Hanford's Central Plateau

A perspective on cleanup decisions and priorities

Oregon Hanford Cleanup Board
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Introduction

Since cleanup at the Hanford Site began in 1989, most of the work has focused along the Columbia River corridor, specifically the six reactor areas and the 300 Area. Within the next two years, that focus is expected to begin shifting to Hanford's Central Plateau as most River Corridor work will be complete.

In past years, the U.S. Department of Energy (DOE) and its regulators, the U.S. Environmental Protection Agency (EPA) and the Washington Department of Ecology, have issued proposed strategies for Central Plateau cleanup (one by DOE, one jointly by Ecology and EPA). Neither proposal received widespread support from the other or from outside agencies or stakeholders.

In February 2014, DOE and its regulators began discussions to identify Central Plateau priorities and a process to move cleanup forward on the Central Plateau.

The Oregon Hanford Cleanup Board provides the following priorities, perspectives, assumptions and assertions to help inform those discussions as they proceed.

> **Note: retrieval and treatment of Hanford's tank waste has long been a priority for Oregon and for the Oregon Hanford Cleanup Board – and remains a priority. This document mostly does not address tank issues, but instead focuses on cleanup responsibilities that fall under authority of DOE's Richland Office.**

The Goal

A logical, integrated, risk-based, open, transparent and accountable approach towards cleanup of Hanford's Central Plateau.

Assumptions

- Cleanup of the Plutonium Finishing Plant (to slab on grade) will remain a priority and the work will be completed by 2017 or sooner.

- Tank waste retrieval will meet Tri-Party Agreement requirements (for volume of waste retrieved).

- Spent fuel stored in the Canister Storage Facility will remain on site likely for at least a few decades, but eventually will be removed from the site.

- The final remedy for the four remaining canyons will be similar to the remedy selected for U Plant canyon (disposal of waste in canyon cells; collapse of walls and roof; engineered cover).

- Designated waste disposal facilities will be appropriately capped upon completion of the operation of each of these facilities. This includes the Environmental Restoration Disposal Facility, the Integrated Disposal Facility, the Navy reactor compartment trench (trench 94), and the two mixed low-level waste trenches (with the exception of the navy compartment trench, these are engineered facilities with leachate collection). The inventory of waste going into all of these facilities is known. Liquids have been eliminated or solidified. Long term monitoring of the vadose zone and groundwater beneath these disposal facilities will continue indefinitely.

Assertions

Groundwater

- Restoration of groundwater to highest beneficial use is a priority.

- Existing groundwater treatment facilities should be expanded to optimize the groundwater cleanup, including treatment of additional contaminants.

- As long as the mass of contamination in the deep vadose zone (that will eventually re-contaminate the groundwater) is not removed or permanently immobilized, groundwater treatment – no matter how extensive – can only be considered a temporary solution.

Leaked Tank Waste and other Deep Vadose Zone Contamination

An estimated one million gallons of high-level tank waste has leaked to the soil. In addition, Westinghouse Hanford Company estimated in 1991 that more than 120 million gallons of tank waste was intentionally discharged to the ground between 1946 and 1959 to provide more tank space for newly generated waste coming out of the reprocessing plants. Some of this waste

has reached groundwater and tank waste in the soil is likely spread extensively through the soil column beneath all of the single-shell tank farms.

- The deep vadose zone becomes more difficult to remediate with each passing day, as the contaminant plumes continue to spread.

- To effectively deal with contamination in the deep vadose zone, the problem needs an increased level of priority, focus and funding, including the development of new technology.

- Characterization of contamination below the tanks is crucial before a decision can be made to either remove the tanks to access the contamination, or to safely place a barrier over each tank farm.

- Surface barriers will likely be ineffective in containing deep vadose zone contamination.

- If the deep vadose zone contaminants are not adequately addressed, the groundwater treatment programs will have to run in perpetuity.

- "Targeted" retrieval and/or treatment of below-tank contamination is an appropriate way to deal with waste under tank farms. It should not be an "all or nothing" choice.

- DOE estimates that the majority of the carbon tetrachloride that was disposed to the soil near the Plutonium Finishing Plant has vaporized and is no longer present in the soil or groundwater. Additional efforts should be made to determine whether that assumption is correct, and if not, additional remediation of the carbon tetrachloride needs to occur.

Liquid Waste Disposal Sites

Portions of DOE's decision on the PW-1, -3, -6 and CW-5 Waste Sites did not meet public expectations, as highly concentrated plutonium-contaminated soils may be left on site under fairly shallow burial. DOE has committed to excavating at least two feet additional depth of contaminated soil at the bottom of the "high-salt" waste group, and disposing of the waste at the Waste Isolation Pilot Plant (WIPP) or ERDF as appropriate.

- After removal of the two feet of soil, if sampling detects high concentrations of plutonium still remaining in the soil, DOE should follow the principle often used in the 100 Areas – that once they are digging in an area – they should continue until they remove the mass of the contamination.

Burial Grounds

- There should be a presumption of remove-treat-dispose (RTD) for shallow, long-lived and/or mobile contaminants.

- RTD on the Central Plateau is not necessarily just moving waste a matter of a few hundred yards or a few miles. "T" – "treatment" – can often result in greatly reducing the mobility or even toxicity of some wastes, reducing the likelihood of the waste migrating and reducing risk.

- The likely risk of leaving waste in place cannot be accurately predicted without sufficient understanding of what contaminants are in a particular waste site; in what quantities or concentrations; the waste form; and how combinations of these contaminants affect natural resources. Therefore, no site should be proposed for leaving waste in place without the knowledge to understand the risks imposed by doing so. This would include burial grounds where pre-1970 transuranic waste was disposed.

- "Targeted" retrieval and/or treatment – going after the most hazardous and/or mobile contaminants – is an appropriate way to deal with waste in Hanford's burial grounds. It is not an "all or nothing" choice.

- A decision to "leave waste in place" requires additional characterization that is not necessary in RTD.

Cesium/Strontium Capsules

- The cesium/strontium capsules should be moved to dry storage as soon as is reasonably possible, before eventual disposal in a deep geologic repository.

Caps/Barriers

- Barriers are NOT appropriate in all circumstances at Hanford. If contaminants in a particular waste site are long-lived and/or somewhat mobile, that waste site is probably a bad candidate for capping. In these instances, capping should be considered only if RTD is technically infeasible or costs are highly prohibitive.

- Barriers are appropriate in some situations. If the contaminants in a particular waste site are known and are hazardous for only a short period of time and they will lose their toxicity in a few years to, at most, a few decades, then the waste site might be a candidate for capping.

- When comparing costs of RTD and capping, there must be a full accounting of all costs associated with capping, including monitoring, site maintenance and repair, institutional controls, and Natural Resource Damage Assessment injury, damages, and restoration.

- In those instances where containment in place is determined to be necessary, every effort should be made to minimize both the number and size of caps. They must also be compatible with adjacent caps so that runoff does not gather in an inappropriate location or drive contaminant movement.

- When caps are used, DOE has to demonstrate through monitoring (not just modeling) that the waste is not spreading in the vadose zone or groundwater, and that the cap is working as designed. In addition, there must be trigger points that force action if the waste begins to spread and an action plan that outlines specific actions that will be taken if the trigger points are reached.

- Caps over waste sites should be self-maintaining systems that do not require active intervention, such as the spraying of herbicides or re-planting of shallow-rooted vegetation.

- In designing and constructing a cap, it should be assumed that native deep-rooted vegetation will – at some point – grow on the cap.

Tank Farm Closure

- While the retrieval of waste from the single-shell tanks remains a priority, near-term closure of the tank farms is not a high priority at this point in the Hanford cleanup. The risk posed by the emptied tanks is not an immediate risk.

Processing Canyons

- Final closure of the canyons is not a high priority at this point in the Hanford cleanup. The risk posed by the canyon facilities is not an immediate risk.

- The wastes stored in the PUREX tunnels should eventually be removed, processed, and treated and disposed as appropriate, prior to completion of PUREX closure.

Institutional Controls (ICs)

- DOE's decision to leave cesium-137 waste sites under soil cover by default extends its responsibility to maintain an active presence on site for at least 300 years.

- Areas relying on the maintenance of ICs beyond 100 years should be minimized through more robust cleanup or engineered controls.

- To ensure protection of human health and the environment, federal ownership and active control is required as long as the potential hazard exists.

- Land use control areas should only be as large as absolutely necessary. DOE should minimize both the number and size of such areas.

- CERCLA states that "ICs are appropriate to supplement, not supplant cleanup." That must be honored in considering potential ICs at Hanford.

Small and Contiguous Final Footprint

- The areas identified for waste management and containment of residual contamination should be as small as practical while ensuring that the entire area requiring protection is encompassed in contiguous areas.

Natural Resource Damage Assessment and Restoration Considerations

- The use of caps or other IC does not end Natural Resource injury. Areas that are not remediated result in larger Natural Resource injury claims and damages.

Ponds

- The ponds (like every other liquid disposal site at Hanford) must be characterized to a degree that a remedy decision can be made.

- If a pond can be demonstrated to meet cleanup levels, closure with barriers may be an acceptable option, provided the expected growth of natural vegetation and intrusion by burrowing animals will not bring contaminants to the surface, and recognizing that the natural resource injury continues in the absence of full cleanup. These factors must be included and evaluated in making the cleanup decision.

- "Targeted" retrieval and/or treatment – going after the most hazardous and/or mobile contaminants – is an appropriate way to deal with waste in Hanford's ponds. It is not an "all or nothing" choice

Tribal Rights

The entire Hanford Site is within the boundaries of the lands ceded by treaty by area Native American tribes. These treaties reserved specific rights to the tribes, including those related to hunting, fishing, gathering foods and medicines, and pasturing livestock.

- Treaty rights must be respected in cleanup decisionmaking.

- Treaty rights must be respected in terms of future land use.