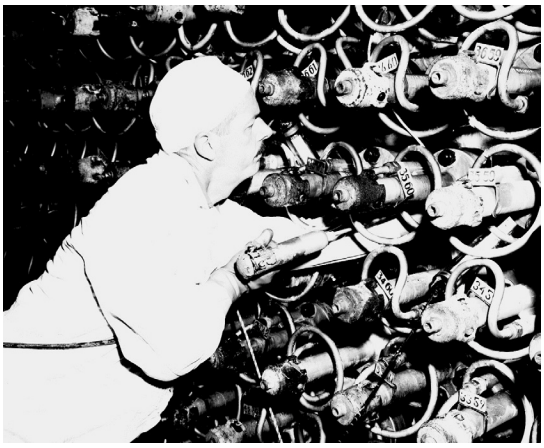
THE B REACTOR NATIONAL HISTORIC LANDMARK

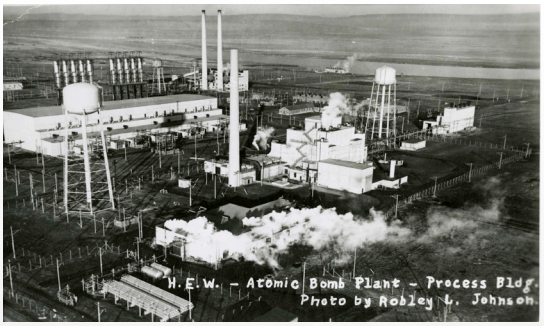
BACKGROUND AND HISTORY

The B Reactor National Historic Landmark at the Hanford Site in Washington state was the world's first full-scale plutonium production reactor. Created as part of the top-secret Manhattan Project during World War II, B Reactor produced plutonium used in the Trinity Test, as well as for the atomic bomb dropped on Nagasaki, Japan, to end World War II. The reactor was designed and built by the DuPont company based on experimental designs tested by Dr. Enrico Fermi at the University of Chicago and tests from the X-10 Graphite Reactor at Oak Ridge, Tennessee. B Reactor was graphite-moderated and water-cooled. It consists of a 28 by 36-foot, 1,200-ton graphite pile, penetrated through its entire length horizontally by 2,004 aluminum process tubes containing uranium fuel slugs. Cooling water from the nearby Columbia River was pumped through the aluminum tubes around the uranium slugs. This design allowed the reactor to produce plutonium-239 by irradiating naturally occurring uranium with neutrons.



A Manhattan Project era-worker loads green fuel into the B Reactor at the front face of the reactor..

Construction of B Reactor began in October 1943, and fuel was loaded into B Reactor on Sept. 13, 1944—just 11 months later. B Reactor went "critical" (started up) at 10:48 p.m. on Sept. 26, 1944. The first plutonium was shipped from Hanford to Los Alamos, New Mexico in February 1945.



The B Reactor was the world's first full scale plutonium production reactor. Its design reflected the proof-of-concept work by Enrico Fermi at the Chicago Pile in 1942, and tests performed at the K-25 pilot reactor at Oak Ridge in late 1943. It was built in just 11 months, and started operations in September 1944. The first plutonium was shipped from Hanford to Los Alamos, New Mexico in early 1945 to support the Trinity Test on July 16, 1945. Less than a month later, Hanford plutonium was used in the "Fat Man" bomb dropped on Nagasaki, Japan.

With its mission thought to be complete after the end of World War II, B Reactor was shut down at the end of 1946. However, amid growing tension between the United States and the former Soviet Union, B Reactor was restarted in 1948 to support production of plutonium for the Cold War until 1967. The B Reactor was shut down permanently in February 1968 and defueled.

The B Reactor was named a National Historic Mechanical Engineering Landmark by the American Society of Mechanical Engineers in 1976, was listed in the National Register of Historic Places in 1992, was designated a National Historic Civil Engineering Landmark in 1994, and became a National Historic Landmark (NHL) in 2008.

More than 30 buildings and 20 service facilities were part of B Reactor operations. From 1969 through 2006, all were dismantled and removed except for the reactor building, main exhaust stack and the river pump house, which still provides water used for modern site cleanup activities. As recently as 2008, plans called for the B Reactor and its cooling stack to be dismantled as part of Hanford cleanup.

PATH TO PRESERVATION

B Reactor would not be standing today were it not for the dedication and commitment of the B Reactor Museum Association (BRMA), a local non-profit organization that includes many former workers. Since its establishment in 1991, the group worked tirelessly to advocate for B Reactor to be preserved and opened to the public. They built a strong local coalition that included the Tri Cities Development Council, the Hanford Communities, and Visit Tri Cities. The groups worked closely with the Washington State congressional delegation, which strongly supported maintaining B Reactor and providing safe, public access. These individuals and organizations were working against the clock, because the decision to dismantle and cocoon B Reactor had been made, and the work included in cleanup contracts.

The B Reactor is a popular school field trip destination for elementary, middle, and high schools around the region. DOE Richland works closely with educational institutions, Tribes, STEM camps, clubs and other interested groups to provide access to B Reactor and customized tours.

Within DOE, support for B Reactor grew slowly over time. The idea of preserving the reactor seemed impossible when first proposed by BRMA in 1991, but a management change at DOE-Richland in 1999 gave advocates a new opportunity. While there didn't appear to be local authority to preserve B Reactor and open it to the public, management kept the idea alive by socializing the concept with DOE HQ management, supporting a National Historic Landmark nomination package prepared by BRMA and the National Park Service, and modifying the applicable cleanup contract to make B Reactor the last to be cocooned – thus buying several additional years for B Reactor supporters to continue their work. In spring of 2008, DOE learned that the U.S. Department of Interior planned to name B Reactor a National Historic Landmark (NHL). That allowed local management to work with DOE HQ on a new path forward.

Today, the B Reactor National Historic Landmark is part of the Manhattan Project National Historical Park. B Reactor has had visitors from all 50 states and more than 90 countries, and provides an opportunity for DOE share the legacy of the Manhattan Project and the vital cleanup work going on today.

FROM LIABILITY TO ASSET

In August 2008, at a ceremony conferring NHL status on the Hanford B Reactor, the acting Deputy Secretary of the Department of Energy (DOE) stood with the Deputy Secretary of the U.S. Department of the Interior and announced a policy change for B Reactor. Its new path would be permanent preservation and public access.

DOE immediately began to make improvements to the reactor to support public access (e.g., life safety code upgrades, general cleanup and hazard reduction, and new signage). In March 2009, DOE hosted its first public tours of B Reactor. Former workers from BRMA were among the first trained tour guides. By 2015, more than 10,000 public B Reactor tour seats were being offered each year, along with opportunities for area schools, Tribes, and clubs to access the facility. DOE offers tours six days per week, generally from April through November. Unlike the rest of the Hanford Site, B Reactor is accessible to people of all ages and all nationalities. It is a major draw for visitors, who have come from all 50 states and more than 90 countries worldwide to date. The local destination marking organization, Visit Tri Cities, estimates that the B Reactor public tours bring at least $2 million to the local economy each year. From DOE's perspective, the tours are an opportunity for the public to learn about the Manhattan Project and its legacy. Seeing B Reactor, and learning about the plutonium production process, gives visitors a foundation for understanding the diversity and volume of waste generated, and the approaches DOE is using to successfully clean up the Hanford site.