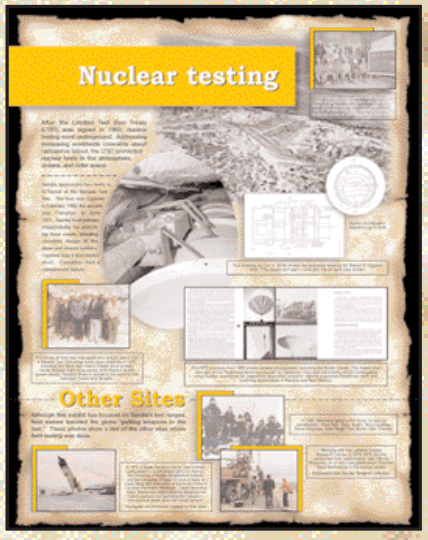
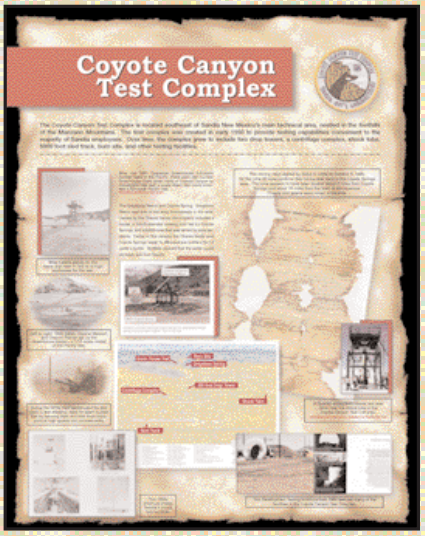
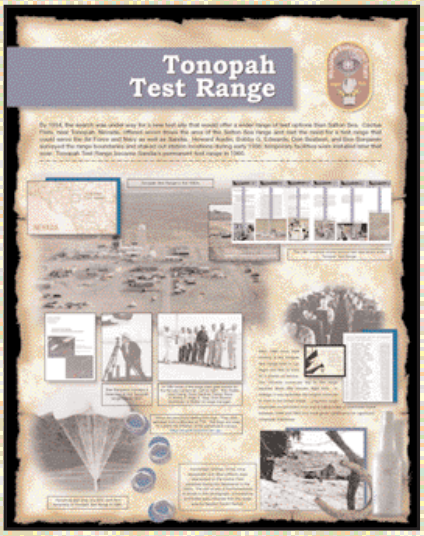
Putting weapons to the test

This exhibit explores Sandia's key capabilities in field testing nuclear weapon designs and its role insupporting nuclear testing.

To view a poster, click on any of the icons below. To magnify an area within a poster, use the magnifying tool on the Acrobat Reader tool bar and drag a box over the area.







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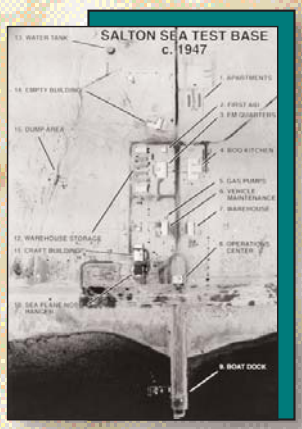
Putting weapons to the test

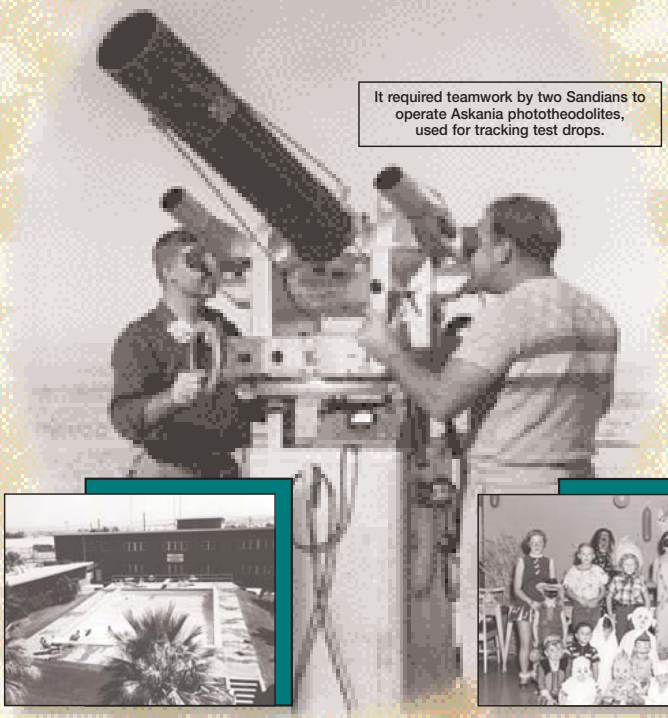
"Field test is one of the real roots of Sandia," asserts Howard Austin, one of Sandia's pioneer field testing managers. From its earliest days as Z-Division of Los Alamos, Sandia was involved in field testing. In 1945, one of the first tasks of Z-Division was to locate a site for drop testing of developmental bomb shapes; this was the genesis of Sandia's work in non-nuclear testing. Sandia began its supporting role in nuclear testing in 1946 when Z-Division personnel were called to the Pacific for Operation Crossroads, the first post-war nuclear test series.



Salton Sea instrument laboratory and control center.

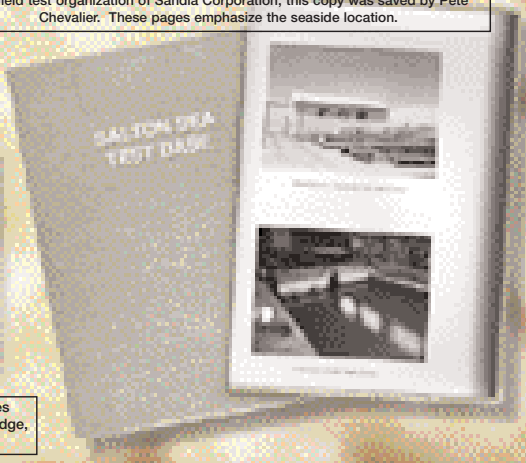
The field test group was organized in September 1945 under Glenn Fowler and Dale Corson. Fowler made arrangements with the Isleta Pueblo to use a test range west of Los Lunas. According to Fowler, "Almost simultaneously with the decision to go to Los Lunas, we started thinking about a more permanent place." In 1946, Fowler and other Z-Division personnel located a Navy test range in California at the Salton Sea. The Salton Sea Test Base was Sandia's first permanent test base and was primarily used to test strategic bombs dropped from high altitudes. As the area became heavily populated and Sandia's testing requirements changed, the Salton Sea Test Base was phased out, finally closing in 1961. The Tonopah Test Range was added in 1957 and became Sandia's permanent range in 1960.

Sandia field testers at work in the Salton Sea control room, *left to right*: Billy Mitchum, Tom Pace, Howard Austin, Ed Stout.



It required teamwork by two Sandians to operate Askania phototheodolites, used for tracking test drops.

This book serves as a pictorial resume of the facilities at the Salton Sea Test Base and was used for recruiting and to show the capabilities of the facility to outside agencies. The contents were compiled by the special projects section of the field test organization of Sandia Corporation; this copy was saved by Pete Chevalier. These pages emphasize the seaside location.



One-third of the 100 Sandia employees at Salton Sea lived on the base. Here families of the field testers enjoy the swimming pool at the San Felipe Lodge recreation center.

Children of the field testers pose in their costumes at a 1953 Halloween party held at the San Felipe Lodge, Salton Sea Test Base.

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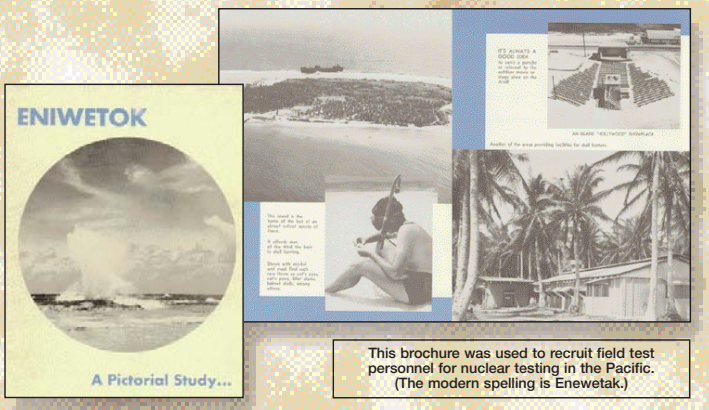
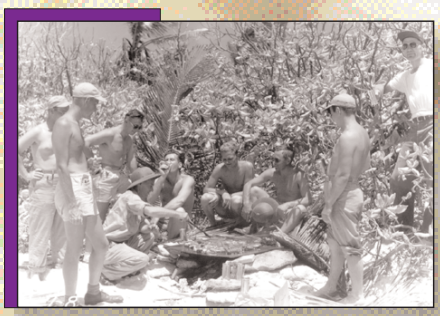
Nuclear testing

Sandians have provided technical support for all post-war U.S. nuclear tests, beginning with Operation Crossroads in 1946. Sandia provided instrumentation, data recording, and analysis for nuclear tests designed by Los Alamos and Lawrence Livermore National Laboratories.

Personnel from Z-Division and Los Alamos assumed overall responsibility for technical support of Operation Sandstone, the second postwar nuclear test series. X-ray, first in the Sandstone series, was detonated on a tower on Enewetak Atoll.



This brochure was used to recruit field test personnel for nuclear testing in the Pacific. (The modern spelling is Enewetak.)

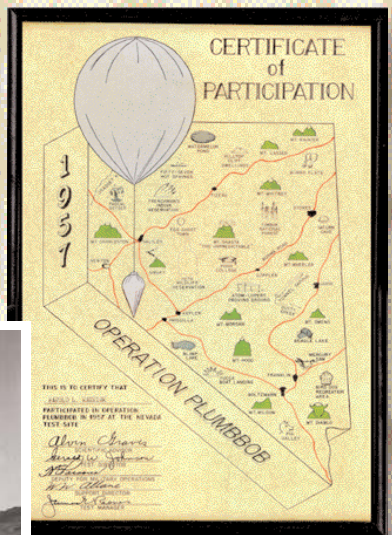


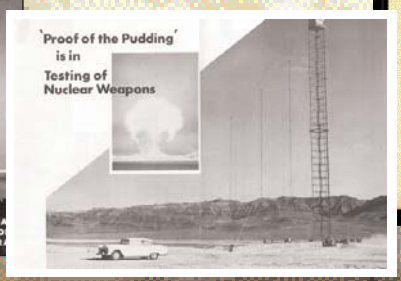
Field test personnel relax with a beach cookout during the Sandstone nuclear test series.

These snapshots were purchased by Harold Rarrick at the Enewetak Base Exchange in 1958.

Nevada Test Site

In 1950, the Atomic Energy Commission established the Nevada Test Site (NTS) north of Las Vegas to conduct nuclear tests. Sandia supported these tests. In the 1950s, Sandia employees had the opportunity to travel to the Nevada Test Site to observe the atmospheric nuclear tests. This employee observer group at Operation Big Shot included, *back row, left to right*, CJ McGarr, Dan Yarbrough, CJ Harris, Bob Lemm, Randy Parsons, Jim Dempsey, Celia Brand, and Conrad Roesche; *front row, left to right*, John Maxon, Harold Gunn, Ted Sherwin, Max Weber, Nate Wineberg, and Fred Smith. A *Sandia Bulletin* article from May 9, 1952 shows the detonation and relates the story.
Sandia Bulletin donated by Fred Leckman.





Right: Operation Plumbbob included a number of tower and balloon nuclear weapons related tests. The Fizeau test was a tower shot at NTS in September 1957. The tower setup is shown in this *Weaponizing* brochure from the late 1950s. Harold Rarrick's Certificate of Participation for Operation Plumbbob includes the Fizeau shot. In other Operation Plumbbob tests, Sandia first used balloons to lift devices to greater heights than were feasible with towers.

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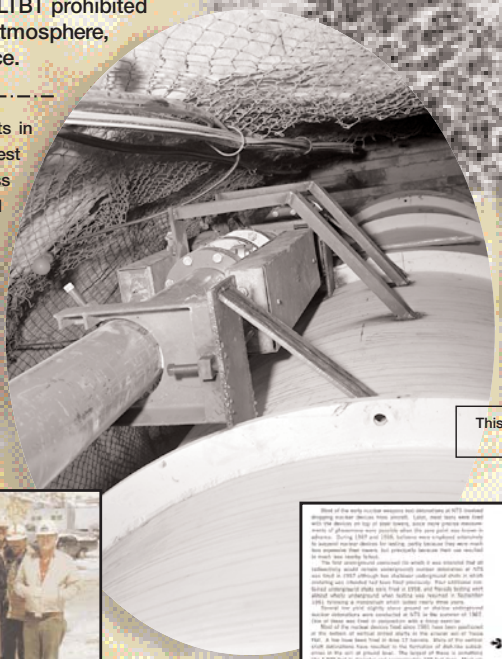
Nuclear testing

This Cypress group photo from February 1969 shows the field testers attitude about their work. Because tests were often carried out at remote sites, field testers developed a strong sense of camaraderie in their work.

After the Limited Test Ban Treaty (LTBT) was signed in 1963, nuclear testing went underground. Addressing increasing worldwide concerns about radioactive fallout, the LTBT prohibited nuclear tests in the atmosphere, oceans, and outer space.

Sandia sponsored two tests in G-Tunnel at the Nevada Test Site. The first was Cypress in February 1969; the second was Camphor in June 1971. Sandia took primary responsibility for executing these events, including complete design of the pipes and closure systems. Cypress was a successful shot; Camphor had a containment failure.



Drawing and information supplied by Carl S. Smith.

This drawing by Carl S. Smith shows the assembly drawing for Station 2, Cypress shot. The experiment went inside the line-of-sight pipe shown.

This photo of field test managers and visitors came from a Nevada Test Site scrap book page dated April 1976. Included are, *front row*: Glenn Fowler (blue jacket), Carter Broyles (light blue pants), and Howard Austin (green pants); Howard Viney is visible in the second row between Fowler and Broyles.

This NTS brochure from 1963 shows several photographs, including the Sedan Crater. The Sedan shot was part of the Plowshare series sponsored by Lawrence Livermore Laboratory, which investigated using nuclear explosives for peacetime excavation projects. Sandia supported Plowshare work with cratering experiments in Nevada and New Mexico.

Other Sites

Although this exhibit has focused on Sandia's test ranges, field testers traveled the globe "putting weapons to the test." These photos show a few of the other sites where field testing was done.

In 1986, Sandians went to the Arctic to test ice penetrators. *From left*: Dean Kuehl, Terry Leighley, Diana Helgesen, Stan Yager, Rob Smith, Bob Thomas.

In 1974, a dozen Sandians, led by John Eckhart, participated in a joint project with Los Alamos, the University of Alaska Geophysical Institute, and the University of Texas to conduct tests at Cape Parry, 285 miles north of the Arctic Circle in Canada's Northwest Territories. Called Operation Tordo, Sandia was responsible for designing the rocket payloads and launching the Canadian-manufactured Black Brant IVA rocket systems.

Photograph and information supplied by Rick Orzel.

Working with the Laramie Energy Research Center in 1975-1976, Sandia conducted field experiments near Hanna, Wyoming, on in-situ coal gasification. Sandian Dave Northrop is in the orange jacket.

Photograph from the Ben Benjamin collection.

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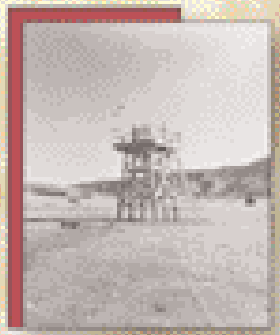
Coyote Canyon Test Complex

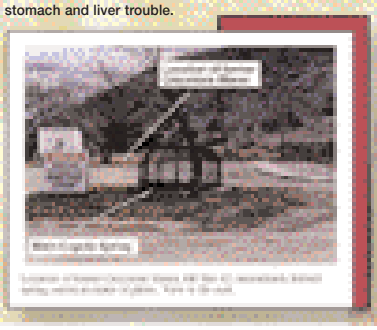
The Coyote Canyon Test Complex is located southeast of Sandia New Mexico's main technical area, nestled in the foothills of the Manzano Mountains. The test complex was created in early 1950 to provide testing capabilities convenient to the majority of Sandia employees. Over time, the complex grew to include two drop towers, a centrifuge complex, shock tube, 5000 foot sled track, burn site, and other testing facilities.



Mike Cetera stands on the tower that held 11,500 lb of high explosives for the test.

After the 1951 Operation Greenhouse full-scale nuclear tests in the Pacific, there were non-nuclear Greenhouse scale-down tests at Coyote Canyon to investigate how well a scale-down test could simulate a full-scale Pacific test.
Information provided by Dick Jones.

The Greystone Manor and Coyote Spring. Greystone Manor was one of the early homesteads in the area. Owned by the Chavez family, the property included a house, a 100-ft-diameter wading pool fed by Coyote Springs, and a bathhouse that was rented by area residents. Earlier in this century, the Chavez family sold Coyote Springs water to Albuquerque bottlers for 10 cents a bottle. Bottlers claimed that the water cured stomach and liver trouble.

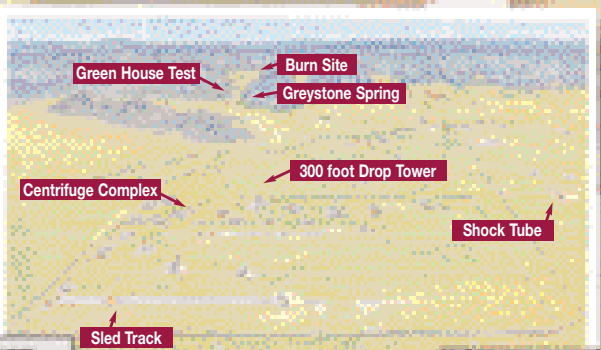


This mining claim signed by Rufus C. Little on October 6, 1928, for the Little #2 mine confirms that mining was done in the Coyote Springs area. The mine appears to have been located about 3 miles from Coyote Springs and about 16 miles from the town of Albuquerque. Fluorite and galena were mined in the area.

Left to right: Dick Jones, Hershel Waldorf, and Deacon Palmer set up the Greenhouse model – a 1/15 scale model of the Pacific test.

A Spartan antiballistic missle test was done near the shock tube in the Coyote Canyon Test Complex.
Photograph and information supplied by Dennis Mitchell.

During the 1970s, field testers used the sled track to test shipping casks for spent nuclear fuel by ramming them and their truck transports at high speeds into concrete walls.



This 1950s brochure shows Sandia's shock test facilities.

This Development Testing brochure from 1983 features many of the facilities in the Coyote Canyon Test Complex.

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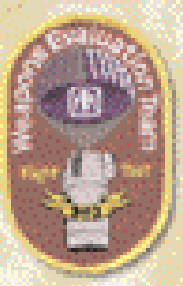
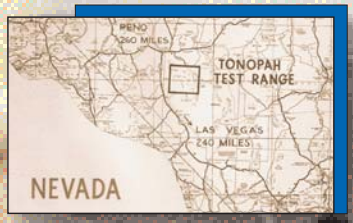
Tonopah Test Range



By 1954, the search was under way for a new test site that would offer a wider range of test options than Salton Sea. Cactus Flats, near Tonopah, Nevada, offered seven times the area of the Salton Sea range and met the need for a test range that could serve the Air Force and Navy as well as Sandia. Howard Austin, Bobby G. Edwards, Don Beatson, and Ben Benjamin surveyed the range boundaries and staked out station locations during early 1956; temporary facilities were installed later that year. Tonopah Test Range became Sandia's permanent test range in 1960.

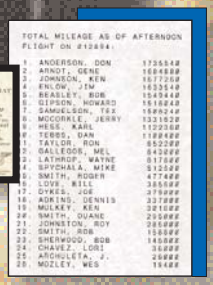


Tonopah Test Range in the 1980s.

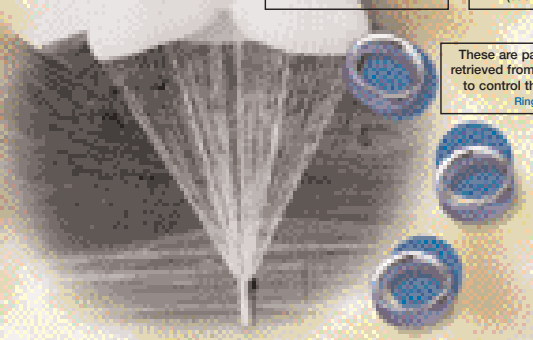
This 1981 brochure shows various test operations at the Tonopah Test Range.

Ben Benjamin surveys a base line at the Tonopah range site in 1957.

In 1964 some of the range crew grew beards for the Nevada Centennial. *Left to right*: Bob Statler, Lloyd Young, Grant Gardner, Dewey Stout, A. Korbe, F. Steel, K. Datz, Dick Browne (successor to Statler as range manager).



After 1968 most staff working at the Tonopah Test Range lived in Las Vegas and flew to work on a charter air service. The 160-mile commuter trip to the range required about fifty minutes flight time. In mileage, it may have been the longest commute to work in the United States. Long-time range employees accumulated more than a million miles of commuter travel between 1968 and 1993 and were given certificates for significant commuter milestones.



These are parachute reefing line rings. They were retrieved from a B53 test at TTR. The rings are used to control the inflation of the parachute's canopy.
Rings and patch loaned by Dan Luna.

Parachute test drop of a B53 Joint Test Assembly at Tonopah Test Range in 1995.

Homestead ranches, mines, mine equipment, and other artifacts were abandoned on the Cactus Flats periphery during the Depression in the 1930s. The ruin of one of the homesteads is shown in this photograph. A horseshoe and bottle were collected from the range area by Sandian Harold Rarrick.

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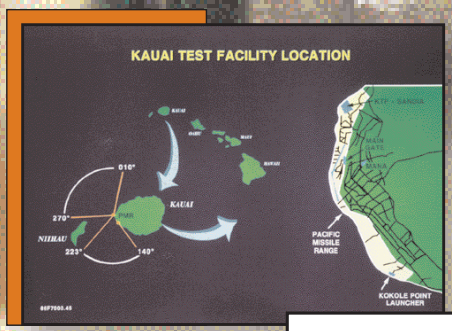
Kauai Test Facility

During the last U.S. atmospheric nuclear tests in 1962, Sandia established a rocket-launching facility on Kauai in the Hawaiian Islands. First known as Barking Sands, it became the Kauai Test Facility. Kauai was where Sandia tested designs for high-altitude rockets; both rail-launch and vertical-launch facilities at Kauai supported the testing of hundreds of rockets over the years.

STARMATE I was launched in September 1989.

STARS Mission 2 ODES Demonstration flight at Kauai Test Facility in 1994.



Kauai Test Facility, 1989.

Below: Sandia launches one of its Strypi rockets developed originally during the 1962 Dominic tests. The Strypi rocket proved so robust and reliable that it became a work-horse in Sandia's rocket research program.