United States Department of the Interior

BUREAU OF RECLAMATION
Upper Columbia Area Office
1917 Marsh Road
Yakima, Washington 98901-2058

IN REPLY REFER TO:

MAY 4 2007

UCA-1120
PRJ-3.00

Interested Parties

Subject: Information about Hypothetical Simulations of Potential Impacts to Hanford Site Unconfined Aquifer from Black Rock Reservoir Seepage

Dear Ladies and Gentlemen:

Enclosed is a copy of the Pacific Northwest National Laboratory (PNNL) report, *Potential Impacts of Leakage from Black Rock Reservoir on the Hanford Site Unconfined Aquifer: Initial Hypothetical Simulations of Flow and Contaminant Transport* (March 2007). This report was the result of the Bureau of Reclamation asking PNNL about what amount of additional groundwater, regardless of source, would impact the Hanford site. PNNL, under contract to Reclamation, then prepared this "qualitative assessment" of how much groundwater could potentially result in adverse effects on the unconfined aquifer, including transport of contaminants, at the Hanford site.

The report models hypothetical groundwater flow increases of 27,000 and 16,000 acre-feet per year entering the west boundary of the site from Cold and Dry Creeks drainages. The 27,000 acre-foot per year seepage was the modeled groundwater volume that raised the groundwater level back to the historical high of the peak operational period of the Hanford site. Since 1988, the elevation of the aquifer under the Hanford site has been declining due to the cessation of wastewater discharges into the ground (section 1.1, page 1.2). The 16,000 acre-feet/year represents a midpoint between the 27,000-acre-foot per year volume and the existing natural groundwater recharge estimated at 5,000 acre-feet/year from the Cold and Dry Creeks drainages.

The 27,000 acre-foot per year hypothetical groundwater increase is not based on any estimates of seepage from the potential Black Rock reservoir. Reclamation is currently developing a groundwater model and preparing an estimate of the seepage that could be expected from the reservoir area. The Reclamation groundwater modeling report, which will include a peer review by the U.S. Geological Survey, will be made available to the public. PNNL will use the results of the groundwater modeling to run additional simulations to show how that seepage might impact the Hanford site.

If you have questions, please contact Mr. Kim McCartney at 509-575-5848, extension 370, or Mr. Gerald Kelso at 509-575-5848, extension 202. You may also access this report on the Storage Study website: www.usbr.gov/pn/programs/storage_study.

Sincerely,

Kim McCartney
Storage Study Manager

April 30, 2007

Dear Report Recipient:

RE: PNNL-16272

In March 2007, the Pacific Northwest National Laboratory issued a report documenting initial scoping calculations performed for the U.S. Bureau of Reclamation on potential impacts to the Hanford unconfined aquifer from the proposed Black Rock Reservoir. This report (PNNL-16272), entitled "Potential Impacts of Leakage from Black Rock Reservoir on the Hanford Site Unconfined Aquifer: Initial Hypothetical Simulations of Flow and Contaminant Transport," contained minor typographical errors on pages 4.5 and 4.9 that do not influence the results or conclusions contained in the document. Please replace pages 4.5 and 4.9 with the pages accompanying this letter to correct these errors.

Sincerely,

Vicky Freedman
Senior Research Scientist
Pacific Northwest National Laboratory

Table 4.1. Peak Concentrations and Arrival Times at the Core Zone Boundary for Tritium. Relative peaks and arrival time differences are with respect to the Base Case (no additional flux).

Case	Peak Concentration (pCi/L)	Arrival Time (yr)	Relative Peak	Arrival Time Difference
No Additional Flux	31,000	2005	–	–
16,000 Acre-ft/yr	30,300	2005	0.98	0
27,000 Acre-ft/yr	30,000	2005	0.97	0

Table 4.2. Peak Concentrations and Arrival Times at the Core Zone Boundary for Iodine-129. Relative peaks and arrival time differences are with respect to the Base Case (no additional flux).

Case	Peak Concentration (pCi/L)	Arrival Time (yr)	Relative Peak	Arrival Time Difference
No Additional Flux	6.93	2005	–	–
16,000 Acre-ft/yr	6.57	2005	0.95	0
27,000 Acre-ft/yr	6.39	2005	0.92	0

Table 4.3. Peak Concentrations and Arrival Times at the Core Zone Boundary for Technetium-99. Relative peaks and arrival time differences are with respect to the Base Case (no additional flux).

Case	Peak Concentration (pCi/L)	Arrival Time (yr)	Relative Peak	Arrival Time Difference
No Additional Flux	150	2005	–	–
16,000 Acre-ft/yr	144	2005	0.96	0
27,000 Acre-ft/yr	142	2005	0.95	0

Table 4.4. Peak Concentrations and Arrival Times at the Core Zone Boundary for Uranium-238. Relative peaks and arrival time differences are with respect to the Base Case (no additional flux).

Case	Peak Concentration (pCi/L)	Arrival Time (yr)	Relative Peak	Arrival Time Difference
No Additional Flux	5.99	2280	–	–
16,000 Acre-ft/yr	8.54	2108	1.43	-171
27,000 Acre-ft/yr	9.03	2088	1.51	-191

Table 4.5. Peak Concentrations and Arrival Times at the Columbia River for Tritium. Relative peaks and arrival time differences are with respect to the Base Case (no additional flux).

Case	Peak Concentration (pCi/L)	Arrival Time (yr)	Relative Peak	Arrival Time Difference
No Additional Flux	66,700	2005	–	–
16,000 Acre-ft/yr	72,900	2007	1.09	+2
27,000 Acre-ft/yr	79,300	2007	1.19	+2

Table 4.6. Peak Concentrations and Arrival Times at the Columbia River for Iodine-129. Relative peaks and arrival time differences are with respect to the Base Case (no additional flux).

Case	Peak Concentration (pCi/L)	Arrival Time (yr)	Relative Peak	Arrival Time Difference
No Additional Flux	7.83	2005	–	–
16,000 Acre-ft/yr	6.94	2005	0.89	0
27,000 Acre-ft/yr	6.58	2005	0.84	0

Table 4.7. Peak Concentrations and Arrival Times at the Columbia River for Technetium-99. Relative peaks and arrival time differences are with respect to the Base Case (no additional flux).

Case	Peak Concentration (pCi/L)	Arrival Time (yr)	Relative Peak	Arrival Time Difference
No Additional Flux	178	2005	–	–
16,000 Acre-ft/yr	178	2005	1.0	0
27,000 Acre-ft/yr	177	2005	0.99	0

Table 4.8. Peak Concentrations and Arrival Times at the Columbia River for Uranium-238. Relative peaks and arrival time differences are with respect to the Base Case (no additional flux).

Case	Peak Concentration (pCi/L)	Arrival Time (yr)	Relative Peak	Arrival Time Difference
No Additional Flux	7.28E-04	2305	–	–
16,000 Acre-ft/yr	2.75E-01	2305	378[(a)]	[(a)]
27,000 Acre-ft/yr	3.68E-01	2278	505[(a)]	[(a)]
(a) Peak occurred at end of simulation (true peak did not occur).				