



Heart of America Northwest

The Public's Voice for Hanford Cleanup

1314 NE 56th St, Suite 100 - Seattle, WA 98105

206.382.1014 - www.hoanw.org - hoanw.blogspot.com

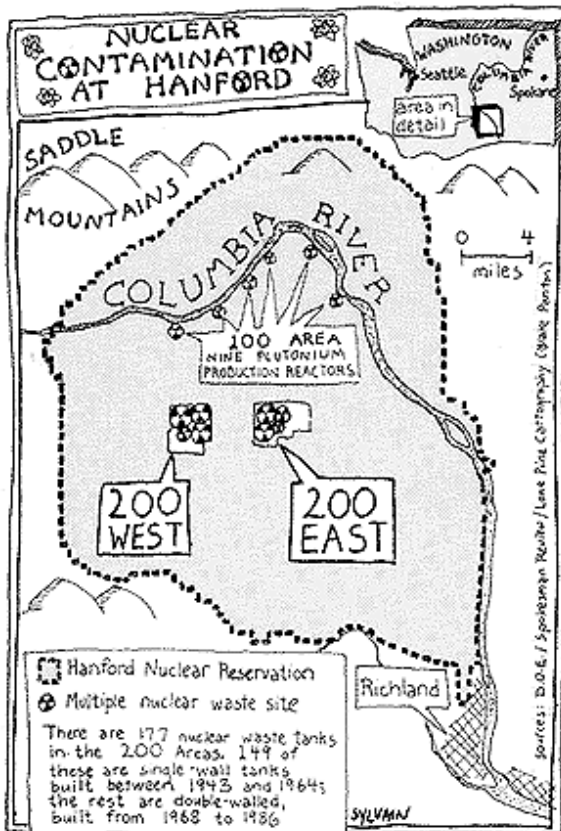
Proposed Extension of Apatite Barrier to prevent Strontium-90 from reaching the Columbia River

Submit comments by July 22, 2010 to: 100NRPP@rl.gov or

Paula Call, USDOE – RL; P.O. Box 550, A7-75; Richland, WA 99352

What is Strontium-90?

Strontium-90, a radioactive isotope of Strontium, is a nuclear fission product with a 29 year half-life, and a groundwater contaminant at the Hanford Site. Strontium-90 is a particular contaminant of concern in the "100-N area," which is very near the Columbia River and the site of the N Reactor. The N Reactor differed from Hanford's other nuclear reactors because its cooling system was a closed loop instead of single pass. Cooling water was cycled through one hundred times instead of once before being discharged; this conserved water but led to higher concentrations of contaminants in the discharges. Frequently, the cooling water was discharged into unlined ditches and trenches in the ground near the reactor. As a result, the groundwater under the 100-N area is now contaminated with Strontium-90 at levels above 1,500 times the Drinking Water Standard.



The 100 N area of the Hanford Site is located right along the Columbia River.

The proposal

This proposal is to extend the apatite permeable reactive barrier in Hanford's 100-N area (see map). The apatite barrier removes Strontium-90 (Sr-90) from the groundwater before the contamination reaches the Columbia River. Previously, the Department of Energy (USDOE) operated a pump and treat system to achieve the goal of a 90% reduction in the flow of Sr-90 into the River, but the system was poorly designed. While the treatment technology did remove Sr-90 from the extracted water, the treated water was re-contaminated with Sr-90 upon reinjection, and the net gain from the pump and treat system was a hydraulic gradient.

Thus, in 2006, USDOE built a 300 foot stretch of apatite barrier along the Columbia River in the 100N area as a field test of its effectiveness in capturing Sr-90. USDOE determined that the apatite barrier resulted in a 90% reduction of Sr-90 entering the River in one year. They are now proposing to extend the apatite barrier from its current length of 300 feet to 2,500 feet to effectively span the entire plume of Sr-90 contaminated groundwater. Under the proposal, USDOE would also decommission the pump and treat system, which was shut off in 2006.

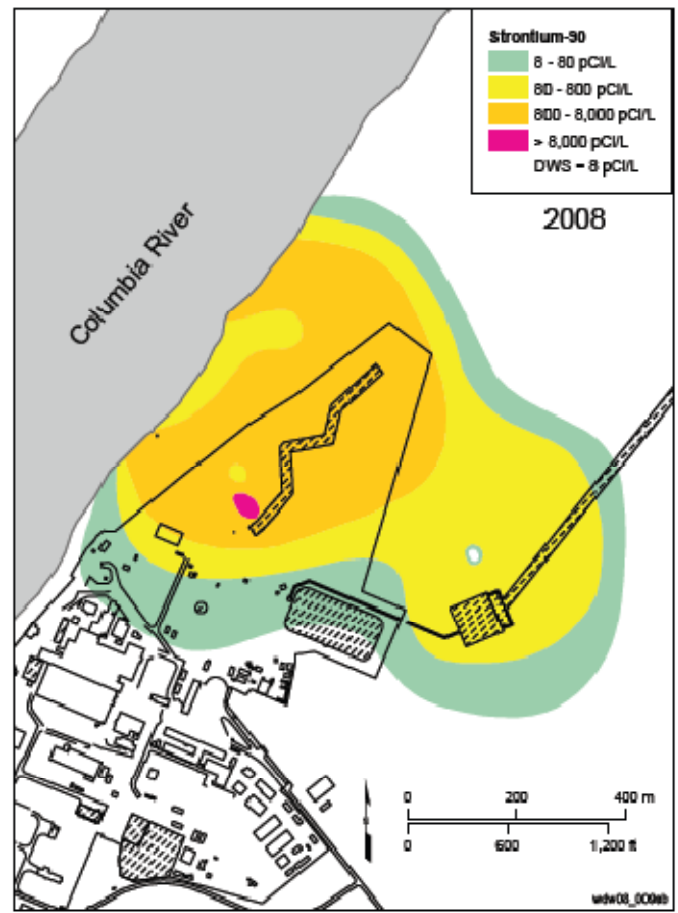
How does the apatite barrier work?

Upon human exposure to Strontium-90, usually via ingestion of contaminated substances, the Sr-90 is deposited in the bone and bone marrow because it acts like calcium. Sr-90 accumulates and can cause bone deformities in fish and other animals, including humans. Internal exposure is linked to bone cancer, cancer of the soft tissue near the bone, and leukemia.

The apatite barrier is permeable to water, but mimics calcium in the bones as it sequesters the Sr-90 as the groundwater flows through. Under the proposal, chemicals that form apatite are injected into the ground to a depth of 30 feet at a location very close to the bank of the Columbia River in Hanford's 100-N are. The barrier is supposed to then stay in place and function for 300 years. After 300 years, the Sr-90 will have naturally decayed through ten half-lives and will no longer be a threat to human health and the environment. In summary, the apatite barrier functionally filters and binds Sr-90 as the contaminated groundwater flows through it en route to the Columbia River.

Heart of America Northwest's Concerns

- The apatite barrier, while probably effective in reducing the flow of Sr-90 into the Columbia River, does not constitute a final remedial action for the 100-NR-2 operable unit. The Sr-90 contamination in the groundwater itself must be addressed;
- Heart of America Northwest does not support the provision in the proposal to decommission the pump and treat facility and piping. The Department of Energy should consider restarting the pump and treat system in addition to extending the apatite barrier;
 - Reasonable and thorough explanations for the "failure" of the pump & treat system have not been given to the public;
- The shoreline of the Columbia River along the Hanford Reach is designated critical habitat under the Endangered Species Act. What are ecological effects of creating a massive concentration of Sr-90 built up in the apatite barrier very close to the Riverbank for 300 years?
 - Additionally, the chemical impacts of injecting high concentrations of the apatite forming media on the aquatic life and life on the Riverbank are not adequately discussed;
 - The Department of Energy did not consult the National Marine Fisheries Service or the United States Fish and Wildlife Service about this plan, as they are legally required to do under the Endangered Species Act;
- The Department of Energy is required to bring the Sr-90 plume in the 100-N area into compliance with the Drinking Water Standard by December 31, 2016 (M-016-110-T03). Heart of America Northwest is concerned that this milestone in the Tri-Party Agreement will not be met through the apatite barrier alone;
- We are concerned that USDOE plans to only construct the apatite barrier to a depth of approximately 30 feet, when non-USDOE models indicate that the majority of the Strontium-90 is in the lower part of the aquifer;
 - Another factor of our concern is that permeability of the barrier will decrease over time. As the barrier plugs up with Strontium-90 or some other media, groundwater will simply flow around the barrier. If the barrier does not extend all the way to the bottom of the aquifer, contaminated groundwater could flow under the barrier and proceed into the Columbia River;



Strontium-90 contamination plume in 100-N groundwater; the federal Drinking Water Standard is 8 pCi/L, and the area shaded red is over 1,000 times the Drinking Water Standard. Image from 2008 Hanford Site Groundwater Monitoring Report

- Remediation of the Strontium-90 in the soil on the other side of the barrier (closer to the Columbia River) still needs to be addressed;
- We are concerned that the other contaminants of concern identified in the Proposed Plan (for example: nitrate, tritium, sulfate, petroleum hydrocarbons, manganese, iron, and chromium, are not addressed in this modification of the decision.

Resources/Original USDOE documents

- Proposed Plan for Amendment of 100-NR-1/NR-2 Interim Action Record of Decision (June 2010)
http://www.hanford.gov/files.cfm/CAL_Proposed_Plan062110.pdf
- Department of Energy's factsheet for the public on the Proposal (June 2010)
http://www.hanford.gov/files.cfm/CAL_Final_Fact_Sheet062110.pdf
- Interim Remedial Action Record of Decision for the 100-NR-1 and 100-NR-2 Operable Units, Hanford Site (September 1999)
<http://www5.hanford.gov/arpir/?content=findpage&AKey=D9177845>
- Tri-Party Agreement Milestone 016-110-T03 (August 2009)
<http://www5.hanford.gov/arpir/?content=findpage&AKey=0908130230>

Submit comments by July 22, 2010 to:

100NRPP@rl.gov or

Paula Call, USDOE – RL; P.O. Box 550, A7-75; Richland, WA 99352

Questions?

Contact Heart of America Northwest:

206.382.1014

<http://www.hoanw.org>
office@hoanw.org