

November 2000 Engineer Update [Previous Story](#)
[Back to Contents](#)

Corps builds flood control structures for Los Alamos

By Capt. Tom Tickner
Sacramento District

The Cerro Grande fire in New Mexico that destroyed 48,000 acres and left hundreds homeless in May has been out for more than three months, but its aftermath was felt long after firefighters extinguished its flames. Post-burn conditions severely altered the hydrology of the area, causing an imminent threat of flooding from monsoon rains, which could result in excessive storm water runoff near the Los Alamos National Laboratory (LANL), the city of Los Alamos, and adjacent pueblos.

In response to that potential disaster, more than 80 U.S. Army Corps of Engineers employees were called in from all over the nation to assist Albuquerque District in studying, designing, and executing emergency flood prevention measures.



The flood retention structure at Pajarito Canyon will protect Los Alamos Technical Laboratory. (Photo courtesy of Sacramento District)

Corps involvement and missions

Initially, the Corps only provided temporary housing for the fire victims of Los Alamos. However, acting on requests from local and federal agencies, project manager Cheryl Buckle of Albuquerque District and a team from around the country began work on a flood fight plan. Their goal was to identify vulnerable areas and recommend protective actions.

"In some cases, the predicted post-fire discharge was up to 10 times greater than pre-fire flows," said Marie Vanderpool, a Corps hydrologist from Kansas City District. Their around-the-clock work provided critical information within nine days and a final report by July 12.

The results clearly showed that Los Alamos County, two local Indian pueblos and the Department of Energy's (DoE) Los Alamos National Laboratory needed an immediate response. The Cerro Grande fire also affected Albuquerque District itself. David Griego, Albuquerque District's project manager for Cochiti Lake, installed three log booms for debris protection, and he is monitoring the water quality for radioactive nuclei.

Due to the complexity of the environment, and the unique national security mission of LANL, Albuquerque District established the Los Alamos Fire Recovery Office. This office served as the forward headquarters and central information point responsible for public affairs, environmental issues, and coordination with five customers and many other agencies involved in 21 emergency projects. Each project and customer was unique and each had varying desires, but all directly affected each other due to the area's hydrology.

"This is the type of challenge I hoped I'd find on my first emergency management dispatch," said Mark Cohen of Los Angeles District, an assistant in the Fire Recovery Office. "It's very rewarding helping people in need."

Temporary housing

The Corps gave Los Alamos County 114 temporary homes for families whose houses were destroyed by the fire. Once their homes are rebuilt, the Federal Emergency Management Agency plans to remove the temporary homes and give them to local Indian pueblos for much-needed teacher housing.

Project engineer Dennis Hughes of Huntington District, along with fellow Planning and Response Team (PRT) members, completed the project July 7.

Diamond drive 86-inch culvert

Los Alamos County and the Corps identified a 1940s landfill bridge in danger of failure. This structure services about 19,000 vehicles daily and links the southern half of Los Alamos to hospitals and the main town. It is 120 feet high, 425 feet long at the base, 85 feet wide at the crest, and can impound 814 acre-feet of water. An 18-inch culvert provides drainage.

The fire eliminated 95 percent of the vegetation in the watershed directly above the landfill bridge, and the culvert clogged immediately with the increased runoff and sediment.

The Corps' solution was an emergency operation to install an 86-inch steel pipe 432 feet through the embankment. Albuquerque District's project engineer Roger Torres, and project manager Eric Fino began the "jacking and boring" operation (a form of micro-tunneling) on July 7 and punched through on July 15. The flood flows now pass through the completed culvert, protecting the road embankment and the downstream from a breach failure.

Pueblos

The Cerro Grande Fire affected Native American lands on the Santa Clara and San Ildefonso Pueblos. Many of their canyons have already experienced erosion from the increased runoff.

Ron Kneebone of Albuquerque District, project manager for work at the pueblos, is executing 15 flood prevention projects. These include strengthening an existing levee system, installing grade control structures, upgrading low-water crossings, and installing protection around facilities.

"We've already provided protection for life and property," Kneebone said. "The tribes are happy with the Corps' performance, and this work has strengthened our relationships with them."

Los Alamos National Laboratory

The Corps identified and executed five flood-risk-reducing design-build projects under Kris Schafer, project manager from Albuquerque District, and Bob Kreienheder, resident engineer from Kansas City District. The Corps directed Sundt Construction Company, headquartered in Arizona, to design and build three projects to harden existing structures, one to retain sediment, and one to protect a downstream nuclear facility from a 100-year storm event.

Existing structures -- Joe Russell, project engineer from Portland District, supervised three projects to reduce the risk in flooding and erosion of contaminated sediment downstream. The Corps strengthened the crest, and the upstream and downstream portions of the Los Alamos Dam with shotcrete and articulated concrete matting. An abandoned land bridge then received attention. Shotcrete was applied to the upstream face and a spillway was engineered into the hydrology plan. The third project similarly strengthened a main travel route, New Mexico State Highway 4.

Sediment retention -- Mark Clark from the Rock Island District, the Corps' project engineer on the "low-head weir" project, supervised construction of the sediment retention structure. "This 13-foot high, 200-foot-long rock gabion structure is built across the bottom of Los Alamos Canyon," Clark said. "High flows in the canyon that may contain contaminated sediment will slow down behind the structure, sediment will settle out, and then runoff will pass over and through the gabion structure."

Nuclear facility -- By far the largest, most difficult undertaking was the design and construction of a roller compacted concrete (RCC) flood retention structure in Pajarito Canyon. It will protect the laboratory's Technical Area 18, a nuclear research facility downstream. The national security component of the project gave it added urgency. The structure not only protects against flooding but also against sediment runoff. Equally critical, it provides protection to allow national defense operations to continue at Technical Area 18 in any weather.



The low-head weir across Los Alamos Canyon will contain contaminated sediment. (Photo courtesy of Sacramento District)

Dwight Gill from Portland District was the Corps' project engineer for the RCC flood retention structure. He supervised the around-the-clock construction of this massive undertaking:

Height -- 70 ft.

Base length -- 215 ft.

Crest length -- 390 ft.

Crest width -- 20 ft.

Outflow -- Restricted to less than 400 cubic feet per second

Sundt Construction Company received the "go-ahead" for the design-build structure on June 26, completed to the 100-year protection level Aug. 28, and completed the Oct. 7.

"A project of this complexity can take years to develop from concept to design to construction," said Kreienheder. "We did it in just over 90 days." said Kreienheder.

Sundt's area manager, Mike Sick said, "We all pulled together as a team (Corps, DoE, LANL, and URS-Greiner, Sundt's design-build architect) and solved each issue quickly and efficiently."

"The project posed a number of challenges for us, including performing the engineering, the construction mobilization, and overcoming the laboratory's security issues," Schemer said. "Escorts were assigned to every construction crew, so not having free access was a challenge."

But DoE was still impressed by the operation, according to Vozella. "Within days of requesting assistance, the Corps moved in and began executing large infrastructure design-build projects," he said. "DoE and LANL focused on smaller facility and utility protection projects and rehabilitation of burned areas on DoE lands."

With most of the emergency work complete, we can reflect on what was accomplished. The Corps team executed more than \$20 million in emergency work for a variety of customers in only about 90 days.

"All team members who supported this effort were superb and are the true heroes of this success story," said Col. Raymond Midkiff, Albuquerque District Commander. "Without them, we would still be trying to complete this important work. We can't thank them enough for their hard work and dedication during the past three months."

For more information, see the project website at www.spa.usace.army.mil/cgfffe.htm.

(Capt. Tom Tickner is the officer in charge of the Los Alamos Fire Recovery Office in Sacramento District.)

END

[Back to Contents](#)

[Next Story](#)
