



Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

0049578 061237

AUG 6 1998



Mr. Raymond E. Isaacson
2106 Lee Boulevard
Richland, Washington 99352-3658

Dear Mr. Isaacson:

TRANSPORT OF RADIONUCLIDES TO THE GROUND WATER TABLE

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This letter is in response to the letter to Mr. John Wagoner from you, same subject as above, dated May 29, 1998. Mr. Wagoner has assigned me the responsibility of integrating vadose zone activities and groundwater activities at Hanford to assure the protection of groundwater and the Columbia River.

Enclosed please find copies of the Resource Conservation and Recovery Act (RCRA) assessment documents for the tank farms that are found to be impacting groundwater resources. Many of your concerns are addressed in the reports. In general, the Groundwater Project scientists agree with the theoretical aspects of hydrology that you make in your letter. Indeed, nearly all the mass of the contaminants, measurable by gamma monitoring techniques, are held in the soil column relatively close to the bottom of the tanks. However, the groundwater monitoring wells for the tank farms show small quantities of mobile contaminants, generally technitium-99 and chromate, are reaching the groundwater in pulses. In addition, we see excess quantities of calcium and magnesium in these wells, indicating that the sodium from the tank releases is forcing these ions off of the soil exchange sites. Recent sampling in the SX-Tank Farm shows negligible contamination close to the water table directly below the deepest part of the plume mapped by kriging of the gamma data. This one borehole, coupled with the groundwater data, provides indications that preferential pathways may be the mechanism for transport of mobile contaminants from tank leaks to the groundwater table. The report for this borehole will be published within a month.

The factors most likely causing the pulses of mobile contaminants to reach the groundwater include:

- Gravel covers over the tank farms increase infiltration and recharge of snowmelt and rainfall relative to ambient conditions.

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- Some tanks farms have surface features that also enhance ponding of snowmelt and rainfall on the gravel.
- It is suspected that there are leaking pressurized fresh water lines within or adjacent to tank farms.
- The tanks create an "umbrella effect" concentrating percolating water around the tanks and through the highest concentrations of contaminants.
- Unsealed drywells may provide pathways for short-circuiting a portion of the soil column.
- Geologic features such as clastic dikes may also provide direct pathways or may influence vertical flow by acting as boundary conditions to lateral spreading in layered strata.

In all sincerity, please accept my invitation to participate in Hanford's initiative for resolving vadose zone issues. Your years of experience and first-hand knowledge of Hanford Site conditions and past practices are needed in order to resolve vadose zone issues. Earlier this year, a new Project was created to integrate and establish a sitewide approach to managing groundwater and vadose zone issues, and to assess Hanford's impacts upon the Columbia River. This project is called the Groundwater/Vadose Zone Integration Project. Information regarding this project, which is in the planning phase, can be found on the Internet: <http://www.bhi-erc.com>. The web site contains project workshop and team meeting minutes, as well as the initial work plan ("Plan for a Plan", published in April 1998). Weekly project team meetings are held for all interested people, in order to keep our stakeholders informed and involved in the many decisions being made as the project evolves. If you would like to attend these meetings, or would like information regarding other ways to become involved, contact Ms. Karen Strickland, Bechtel Hanford, Inc., at 372-9236, and she can assist you. If you like, she will add you to the project distribution network, which will enable you to receive routine updates via facsimile or e-mail.

If you have any questions or need further information please contact one of the following key Hanford contacts:

- Mr. K. Michael Thompson, Groundwater, at 373-0750,
- Messrs. Richard A. Holten or K. Michael Thompson, Groundwater/Vadose Zone Integration Project, at 376-3963 or 373-0750, respectively, and
- Mr. David S. Shafer, Tank Waste Remediation System Vadose Zone, at 376-9255.

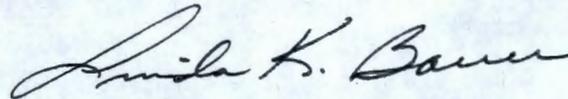
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The U.S. Department of Energy, Richland Operations Office, thanks you for your continued interest in the Hanford Site. If I can be of any further assistance, please contact me at 376-6628.

Sincerely,



Linda K. Bauer, Assistant Manager
for Environmental Restoration

GWP:KMT

Attachments:

1. PNNL-11826, UC-502
2. PNNL-11810, UC-502
3. PNNL-11809, UC-502