

April 11, 2002

Larry Jensen, CHP
Senior Health Physicist
Emergency Response Branch #3
United States Environmental Protection Agency
Region 5
Superfund Division
77 West Jackson Boulevard
Chicago, Illinois 60604

Dear Mr. Jensen:

I am writing in response to your April 5, 2002, inquiry to Larry Camper regarding the manner in which the U. S. Nuclear Regulatory Commission (NRC) staff applies the criteria in Regulatory Guide 1.86 "Termination of Operating Licenses for Nuclear Reactors" (June 1974) in situations where more than one radionuclide is present. Specifically, you asked if a smear involving thorium-232, which is many decades old, and is in equilibrium with other radionuclides in the thorium series, is taken for removable contamination, should the results be judged against the Regulatory Guide 1.86, Table 1 value of 200 dpm/100 cm² because the whole thorium natural decay chain is present or should it be judged against the 20 dpm/100 cm² guideline for radium-228, because this is the most restrictive radionuclide in the removable material.

In instances where the Regulatory Guide 1.86 values are the prescribed remediation criteria for a materials site, the NRC staff requires that licensees demonstrate that radionuclide-specific criteria are met for each corresponding radionuclide present at the facility. As such, in the situation you describe above, the staff would expect the licensee to demonstrate that the maximum removable contamination for natural thorium is less than 200 dpm/100 cm² and the removable contamination for radium-228 is less than 20 dpm/100 cm². Please note that, in addition to any specific remediation criteria, NRC staff expects licensees to demonstrate that all residual radioactivity at a facility has been remediated to levels that are as low as reasonably achievable (ALARA).

You also asked if Regulatory Guide 1.86 is the proper reference. Regulatory Guide 1.86, as the title indicates, was developed for nuclear reactors. Staff of the Office of Nuclear Material Safety and Safeguards have used a similar document entitled "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use, or Termination of Licenses for Byproduct, Source, or Special Nuclear Material" (August 1987) as guidance for the remediation of materials sites in the past and it is cited in many licenses as the appropriate remediation criteria for a particular license. However, in 1997 NRC promulgated 10 CFR 20 Subpart E, the License Termination Rule (LTR), which requires that licensees demonstrate that residual radioactive material at a facility, at license termination, will not result in a dose to the

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average member of the critical group of more than 0.25 milliSieverts per year (25 millirem per year) and is ALARA. To demonstrate compliance with the LTR, licensees may estimate the potential dose by developing a site-specific dose estimate, or by using screening criteria developed by the NRC staff and published in NUREG-1727 "NMSS Decommissioning Standard Review Plan" (September 2000). NUREG-1727 is available on the NRC Website at NRC.GOV.

I hope this addresses your questions and, if you have any additional questions, feel free to contact me at (301) 415-6749, or by e-mail, at DAO@NRC.GOV.

Sincerely,

/RA/

Dominick A. Orlando, Technical Assistant
Decommissioning Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

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