



Department of Energy  
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APR 24 1996

Ms. Marilyn B. Reeves  
Environmental Restoration Committee  
Hanford Advisory Board  
800 N.W. Sixth Ave., Suite 342  
Portland, Oregon 97209

Dear Ms. Reeves:

HANFORD SITEWIDE GROUNDWATER REMEDIATION STRATEGY (HANFORD ADVISORY BOARD [HAB] ADVICE #40)

ITEM 1:

The U.S. Department of Energy, Richland Operations Office (RL) appreciates the HAB's recent endorsement of the Hanford Groundwater Remediation Strategy. Significant actions are presently underway that are in concert with the strategy:

- The Record of Decision (ROD) for pump-and-treat operations at 100-HR-03 and 100-KR-04 was signed on April 1, 1996. Remedial design is already underway. The existing pilot-scale pump-and-treat system continues to function at 100-D Area (100-HR-03 Operable unit) for chromium (10,300,000 gallons processed and 83 pounds of chromium removed).

- Pilot pump-and-treat operations at 200-UP-01 Operable Unit for uranium and technetium also continue to operate (8,700,000 gallons processed and 49 pounds of uranium removed). A ROD is forthcoming for an interim remedial action for pump-and-treat operations in this operable unit.

- Pilot pump-and-treat operations at 200-ZP-01 also continue to operate for carbon tetrachloride (5,300,000 gallons processed and 188 pounds of carbon tetrachloride removed). Components for the pump-and-treat system required under the 200-ZP-01 ROD are being delivered and construction is underway.

- The 200-ZP-02 vapor extraction system is operating and has removed 149,000 pounds of carbon tetrachloride from the soil column.

- The pump-and-treat system at 100-N for strontium-90 continues to operate and a report evaluating the system's effectiveness has been delivered to State of Washington Department of Ecology (Ecology) (9,500,000 gallons processed and 0.04 Ci of strontium-90 removed).

The Groundwater Remediation Strategy will be revised periodically as new data becomes available. Eventually, as the operation of the pump-and-treat systems provide performance and aquifer hydraulic data, predictive numerical modeling will be incorporated into the strategy. Revisions to the strategy will be documented in periodic revised publications of the Hanford Groundwater Protection Management Plan.

Ms. Marilyn B. Reeves

-2-

APR 24 1996

## ITEM 2 (Strontium-90):

The Tri-Party Agreement requires RL to provide Ecology recommendations regarding continuation of N-Springs pump-and-treat system and system upgrades. The existing pump-and-treat system is significantly reducing groundwater flow to the river (approximately 75 percent reduction). It is also providing information on commercially available treatment options and demonstrable groundwater cleanup standards. Therefore, the existing pump-and-treat system is meeting the Expedited Response Action (ERA) goals established in the September 23, 1994, Action Memorandum. RL has recommended to Ecology that the system continue to operate until a final remedy is implemented. The present Environmental Restoration Project planning baseline provides funding for Activity Data Sheet (ADS) 3125-0 (NR-02 Groundwater Remediation/Pump-and-Treat) at the following levels: Fiscal Year (FY) 1996 = \$3,705,000, FY 1997 = \$2,637,000, and FY 1998 = \$1,128,000. The final remedy will be based on the corrective measures study to be submitted in November 1996. In addition, a modeling evaluation indicated that modification of the existing extraction well network would increase the <sup>90</sup>Sr flux reduction to 94 percent when operating at 189 L/min. The cost evaluation illustrated that an increased pumping rate would decrease the cost per gallon over the life of the ERA. Furthermore, the cost evaluation showed that increasing the pumping rate to 60 gal/min could be accomplished for a minimal added capital and operating cost. Therefore, RL also recommended to Ecology that the existing extraction well network be modified to increase <sup>90</sup>Sr reduction up to approximately 96 percent.

It is, however, important to note that the reduction of <sup>90</sup>Sr to the river is predominantly the result of capture of the <sup>90</sup>Sr plume by hydraulic control measures, not by reducing the contaminant concentration or mass. The Hanford Sitewide Groundwater Remediation Strategy (DOE-RL 1994a) estimates the unconfined aquifer contains approximately 75.5 Ci, of which 75 Ci are adsorbed on the sediments within the unconfined aquifer, and about 0.5 Ci is dissolved in the groundwater. These numbers suggest the remaining 1,791 Ci are located in the cribs or contained within the vadose zone below the cribs. The pump-and-treat system currently in operation demonstrates the difficulty of restoring the aquifer (mass removal) because of its heterogeneity and the difficulty of removing <sup>90</sup>Sr from the aquifer sediments. It is estimated that 0.1 Ci of <sup>90</sup>Sr will be removed on an annual basis with the existing system. Based on recent geochemical studies by Serne and LeGore (1996), if the treatment system was terminated even after operating for 10 years the <sup>90</sup>Sr concentrations in the groundwater will rapidly return to near pre-ERA concentrations (minus radioactive decay).

## ITEM 2 (Chromium):

Ecology, U.S. Environmental Protection Agency, and RL finalized the ROD for an interim action requiring pump-and-treat remedial action for hexavalent chromium at 100-H, 100-D, and 100-K Reactor areas on April 1, 1996. These areas are within the 100-HR-03 and 100-KR-04 Operable Units. RL is proceeding with design efforts and will take all reasonable actions to expedite design,

Ms. Marilyn B. Reeves

-3-

APR 24 1996

procurement and construction of the treatment systems. The present Environmental Restoration Project planning baseline provides funding for ADS 3110-0 (100-HR-03/KR-04 Groundwater Remediation/Pump-and-Treat) at the following levels: FY 1996 = \$11,133,000, FY 1997 = \$9,095,000, and FY 1998 = \$4,384,000. These levels are sufficient to design, procure, install, and operate pump-and-treat systems as required to meet the objectives of the ROD.

ITEM 3 (Treatability Test at N-Area):

Funding will be provided by RL to perform pump-and-treat actions at N-Springs as directed by Ecology. As cited above, RL has recommended to Ecology that upgrades be made to the well system and to increase the treatment rate from 50 gallons/minute to 60 gallons/minute to increase capture of <sup>90</sup>Sr to approximately 96 percent. Funding is available to perform these upgrades and concurrently conduct the clinoptilolite (zeolite) insitu treatment zone treatability test. It is RL's desire to have data on both options for inclusion into the Corrective Measure Study (the document Ecology will use as a basis for the final remedial action decision).

RL will continue to engage the public and the Environmental Restoration Committee on the treatability test. The test plan is expected to be released to the public for a 30-day comment period in the near future. We will be prepared to provide an update at the April 1996 meeting of the Committee.

RL appreciates the opportunity to discuss groundwater issues before the HAB. The HAB has been instrumental in providing guidance used in the formulation of the cleanup strategy. If you have any further question, please contact me on (509) 373-0750.

Sincerely,



K. Michael Thompson, Senior Project Manager  
Groundwater Project

GWP:KMT