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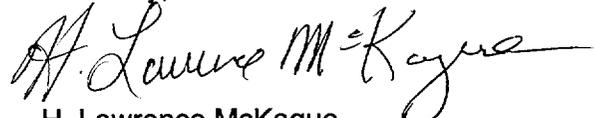
U.S. Nuclear Regulatory Commission
ATTN: Dr. John S. Trapp
Office of Nuclear Material Safety and Safeguards
Two White Flint North, Mail Stop 7 D13
Washington, DC 20555

Subject: Completion of Administrative Item—Review of DOE Information Addressing Igneous Activity Key Technical Issue Agreement Item 2.12 (AI 01402.461.271)

Dear Dr. Trapp:

Attached is AI 01402.461.271, entitled "Review of DOE Information Addressing Igneous Activity Key Technical Issue Agreement Item 2.12." This review provides a basis for accepting the methodology proposed by DOE to address staff concerns with airborne particle concentration distributions used in DOE performance calculations. Although no new data are presented, the proposed methodology will likely result in information that adequately addresses staff concerns. If you have any questions, please contact Dr. Brittain Hill at 210-522-6087 or me at 210-522-5183.

Sincerely,



H. Lawrence McKague
Element Manager, GLGP

HLM:rae

Attachment

cc:	J. Linehan	D. Riffle	J. Schlueter	C. McKenney	CNWRA Element Managers
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**REVIEW OF DOE INFORMATION ADDRESSING IGNEOUS ACTIVITY
KEY TECHNICAL ISSUE AGREEMENT ITEM 2.12
BRITTAIN HILL, JULY 2002**

Summary

A Letter Report entitled "Particulate Inhalation, Revision 00," was submitted by the U.S. Department of Energy (DOE) to fulfill Igneous Activity Key Technical Issue Agreement item 2.12. This agreement is for DOE to provide clarifying information on the basis for airborne particle concentration distributions used in DOE performance calculations. Based on staff review of the Letter Report and other available information, the technical approach proposed in this Letter Report appears adequate to satisfy Igneous Activity Key Technical Issue Agreement item 2.12. Staff conclude that DOE does not currently have a technical basis to address staff concerns regarding airborne particle concentration parameters, but that DOE has an adequate approach to develop such information prior to a potential license application.

Igneous Activity Key Technical Issue Agreement Item 2.12

"Provide clarifying information on how PM_{10} (i.e., particles with mean aerodynamic diameters of $10\ \mu m$ or less) measurements have been extrapolated to TSP (i.e., total suspended particulate) concentrations. This should include consideration of the difference in behavior between PM_{10} and TSP particulates under both static and disturbed conditions. DOE will provide clarifying information on how PM_{10} measurements have been extrapolated to TSP concentrations. This will include consideration of the difference in behavior between PM_{10} and TSP particulates under both static and disturbed conditions in a subsequent revision to the analysis and model report Input Parameter Values for External and Inhalation Radiation Exposure Analysis (ANL-MGR-MD-000001) or equivalent document. This will be available to the NRC in FY02."

Review

Most airborne particle concentration measurements are made for particles with aerodynamic diameters of $10\ \mu m$ or less (i.e., PM_{10}). Particles with mean aerodynamic diameters up to $100\ \mu m$ (i.e., TSP), however, can be suspended in the breathing zone. Particles $10\text{--}100\ \mu m$ are inhalable but are too large to reach the lung. Normally these $10\text{--}100\ \mu m$ particles are ingested and rapidly cleared from the body with negligible health effects. For radiological dose calculations involving high-level waste (HLW), however, some isotopes of americium and plutonium have non-negligible dose conversion factors for naso-pharyngeal exposure under normal clearance rates. Risk assessments for the proposed repository site at Yucca Mountain thus must consider doses potentially received from HLW-contaminated particles with mean aerodynamic diameters up to $100\ \mu m$.

The Letter Report on Particulate Inhalation primarily reiterates information presented in CRWMS M&O (2000). Total suspended particulate concentrations currently used by DOE are extrapolated from PM_{10} measurements using a TSP: PM_{10} ratio of 2.5:1, which is based on direct measurements taken above static Mt. St. Helens 1980 tephra deposits. Airborne particulate concentrations measured above basaltic tephra-fall deposits at Cerro Negro volcano in Nicaragua, however, show TSP: PM_{10} ratios are sensitive to the level of surface disturbing activity on the deposit (Hill et al., 2001). Although static deposits can have TSP: PM_{10} ratios of approximately 2.5, these ratios can increase to approximately 10:1 for highly disturbed deposits (Hill et al., 2001). Thus, use of

TSP:PM₁₀ ratios from static deposits (i.e., CRWMS M&O, 2000) may underestimate airborne particle concentrations above disturbed deposits.

The Letter Report on Particulate Inhalation outlines additional information that supports the apparent sensitivity of TSP:PM₁₀ ratios to surface disturbing conditions. The report states DOE is developing a new approach to calculating airborne particle concentrations, which uses concentrations for a range of static and disturbed deposit conditions. This report also summarizes an approach by DOE to develop appropriate TSP:PM₁₀ ratios for a set of undisturbed and disturbed deposit conditions relevant to evaluating potential inhalation doses to a reasonably maximally exposed individual. The deposits will be analogous to post-eruption volcanic fall deposits, with exposure times based on the behavior of a reasonably maximally exposed individual. Staff conclude that the proposed approach appears likely to result in a technical basis adequate to support parameter ranges of airborne particle concentrations for static and disturbed deposits following a potential repository-penetrating volcanic event. DOE intends to provide the results of these planned investigations to the NRC in early 2003, at which time they will be reviewed by appropriate staff.

References

CRWMS M&O. "Input Parameter Values for External and Inhalation Radiation Exposure Analyses." ANL-MGR-MD-000001. Rev. 01 ICN 00. North Las Vegas, Nevada: DOE, Yucca Mountain Site Characterization Office. 2000.

Hill, B.E., C.B. Connor, J. Weldy, and N. Franklin. "Methods for Quantifying Hazards from Basaltic Tephra-Fall Eruptions." C. Stewart, ed. Proceedings of the Cities on Volcanoes 2 Conference, Auckland, New Zealand, 12-14 February 2001. Institute of Geological and Nuclear Sciences Information Series 49. Lower Hutt, New Zealand: Institute of Geological and Nuclear Sciences Limited. p. 50. 2001.