Dane Finerfrock - Fwd: Comments concerning proposed Rulemaking on Depleted Uranium

From: Sonja Robinson
To: Dane Finerfrock
Date: 2/1/2010 7:09 AM
Subject: Fwd: Comments concerning proposed Rulemaking on Depleted Uranium
Attachments: Utah DU.pdf

>>> "Peter C. Burns" <prof.peter.c.burns@gmail.com> 1/31/2010 9:04 PM >>>
Dear Board Members,

Please consider my comments concerning the DU rulemaking that are given in the attached PDF.

Sincerely,

Peter Burns

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Peter C. Burns
Henry Massman Professor of Civil Engineering
Director, Energy Frontier Research Center
Concurrent Professor, Chemistry and Biochemistry
Department of Civil Engineering and Geological Sciences
University of Notre Dame
Notre Dame, IN 46556
(574)-631-5380

petercburns.com

UNIVERSITY OF
NOTRE DAME

Materials Science of Actinides
Energy Frontier Research Center

156 Fitzpatrick Hall
Notre Dame, Indiana
46556 USA

Peter C. Burns, Director
Ginger Sigmon, Managing Director

***tel* (574) 631-5380**
***fax* (574) 631-9236**

Comment to the Utah Nuclear Regulatory Board
Concerning Disposal of Depleted Uranium in Shallow Landfills

Dear Members of the Board,

I am writing to provide comment concerning the proposed rulemaking related to disposal of depleted uranium and aspects of the proposed performance assessment requirements. I am the Henry Massman Professor of Civil Engineering and Geological Sciences at the University of Notre Dame, and have been employed as a faculty member of the university for 13 years. I earned a B.S. (1988), M.S. (1990) and Ph.D. (1994) in geology prior to two years of post-doctoral research experience and one year on faculty at the University of Illinois. I have published more than 250 scientific papers, the majority of which deal with the mineralogy, geochemistry or structural chemistry of uranium. I have been the principle investigator on several Department of Energy and National Science Foundation projects concerning uranium, and am currently Director of the Energy Frontier Research Center *Materials Science of Actinides*. My past research efforts included studies related to the proposed repository at Yucca Mountain and contamination of the subsurface with radionuclides at former weapons production facilities. I served as an expert panel member on two recent (fall, 2009) NRC round-table discussions on a proposed rulemaking concerning disposal of depleted uranium, and am currently a member of a National Academy of Sciences study panel examining nuclear waste forms. Full details of my background and scientific accomplishments/credentials can be found at petercburns.com

The safe disposal of depleted uranium (DU) is a unique challenge. Unlike class A wastes, it becomes more dangerous (radioactive) with time, with a peak radioactivity occurring after about 1,000,000 years (due to the ingrowth of daughter products). Uranium is also a toxic heavy metal, which presents a risk in addition to that associated with its radioactivity. Shallow landfill disposal presents numerous pathways for release of radioactivity into the environment. I consider it unwise to dispose of DU in landfills, but will restrict my comments to the specific rulemaking you contemplate.

With the details depending on the specific form of uranium, it is rather soluble in oxygenated (above the water table) groundwater, and transport of uranium through the vadose zone into the groundwater table can be rapid under some geologic conditions. The rate of transport through the natural environment depends on several factors that are difficult to quantify and that vary through time. Although much of the performance assessment modeling associated with disposal of DU tends to emphasize the radon risk, leakage of uranium into groundwater and surface water poses a considerably larger and longer-term risk to the biosphere and humanity. It is easier to focus on the radon risk, which is only relevant for individuals located near the emplaced waste due to the short half life of the isotope. I contend that the much larger risk is contamination of groundwater and surface water with dissolved uranium, as this can impact an entire watershed.

The maximum peak risk (dose) associated with disposal of DU will occur in the distant future, on the order of 1,000,000 years. The proposed regulatory timeframe of 10,000 years does not capture this expected peak dose, but may be defensible relative to the viability of the calculations and models, and the defensibility of models that extend beyond that timeframe. I applaud the proposed wording that requires at least a qualitative assessment of risk to peak dose, as this will necessarily address such factors as climate change.

Performance assessment models can be substantially flawed by incorrect assumptions, omissions, errors in fact. lack of understanding of the operative processes, or even intentional biasing. As such, my primary recommendation to the Board is that a robust system of peer review be established for the examination of any performance assessment intended to support the disposal of DU. Specifically, I am recommending that upon receipt of an application for a disposal license with the supporting documentation and performance assessment models, the government of Utah seek a review of the performance assessment models. This review should be conducted by a team of scientists/engineers who are independent of the company seeking license, the government of Utah, the NRC, and the various other stakeholders.

I propose that the peer review be conducted by a panel of about six individuals spanning the disciplines of geochemistry, hydrology, climate change, geomorphology, geotechnical, and health physics. The panel should be specifically charged with the detailed review of the model with an emphasis on at least the following:

- the validity of models of physical and chemical processes
- the validity of bounding assumptions
- errors and/or omissions
- areas of uncertainty that exceed the model's claims
- the details of implementation of the model (computer code, etc.)

I suggest the peer review panel be given six months to provide a report that would be submitted to the government and that would be a public document. The company could then respond to any issues with a revised performance assessment if they deemed it appropriate, and the government could proceed to a decision on the issue of licensing. The six-month delay this peer review would cause seems warranted when it is weighed against the potential consequences of poor decisions relative to the environment and public trust.

Sincerely,

Peter C. Burns
Henry Massman Professor
Director, Energy Frontier Resarch Center