatory Guide that provides a simple model and guidance for assessing H-3 releases which may migrate to the unrestricted area at nuclear power plant sites.

Alternative 1: Do Not Develop a Regulatory Guide

Under this alternative, the NRC would not develop or issue guidance. This alternative is considered the “no-action” alternative and provides a baseline condition from which any other alternatives will be assessed. If NRC does not take action, there would not be any changes in costs or benefit to the public, licensees or NRC. However, the “no-action” alternative would not address identified concerns with the case-by-case review of abnormal, accidental releases of high concentrations of H-3 in excess of the Environmental Protection Agency drinking water standard for H-3. The NRC would continue to review each application on a case-by-case basis with no guidance for its review or guidance to licensees and Regional Inspectors reviewing the events and consequences.

Alternative 2: Develop a Regulatory Guide

Under this alternative, the NRC would develop formal guidance in the form of a Regulatory Guide. This guidance document would incorporate the latest information, supporting guidance, review practices, and provide a simple model for licensees and Resident Inspectors to assess H-3 releases and subsequent discharges. By doing so, the NRC would ensure that a simple model and regulatory guidance in this area is available and current, and accurately reflects the staff’s position.

The impact to the NRC would be the costs associated with developing the simple H-3 ground-water flux model; testing it; preparing and issuing the regulatory guide. The impact to the public would be the voluntary costs associated with reviewing and providing comments to NRC during the public comment period. The value to NRC staff and its applicants would be the benefits associated with enhanced efficiency and effectiveness in using a common guidance document as the technical basis for license applications and other interactions between the NRC and its regulated entities.

Conclusion

Based on this regulatory analysis, the NRC staff concludes that development of a Regulatory Guide with a simple H-3 model is warranted. The action will enhance the assurance of reactor safety by ensuring that appropriate guidance is available for all stakeholders. In that way it would facilitate the regulatory actions when there are inadvertent releases to the unrestricted area.