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New Tool Provides More Informed Look at Hanford Cleanup Decisions

Since 2018, Hanford contractor CH2M Hill Plateau Remediation Company (CHPRC) has been working with the U.S. Department of Energy Richland Operations Office (DOE-RL) to develop a Cumulative Impact Evaluation (CIE) toolset. Currently, impacts from contamination and cleanup decisions are assessed on a site-by-site or operable-unit-by-operable-unit basis. The new tool enables a holistic look at impacts across the 75 square miles and nearly 1,000 waste sites of Hanford's Central Plateau.

"This tool will give us the ability to make educated decisions on alternatives related to cleanup," said Moses Jaraysi, CHPRC Vice President for Environmental Programs. "It is unique in that it evaluates cumulative impacts for contamination from source units and tank farms as that contamination comingles with existing groundwater contamination."

As a decision support tool, the CIE provides a consistent evaluation process and common framework for cleanup decisions. For example, it can be used to inform feasibility studies or determine when changes are needed to groundwater pump and treat systems. The CIE can adapt to changing conditions and can compare cleanup alternatives, such as placement of an evapotranspiration barrier versus chemical stabilization of deep contamination.

Built on established models of site soil and groundwater interactions, the CIE uses data from groundwater monitoring wells; source units including landfills, waste sites, and tank farms; Columbia River water levels; and many other



The Cumulative Impact Evaluation toolset enables a holistic view of impacts across the Central Plateau.

sources to estimate the presence and spread of contamination in the soil and groundwater.

While the results generally focus from the present out to 100 or 200 years, CHPRC plans to have the toolset look as far as 1,000 years ahead, with capability to extend this period to thousands of years. Current tools to evaluate impacts from specific waste sites can take three or more months to calculate estimates, but the CIE can estimate cumulative impacts in a few weeks or less. More importantly, the modular nature of the CIE allows efficient evaluations (in hours) of specific cleanup or closure decisions, providing decision-makers with a flexible and comprehensive "what if" set of tools.

"Because the CIE is a set of databases, models, and computational modules, it's easier to update and can evolve as our information about Hanford evolves," said Doug Hildebrand, who

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Speakers' Bureau

If you would like to have a member of the Hanford Communities Speakers' Bureau address your organization, please call (509) 942-7348.

Meetings

October 31

National Academy of Sciences Public Meeting for Low-Activity Waste

8:30am to 5:30pm
Courtyard by Marriott
Richland, Washington

Contact: Charles Ferguson
CFerguson@nas.edu

December 4 & 5

Hanford Advisory Board Meeting

8:30am to 5:00pm
Best Western Hotel
1515 George Washington Way
Richland, Washington

Contact: Jolynn Garcia
jolynn_m_garcia@orp.doe.gov
(509) 376-6244

Soil Treatability Technology Shows Promise for Faster Cleanup

A one-acre site near Hanford's former K East and K West reactors was recently used to test a counterintuitive approach to cleanup: flushing a contaminant closer to the groundwater to expedite removal. Normally, workers use pump and treat, soil extraction, and other methods to prevent contaminants from reaching the groundwater, where they could flow into the Columbia River. But by using treated water to drive residual hexavalent chromium in the soil toward existing groundwater extraction wells, contractor CHPRC hopes to shave decades off cleanup time.



A new approach may speed cleanup by driving contaminants like hexavalent chromium into the groundwater, where it can be removed from groundwater extraction wells.

Chromium, a toxic chemical used to inhibit corrosion in reactors during Hanford's plutonium processing days, has been reported at levels that exceed drinking water standards in many of the old reactor areas along the river. Rainwater and runoff can naturally push it through the soil, but the process can take many years.

The soil flushing study was conducted from May through mid-August. Results thus far have exceeded expectations.

"We saw spikes in contamination at our extraction wells faster than we anticipated," said Bill Barrett, CHPRC Vice President of Soil and Groundwater Remediation. "But the containment has been good. We have driven down the contamination to near drinking water standards."



A remote sensor developed by Freestone Environmental Services of Richland is helping track the movement of the chromium underground.

CHPRC will continue to monitor the groundwater over the next few months to see if any contamination returns. If the results are confirmed successful, the system may be implemented at other former reactor areas near the river.

Along with the flushing test, DOE has been testing a sensor developed by Richland-based Freestone Environmental Services. The sensor automatically detects, samples, analyzes, and relays data on the concentration of hexavalent chromium at the moment the contaminant reaches a groundwater monitoring well. This remote chromium monitoring sensor could change the way Hanford collects data to monitor chromium.

"This is real-time data collection rather than much-delayed monitoring and waiting for the manually collected sample results to come back from the laboratories. That can take from 7 to 30 days," said Ellwood Glossbrenner, DOE project scientist. "This technology will tell us exactly when the chromium reaches a well, what the extent of contamination is, and the dynamic nature of the plume in the groundwater aquifer."

"The application of the soil flushing technology along with the real-time data collection are expected to accelerate the soil and groundwater remediation in the 100 K area in the future," said the Washington State Department of Ecology's Dib Goswami. ■

Workers Complete Stabilization of PUREX Tunnel 2

On April 26, 2019, workers with CHPRC finished filling Tunnel 2 near the Plutonium Uranium Extraction (PUREX) Facility on Hanford's Central Plateau with engineered grout. This accomplishment reduces both the risk of a collapse and a potential release of radioactive materials.

"The tunnel has been filled with grout, and we've significantly reduced the risk of contaminating Hanford workers, the public, or the environment," said Brian Vance, DOE's Manager for the Hanford Site. "The team did an excellent job performing this work safely."

The tunnel is one of two containing contaminated processing equipment and materials from earlier work at PUREX. When Tunnel 1 suffered a partial collapse in May 2017, an engineering evaluation of Tunnel 2 showed it could also collapse. An independent panel of experts recommended grouting to stabilize this tunnel because grout provides a high level of stability and protection. Grouting does not preclude future remedial actions or limit final closure decisions.

Trucks brought approximately 4,000 loads (40,000 cubic yards) of grout to be piped into the tunnel. Cameras in the tunnel allowed workers to monitor the grout flow and ensure it covered the length of the tunnel and the contaminated equipment inside. Workers injected the grout in several layers; they allowed each layer to set before starting to pour the next.



Workers filled Tunnel 2 near the Plutonium Uranium Extraction Facility with engineered grout to prevent it from collapsing.

"I couldn't be prouder of the workers in the field, support staff across our company, and cooperation of all the site contractors that led to this important work being completed safely," said Ty Blackford, president and chief executive officer, CHPRC.

Hanford crews will continue to monitor the tunnel until the full mission is complete. A video tells more about how the feat was accomplished. See <https://www.youtube.com/watch?v=AQkJ1SBV0mE> ■

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oversees the project for DOE-RL. "It addresses both hazardous and radioactive materials and also takes into account existing or completed cleanup actions, an improvement over previous analyses."

DOE-RL and CHPRC have worked closely with the Hanford regulators — the U.S. Environmental Protection Agency and Washington State Department of Ecology — as the CIE was developed. Staff from the agencies met to discuss the framework for the evaluation and the models to be included. The tool reached the proof-of-principle stage earlier this year. In October, an independent technical panel will review the approach and tools. CHPRC plans to have the CIE ready for full implementation to support feasibility studies for the Hanford Site Central Plateau by 2021.

"Ecology supports the approach taken by DOE in the CIE process," said Washington State Department of Ecology hydrogeologist Dib Goswami. "We believe, with our technical and regulatory contributions and oversight, DOE will be able to carry out a defensible cumulative evaluation at the Hanford Site." ■

Watch the Progress in the Demolition of Hanford's Plutonium Finishing Plant

The Hanford Communities filmed a briefing of demolition progress on July 26th. Check out this YouTube link <https://youtu.be/AtChVKKLeXI>

Weekly progress can be monitored on the Hanford.gov website. Click on Richland Operations then choose PFP Updates - Learn More

Exercises Help Keep Responders Ready

No location is immune from national disasters. The DOE, Washington State Department of Ecology, and Hanford Site contractors team with local agencies and beyond to ensure that responders are trained and ready should a disaster strike.

This spring, for example, staff from the Volpentest Hazardous Materials Management and Emergency Response (HAMMER) Federal Training Center, managed by Mission Support Alliance, participated in Shaken Fury 2019. This large-scale exercise, held in Nashville, Tennessee, helped strengthen the nation's ability to rapidly respond and recover following a catastrophic earthquake. Shaken Fury 2019 was a simulated 7.7-magnitude earthquake along the New Madrid Seismic Zone, which would create widespread catastrophic damage and economic losses. Thousands participated in the exercise, including personnel from DOE, the U.S. military, state and local governments, and the private sector.

“This is one of many examples of how the expertise provided by environmental management cleanup

operations is benefitting other DOE offices and the nation,” said Jill Conrad, DOE-RL program manager for HAMMER.

Exercises such as Shaken Fury 2019 help the response community and stakeholders prepare, evaluate capabilities, and identify areas for improvement. Locally, Benton County and Franklin County work directly with Hanford emergency management to plan responses to a variety of potential incidents. A dedicated line links emergency operations centers onsite and off. When the county emergency management agencies are alerted to an emergency, they in turn reach out to law enforcement and fire departments. Local agencies also practice yearly with Hanford contractors. Exercises include various scenarios and incident locations to keep responder skills sharp.

“Government at all levels has a continuing responsibility for the health, safety, and general welfare of its citizens,” said Deanna Davis, Emergency Manager for Benton County. “Responding effectively requires planning, coordination, education, training, and community awareness.” ■

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