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News Release

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Preserving Manhattan Project historic sites

Preserving significant sites that were meant to be temporary provides unique challenges for Los Alamos National Laboratory staff

LOS ALAMOS, N.M., October 29, 2020 — Beginning in 1943, Project Y – the code name for Los Alamos during World War II – transformed the isolated Pajarito Plateau. The sounds of construction equipment replaced the voices of the Los Alamos Ranch School boys and local homesteaders. Construction crews hurriedly built many structures on mesa tops and in the canyons of Los Alamos. Countless concerns flooded Manhattan Project staff, but desiging structures to withstand the test of time was not one of them. The top-secret race to develop an atomic bomb before Nazi Germany was on and everyone felt the pressure.

Over the next 75 years, some of the structures slumped into disrepair from exposure to the harsh northern New Mexico environment—concrete cracking and spalling, wood frames rotting. That's where Los Alamos National Laboratory's historic preservation team enters the Manhattan Project story.

"Concrete has proven to be especially susceptible to the dozens of freeze-thaw cycles that often take place on a winter day in Los Alamos," said Jeremy Brunette from the Laboratory's Historic Building Surveillance and Maintenance Program.

The Manhattan Project National Historical Park team at Los Alamos identified several sites that need attention, and they work continuously to maintain, restore, and protect these historic sites. Most recently, two sites that share different stories from the early years of the Laboratory underwent preservation work.

Overshadowed Story: Plutonium Recovery

A story that is often overshadowed when sharing Manhattan Project history is that of plutonium recovery. The Concrete Bowl helps bring that story to life.

Throughout the Manhattan Project, uranium and plutonium were so rare and costly that scientists carefully conserved every gram. By the end of 1945, it cost an estimated $390 million to create the plutonium for the Manhattan Project—that is over $5 billion in today's money! During the Trinity Test, scientists planned to carry out a test with half the world's plutonium, so tensions were understandably high.

If the Trinity Test did not succeed, project staff needed to recover the precious plutonium rather than losing it on a failed test. Manhattan Project researchers discussed several possible plutonium recovery approaches and tested any potential solutions that were not too far-fetched. One idea was the "water recovery method."

For this method, staff members constructed a concrete bowl 200 feet in diameter and built a wooden water tank on a tower in the center. In this water tank, they placed a small-scale, industrial prototype of a bomb that contained natural uranium as a stand-in for plutonium. Researchers then detonated this mock-up with conventional explosives inside the water tank.

The water from the explosion landed in this concrete reservoir and drained into the bowl's filter system, where workers recovered the metal fragments. Scientists continued these water-recovery tests until early 1945, but after realizing this method was not feasible for a full-scale nuclear test, they moved on to other potential recovery methods—including the infamous giant steel containment vessel known as "Jumbo."

The Concrete Bowl with the wooden tower. The bowl was designed to test recovering plutonium in case of a failed nuclear test.

The Concrete Bowl remains in place today—an example of the wartime Laboratory's practice of simultaneously testing different solutions to solve complex problems. In the 75 years since the bowl's construction, weeds and trees took over and the local fauna discovered it as a reliable watering hole on the arid Pajarito Plateau.

"One of the pleasures of working at the Concrete Bowl is the amount of wildlife in the area. We saw elk, deer, and coyotes every day," Brunette said.

Concrete bowl before restoration.

Concrete bowl after restoration.

Brunette also described that "in the Concrete Bowl, the steel reinforcing mesh was placed too close to the surface, exposing it to the elements and allowing it to carry moisture and rust into the concrete."

Before any work began, the Lab's Environmental Protection and Compliance Division ensured there was no contamination remaining from these early tests at the site. The Lab's Historic Buildings team worked with Vital Consulting Group from Albuquerque on the removal of damaging vegetation to preserve this unique historic site. Vital Consulting Group also graded the soil away from the bowl to reduce the accumulation of water inside the bowl.

While the deer and elk may need to find a new watering hole, these efforts will preserve this historic site for years to come.

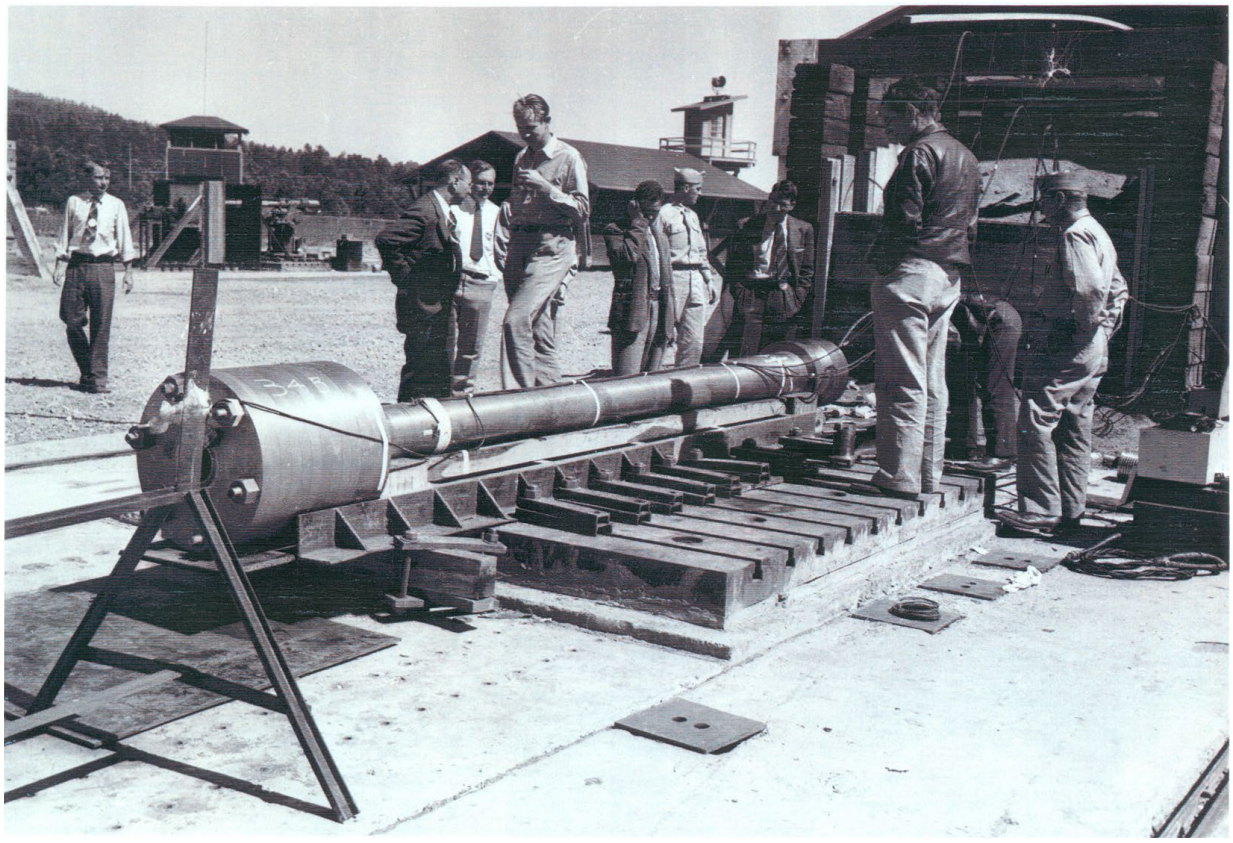
An Early Wartime Test Facility

From the beginning of Project Y, Robert Oppenheimer and Manhattan Project physicists believed they could make a "gun-type" atomic bomb, but they had to perfect the mechanism that could cause a sustained chain reaction in fissionable material. Manhattan Project researchers developed the Gun Site, known in 1943 as Anchor Ranch Proving Ground, to design and test nuclear weapon prototypes.

At this site, scientists, engineers, ordinance experts, and members of the U.S. Navy conducted experiments on the inner workings of this design. The name Gun Site refers to this site's role in the development of the uranium weapon, Little Boy.

Because researchers fired numerous "gun-assembly" tests at this site using special gun barrels made by the U.S. Navy, they needed bunkers for protection during their experiments. Manhattan Project engineers constructed the buildings in a natural drainage, placing the tests above the bunkers and lessening the hazards of these experiments.

Scientists observed the tests from inside the concrete and earthen bunkers using a wooden periscope tower that relied on an elaborate system of mirrors—like a milk carton periscope you may have made as a child.



Gun Site during Manhattan Project—the wooden periscope tower is visible in the back right of the image.

Gun Site today.

Today, the preservation mission for this site came back to a familiar issue—concrete. Brunette explains why Manhattan Project era concrete presents the greatest preservation challenge. “We find that much of the Manhattan Project era concrete was mixed using large, smooth river rock aggregate that would not be suitable for modern construction.”

The buildings at Gun Site underwent extensive concrete repairs in 2012, including the reconstruction of the concrete parapet wall and a concrete cap to drain water from the top. However, that concrete cap failed and allowed further degradation of the historic site. The Lab and Vital Consulting Group worked to remove the crumbling concrete from the 2012 project. With this work completed, the Manhattan Project team will move forward with additional preservation efforts at Gun Site.

Gun Site parapet wall and cap before restoration.

Gun Site parapet wall and cap after restoration.

These unique sites tell the story of Los Alamos National Laboratory's history of solving difficult scientific and technological challenges and the story of a collective effort to achieve a common goal. The Manhattan Project was an immense project that created new fields of science and shaped the world we live in today.

In the spirit of its namesake, collaboration and teamwork defines the Manhattan Project National Historical Park. The National Park Service, the Department of Energy National Nuclear Security Administration's Los Alamos Field Office, and Los Alamos National Laboratory work together to protect these sites for future generations. Ensuring that important historic sites remain intact to tell the story of this world-changing event is a crucial component of the collaborative effort to administer the Manhattan Project National Historical Park. The team is not finished; they have already begun preservation work in another significant Manhattan Project historic location, V-Site.

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Formally established in November 2015 through a memorandum of agreement between the U.S. Department Energy and the National Park Service to preserve portions of three World War II sites where the United States developed the first atomic weapons, the Park marks the history of the people, science, events, and controversy associated with the creation of the atomic bomb in the top-secret effort known as the Manhattan Project. Under the agreement, the National Park Service and Department of Energy jointly manage and administer the park.

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About Los Alamos National Laboratory

Los Alamos National Laboratory, a multidisciplinary research institution engaged in strategic science on behalf of national security, is managed by Triad, a public service oriented, national security science organization equally owned by its three founding members: Battelle Memorial Institute (Battelle), the Texas A&M University System (TAMUS), and the Regents of the University of California (UC) for the Department of Energy's National Nuclear Security Administration.

Los Alamos enhances national security by ensuring the safety and reliability of the U.S. nuclear stockpile, developing technologies to reduce threats from weapons of mass destruction, and solving problems related to energy, environment, infrastructure, health, and global security concerns.

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