

Regulatory Guide Periodic Review

Regulatory Guide Number: 3.59, Revision 0

Title: Methods for Estimating Radioactive and Toxic Airborne Source Terms for Uranium Milling Operations

Office/Division/Branch: NMSS/DUWP/URLB
Technical Lead: Janelle Jessie

Staff Action Decided: 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)?

This RG was issued in 1987 to address methods, models, data, and assumptions acceptable to the NRC staff for estimating airborne emissions of radioactive and toxic materials from various steps in uranium milling, to meet the requirements of title 10 of the Code of Federal Regulations (10 CFR) Part 20, "Standards For Protection Against Radiation," and 10 CFR Part 40, "Domestic Licensing of Source Material."

This RG is not consistent with the current 10 CFR 20. At the time of publication of RG 3.59, 10 CFR Part 20 radiation safety standards were based on the International Committee on Radiation Protection (ICRP)-2, which used the formula $5(N-18)$ rem (where N=worker's age) as the external dose limit for occupational exposure, and maximum permissible concentrations (MPC) based on organ dose to determine internal dose. The public was allowed a dose of 500 mrem/yr.

The current 10 CFR Part 20 standards are based on ICRP-26 and ICRP-30, and the public dose limit is now 100 mrem/yr. Also, it defines occupational exposure as 5 rem/yr and uses an Effective Dose Equivalent (EDE) approach derived from the summation of individual organ dose multiplied by an organ weighting factor to determine the internal dose. This approach has stochastic and non-stochastic annual limits on intake (ALIs) and derived air concentrations (DACs) for intake of radionuclides. The changes in regulations resulted in significant changes regarding the methods to develop radiation dose estimates for uranium milling operations. The computer code MILDOS used for estimating radiological impacts from airborne emissions from uranium milling facilities has been updated several times and is now MILDOS-AREA, which is able to perform such calculations within an 80-kilometer radius of an operating uranium recovery facility.

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?

The RG provides outdated guidance that is not consistent with the 10 CFR 20.

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?

The staff estimates 0.2 FTE to update the RG.

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4. **Based on the answers to the questions above, what is the staff action for this guide (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.**

As discussed in Management Directive (MD) 6.6, "Regulatory Guides," the NRC staff reviews RGs periodically to ensure that these guides continue to provide useful guidance. The staff will consider any new regulatory citation issues and the technical information that may need to be updated during the next periodic review of the guide.

NOTE: This review was conducted in February 2013 and reflects the staff's plans as of that date. These plans are tentative and subject to change.