STAFF'S RESPONSE TO THE JUNE 9, 2006,
ADVISORY COMMITTEE ON NUCLEAR WASTE LETTER:
"FUTURE VOLCANISM AT YUCCA MOUNTAIN - COMMENTS ON THE NRC STAFF MODEL FOR THE FLUVIAL REDISTRIBUTION OF VOLCANIC TEPHRA."

RECOMMENDATION 1: CONSIDERATION OF THE EFFECTS OF WIND AND FLUVIAL REDISTRIBUTION

The focus of the staff's presentation was on the fluvial redistribution of tephra. Ongoing staff work related to wind (i.e., eolian) redistribution and its integration with modeling of fluvial redistribution is not yet complete. Staff is aware that the two processes of eolian and fluvial redistribution are expected to occur simultaneously and is accounting for both processes in the development of its abstracted model. As work progresses in this area, staff can provide additional information regarding how the modeling approach for eolian redistribution is integrated with the modeling of fluvial redistribution, and the potential risk significance of both processes.

RECOMMENDATION 2: CONSIDERATION OF THE EFFECT OF LARGE FLOOD EVENTS

The current approach to modeling fluvial redistribution relies on a mass balance approach in which elevated airborne concentrations of waste particles at the reasonably maximally exposed individual (RMEI) location are supported by replenishment from the upstream fluvial catchment (source) region for as long as waste particles remain in the source region. This replenishment arises from both relatively frequent (small) and infrequent (large) flood events that are capable of redistributing contaminated tephra to the depositional fan. Deposition beyond the area of the active depositional fan associated with infrequent large flood events is not expected to significantly influence the long-term average airborne waste particle concentration at the RMEI location. Nevertheless, staff remains cognizant of the potential for infrequent large flood events and have included the effects of 100-yr and 500-yr floods in development of mass redistribution relationships.

RECOMMENDATION 3: REVIEW AND DOCUMENTATION OF TECHNICAL BASES FOR MODEL PARAMETERS, ASSUMPTIONS, AND PROCESSES

To date, the technical basis for the redistribution model has been documented in Hooper and Benke (2006), Benke et al. (2006), Hooper (2005), Mohanty et al. (2005), Hill et al. (2004), and Hooper (2004), in addition to multiple abstracts and U.S. Nuclear Regulatory Commission/ U.S. Department of Energy letters. As work progresses in this area, staff anticipates that additional documentation will be developed to support refinement of the abstracted redistribution model and its associated parameters.

Enclosure

REFERENCES:

Hooper, D., and R. Benke. 2006. Fluvial redistribution of contaminated tephra: Process-level modeling and parameter estimation. *International High-Level Radioactive Waste Management Meeting*, May 2006, Las Vegas, Nevada. In press.

Benke, R., B. Hill, and D. Hooper. 2006. Fluvial redistribution of contaminated tephra: Description of an abstracted model. *International High-Level Radioactive Waste Management Meeting*, May 2006, Las Vegas, Nevada. In press.

Hooper, D. 2005. Modeling the long-term fluvial redistribution of tephra in Fortymile Wash, Yucca Mountain, Nevada. ML052910334.

Mohanty, S., and others. 2005. Risk Analysis for Risk Insights Progress Report. ML051580323.

Hill, B.E., D. Hooper, J. Rubenstone, and J. Trapp. 2004. 4.3.10—Volcanic Disruption of Waste Packages (DIRECT1) and 4.3.11—Airborne Transport of Radionuclides (DIRECT2). Risk Insights Baseline Report. ML040560162.

Hooper, D.M. 2004. First-order Conceptual Model for Fluvial Remobilization of Tephra along Fortymile Wash, Yucca Mountain, Nevada. ML041320668.