

## **Draft Advice: Proposed Plan for Remediation of the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units (Draft A)**

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### **Background**

A Remedial Investigation/Feasibility Study has been completed for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units (DOE/RL-2010-95; 100-D/H RI/FS) and a Proposed Plan was prepared which highlights key information about the cleanup alternatives considered and the preferred alternative proposed for remediation.

As of December 2012, 343 sites or locations where waste was potentially disposed during past operations were identified in the 100-D/H Area. The Richland Operations Office (DOE-RL) reviewed the relevant operational histories and conducted field investigations as necessary to determine the status of each site. These reviews and investigations revealed that 52 of the 343 locations did not have contamination requiring further evaluation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which leaves a total of 291 waste sites for evaluation. The waste sites include storage tanks, ponds, trenches, cribs, French drains, solid waste burial grounds, retention basins, pipelines, and spills/leaks. The RI/FS Report concluded that without remedial action, contaminants in waste sites and groundwater would present an unacceptable level of risk to human health and the environment.

The Board supports a decision to proceed with remediation of the 100-D/H River Corridor areas, and is generally supportive of DOE's alternative analysis for the 100-D/H Areas. The Board agrees with the choice of Alternative 3 which includes removal, treatment and disposal (RTD) of chromium contamination in 11 waste sites, grout filling of five water pipes, and enhancing the pump-and-treatment remediation of groundwater with 82 new wells. While noting that Alternatives 2, 3, and 4 do not meet the 2020 Tri-Party Agreement (TPA) cleanup milestones (M16-110-T02, 100-D/H), Alternative 3 represents a decreased time frame for cleanup of chromium groundwater contamination (12 years), and of the nitrate plume (6 years).

The parts of the groundwater problem missing from the alternatives analysis are the co-extracted contaminants of concern and contaminants of potential concern (COPC). A number of metals and other elements are COPCs that have been detected above the 90th percentile Hanford Site background level, risk-based maximum levels, or maximum contaminant levels (MCLs). However, the pump-and-treat alternatives all appear to be solely aimed at chromium reduction.

The Proposed Plan pump-and-treat alternatives should clearly identify consideration for removal and treatment of the co-extracted non-chromium contaminants before reinjection.

The Board restates its position to use treatment of the co-extracted non-chromium contaminants instead of dilution. The Board has always believed that retrieval, treatment, and disposal methods are the preferred remediation approach (HAB Advice #197).

Perhaps the most important deficiency in this alternative is the decision not to remediate the strontium-90 plume. Given that strontium was reported to be above the Drinking Water Standard in 38 percent of detected unfiltered groundwater samples in the 100-H Area, the Board urges the TPA to consider a more aggressive approach for strontium. Using 44 years of recirculating pump-and-treat groundwater and monitored natural attenuation (MNA) does not seem a prudent approach. Also, there is no provisional fall-back remediation plan for strontium if MNA is found not to work.

Because the 100-H strontium-90 ground water plume occurs immediately adjacent to the river, it should be addressed. The Board recommends that Permeable Reactive Barrier (PRB) technology already proven effective at 100-N Area be employed to capture the strontium and protect the Columbia River. A relatively short section (200-300 meters) of PRB established at the down-gradient end of the 100-H strontium plume to capture strontium would prevent it from entering the river.

There are at least seven waste sites listed in deep decision units (vadose zone below fifteen feet below ground surface) with isotope concentrations that exceed risk levels requiring remediation. The isotopes within these waste sites are predicted to take more than 100 years to decay to activity levels that are less than residential Screening Levels (spans of time that range from 112-190 years).

#### Advice

- Of the alternatives provided in the Proposed Plan, the Board supports Alternative 3, if the following remedial actions are added:
  - Include removal and treatment of the co-extracted non-chromium contaminants exceeding drinking water standards before re-injection.
  - Install a short section (approximately 200-300 meters) of permeable reactive barrier at the down-gradient end of the 100-H strontium plume to capture that contaminant from the groundwater and prevent it from entering the river.
- The Board continues to advise an RTD approach. The Board believes that Institutional Control periods that equal or exceed 100 years defy the reasonable ability to maintain the surveillance that will be necessary to keep intruders and other people from harm.
- The Board advises the TPA agencies to request a full review of the 100-D/H RI/FS and Proposed Plan by the National Remedy Review Board rather than seeking an exemption.