

/o=State of New Mexico/ou=First Administrative Group/cn=Recipients/cn=john.kieling

From: John Tauxe, PhD, PE [engineering@tauxe.net]
Sent: Wednesday, May 03, 2006 8:37 AM
To: Bearzi, James, NMENV
Cc: Kieling, John, NMENV
Subject: RE: SNL MWL Responses to Comments

To whom it may concern at NMED:

As per my recent email exchange with James Bearzi, I have been instructed to submit public comments now for purposes of the 14-day public comment period commencing May 25, the date of a meeting concerning the SNL MWL. I will not be able to attend the meeting since I will be on travel at that time and throughout the following comment period. I have no proxy to present these comments at the meeting.

Please consider the following comments on the document entitled "SNL RESPONSE TO PUBLIC COMMENTS AND CITIZEN ACTION COMMENTS ON THE MIXED WASTE LANDFILL CORRECTIVE MEASURES IMPLEMENTATION PLAN", Enclosure 1: SNL Response to Public comments on the Mixed Waste Landfill Corrective Measures Implementation Plan, dated 20 April 2006.

Responses to my previous comments begin on page 8 in the PDF version of the document. I here address the numbered SNL responses:

1. Selection of the inventory distribution.

The choice of a uniform distribution is consistent with the state of knowledge of the inventory (typical of most legacy waste inventories, it is poor), but the choice of an upper bound that is twice the best estimate is arbitrary. A defensible derivation should be provided.

2. This response indicates that no intrusion scenarios were considered in the performance assessment model, biotic or otherwise, stating that scenarios were restricted to those considered to be the most significant and probable. I submit that biotic intrusion in the form of plant roots and insects (specifically ants) is quite probable and is potentially significant, despite the anticipated presence of a rock biointrusion barrier, which would not be effective at precluding intrusion by plant roots and ants. At other DOE radioactive waste sites in a similar environment (e.g. Los Alamos National Laboratory, Nevada Test Site) biointrusion is modeled as a contaminant transport pathway. At the NTS, it is in fact THE dominant CT pathway. Biotic intrusion should be considered by default to be most probable and potentially very significant. To dismiss it would require a compelling argument, which has not been presented.

The second paragraph of response #2 mentions that "...care will be taken during long-term monitoring to prevent deep-rooting plant species from establishing themselves on the MWL cover." Such maintenance plans should not be considered in performance assessment CT modeling, since they are merely plans, and they presume the presence of institutional control.

Assuming effective IC is certainly not "conservative". Long term IC at the site may be a matter of policy, but cannot be taken for granted. The most likely scenario may be that IC is lost after a century or so (DOE O 435.1 specifies that 100 y of IC may be assumed, but that longer periods require justification), and that native plants will reclaim the site. Citing the monitoring plan is inadequate justification for ignoring the effect of plants in the CT model.

A rock biointrusion barrier is also mentioned as an engineered cap feature intended to preclude biointrusion. While this may be effective at discouraging penetration by small mammals, it has no effect on plant roots or on the behavior of ants. Ants, as has been shown by field research at the NTS, can move a surprising amount of material, including waste, and may reach depths of over 4 meters. No intrusion barrier has been found that will effectively keep ants out of the waste other than a cap thick enough to host all their activity.

A further assumption regarding biointrusion is hinted at in the response: that the barrier "should restrict root growth so long as the underlying materials are

relatively dry". If a cap with impermeable barriers such as geomembranes is proposed, the cap will tend to get quite wet underneath, as has been demonstrated at LANL's MDA AB at Technical Area 49, where an asphalt cover resulted in saturated conditions underneath, since the water could not get out via evapotranspiration. In these arid environments, the best cap is a simple monofill of natural materials such as the alluvium surrounding the MWL. The trick is simply to make it thick enough to act as a sponge for episodic infiltrating water, and encourage plant growth to keep it dry. Specification of a RCRA Subtitle C type cap is misguided. The optimal cap should be based on performance, not on a rigid design.

4. This response states that "Accumulation and accountability of Rn-222 decay products would require a transient model." This is entirely correct. The performance assessment model that was developed was steady state, atypical of such models in the DOE LLW community. I second the suggestion that a transient model be developed in order to adequately account for the decay products of Rn-222 building up in the cap. Specifically, Pb-210 and its immediate short-lived parents and progeny can be strong dose makers in cap materials, especially through the incidental soil ingestion and external irradiation pathways.

5. Response #5 indicates that "The current performance assessment did not include exposure due to [external irradiation] or incidental ingestion of surface soils." Again, this is not in keeping with analyses typical of the DOE LLW performance assessment community. The dose analysis should consider these pathways, in concert with an adequate CT model including transport processes upward into the cap. The amount of water ingested is irrelevant to these exposure pathways.

6. Response #6 states in effect that the inhalation scenario of breathing clear air above the site will produce a higher dose than a scenario of breathing indoor air in a structure placed on the site. This is the opposite of how most of the dose assessment community sees it. Structures tend to concentrate vapors and gases that migrate in through the floor, especially in a house with a dirt floor crawl space. The claim that the outdoor air scenario is conservative is not supported.

Thank you for this opportunity to submit followup comments to SNL's responses. I hope that this exchange will promote development of a more comprehensive fate and transport model and dose assessment for the MWL.

- John Tauxe, PhD, PE