

JAN 29 1982

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WMHL: 3406.3.1

Dr. Dan Egan  
EPA  
401 M. Street  
Crystal Mall #2  
ANR 459  
Washington, DC 20460

Dear Dr. Egan:

Thank you for giving me your thoughts on the treatment of short-lived nuclides during our phone conversation on January 22. I am writing to clarify what I think the difficulty may be and to give an example.

Suppose a nuclide with a long half-life has a daughter with a very short half-life. As soon as a parent nucleus decays, the daughter nucleus decays almost immediately. Therefore, in a given volume, the numbers of disintegrations per second are equal for the parent and daughter. This means that the curie concentrations are equal for the parent and daughter. The daughter species acts like a "shadow" which is found in curie concentrations equal to that of the parent.

Some long-lived nuclides which are of health concern in waste disposal have short-lived daughters. In some cases there is a chain of short-lived daughters, each of which will be present in curie concentrations equal to that of the parent. For example, Ra226 has a chain of eight short-lived daughters (Rn222, Po218, Pb214, Bi214, Po214, Pb210, Bi210, and Po210).

The problem arises in comparing releases of a nuclide such as Ra226 against the EPA standard. For every curie of Ra226 released, there is also eight curies of daughter products released. Are these daughters in the "others" category in the EPA standard or should they be ignored?

The argument for ignoring them is that the toxicity index for Ra226 on which the release standard is based probably includes the effects of the daughters.

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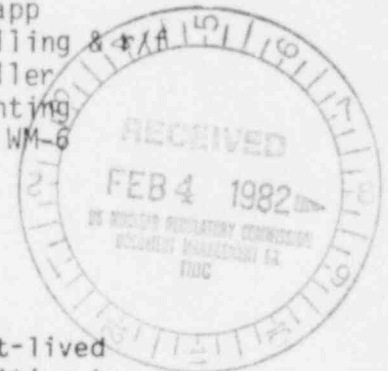
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However, in my view, a literal interpretation of the draft EPA standard in its current form would require each of the daughters to be compared against the 10 curie or 500 curie limit for "other" nuclides.

Thank you again for discussing the problem with me. Please feel free to call me at 427-4173 if you have any further thoughts on the subject.

Sincerely,

ORIGINAL SIGNED BY

Stewart A. Silling  
Project Manager  
High-Level Waste Licensing  
Management Branch  
Division of Waste Management

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