

May 22, 2003

Jessie Hill Roberson
Assistant Secretary for
Environmental Management
U.S. Department of Energy
Washington, D.C. 20585

SUBJECT: RESPONSE TO U.S. DEPARTMENT OF ENERGY'S REQUEST FOR
U.S. NUCLEAR REGULATORY COMMISSION INPUT ON THE DRAFT
LONG-TERM STEWARDSHIP SCIENCE AND TECHNOLOGY ROADMAP

Dear Ms. Roberson:

In your March 5, 2003, letter to me, you asked for U.S. Nuclear Regulatory Commission (NRC) information that might be relevant to the draft Long-Term Stewardship (LTS) Science and Technology Roadmap. As the draft Roadmap indicates, there are many challenges and unique capabilities that may need to be enhanced to achieve an effective LTS program. Many of these challenges are also relevant to our Decommissioning and Uranium Recovery programs that include long-term stewardship related activities.

Seeking and exchanging information among those groups involved with LTS should help the U.S. Department of Energy's (DOE) LTS capability enhancements, as well as make this information available for wider use. Therefore, we support DOE's coordination initiative and appreciate the opportunity to provide DOE with information and insights from our efforts.

Information about our ongoing activities and recent reports that are related to the Roadmap capabilities are identified in Attachment 1. We have included both regulatory information from the Office of Nuclear Material Safety and Safeguards, as well as research results from the Office of Research. We have not included resource estimates for specific projects. However, our projects are generally much less than \$1 million.

In addition, we are providing comments in Attachment 2 regarding statements made in the draft Roadmap about the design and effectiveness of engineered systems such as disposal cell caps/covers discussed under the Roadmap term "Contaminant Containment Capability." In particular, we are concerned that the draft Roadmap does not recognize, and possibly has not taken full advantage of, the extensive and relevant NRC and DOE experience gained from the regulation, design, and construction of uranium mill tailings caps/covers over that past decade.

J. H. Roberson

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Some of the statements in the draft regarding design and effectiveness of existing caps/covers are inconsistent with our uranium mill tailings experience, and could be misunderstood.

If you have any questions about our response, please contact Robert L. Johnson at (301) 415-7282, rlj2@nrc.gov.

Sincerely,

/RA/ M. Federline for

Martin J. Virgilio, Director
Office of Nuclear Material Safety
and Safeguards

Attachments:

1. NRC Projects and Reports with Similarities to the Capabilities Identified in DOE's Draft Long-Term Stewardship Science and Technology Roadmap
2. NRC Staff Comments Regarding the Draft LTS Roadmap

J. H. Roberson

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Some of the statements in the draft regarding design and effectiveness of existing caps/covers are inconsistent with our uranium mill tailings experience, and could be misunderstood. If you have any questions about our response or if your staff would like to discuss our response, please contact Robert L. Johnson at (301) 415-7282, rlj2@nrc.gov, who will make appropriate arrangements.

Sincerely,

/RA/ M. Federline for

Martin J. Virgilio, Director
Office of Nuclear Material Safety
And Safeguards

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* See Previous Concurrence

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Attachment 2

NRC STAFF COMMENTS REGARDING THE DRAFT LTS ROADMAP

The observations and conclusions regarding engineering designs and existing cover systems in Section 2.2.2, entitled “Key Capability 2–Contamination Containment and Control Systems” on page 15 do not recognize and possibly did not take full advantage of the extensive and important NRC and DOE experience gained from the regulation, design, and construction of uranium mill tailings caps/covers over that past decade. Furthermore, some of the statements regarding design and effectiveness of existing caps/covers are inconsistent with our uranium mill tailings experience. Therefore, these statements could be misunderstood as currently written, and could benefit from more complete discussion.

In particular, the following two statements on pages 14 and 15 respectively are of concern: “Current design approaches typically fail to account for inevitable changes over the long term in the environmental setting of containment units.” and “Most existing CC&C designs rely on conventional engineering methods that fail to incorporate key aspects of environmental change.” These statements do not recognize that the NRC guidance and DOE design and construction experience for uranium mill tailings impoundments and erosions protection caps are based on projections of environmental changes that would be of greatest impact on the site and design, such as flooding, precipitation, infiltration, and erosion. The approaches specifically have been developed to consider these environmental changes and protective designs for unconventionally long time periods of 1000 years or more.

Another example is the statement “The limited field evaluations available to date show that many existing cover systems are already showing the effects of erosion and biointrusion (Jones et al.).” Similarly, the following conclusion is given on page 16: “Current designs for surface barriers (covers and caps) attempt to block contaminant release processes such as water flux, erosion, and biointrusion. These designs have failed in the short term because their barrier capability degrades with time.” This conclusion is inconsistent with our experience. NRC’s view is that there is extensive and relevant design and field experience at over 20 uranium mill tailings sites under the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), and that generally, cover designs have had acceptable performance to date. There have been a few cases with limited cover deterioration, and for these the causes have been determined and appropriate corrective action taken by both NRC and DOE. For example, NRC’s guidance in NUREG-1623 was revised to reflect the lessons learned from these cases (e.g., rock quality selection and rock placement).

The statements on page 15, “Systems currently deployed or being planned rely on continuous maintenance or other active interventions (such as water treatment). Other approaches require periodic replacement to continue function as intended.” do not recognize that caps designed for uranium mill tailings sites are designed with the objectives of lasting up to 1000 years and with no reliance on active maintenance. The purpose of such designs is to minimize the potential for periodic replacement and the reliance on costly ongoing maintenance over long time periods. Additionally, the designs are analyzed to control contamination of groundwater and avoid long-term treatment. We know of no cases where the long-term protection of groundwater relies on continuous intervention such as long-term treatment.

We suggest that NRC’s regulatory guidance and supporting technical basis references along with DOE’s extensive design, construction and monitoring experience over the past 10 years be evaluated to determine how this experience can be incorporated into the Roadmap. If this experience already has been considered, the discussions in the draft Roadmap should be revised

to acknowledge the existence of this information and provide a balanced discussion of both the successes, lessons learned, and remaining challenges. Similarly, international experience with engineered caps, for example in France (L' Anbe and La Manche) and Spain (ElCabil), might also be helpful.

This suggestion should contribute to the objective discussed on page 15 of the Roadmap that developing Capability 2 will allow alternative CC&C systems to function over the long-term with a significantly reduced degree of intervention (including maintenance, monitoring, and institutional control). To accommodate long-term environmental change, these alternatives would integrate and accommodate natural processes. Specifically, proposed Enhancement 2.2, would design, build, and operate next-generation containment and control systems that would continue to function over extended periods by mimicking natural processes and accommodating environmental change. This was the intent of the containment and control systems designed and built by DOE and approved by NRC under the UMTRCA Title 1 program.