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April 4, 1997

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Subject: TWRS Vadose Zone Characterization

Dear Messrs. Clarke, Fitzsimmons and Wagoner:

### **Background**

In February 1996, new data were disclosed that contamination in the form of cesium-137 has been found deep in the ground beneath tanks in Hanford's SX Tank Farm. The DOE responded by appointing an independent Vadose Zone Expert Panel to examine data and resolve the question whether these data were indicative of contaminants moving as a broad plume through the formation or moving down the borehole itself. As of December 1996, two new boreholes had been drilled, using techniques that were less likely to cause borehole contamination. The new data confirm that contamination exists in the vadose zone formation to a depth of at least 130 feet and this is not a result of borehole effects.

The Expert Panel's report quoted extensively from recent findings of the National Academy of Sciences National Research Council (NAS) in its review of the TWRS Draft Environmental Impact Statement, Hanford Tanks: Environmental Impacts and Policy Choices (NAS, Washington, D.C., 1996). The NAS noted "an adequate understanding of the extent to which soil and groundwater beneath the tanks have been contaminated is crucial to tank remediation planning" (p. P-8). The NAS further noted:

- "Decisions on waste in the tank are interrelated with decisions regarding the soil and groundwater contaminated by past leaks and deliberate discharges" (p. 36).
- "It is not at all evident how a preferred tank waste retrieval and treatment remediation alternative can be selected rationally without simultaneously considering what is to be done with contamination left behind" (p.37).

- “Adequate characterization of the tank wastes and surrounding contaminated environment will be required for processing of waste that is removed for treatment and for in situ disposition of wastes not removed from the tanks (either by choice or necessity). A better understanding of what has already leaked and how rapidly it is moving toward the groundwater is needed for assessing risks. Significant uncertainty currently exists concerning the sources and migration paths of cesium and technetium that have been found at some depth beneath the tank farms. Leakage from the tanks caused by sluicing, as well as the risk associated with waste left in the tanks, must be analyzed during the first phase in the context of overall risks. The mechanisms and rates of migration of cesium and other radionuclides originating from the tank farms and from other waste disposal facilities at the Hanford Site also need to be better understood” (p. 52). [Emphasis added]

## Advice

The Hanford Advisory Board believes that DOE must heed the advice of the Vadose Zone Expert Panel and the National Academy of Sciences. The HAB notes that Hanford continues to spend money on modeling tank farm contamination using inaccurate and incomplete data. Further, the HAB notes that DOE is proceeding with existing plans to remediate tanks such as C-106, heedless of the new findings and their implications. Finally, it appears that the effort to characterize the vadose zone is under-funded, understaffed, and of low priority. This situation continues despite the new data.

This advice is designed to ensure that TWRS work goes forth in a safe and sound manner. It should in no way be construed as running counter to the Board’s value of “getting on with cleanup.” The Board remains committed to ensuring DOE meet its goal of expeditious, safe, and efficient removal, treatment, and disposal of tank wastes. Far from slowing the TWRS disposal program, new vadose zone data emphasize the importance of moving forward aggressively.

The HAB therefore recommends that DOE take the following actions:

1. Provide adequate resources necessary to develop a comprehensive plan and investigate and document the extent of the radiological contamination of the vadose zone. This should include continued support to the Expert Panel and a budgetary increase of the vadose zone project in consultation with the Expert Panel and this Board.
2. Continue to integrate vadose zone characterization issues between programs at Hanford, as recommended by the HAB in Consensus Advice No. 54 (November 8, 1996).
3. Evaluate any and all activities at the Hanford tank farms that contribute liquid discharges to the ground that could “drive” the existing contamination deeper.
4. Revisit C-106 leak detection issues, with an emphasis on providing a monitoring system to assure maximum leak detection capability and the best possible environmental protection.
5. Develop and implement an effective public involvement plan on the vadose zone issue so that information is readily available to interested parties, and input from a wide variety of sources can be considered.
6. Revise or supplement the TWRS EIS to assure that reliable and accurate data are used to make future decisions regarding retrieval and closure.

We look forward to your response and to periodic progress updates on this matter.

Very truly yours,

Merilyn B. Reeves, Chair  
Hanford Advisory Board

cc: Alice Murphy, Designated Federal Official  
The Oregon and Washington Congressional Delegations  
Randy Smith, Environmental Protection Agency  
Dan Silver, Washington Department of Ecology

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*This advice represents HAB consensus for this specific topic. It should not be taken out of context to extrapolate Board agreement on other subject matters.*

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*For questions or comments, please send [email](mailto:Hanford_Advisory_Board@rl.gov) to Hanford\_Advisory\_Board@rl.gov*  
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