Waste Encapsulation and Storage Facility

The Waste Encapsulation and Storage Facility is located adjacent to the B Plant processing facility in the 200 East Area of the Hanford Site.

History

Construction of the Waste Encapsulation and Storage Facility (WESF) began in 1971 and ended in 1973. WESF began operations in 1974 and processed cesium and strontium capsules until 1985. Some of the capsules were leased and shipped off-site for use as radiation sources. All of the capsules were returned to WESF by 1996 and placed into underwater storage by 2000.

Today, the facility provides storage for 1,335 cesium capsules and 601 strontium capsules.

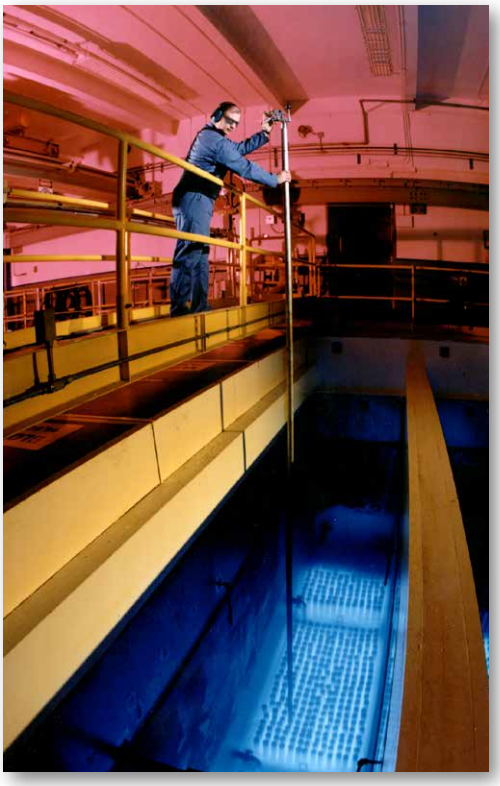
The capsules are stored in pools filled with water. The water is needed to protect workers from high levels of radioactivity associated with cesium and strontium, and it also helps to keep these elements cool.

The U.S. Department of Energy and contractor CH2M HILL Plateau Remediation Company manage the Waste Encapsulation and Storage Facility at the Hanford Site in southeast Washington state.

Background

The Waste Encapsulation and Storage Facility (WESF) provides safe and compliant underwater storage for 1,936 highly radioactive capsules containing the elements cesium and strontium.

In the 1970s, radioactive isotopes of the chemical elements cesium and strontium were removed from waste tanks at Hanford to reduce the temperature of the waste inside the tanks. Both elements were ultimately placed in sturdy, stainless steel containers at WESF for safe storage and monitoring.

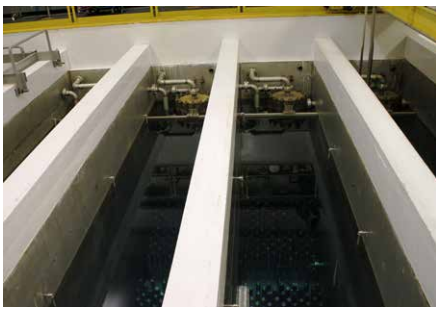


The water around the cesium and strontium capsules in the WESF pools glows a color of blue in an effect known as the Cherenkov Glow, as the radioactive cesium and strontium decay and lose their radioactivity to become stable atoms.

Mission

The U.S. Department of Energy (DOE) and CH2M HILL Plateau Remediation Company (CH2M) are committed to safely storing the capsules until they can be removed for interim and final placement. Safe, compliant and monitored storage is critical due to the high levels of radioactivity and heat that the capsules generate.

While the capsules are currently in a safe configuration, WESF is an aging facility, and DOE is evaluating alternatives for placing the capsules in dry storage. Dry storage would eliminate the possibility of a release of radioactive material in the unlikely event of a major earthquake that might result in loss of pool storage water and overheating and breach of one or more capsules.



The capsules are stored in concrete "cells" underwater. The water provides shielding to workers and helps keep the capsules cool.

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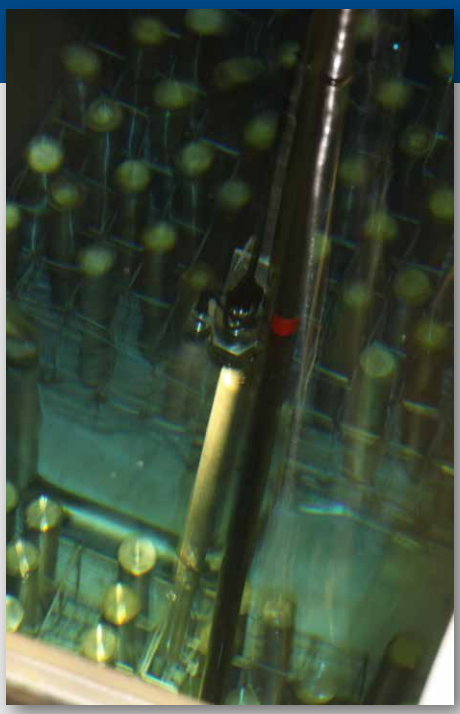

Workers use long-reach tools to handle the capsules under water.

Radioactive Decay

A radioactive half-life is the amount of time that it takes for the radioactivity of a material to decrease by half. The half-life of both cesium and strontium is about 30 years, meaning it will take 30 years to have half as much radioactive material as we do today.

Progress

Since 2008, CH2M has safely and compliantly managed WESF and storage of the capsules. In 2012, CH2M engineers assessed the heat given off by the capsules and the potential impact on the structural integrity of the pool. CH2M evaluated how a new capsule configuration could allow the greatest response time possible in the unlikely event of a loss of cooling water that could possibly cause failure of either the pool structure or capsules.

During the assessment, engineers calculated the wattage output of more than 800 capsules to determine the best way to rearrange them in order to balance the heat load. Work began in February of 2012 and was completed in June of that year, four months earlier than planned. This was the first time a major relocation of the capsules was undertaken in about 20 years.

Workers used long-reach tools (left) and video technology (right) as they repositioned the capsules to reduce the heat load of the capsules in underwater storage at WESF.

Future

Long-term plans for WESF include continued preparations for transfer of the capsules to dry storage. Transferring the capsules to dry storage will enable deactivation of the facility and reduction of hazards at the Hanford Site.

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