

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
WASHINGTON, DC 20555-0001

July 23, 1997

NRC INFORMATION NOTICE NO. 97-55: CALCULATION OF SURFACE ACTIVITY FOR
CONTAMINATED EQUIPMENT AND MATERIALS

Addressees

All Uranium Recovery Licensees.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to the correct method for calculating surface activity of contaminated materials. Recipients should review the information for applicability to their radiation protection programs and consider actions as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not requirements; therefore, no specific action or written response is required.

Description of Circumstances

During recent inspections at uranium recovery sites, the staff noted that two licensees had used the 2-pi efficiency factor (radioactive emissions from the surface to the meter) when converting counts per minute to disintegrations per minute (dpm) in the determination of surface activity levels. The activity values are compared with the guideline limits, in Regulatory Guide 1.86, for the release of equipment and materials from a uranium recovery site. The appropriate efficiency factor to use in this situation is the 4-pi value because activity is released in all directions and because the main health risk from surface activity is subsequent inhalation or ingestion of the radionuclides. The 2-pi factor would be appropriate for use in the determination of beta dose from exposure to a contaminated surface.

The use of the incorrect efficiency factor in the determination of surface activity results in a value almost half the correct value. In other words, material contaminated with approximately twice the recommended surface activity limit could be released from sites, using the 2-pi value in the calculation of surface activity.

Discussion

A significant health risk has not been created by the mistaken use of the 2-pi efficiency factor for determining surface activity for release of material, since all radiation protection programs include procedures to maintain exposures as low as is reasonably achievable. The staff has estimated (Nuclear Material Safety and Safeguards Decommissioning Handbook,

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Appendix C, Table 1) that exposure to material with the total surface activity limit for the uranium chain (5000 dpm/100 cm²) would produce a dose of 0.13

mSv/yr (13 mrem/yr). Therefore, twice this dose would be significantly less than the 1 mSv/yr (100 mrem/yr) limit for members of the public specified in 10 CFR Part 20.

Staff will address this issue during future inspections by reviewing licensee procedures and records to ensure that the correct efficiency factor has been used to determine surface activity levels. This information notice requires no specific action or written response. If you have questions about the information in this notice, please contact the technical contact listed below.

signed by

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and Safeguards

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