Comments of the Groundwater Advisory Panel

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On

"The Potential for Off-Site Exposures Associated with the Santa Susana Field Laboratory, Ventura County, California" by Center for Environmental Risk Reduction, University of California at Los Angeles, California

The Panel is providing the following comments based on a preliminary review of the subject report, primarily Chapter 7 entitled "TCE Contamination". It is anticipated that additional comments will be prepared following a complete review.

The report describes in Section 7.2 "A Simplified Conceptual Model of TCE Distribution in SSFL Groundwater". There are both conceptual and factual errors in this section which result in erroneous inferences and conclusions.

1) **"This means that the infiltrating TCE penetrated to depths below the water table and continued to sink until the resistances posed by friction against the fracture walls and buoyancy forces halted its progress".** Friction is force that acts only when there is motion. It affects the rate of DNAPL motion, but has no influence on when DNAPL ceases to move. Buoyancy is a driving force always acting to promote downward migration; it can never act to halt the progress of downward migration of DNAPL. Downward motion of DNAPL ceases only when all driving forces are balanced.
2) **"At SSFL, where fractured flow dominates, DNAPL dissolution is expected to be slow and most of the DNAPL that reaches groundwater may still be harbored in fractures".** Thousands of measurements of TCE mass present in cores provide overwhelming evidence that no significant DNAPL is now present in the SSFL groundwater. The conclusions drawn from these data are supported by

widely accepted calculations of the time required for DNAPL in fractures to dissolve into contiguous waters.

3) **“Thus, the MW model’s estimates of diffusive penetration into sandstone are much higher than would be suggested by the team’s estimate of the diffusion coefficient of TCE”.** This statement in Section 7.3.1 summarizes an inference made at several places that Boeing and its consultants have overestimated the effect of diffusive mass transfer of TCE into the sandstone matrix because sorption may be greater than used by Boeing. However, it is a well known fact that sorption, as characterized by the retardation factor, actually increases the rate of mass transfer from the fracture to the matrix, instead of decreasing it as claimed in the subject report. The reasoning and mathematical support for this fact are described in detail in Chapter 12, “Dense Chlorinated Solvents and Other DNAPLs in Groundwater, Pankow and Cherry, editors. This chapter references and summarizes several papers that are relevant to this issue. Also, it is shown in this chapter that the dependence of mass transfer from fracture to matrix upon tortuosity is not nearly as strong as implied by the authors. In fact, if one uses the values for retardation and tortuosity presented in Section 7.3.1, it is concluded that more TCE has transferred to the matrix than is calculated using typical parameters for SSFL.