REQUEST FOR ADDITIONAL INFORMATION (RAI)
Volume 3—Postclosure Chapter 2.2.1.4.2, 1st Set (Demonstration of Compliance with the Human Intrusion Standard)
(RAIs 1 through 3)
(DEPARTMENT OF ENERGY'S SAFETY ANALYSIS REPORT SECTIONS 2.4.3)

RAI #1
Clarify the technical basis for the amount of water entering the waste package for the human intrusion scenario. Also, provide a comparison of the amount of water estimated to enter the human intruded waste package with the amount estimated to enter waste packages that have patch failures.

Basis: The SAR implies that the 'only' water that enters a waste package that is breached due to a human intrusion event is the water that enters the borehole (i.e., other seepage water does not enter the breached area caused by the intrusion). It is unclear as to why other seepage water that enters the drift could not enter the breached area of the waste package caused by the intrusion. The staff needs this information to determine compliance with 10 CFR Part 63.322.

RAI #2
Clarify the technical basis for delay of radionuclide transport due to matrix diffusion in the borehole.

Basis: Advective flow of water in the borehole potentially results in very short travel times (e.g., on the order of a few years) in the borehole when fracture-matrix interactions are ignored (see section 2.4.3.3.5.1 of the SAR, page 2.4-316). The SAR suggests that sorbing radionuclides are delayed significantly due to matrix diffusion (Figure 2.4-170). But the supporting information does not clearly explain the basis for how the relatively slow matrix diffusion process has such a significant effect given the very short travel times and the limited time over which the matrix diffusion process can occur. The staff needs this information to determine compliance with 10 CFR Part 63.314.

RAI #3
Address the impact on overall performance of drilling through the perched water below the repository to the saturated zone, considering the volume and areal extent of the perched water and the potential effect on the transport of radionuclides within the unsaturated zone.

Basis: DOE has included perched water in its TSPA as a feature that deflects radionuclide transport paths laterally to faults, then down to the saturated zone. The human intrusion scenario (i.e., borehole to the saturated zone) could result in a borehole penetrating the perched zone and thereby potentially affecting the pathway of radionuclides within the perched zone

down to the saturated zone (i.e., radionuclides released from breached waste packages, which are transported to a perched zone, could subsequently enter the borehole and move down the borehole to the saturated zone). The staff needs this information to determine compliance with 10 CFR Part 63.322.