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ADJUDICATIONS STAFF

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To: Nuclear Regulatory Commission
From: HEAL Utah
Subject: Site-Specific Analysis Rulemaking (Unique Waste Streams) Docket ID NRC-2011-0012
Date: June 13, 2011

Below are comments on behalf of HEAL Utah on three documents released by the NRC in May 2011: Part 61: Site Specific Analysis for Demonstrating Compliance with Subpart C Performance Objectives - Preliminary Proposed Rule Language; Technical Basis for Proposed Rule to Amend 10 CFR Part 61; and Technical Analysis Supporting Definition of Period of Performance for LLW Disposal.

Thank you in advance for the opportunity to comment.

1. First, allow us to continue to register our dismay that the NRC considers near surface disposal an appropriate and safe mechanism for disposing of long-lived waste streams such as Depleted Uranium. As we and many other stakeholders have previously noted – in comments which the Commission has apparently chosen to ignore – climatic factors that today might make a near-surface site apparently suitable for long-lived nuclear waste will almost certainly radically change over time, invariably making such sites unsuitable in the future.

   As evidence, we point to a site no further away than EnergySolutions' LLRW facility in Clive, Utah. A growing body of scientific evidence suggests that waters from an enlarged Great Salt Lake (termed "Lake Gilbert") may have reached the Clive site as recently as 10 or 11,000 years ago. Even EnergySolutions itself, which had previously fiercely insisted that any future flooding of the site would be "speculative," now stipulates that flooding of the Clive site will happen at some point in the next 100,000 years. If the NRC allows DU to be buried in Clive, the entire site surrounding it will almost certainly be washed away. Hundreds of thousands of tons or more of radioactive depleted uranium decay products will mix into the Great Salt

Lake. It's solely a question of when.

Given such scenarios, we continue to believe that wastes which remain highly radioactive for timeframes longer than 1,000 years should be directed to deep geologic disposal, given that deep geologic disposal systems, buried thousands of feet below the Earth's surface, are less susceptible to climatic variation and catastrophic failure.

2. In addition, we renew our objection to the classification of unique waste streams as Class A waste. Waste streams that were not evaluated as part of the development of Part 61 should not be considered Class A, even if such waste streams will be required to pass a performance assessment and intruder analysis, as prescribed in these proposed rules. Grouping unique wastes and Class A wastes under the same umbrella, even though such wastes might entail vastly different disposal requirements and considerations and analyses, undermines the entire purpose of a waste classification system. We suggest that unique waste streams not be considered Class A, and instead be termed, simply, "unique waste streams," until such time as they are appropriately classified under a federal analysis and rulemaking.

3. Next, we urge the Commission to clarify some critical language within § 61.41 of the Proposed Rule Language which calls for a performance assessment "that evaluates peak annual dose up to 20,000 years following closure of the disposal facility."
    a. The confusing language is "**up to** 20,000 years." It sounds like a period less than 20,000 would suffice. Does that mean the assessment could go up to 5,000 years? To 10,000 years? We urge an edit that changes it to "that evaluates peak annual dose **for a minimum of** 20,000 years following closure of the disposal facility." "**At least**" would also work. But not "**up to**."

4. We applaud the proposed language regarding the inadvertent intruder analysis; specifically, that "the intruder assessment **must** assume that an inadvertent intruder occupies the disposal site after closure and engages in activities that unknowingly **expose the intruder to radiation** from the waste" and that, "[t]he intruder assessment must identify the intruder barriers and examine the performance of the barriers. The intruder assessment must also address the effects of uncertainty on the performance of the barriers."

We believe this language requires an inadvertent intruder analysis, and that an inadvertent intruder cannot simply be "assumed away," for example by assuming that no one would ever engage in activities that could uncover waste at a specific site.

In addition, to further clarify, we ask that the Commission add one more phrase **§ 61.7 Concepts. (c)(7)**: "A narrative description that explains why an inadvertent intruder would never occupy a given disposal facility or engage in activities that uncover waste or lead to inadvertent exposures—for example, because a facility is located in a particularly inhospitable or arid place—would not satisfy the requirement for an intruder assessment in this part."

5. Under the "concepts" section of the Proposed real language it says, "For long-lived waste and certain radionuclides prone to migration, a maximum disposal site inventory based on the characteristics of the disposal site may be established to limit potential exposure."
    a. We are eager to hear more about this – and wonder when and how such maximum limits will be defined. While we continue to believe that near surface disposal is a terrible choice for depleted uranium, we are glad to hear that the NRC recognizes that for any one LLRW site to contain all of the estimated 700,000 tons of DU would be particularly inappropriate.

6. We now turn to the "Technical Analysis Supporting Definition of Period of Performance for Low-Level Waste Disposal," which describes how NRC staff determined the parameters contained in the draft rules. On p. 28, the analysis states: "Based on the September 2009 workshops, the staff believes that there is a general consensus that a dose limit of 25 mrem TEDE is appropriate for the compliance period (NRC 2009a, NRC 2009b). Staff also believes that this is an appropriate dose limit for the compliance period."

    We continue to believe that TEDE (Total Effective Dose Equivalent) is a poor choice for calculating safe doses of radioactivity. We borrow here from analysis done by our colleague Dr. Arjun Makhijani in "IEER Comments on the Nuclear Regulatory Commission's Rulemaking Regarding the 'Safe Disposal of Unique Waste Streams Including Significant Quantities of Depleted Uranium'" from Oct. 30, 2009.

Makhijani argues convincingly that "organ doses" is a much more accurate and protective criteria for determining the impact of human exposure than whole body analyses. He points out that for many radionuclides, the impacts of the same dose of isotopes is many times stronger on a given organ than it is on the whole body. We quote:

> SECY-08-0147 did not calculate organ doses at all despite the fact that the main radionuclides in question – uranium-238, uranium-234, thorium-230, radium-226, radon-222 (and its daughters) – have dose conversion factors for particular organs that are much greater than for the equivalent dose to the whole body. For instance, the bone surface dose due to radium-226 per unit intake by ingestion is about 44 times larger than the whole body dose equivalent. As another example, the target organ for radon-222 (and its decay products) is the lung and other organs get minimal doses. When organ dose to whole body equivalent ratios for inhalation are considered (important in case waste is uncovered by erosion, especially in dry areas), the differences can be even greater. The ratio of bone surface dose to the whole body effective dose equivalent for inhalation of medium solubility thorium-230 is more than 50.

Makhijani was told at a workshop that TEDE was a more "modern" way of calculating doses than using organs. He then replied:

> I pointed out that human beings still have organs, and 10 CFR 61 Subpart C requires organ dose calculations, so it is not a question of "modern" methods of calculation. Further, the most recent EPA method of internal dose calculation, published as Federal Guidance Report 13, allows for both organ dose and whole body effective dose equivalent calculations. So it is not even a question of "modern" methods versus obsolete methods. Also, whether a certain method is "modern" or not or whether only whole body equivalent doses are used in other parts of the NRC's work is irrelevant. The plain language of the present DU rulemaking process requires an evaluation relative to the performance requirements of 10 CFR 61, and those requirements are in Subpart C. In turn, Subpart C requires, among other things, limitation of organ dose. Hence, in every circumstance where organ dose may exceed whole body effective dose equivalent, as is the case with DU disposal, the rule *requires the calculation dose to the critical or most exposed organ.*

Thus, we urge the NRC to calculate the impacts of radionuclides on individual organs – rather than using whole body TEDE – in developing the critical maximum dose levels contained in the draft rules.

Thanks again for the opportunity to comment.

Sincerely,

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Rulemaking Comments

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Subject: HEAL Utah Comments on Site-Specific Analysis Rulemaking (Unique Waste Streams)
Attachments: HEAL Utah comments on NRC unique waste docs.docx

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