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M E M O R A N D U M

DATE: December 22, 2000
TO: Mal Murphy [malmurphy@home.com]
CC: Danielle Fife **[**dfife@nrff.com]
RE: **SATURATED ZONE FLOW & TRANSPORT AMR Reviews**
Features, Events, and Processes in SZ Flow and Transport
ANL-NBS-MD-000002

Key Items are:

1. p. 15, Section 4.1, Paragraph 2. Water density and viscosity based on 20°C reservoir temperature. This will lead to slower settling velocity.

2. p. 24, Section 6.1.1.2, Paragraph 1 & p. 26, 6.1.5.2. **Groundwater system is modeled as a mixing cell assuming that all the contaminants discharged at the 20-km boundary are intercepted by the community's wells. This will be overly optimistic if the mixing cell combines *all* the produced water with *all* the contaminant.** Check references CRWMS M&O 2000e: AMR on "Input and Results of the Base-Case Saturated Zone Flow & Transport Model for TSPA" ANL-NBS-HS-000030 and "Type Curve Calculations Mass Transport in Parallel Fractures Used in Particle-Tracking Scheme in the Saturated Zone" B00000000-01717-0210-00089.

3. p. 24, Section 6.1.1.2, Paragraph 2. **Does not include existing wells explicitly, but assumes they are included through matching head data – this ignores transients (as described in Parviz's AVYM Model) and is only true if wells have pumped long periods at same rates.**

4. p. 24, Section 6.1.1.2, Paragraph 2. “Changes over time in the behaviors and characteristics of the critical group [Amargosa Valley residents] including, but not necessarily limited to, land use, lifestyle, diet, human physiology, or metabolics; shall not be considered.” **Presumably population growth is also not considered.**

5. p. 30, Section 6.1.10.2, top of page. They used a single Kc parameter for sorption of colloids, based on Americium sorption. This probably does not give sufficient credit to colloid retardation, but may be insignificant overall.

6. p. 33, Section 6.2.1.2, Paragraph 1. This arm waving assumes hydrothermal activity would cause convection, therefore mixing, therefore mixing and thus be good. It is wrong, because it ignores the potential for accelerated displacement causing more rapid, less diluted transport.

7. p. 46, Section 6.3.2.2, Paragraph 1. “Modeling indicates future spring locations are not likely to be within that twenty-kilometer radius (D’Agnese et al. 1999, p. 32).” Spring deposits around EWDP wells demonstrate a substantial possibility of such, even if not a likelihood. **Springs closer to Yucca Mountain could lead to early release to surface prior to 20-km distance, with less dilution or aging.**

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