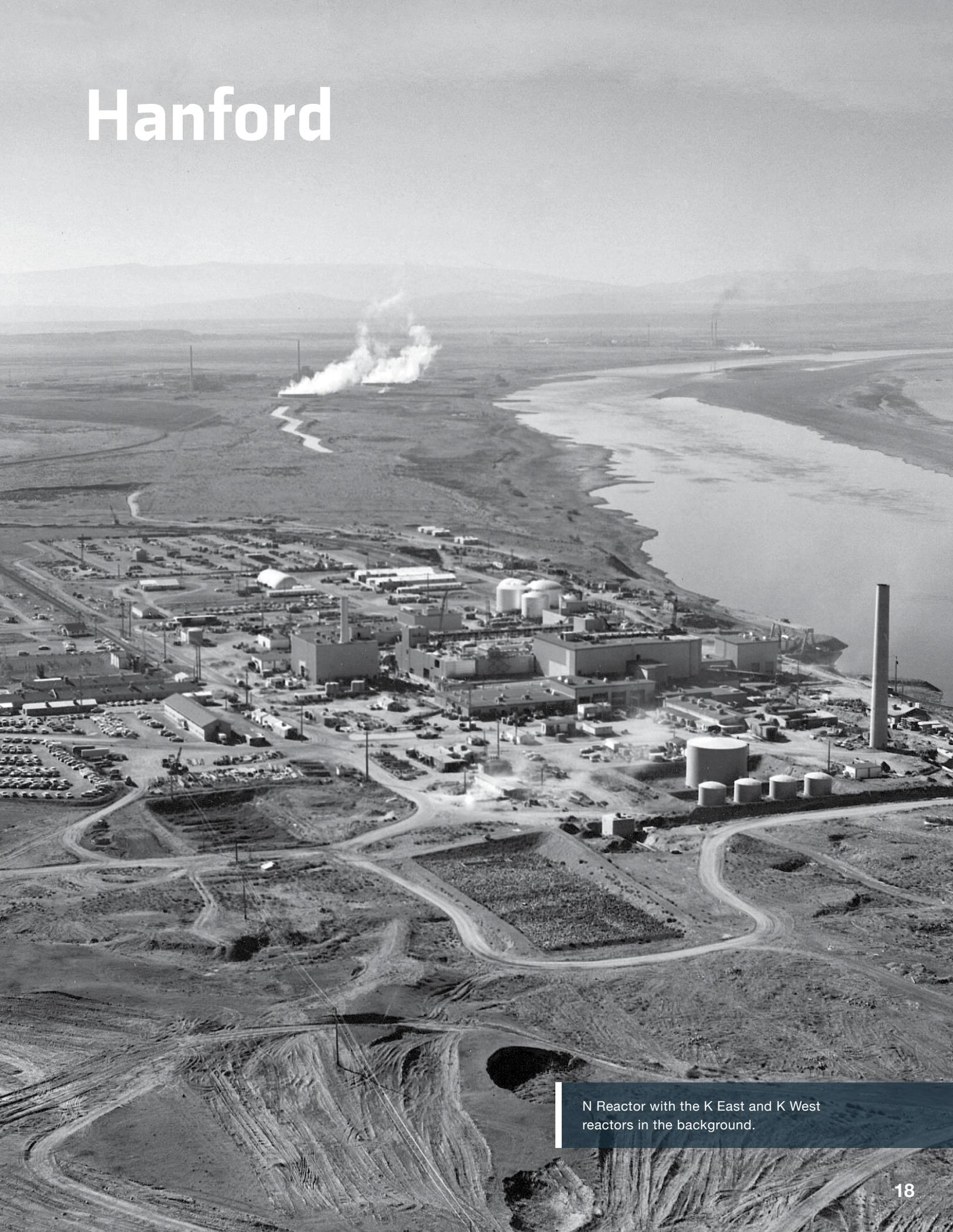


Hanford



N Reactor with the K East and K West reactors in the background.

Hanford

Overview

The Hanford Site, a 580-square-mile section of semi-arid desert in central Washington, was established in 1943 as part of the Manhattan Project to produce plutonium for national defense. Construction began in October 1943 on the first industrial-scale nuclear reactor, B Reactor, which produced plutonium for the Trinity test and the atomic bomb used to help end World War II. In total, nine nuclear reactors were built along the banks of the Columbia River to provide product for five primary processing facilities that operated throughout the Cold War era. In total, Hanford produced two-thirds of the plutonium used in the U.S. nuclear weapons stockpile.

With the signing of the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement [TPA]) in 1989 by the Washington State Department of Ecology (Ecology), EPA, and DOE, the primary mission of the Hanford Site shifted from production to cleanup. The Hanford Site's current mission focuses on environmental restoration, which includes remediation of contaminated areas, decontamination and decommissioning of facilities, waste management (i.e., waste storage, treatment, and disposal), and related scientific and environmental research and development of waste management technologies.

Cleanup of the Hanford Site is overseen by DOE's Richland Operations Office (DOE-RL) and Office of River Protection (DOE-ORP). The DOE-RL and the DOE-ORP manage the site through several contractors and their subcontractors. The DOE-RL serves as the Hanford Site property owner and oversees cleanup along the Columbia River and in Hanford's

Central Plateau, including groundwater and waste site cleanup; management of solid waste, spent nuclear fuel, and sludge; facility cleanout, deactivation, and demolition; environmental restoration; plutonium management; and all site support services.

DOE-ORP was established by Congress in 1998 as a field office to manage the retrieval, treatment, and disposal of approximately 56 million gallons of radioactive tank waste currently stored in 177 underground tanks in the central part of the site. The tank waste is material left over from years of World War II and post-war production of nuclear weapons fuel. In support of this mission, DOE-ORP is responsible for the safe operation of the tank farms and associated 200 Area facilities and construction and operation of the Hanford Tank Waste Treatment Plant and Immobilization Plant (WTP) located in the Central Plateau.

Cleanup accomplishments include:

- **Remediated more than 1,300 waste sites.**
- **Demolished over 880 facilities.**
- **Completed interim safe storage six reactors out of nine.**
- **Preserved the B Reactor as a National Historic Landmark.**
- **Transferred all spent nuclear fuel to dry storage.**
- **Transferred highly radioactive sludge from K Basins near the Columbia River to longer-term storage on the Hanford Central Plateau.**
- **Treated more than 22 billion gallons of contaminated groundwater.**
- **Completed interim stabilization**

efforts transferring 3 million gallons of pumpable liquids from single-shell tanks (SSTs) to newer double-shell tanks (DSTs).

- Completed waste retrieval activities from 17 SSTs and 1 DST.
- Installed interim surface barriers at SST farms with historical soil contamination.

Cleanup Highlights 2020-2030

At Hanford, the coming decade will see the successful launch of one of EM's largest and most significant efforts – the start of tank waste treatment. The WTP is EM's largest and most complex project and one of the largest civilian nuclear construction projects in the world.

TANK WASTE TREATMENT

By the end 2023, DOE-ORP will complete the Low-Activity Waste (LAW) Facility, Balance of Facilities (BOF), and Analytical Laboratory (LAB) (collectively known as LBL, including direct-feed low-activity waste [DFLAW] and LBL facility services) to begin treating LAW. Starting these facilities in the near term allows for treatment to begin on the most mobile form of tank waste prior to all treatment facilities being completed.

The DFLAW approach will rely on a LAW pretreatment system known as the Tank Side Cesium Removal (TSCR) pretreatment system that will allow tank waste supernatant to be treated and stored in AP Farm for subsequent delivery to the WTP LAW Facility. Upgrades will also be completed at the Liquid Effluent Retention Facility and Effluent Treatment Facility to allow receipt and treatment of the anticipated secondary liquid effluent from DFLAW operations. DOE-ORP is also completing an Analysis of

Alternatives (AoA) for high-level waste treatment to identify and evaluate a broad set of alternatives that meets the established mission need and to analyze the life-cycle cost, schedule, and risks associated with each alternative. In addition, DOE-ORP will continue tank waste retrieval activities in the SSTs. Work is currently underway in the A and AX tank farms.

ADDITIONAL RISK REDUCTION

In 2020, DOE will complete the demolition of the Plutonium Finishing Plant, leaving it in slab-on-grade condition. Furthermore, several below grade structures will be stabilized with grout to prevent potential surface subsidence.

Over the coming decade, the 324 Building will be placed in a minimum surveillance and maintenance configuration until remediation can be resumed at the underlying 300-296 waste site and the building can be demolished. EM will continue to evaluate the transfer of cesium and strontium capsules currently stored in wet storage at the Waste Encapsulation and Storage Facility to safer dry storage. Stabilization activities at REDOX and PUREX will place these facilities in a low-cost surveillance and maintenance configuration.

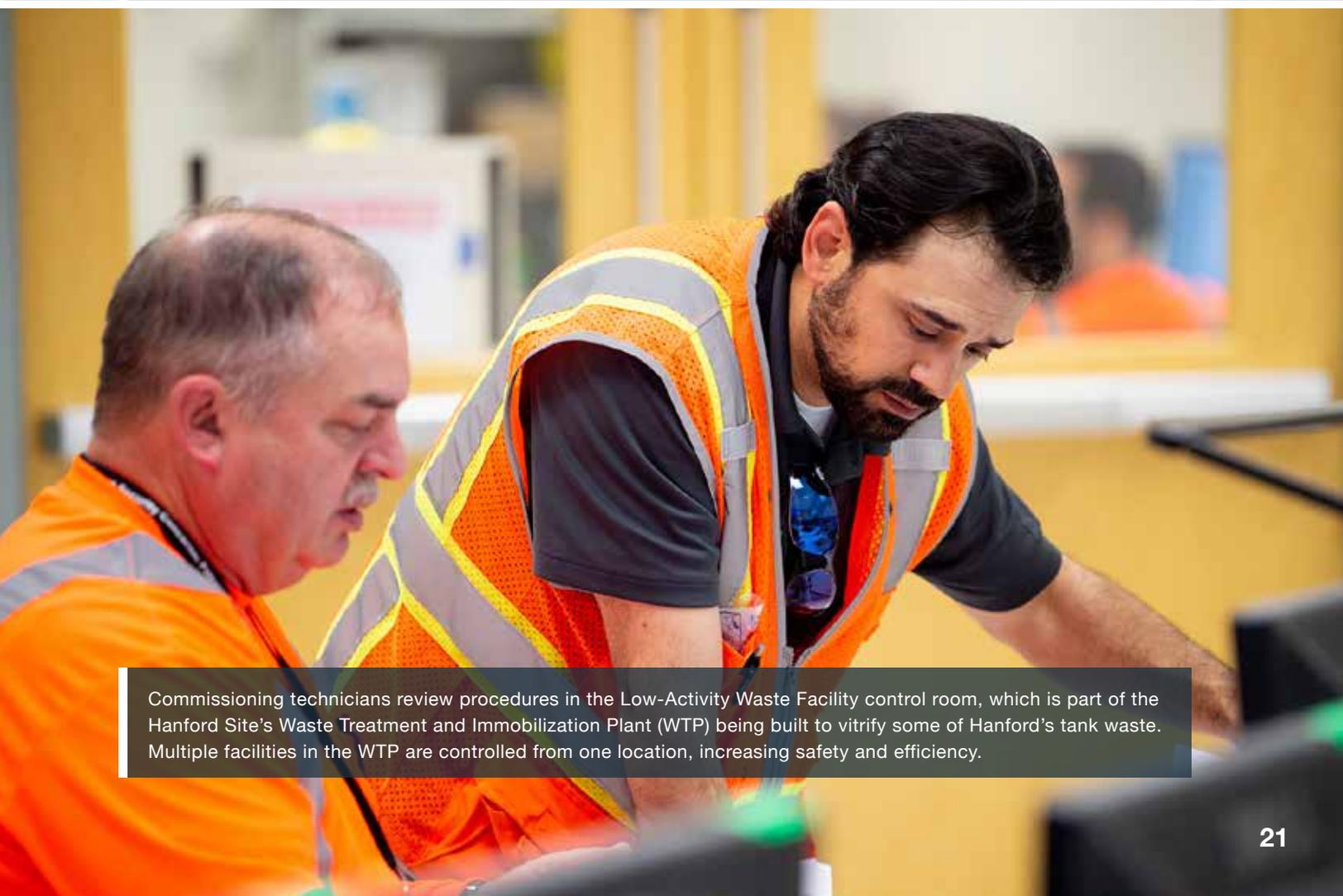
Active groundwater remediation systems will continue operating along the River Corridor, treating about 1 billion gallons of contaminated groundwater annually. Additionally, DOE-RL will complete critical infrastructure projects to support the Hanford mission.

Remaining Cleanup Scope Post-2030

While there is a great deal of uncertainty about what may transpire between now and the distant post-2030 clean-up work, the Hanford clean-up mission, currently outlined in the TPA and other legal documents includes waste retrieval and tank closure activities, construction of additional waste treatment facilities, and extensive waste site demolition and remediation activities, including at the B Plant, PUREX, REDOX, and T Plant processing canyons.



A process vessel being delivered to the Effluent Management Facility, which is part of the Hanford Site's Waste Treatment and Immobilization Plant being built to vitrify some of Hanford's tank waste. The EMF is a key facility in the Direct-Feed Low-Activity Waste process.



Commissioning technicians review procedures in the Low-Activity Waste Facility control room, which is part of the Hanford Site's Waste Treatment and Immobilization Plant (WTP) being built to vitrify some of Hanford's tank waste. Multiple facilities in the WTP are controlled from one location, increasing safety and efficiency.