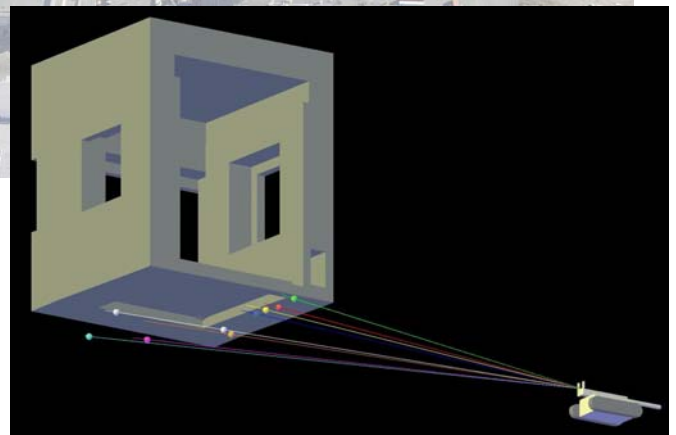


## River Corridor's 324 Building B-Cell Contamination

Highly contaminated radioactive material below building poses latest challenge for Hanford's River Corridor Closure Project

### Background

For nearly 60 years, the 300 Area was the center of Hanford's radiological research and nuclear fuel fabrication. Located along the Columbia River and just 1.5 miles north of the city of Richland, the past research and fabrication work left behind highly contaminated facilities and waste sites. The discovery of highly radioactive contamination below the 324 Building makes it the most hazardous facility that Washington Closure will deactivate, demolish and clean up along Hanford's river corridor.



The three-story 324 Building covers 102,000 square feet, and includes one story below ground. The facility was completed in 1965 to support materials and chemical processing research and development activities at Hanford. Research operations at the facility ceased in 1996 and stabilization cleanup activities began.

Washington Closure has been preparing for the demolition of the 324 Building since 2005 by stabilizing and preparing for removal of five highly contaminated hot cells. The hot cells were built to allow Hanford personnel to work with highly radioactive materials without being exposed to radiation. Workers stood outside the hot cells and observed through leaded-glass windows as they conducted activities with remotely operated equipment. The greatest level of contamination is in a two-story hot cell called the Radiochemical Engineering Complex B-Cell.

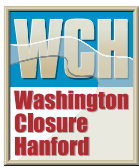
During preparations to demolish the 324 Building, Washington Closure discovered that highly radioactive materials have migrated into the soil beneath B-Cell. The presence of these contaminants has affected demolition schedules for the facility. Washington Closure

*Instrument probes show B-Cell contamination remains below the hot cell. Radiation levels are extremely high and direct exposure for a few minutes would be fatal. Readings in the soil were measured at levels up to 8,900 R/hr. Sampling has verified that B-Cell soil contamination levels remain above groundwater.*

is working to ensure that the contaminated soil is not exposed to the environment and that water does not drive existing contaminants further into the soil where they could impact groundwater.

### How did the radioactive materials reach the soil?

The material appears to have leaked from the cell during past operations of the facility during the 1980's. As part of the recent preparations for demolition, Washington Closure removed radioactive grout from the B-Cell's sump and trench. During the process, a visible breach was identified in the stainless steel liner on the floor of the hot cell. At some time prior to the



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addition of grout to the cell in the 1990s, the contaminated material apparently leaked through the breached liner and through an expansion joint or crack in the concrete slab below the hot cell.

### Where did the radioactive materials come from?

Research activities in B-Cell included test projects for waste vitrification (the transformation of a substance into glass) and grouting methods for stabilizing highly radioactive materials. A report in 1993 referenced a large spill of concentrated cesium and strontium into the cell during the 1980s. Other smaller spills inside the hot cell were also documented.

### How was the radioactive material identified?

To characterize the soil beneath B-Cell without exposing personnel directly to the soil, workers installed Geoprobe closed-ended tubes below the building's floor slab. A Geo-probe tube is a 2¾-inch diameter steel tube that is pushed into the soil using a hydraulic ram. A Washington Closure Hanford subcontractor installed the tubes 65-feet horizontally, approximately 12-feet beneath ground level, resulting in measurement locations several feet under the floor of B-Cell. Instrument readings indicate localized high level of radioactive material under B-Cell with readings in excess of 8,900 R/hr. Special controls have been implemented and physical samples of the material have been retrieved and sent to the laboratory for analysis. The laboratory results will provide much needed data regarding the make-up of the hazardous radioactive constituents beneath B-Cell. Laboratory results will be available in early to mid September 2011.

### How will the contamination under B-Cell be removed?

Work is under way to develop plans for safely remediating the radioactive materials. The laboratory results from the physical samples are needed to verify the hazards and safest means for removing the contamination below the building and to determine the safest way to package and manage the resulting waste. Depending on the yet-to-be determined method for retrieving the hazardous materials, plans and schedules for demolition of the 324 Building will be adjusted as appropriate.

### How much radioactive material is under B-Cell?

The initial dose rate measurements indicate quantities on the order of 100,000 curies of radioactive material

may be present. Modeling of the radioactive material, and a determination of how far it might have migrated, are being performed as further characterization data are gathered.

### What is the status of the 324 Building?

Demolition of the building is on hold until removal strategies for the highly radioactive material below B-Cell are evaluated. Thousands of curies of radioactive materials and hazardous substances have been removed from inside the facility.

### What are the risks associated with the material under B-Cell?

The primary concerns for radioactive material in soils or facilities at Hanford are direct exposure to workers, dispersion of material into the air, and migration of material into the groundwater. In this case, the material under B-Cell appears to represent relatively low risk in its current configuration. Workers are not directly exposed to the material because it is located below grade beneath the building's concrete slab. And because the contamination remains underground, there is not a dispersion pathway for the material to reach the atmosphere. Migration of the material through the soil into groundwater requires a driving force (source of water to push the contamination). Historically, some amount of water may have been present in the cell to provide a motive force, but groundwater monitoring wells in the vicinity of the 324 Building have not identified the building as a source of radioactive contamination in groundwater.

### Project Needs

WCH is currently seeking proven remedial technologies that will allow for the safe removal and disposal of highly radioactive soils beneath the 324 Building.

The removal methods must avoid exposure of workers or the environment to unacceptable levels of either direct radiation or airborne radioactive material. The final retrieved waste form must be transported and disposed at the Environmental Restoration Disposal Facility or Central Waste Complex, on the Hanford Site, in compliance with shipping and waste acceptance criteria.

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