



Heart of America Northwest

The Public's Voice for Hanford Cleanup

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Comments on the Proposed Plan for Amendment of 100-NR/NR-2 OU Interim Action Record of Decision

Joint Comments of Heart of America Northwest and
Heart of America Northwest Research Center

Submitted to the U.S. Department of Energy (USDOE)

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Heart of America Northwest appreciates the opportunity to provide input on the proposed plan for the amendment of the 100-NR/NR-2 OU Interim Action Record of Decision. These comments are meant to transmit specific comments as well as identify broad areas of concern in regards to the proposed plan.

The apatite barrier does not constitute a final remedy

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 up to above 1,500 times the Drinking Water Standard.

This proposal is to extend the apatite permeable reactive barrier in Hanford's 100-N area. The apatite barrier removes Strontium-90 (Sr-90) from the groundwater before the contamination reaches the Columbia River. In 2006, USDOE built a 300 foot stretch of apatite barrier along the Columbia River in the 100-N 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.

However, 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. To that extent, 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 modifying and restarting the pump and treat system in addition to extending the apatite barrier.

- The apatite barrier is a reasonable plan to limit influx of Strontium-90 into the Columbia River in the 100-N Area;
- However, the apatite barrier does not constitute a final remedy for the contaminated groundwater in the 100-NR-2 Operable Unit. The Department of Energy must actively clean up the groundwater and bring it into compliance with Drinking Water Standards. Simply installing the apatite barrier and then letting the Strontium-90 decay for 200 years does not accomplish this, so the Department should modify and restart the pump and treat system to bring the Strontium-90 levels in the groundwater into compliance;
- Reasonable and thorough explanations for the “failure” of the pump & treat system have not been given to the public.

Tri-Party Agreement Milestone M-016-110-T03

The basic premise of the apatite barrier, and why it is useful in the 100-N Area, is that it will sequester Sr-90 as the groundwater passes through en route to the Columbia River. Then the Department of Energy intends to let the sequestered Sr-90 decay naturally for 300 years, until it is no longer a threat to human health and the environment. However, the Department of Energy is legally required to bring the hyporheic zone (the region beneath and next to a stream bed, where mixing of shallow groundwater and surface water occurs) and the river water column into compliance with the federal Drinking Water Standard by December 31, 2016 according to Tri-Party Agreement Milestone M-016-110-T03. The apatite barrier alone will not accomplish this, because there is already Sr-90 contamination on the other side, closer to the Columbia River, of where the barrier is slated to be injected.

- The Department of Energy is required to bring the Sr-90 in the hyporheic zone and the river water column 100-N area into compliance with the Drinking Water Standard by December 31, 2016 Heart of America Northwest is concerned that this milestone in the Tri-Party Agreement will not be met through the apatite barrier alone;
- Thus, 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;
- The Tri-Party Agreement should include a milestone binding the Department of Energy to clean up the Strontium-90 from the entire plume of contaminated groundwater in the 100-NR-2 OU.

Design concerns with the apatite barrier

USDOE plans to only construct the apatite barrier to a depth of approximately 30 feet, while non-USDOE models indicate that Strontium-90 contamination is present in the lower part of the aquifer. Injecting the barrier at limited depth will not solve the problem, but rather only slightly alleviate the quantity of contaminants that reach the river.

Another factor of 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. The lack of foresight and prevention planning by the USDOE before injecting this barrier and establishing a 300-year lifetime is of large concern and should thus be addressed immediately.

- The barrier should be constructed to a depth that covers the entire aquifer in order to maximize Sr-90 sequestration and to ensure that contaminated groundwater will not find alternate pathways (i.e., underneath the barrier) into the Columbia River.

Environmental concerns

The most significant issue is to address all the potential long-term environmental consequences of injecting the apatite barrier into the riverbank of the Columbia River in the Hanford Reach. The United States Department of Energy has established a 300 year lifetime for the barrier in which time, the Strontium-90 that has been filtered from groundwater and bound in the apatite barrier, will have naturally decayed through ten half-lives and will no longer be a threat to human health and the environment. This is provided as long as there are no environmental changes or problems with the barrier, and the lack of foresight by the USDOE could lead to more significant problems in the future.

The Columbia River through the Hanford Reach is designated critical habitat for salmon and steelhead under the Endangered Species Act. There have already been significantly documented negative effects of exposure to Strontium-90, one of the major groundwater contaminants at the Hanford Site, that include bone deformities in fish and other organisms, including humans. Exposure to Sr-90 has also been linked to bone cancer, cancer of the soft tissue near the bone, and leukemia. There have not, however, been significant studies of the effects of massive concentrations of the apatite barrier chemicals on the environment. The lack of discussion and research on this topic does not signify that the barrier is environmentally safe, but rather leads to concern about potential effects it could have once injected near the riverbank. The Department of Energy failed to consult the National Marine Fisheries Service or the United States Fish and Wildlife Service about this proposed plan, as they are legally required to do under the Endangered Species Act. Thorough research on all potential effects that could occur in the next 300 years is essential and it is essential that these agencies be consulted.

- The Department of Energy failed to consult the National Marine Fisheries Service or the United States Fish and Wildlife Service about this proposed plan, as they are legally required to do under the Endangered Species Act;
- What maintains the location of the barrier? Has the USDOE considered the impacts of possible erosion over the next 300 years that could change the shape and location of the riverbank near the barrier? The landscape of the Hanford site is largely desert-like and lacks significant trees and plants that are important for holding soil in place along riverbanks. This could lead to erosion over the next 300 years;
- The ever-growing issue of global warming is threatening the climate and could lead to serious climate changes in the next 300 years. The Pacific Northwest National Laboratories found that there might only be a few short stages throughout the year when conditions are optimal for apatite injection. Significant changes in weather and climate could also impact the placement, location, and stabilization of the apatite barrier over the 300 years of its proposed lifetime. Climate change increases the potential for changes in river patterns in unpredictable ways.
- It is this generation's obligation to ensure that Hanford's groundwater is usable. As the climate changes and water supply becomes limited, there will be increased pressure to rely on Hanford's groundwater resources;
- The apatite barrier consists of calcium salts and sodium phosphates. The effects of high concentrations of sodium and salts have been associated with kidney malfunction and problems with regulation of blood wastes in both fish and humans. Salmon are an anadromous species, meaning that they complete their lifecycle in both fresh and saltwater environments, and thus have a more complicated kidney waste filtration system. This raises questions as to the long-term effects of injecting high concentrations of this barrier into the ground near the Columbia River and the impact it could have on the health of the fish and other organisms in direct proximity to the chemicals.

Other contaminants of concern not addressed in the proposed plan

- 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.

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*Resources for citizens seeking to comment and be engaged on Hanford cleanup issues
are available at www.hoanw.org*