



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON NUCLEAR WASTE AND MATERIALS
WASHINGTON, D.C. 20555-0001

ACNWS-0266

August 1, 2007

The Honorable Dale E. Klein
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: CHAPTERS 11.2 THROUGH 11.5 OF NUREG-0800, "STANDARD REVIEW PLAN (SRP) FOR THE REVIEW OF SAFETY ANALYSIS REPORTS FOR NUCLEAR POWER PLANTS"

Dear Chairman Klein:

At the request of the Advisory Committee on Reactor Safeguards, the Advisory Committee on Nuclear Waste and Materials (the Committee) reviewed the revisions to Chapters 11.2 through 11.5 of NUREG-0800, "Standard Review Plan (SRP) for the Review of Safety Analysis Reports for Nuclear Power Plants." The staff of the Office of New Reactors (NRO), Health Physics Branch, provided presentations on the revised SRP chapters to the Committee at recent Committee meetings including the following:

- SRP Chapter 11.2, *Liquid Waste Management System*, at the 175th Meeting (December 2006)
- SRP Chapter 11.3, *Gaseous Waste Management System*, and Chapter 11.4, *Solid Waste Management Systems*, at the 178th Meeting (April 2007)
- SRP Chapter 11.5, *Process and Effluent Radiological Monitoring Instrumentation and Sampling Systems*, at the 179th Meeting (May 2007)

These SRP chapters were revised by March 2007 and posted on the Nuclear Regulatory Commission's (NRC) website to be available to potential applicants for new nuclear power reactors 6 months in advance of when the new license applications are expected to be transmitted to the NRC. The revisions did not receive stakeholder review before posting on the website, although some industry feedback has been received after the posting.

The revisions to these SPR chapters include the following:

- Adding 10 CFR Part 20.1406, *Minimization of Contamination*, as an acceptance criteria
- Adding supplemental guidance on meeting 10 CFR Part 20.1301(e) and 40 CFR Part 190, *Environmental Radiation Protection Standards for Nuclear Power Operations*

- Updates to address modernization of equipment used (e.g., mobile radioactive waste treatment systems) and updated regulatory documentation employed in licensing reactors (e.g., the Offsite Dose Calculation Manual)
- Updates to regulations that have been issued after the last revision (e.g., Department of Transportation shipping requirements in 10 CFR Parts 171 to 180)

RECOMMENDATION

As soon as practical, the technical bases referenced in the SRP sections should be updated, including computer codes, methodologies, and parameter values cited in referenced regulatory guides, supporting NUREGs, and other documents.

OBSERVATIONS

Although these SRP chapters have been recently reissued, some of their fundamental technical bases have not been updated. Underlying dose analysis methodologies used in the regulatory guides supporting these SRP chapters and the supporting documentation is outdated. Dose methodologies first published in 1959 are still used (International Commission on Radiological Protection (ICRP) Publication 2). Newer dosimetry methods in ICRP Publication 60 and Publication 64 that have updated dosimetric models and methods are not used. The dose methodologies that underpin SRP chapters use guidance that spans over 40 years, proscribe the calculation of very different dose quantities and result in different calculated doses. The NRO health physics staff suggested an approach that addresses the weaknesses in dose methodologies that updates them in a multi-step fashion. They suggested that the first step could update critical parameters such as dose conversion factors. The second step could update other important parameters such as shielding and biological accumulation factors. The third step could systematically review all dose methodologies used and comprehensively update all of them to ensure that a risk-informed approach is employed.

Some regulatory guides referenced in the SRP chapters are new and under development (e.g., Draft Regulatory Guide 4012 for implementing 10 CFR Part 20.1406) or being revised (e.g., Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants"), and were not available when the SRP chapters were revised.

Some of the regulatory guides have never been finalized (e.g., Regulatory Guide 4.8, "Environmental Technical Specifications for Nuclear Power Plants," issued for comment in December 1975). Other regulatory guides are up to 30 years old (e.g., Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," October 1977) or are not scheduled for revision (e.g., Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," Revision 2, February 1978) in the near future.

Supporting analysis cited in some of the regulatory guides is outdated (e.g., NUREG-1301, "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors," April 1991 and NUREG-1302, "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors," April 1991, use the 1979 Branch Technical Position on Radiological Assessment). Therefore, the supporting methodologies cited in the regulatory guides may not be representative of expected performance from the new reactor designs, and may not take into account modern fuel characteristics and performance, and improvements to reactor coolant water quality since the analysis was conducted.

The Committee reported earlier on one of the technical bases in need of updating, the Gaseous and Liquid Effluent (GALE) code, in its letter report dated January 4, 2007, on Regulatory Guide 1.112, "Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Nuclear Power Reactors."

The Committee plans to continue its evaluation of regulatory guides and technical bases documents regarding radiation protection, radioactive waste management, protection of the environment, and other areas consistent with the Committee's Charter and Action Plan.

Sincerely,

/RA/

Michael T. Ryan
Chairman

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