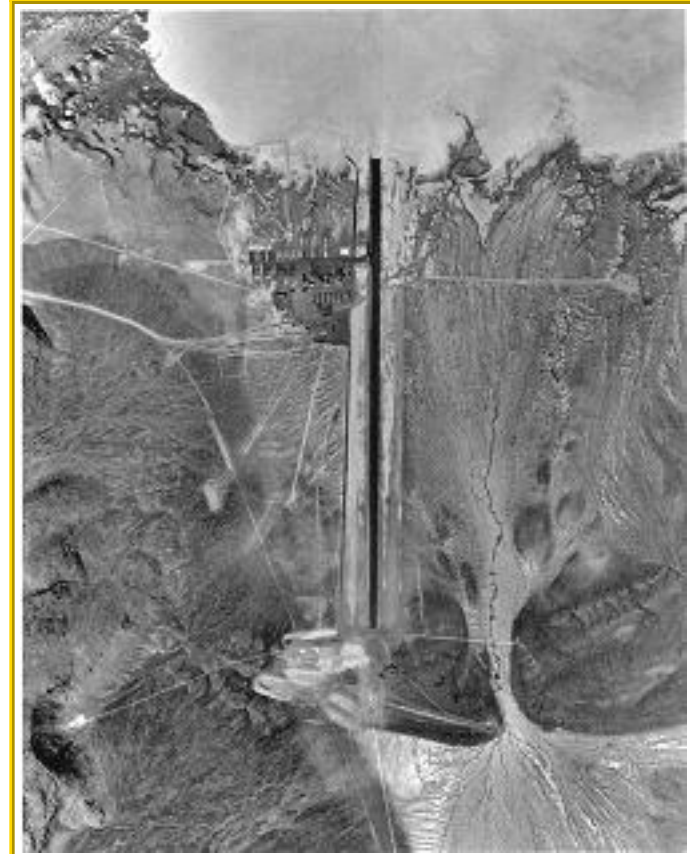


Area 51 was rocked by atomic blasts

By Peter W. Merlin

A remote location

In 1954, Lockheed and the Central Intelligence Agency (CIA) needed a secure test site for the secret U-2 spyplane that was nearing its first flight. Test pilot Tony LeVier and Lockheed Skunk Works foreman Dorsey Kammerer scouted the deserts of the southwestern United States, looking for remote dry lakebeds. Skunk Works chief Clarence "Kelly" Johnson selected a site, but it was rejected by Richard M. Bissell, Jr., of the CIA and his Air Force Liaison, Col. Osmond J. Ritland because it was too close to populated areas. Ritland recommended Groom Dry Lake, Nevada, on the Las Vegas Bombing and Gunnery Range. At first, Johnson objected to Groom Lake because of its proximity to the Atomic Energy Commission (AEC) nuclear proving ground at Yucca Flat. Not only were atomic bombs being detonated above ground just 12 miles to the southwest, Groom Lake was also directly downwind of the radioactive fallout clouds. Johnson relented when he realized that the military and AEC restrictions on the surrounding area would help provide security for the U-2 operation. Nevertheless, atmospheric testing of nuclear weapons plagued the secret base with radioactive fallout and other hazards for many years.



This aerial view shows the Watertown Airstrip at Groom Lake in 1959. The paved runway is 5,000 feet long.

Poison rain

The history of fallout in the Groom Lake area was well documented (starting with the 1951 test series), according to John G. Fuller's book *The Day We Bombed Utah*, which describes the effects of fallout on the populations of eastern Nevada and western Utah. Fuller relates the story of the Sheahan family who operated the Groom Mine, overlooking the dry lakebed. According to Fuller, the AEC monitored radioactive contamination at the Groom Mine through the use of sticky pans, air and water samples, dosimeters [radiation detectors], and even live rabbits. The Sheahans were informed that there would be "a lot of radioactive dust, ...and the clouds would be coming in the direction of the Groom Mine."

There would also be times when the Sheahan family and the miners would have to evacuate. The days of non-productivity were a costly nuisance to the Sheahans. The frequent nuclear testing required the mine "to be shut down often, once as long as 12 days in a row," according to Fuller. As Fuller describes the fallout from interviews with surviving Sheahan family members, it "would just sweep in, thick as a dry thunder shower, just as heavy and just as pelting as actual rain." Cattle, horses, and deer in the Groom area were later observed dead or injured with beta burns, a form of radiation damage from fallout.

Other damage at the Groom mine was caused by shockwaves from the blasts. One detonation broke 30 windows and ripped sheet metal off the sides of buildings. According to Fuller, the Sheahans were informed that detonations were planned for times when the winds would send the atomic clouds north and east. In this way, the fallout would pass over sparsely populated areas, rather than major cities like Las Vegas, Nevada, and Los Angeles, California. In later years, this necessity would plague the workers at the secret Groom Lake airfield with the need to suspend operations and evacuate personnel during nuclear tests.

An open secret

The existence of the facility at Groom Lake was announced by the AEC in 1955, during its construction. The airbase was called Watertown, a name that was commonly used for the facility until 1958 when it was added to the Nevada Test Site as Area 51. In fact, Watertown is still officially listed as a member of Alamo Township in Lincoln County.

An information booklet distributed to the news media in 1957 by the AEC (titled *Background Information On Nevada Nuclear Tests*) mentioned the "Watertown Project." It was described as "a small facility at Groom Dry Lake adjacent to the northeast



The airfield at Watertown, on the southwest corner of Groom Lake, as it appeared during the

corner of the Nevada Test Site, and within the boundaries of the Las Vegas Bombing and Gunnery Range." It noted that the base included "dormitories, equipment, buildings, and a small airstrip." 1950s. U-2 aircraft were parked north of the hangars and west of the runway.

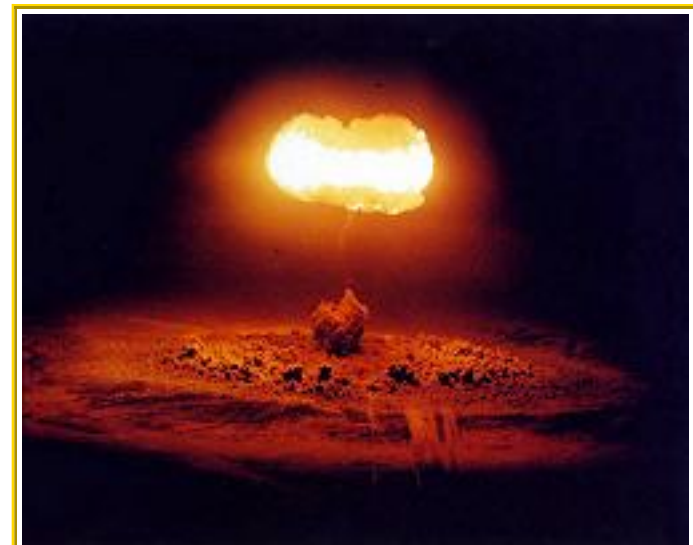
Naturally, there was no mention of the fact that it had been built for the CIA to test fly a new spyplane and train pilots for covert reconnaissance missions. The booklet did include a cover story that the National Advisory Committee for Aeronautics (NACA) had "announced that U-2 jet aircraft with special characteristics for flight at exceptionally high altitudes have been flown from the Watertown strip with logistical and technical support by the Air Weather Service of the U.S. Air Force to make weather observations at heights that cannot be attained by most aircraft." In fact, U-2 aircraft at Watertown were painted in NACA markings to protect the cover story in the event that one of them was lost off-site.

Under the cloud

Prior to the construction of the Watertown facility, there were 32 atmospheric nuclear tests at the NTS. Since they were detonated when the wind was blowing generally northeast, the shots usually deposited fallout on the Groom Lake area. In 1955 and 1956, there were 14 more. The 1957 test series, Operation Plumbbob, included 24 nuclear detonations and six safety experiments (three of which had a slight nuclear yield). These tests frequently required the evacuation of personnel from Watertown, interrupting flight test and crew training operations.

A memo from Brig. Gen. Alfred D. Starbird in the Department of Energy (DOE) historical archives describes a teleconference regarding Watertown exposure to fallout during the 1957 test series. According to the memo, the "Watertown agreement requires that personnel evacuate, if necessary, to permit [the] test device to be fired." It was also cautioned that "expected fallout on Watertown from a given shot should be limited so as to permit re-entry of personnel within three to four weeks without danger of exposure exceeding the established off-site rad-safe [radiation safety] criteria, and with understanding that evacuation for a later shot may be required."

It was requested that this position be passed on to the Nevada Test Organization planning board, and that the Board should determine "delays in firing which may result, if any, from Watertown consideration," and "maximum tolerable fallout on Watertown under stated conditions." At this time, the Groom Lake facility was only being used for the U-2, and was



Shot STOKES was fired from a balloon above Area 7. It exploded with a yield of 19 kilotons. The fallout cloud passed through the Groom Lake area.

expected to be deactivated as the aircraft and crews were dispersed to overseas bases for operational missions. The memo states: "Latest info here indicates Watertown will continue operation through June 30, 1957, and possibly for an additional year thereafter." The evacuations must have been inconvenient to Watertown personnel, as they would have had a severe impact on flight test and training schedules.

Plutonium dispersal near Groom Lake

The first shot of Operation Plumbbob was a safety experiment called Project 57. Such tests were usually conducted to determine that a weapon or warhead damaged in an accident will not detonate with a nuclear yield, even if some or all of the high-explosive components burn or detonate. Because the non-nuclear explosion would disperse nuclear materials, such as plutonium, the Project 57 test was mainly used for developing decontamination and radiation monitoring techniques.

On the morning of 24 April 1957, an XW-25 warhead was subjected to a one-point detonation. Only the bottom detonator was fired. The warhead's high-explosive charge destroyed the weapon and spread plutonium over nearly 900 acres of the surrounding landscape. The primary hazard from plutonium is the danger of inhaling microscopic particles. Alpha radiation emitted by the material is very weak, but can damage soft tissue (as in the lungs).

Ground Zero for Project 57 was only five miles northwest of Groom Dry Lake. Initially, no fallout was detected at Watertown. It was later determined that there was minor alpha activity for 12 days following the shot, but it was well below operational guidelines.

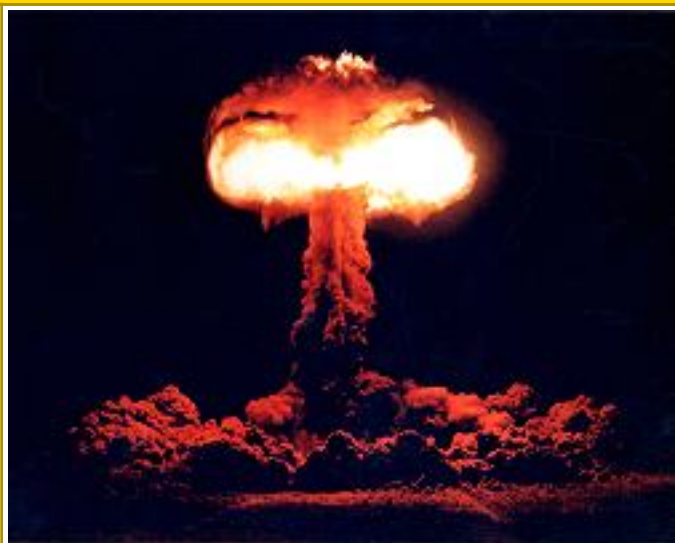
Blast effects at Watertown

The following month saw the beginning of full-scale nuclear detonations for Operation Plumbbob. A DOE database of Estimates of Exposure Rates and Times of Fallout Arrival Near the Nevada Test Site lists six of these shots as having deposited measurable fallout at Watertown. The first to do so was the fourth detonation, called WILSON, which was fired on 18 June 1957. It was a 10-kiloton device, lofted on a balloon to height of 500-feet above Area 9 in the northern part of Yucca Flat. The mushroom cloud climbed to 30,779-feet where a steady wind blew it northeast. Meanwhile, WILSON's stem was blown in the opposite direction towards California. Balloon shots were somewhat cleaner than tower shots because there was no steel structure to vaporize and contribute to the fallout cloud.



Shot SMOKY was fired atop a steel tower in Area 2, adjacent to some hills. It had a yield of 44 kilotons. SMOKY's dusty cloud deposited radioactive fallout over the Groom Lake area.

The Groom Lake base had always been intended as a temporary facility. As U-2 testing began to wind down and CIA pilot classes finished training, Watertown became a virtual ghost town. By mid-June 1957, the U-2 test operation had moved to Edwards AFB, California, and the operational U-2 aircraft were assigned to the 4028th Strategic Reconnaissance Squadron at Laughlin, Texas. This was just as well. The airbase was about to be rocked as never before.



Shot HOOD was fired on 5 July 1957. It was lofted by balloon to a height of 1,500-feet over Area 9, about 14 miles southwest of Watertown. The device exploded with a yield of 74 kilotons, the most powerful airburst ever detonated within the continental United States. HOOD's nuclear cloud drifted over Groom Pass and the Papoose Range, depositing fallout on the Groom Lake area and its shock wave damaged a number of buildings at Watertown.

HOOD, the sixth nuclear shot of Plumbbob was truly spectacular, and caused substantial damage at Watertown. The device had been designed by the University of California Radiation Laboratory at Livermore, California. It was lofted by balloon to a height of 1,500-feet over Area 9, about 14 miles southwest of Watertown. At 4:40 a.m. on 5 July 1957, HOOD exploded with a yield of 74 kilotons, the most powerful airburst ever detonated within the continental United States. It was five times as powerful as the bomb dropped on Hiroshima, Japan, during World War II.

According to Under The Cloud by Richard Miller, HOOD was a thermonuclear explosive, or hydrogen bomb. It was detonated in spite of an informal agreement between the government and the military precluding the use of fusion weapons on U.S. soil. Miller cites a letter from Col. William McGee of the Defense Nuclear Agency, dated 7 July 1980, which admits that HOOD "was a thermonuclear device and a prototype of some thermonuclear weapons currently in the national stockpile."

HOOD's nuclear cloud drifted over Groom Pass and the Papoose Range, depositing fallout on the Watertown camp where the blast had already left its mark. According to a memorandum from R.A. Gilmore of the Nevada Test Organization's Off-Site Radiation Safety Office, HOOD's shockwave damaged a number of buildings at Watertown. Damage included shattered windows on the west sides of Building 2 and the Mess Hall, a broken ventilator panel on the north side of Dormitory Building 102. Two metal Butler buildings suffered the most severe blast effects. A maintenance building on the west side of the base had its west and east doors buckled, and the south door of the supply warehouse west of the hangars buckled in.

Watertown as a radiation field laboratory

Ten days later, 17-kiloton shot DIABLO vaporized its 500-foot tower on the northwest



corner of Yucca Flat. The fiery mushroom cloud sucked up dust and debris and, predictably, headed northeast across the hills. AEC monitors at Watertown documented radiation levels as measured by equipment placed in various buildings, vehicles, and open areas. The airbase included structures made from wood, sheet metal, plaster and other materials commonly found in an average American small town. Therefore, the data provided information on the characteristics of these materials to protect inhabitants against radioactive fallout. The information was logged in tables of "shielding data" for later study. Watertown shielding data from several shots, including DIABLO, is now available to any interested person at the DOE Public Reading Facility in Las Vegas, Nevada. The data tables for DIABLO list readings taken at the Groom Mine main residence, a wood-frame house where radiation levels reached a maximum of 80 milliroentgens per hour (mR/hr). By comparison, normal background levels are between 0.02mR/hr and 0.04mR/hr. Readings were taken at Watertown in several rooms inside wood-frame dormitory Building 103. Levels varied from 12mR/hr to 30mR/hr inside the building. Readings inside Trailer 10, with four-inch-thick aluminum and wood walls, went off-scale three hours after DIABLO detonated. Within an hour, levels dropped to 65mR/hr, and then 24mR/hr 90 minutes later.



Shot DIABLO was fired on top of a 500-foot steel tower in Area 2 on 15 July 1957. It had a yield of 17 kilotons (the bomb dropped on Hiroshima, Japan, during World War II had a 13KT yield). Radiation safety (RAD-SAFE) monitors instrumented buildings and vehicles at Watertown to measure radiation-shielding capabilities of materials commonly found in an average U.S. town.

A warehouse west of the Watertown trailers experienced a maximum of 75mR/hr inside, while levels outside the building reached 110mR/hr. The Base Theater received 90mR/hr for a few minutes as the cloud passed. Levels inside the cab of the Control Tower reached 37mR/hr, while outside levels were up to 60mR/hr. Additional readings were taken in several types of office and storage buildings, and even on the Volleyball court.

Measurements were also taken inside parked vehicles positioned on Groom Lake Road. Radiation monitoring equipment was placed inside trucks, some with closed windows and some open. One truck (with windows open) was located 9.5 miles west of Watertown, along Groom Lake Road. This turned out to be a real "hot spot." The interior of the metal cab received 950mR/hr, while outside registered 1,420mR/hr (or 1.42R). Another truck, two miles west of Watertown only received 0.3mR/hr inside the cab and 0.5mR/hr outside.

A nest for Blackbirds

Air-sampling data was taken almost daily at Watertown during 1958 and 1959 and intermittently in 1960. The airbase was revitalized during this

period when it was selected to support the OXCART program, a predecessor of the Lockheed SR-71 Blackbird. In 1959, the base facilities were expanded to include a radar cross-section measurement range for use in developing the anti-radar capabilities of the OXCART airplane, known as the A-12. The decision to test the A-12 and train CIA pilots at Groom Lake meant that the base would not only have to be expanded, but almost entirely rebuilt. The expansion of the base included new hangars, dormitories, runways, and fuel storage facilities. By 1960, Watertown was commonly known as Area 51, a designation that would appear on most documents and maps for the next two decades.

The OXCART program operated at Area 51 from 1962 until 1968. This did not signal the demise of the remote airbase, however. Other CIA and Air Force programs sustained it for many decades. The Air Force took control of the site in 1977, and it has only continued to grow.

Cratering tests

The last completely above ground test at NTS took place on 17 July 1962. There were, however, several cratering tests conducted in support of Project Plowshare. This endeavor called for the use of nuclear explosives for excavation of canals, harbors, and mountain passes. To prove the feasibility of such peaceful uses of nuclear explosives, devices were buried at a depth that would allow the maximum amount of soil to be displaced.

Fallout and debris from cratering shots were hurled high into the atmosphere. The first cratering test was actually sponsored by the Department of Defense, and was not part of Plowshare. Called DANNY BOY, the 0.43-kiloton shot blasted an 84-foot deep, 265-foot wide crater in basaltic rock on 5 March 1962. Radioactivity was detected off-site, probably at Area 51 which was downwind. The largest cratering shot was SEDAN, on 6 July 1962. The 104-kiloton thermonuclear device left a crater 1,280 feet across and 320 feet deep. Again radioactivity was detected off-site. Shot ANACOSTIA was a low-yield device development test on 27 November 1962. No radioactivity was detected beyond the boundaries of the Test Site.



Shot SEDAN was part of the Plowshare program for peaceful uses of nuclear explosives. The device was buried at a depth of 635 feet to maximize its cratering potential. SEDAN exploded with a yield of 104 kilotons, blasting a crater 320 feet deep and 1,280 feet across in the sandy soil of Area 10 on Yucca Flat. Fallout from the shot drifted over Groom Lake.

Two other Plowshare cratering tests were scheduled for 1969. The shots, code named YAWL and STURTEVANT, were planned for detonation on northern Yucca Flat. In preparation for the tests, DOE officials analyzed the predicted effects that the blasts would have on Area 51. Documents titled

EVENT SAFETY AND DAMAGE EVALUATION - AREA 51 for each test are available at the DOE Public Reading Facility in Las Vegas. These draft reports provide insight into the manner in which nuclear testing impacted operations at Area 51. The analyses for both shots cover the following areas: predicted effects, atmospheric overpressures, radiation, base surge and ejecta, possible damage to Groom Lake road, evacuation from Area 51, and possible delays in firing.

According to the documents, the STURTEVANT device was to be buried about 800 feet below ground, and have a yield of 170 to 250 kilotons. YAWL was to have a yield of 750 to 900 kilotons. Buried about 1,000 feet underground, YAWL would have blasted a crater 500 to 700 feet deep and as much as 1,500 feet across. Predicted effects of both shots were similar. "Anticipated ground motion at Area 51 Camp," according to the STURTEVANT report, "is below the damage threshold for structures, therefore, only minimal architectural damage is expected."

Radiation was an important consideration. Neither shot would have been fired if winds would cause the "hot line", area of highest radiation, to pass near the airbase. The reports state that "wind conditions at detonation time will be chosen such that predicted contamination at Area 51 camp will be less than 6R total dose including shine and redistribution. The dose rate is expected to fall below 6mR/hr before D+4." To reduce risk of radiation exposure, personnel were to be evacuated as with so many previous shots. "Detonation...will require evacuation of the entire Area 51 on D-day." Additionally, the duration of the evacuation would "depend on reliability of contamination predictions and in-field measurements. Re-occupancy is expected by D+4 although field conditions may require short work shifts for several days, possibly two to three weeks."

The possibility of successive firing delays raised the specter of evacuation for a period of days, or even weeks. As always, weather was the determining factor. The reports specified that it might "be necessary to delay detonation on a day-to-day basis awaiting favorable atmospheric conditions." In the case of YAWL and STURTEVANT, all the planning was in vain. Both shots were cancelled.

The blasts move underground

After the nuclear tests moved completely underground, air-sampling stations continued to operate to detect any radiation that might be accidentally released. In addition, observers were stationed at off-site locations, including Area 51, to record ground motion caused by subterranean detonations. When shot TIJERAS was fired on 14 October 1970, Donald Bruskert recorded his observations outdoors at Area 51. According to Bruskert, the



motion came "in rolling waves" five seconds after detonation, and that there was "no jolt." According to the DOE list of United States Nuclear Tests, the yield of the blast was between 20 and 200 kilotons. The ground motion lasted for 25 seconds. During shot ARTESIA, on 16 December 1970, William Moore felt the shock distinctly inside the Area 51 security building. Donald Bruskert, standing outdoors, described the motion from the "20 to 200" kiloton blast as "questionable."

The proximity of Watertown/Area 51 to the Nevada Test Site helped shield activities at the airstrip under the blanket of security that already surrounded the nuclear proving ground. It also created such operational difficulties as radiation exposure, damage to facilities and equipment, and numerous delays due to evacuation. Air Force, CIA, and civilian contractor personnel at the secret airbase willingly accepted these risks in order to accomplish their mission: to develop advanced aircraft and systems in defense of the United States.



This satellite view of the Nevada Test Site shows all the major test areas. The craters on Yucca Flat are clearly visible. Groom Lake (Area 51) is just off the northeast corner of the NTS near Area 15.