

**Dane Finerfrock - Fwd: Comments on Proposed Amendments to License Requirements for Land Disposal of Radioactive Waste**

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**From:** Sonja Robinson  
**To:** Dane Finerfrock  
**Date:** 2/1/2010 7:09 AM  
**Subject:** Fwd: Comments on Proposed Amendments to License Requirements for Land Disposal of Radioactive Waste

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>>> "David C. Kocher" <dck@senes.com> 1/29/2010 12:27 PM >>>  
Dear Mr. or Ms. Robinson,

I am hereby submitting comments on the proposed amendments to Section R313-25-8, Technical Analyses, in the State of Utah's License Requirements for Land Disposal of Radioactive Waste -- General Provisions.

To provide some background information, I served as an invited expert at the U.S. Nuclear Regulatory Commission's Public Workshop on Unique Waste Streams Including Depleted Uranium that was held in Salt Lake City on September 23-24, 2009. For many years, I served on teams of technical experts that prepared performance assessments for disposal of low-level radioactive waste at two U.S. Department of Energy (DOE) sites (Oak Ridge and Savannah River), and I also served on a panel of DOE contractors that provided advice to DOE on matters of conduct of performance assessment and development of appropriate regulatory requirements. Important elements of that panel's advice are incorporated in DOE's current waste management order as it applies to disposal of low-level waste.

Although I am not a resident of the State of Utah, I have been encouraged by a resident who was also an invited expert at the workshop last September to submit comments on the proposed amendments to regulations that would apply to disposal of depleted uranium. My comments, which are concerned with the proposed paragraph (2)(a), are as follows.

[1] The new provision in paragraph (2)(a) should include a statement about "reasonable assurance" of compliance with applicable performance standards, similar to statements about "reasonable assurance" in existing regulations in paragraph (1) and its subparagraphs.

[2] The proposed requirement that a performance assessment shall demonstrate compliance with performance standards in 10 CFR 61 and corresponding provisions of Utah rules when all disposed waste is taken into account, including waste already disposed of and proposed disposals of depleted uranium, raises an important question about the required scope of a performance assessment.

I am not familiar with Utah rules. However, as I'm sure the State understands, the numerical performance standards for waste disposal in 10 CFR 61 are concerned only with limiting potential radiation doses to off-site members of the public. Therefore, site-specific performance assessments basically need to be concerned only with potential releases of

radionuclides beyond the boundary of the disposal facility. There is no requirement in 10 CFR 61 to assess potential impacts on inadvertent intruders who might come onto the disposal site at some time after an assumed loss of institutional control. Rather, protection of inadvertent intruders is handled in 10 CFR 61 by means of the generally applicable waste classification system, which includes limits on concentrations of specific radionuclides in Class A, B, and C wastes and technical requirements for disposal of waste in each class that apply at any licensed disposal facility. The concentration limits for the different waste classes were based on analyses of scenarios for inadvertent intrusion, with a scenario for a resident homesteader generally providing the basis for the limits for longer-lived radionuclides.

The generally applicable waste classification system in 10 CFR 61 has important implications for disposal of depleted uranium. Uranium is not included in the list of radionuclides for which concentration limits on Class A and C wastes are specified. Therefore, depleted uranium in any concentrations and quantities is included in Class A waste, which has the least stringent disposal requirements. This approach to classifying depleted uranium (and other forms of uranium) was taken because the U.S. Nuclear Regulatory Commission (NRC) believed that there would be little uranium in low-level waste intended for disposal in licensed facilities.

However, NRC did include concentration limits for depleted uranium in its proposed 10 CFR 61. The proposed rule specified a Class C limit for depleted uranium of 0.05 microcuries per cubic centimeter. This concentration limit is roughly 60 times less than the concentration of undiluted depleted uranium.

It is evident (at least to me) from the proposed concentration limit for depleted uranium in 10 CFR 61 that large quantities of depleted uranium would not qualify as Class A waste if a intruder dose assessment were required and may not even qualify as Class C waste. Whether or not depleted uranium would be Class C waste probably depends on the kinds of scenarios for inadvertent intrusion into disposed waste that would be considered reasonable for the purpose of setting a concentration limit. For example, if only drilling through the waste, but not excavation into a large volume of waste, were considered credible, which would be reasonable if disposal well below the ground surface were required, and the disposal limit for Class C waste were allowed to be 10 times higher than the limit for Class A waste based on consideration of the likelihood of occurrence of an assumed intrusion scenario, as is the case in 10 CFR 61 as promulgated, it is possible that depleted uranium could be classified as Class C waste.

The point of these remarks is that the State of Utah should carefully consider whether there needs to be a requirement for disposal of depleted uranium that a performance assessment shall also consider potential exposures of future inadvertent intruders and whether there should be a numerical performance standard for protection of inadvertent intruders (a limit on effective dose equivalent of 500 mrem per year, for example). Such requirements would go beyond what is required in 10 CFR 61. If such a requirement were instituted, the State would need to consider the important issues of disposal requirements for depleted uranium, an appropriate numerical performance standard, and definition of credible intrusion scenarios. Not to address protection of inadvertent

intruders in some way would seem to me to be irresponsible, given that large volumes of depleted uranium most certainly would not qualify as Class A waste on the basis of analyses used to establish the waste classification system in 10 CFR 61 and may not even qualify as Class C waste.

[3] Finally, I would like to comment on the last two sentences in paragraph (2)(a), which address the compliance period and the need for an analysis that extends to the time of peak projected dose. These provisions are of critical importance for disposal of depleted uranium because, as everyone is aware, the radiological hazard of uranium increases with increasing time to about 1 million years, due to ingrowth of Ra-226 and its short-lived decay products, especially Rn-222. The increase in hazard amounts to orders of magnitude compared with the hazard from depleted uranium today.

First, I am concerned about the wording that the compliance period "will be a minimum of 10,000 years." The use of "minimum" here leads to a vague specification of the performance period. In my view, the performance period needs to be clearly and unambiguously stated in the regulation, although a less satisfactory approach would be to include guidance with the regulation to indicate how the compliance period might be determined. But, in general, licensees need specific requirements, not vague and ambiguous statements. This would also benefit decision makers.

Second, I do not understand how simulations beyond the performance period "will be performed for a qualitative analysis for the period where peak dose occurs" ("qualitative" is the problem). Simulations would produce quantitative results (whether they are credible is another matter entirely). Perhaps what is intended here is that quantitative simulations would be used to render some kind of qualitative judgment about performance at far future times. Regardless of the intent, however, I do not believe that the meaning of this statement is clear.

Third, related to the previous point is the following issue: How will the State use results of an analysis beyond the compliance period (whether it is qualitative or quantitative) in making a judgment about whether disposal of depleted uranium is acceptable? It seems to me that the regulations, or perhaps an accompanying guidance document, need to give some indication of how results of such an analysis will be used in deciding on the acceptability of disposal of depleted uranium.

[4] I would say in closing that depleted uranium poses special problems in regard to protection of inadvertent intruders and the time frame for compliance with regulations that NRC clearly will need to deal with in revising its regulations to accommodate disposal of this material. There are no obvious precedents for dealing with this kind of waste.

I thank you for this opportunity to comment.

Sincerely,

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