

Project 57: Plutonium Dispersal Took Place Near Groom Lake

By Peter W. Merlin

During the late 1950s, the Nevada desert near Groom Dry Lake echoed with the roar of jet engines as Lockheed's U-2 spyplane was put through its paces. The small airbase on the southern edge of the lakebed was called Watertown. There test pilots developed the U-2 aircraft and its systems, while pilots assigned to the Central Intelligence Agency trained for operational reconnaissance missions. Just over the hills at Yucca Flat, the Atomic Energy Commission (AEC) was detonating nuclear bombs. Since Watertown was downwind of the Nevada Test Site, it received much of the radioactive fallout. Consequently, there was a standing agreement that Watertown personnel would be evacuated prior to a nuclear shot to limit their exposure.

The 1957 nuclear test series, called Operation Plumbob, included 24 nuclear detonations and six safety experiments. The first shot of the series was a safety experiment called Project 57. A test of this type is 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. While not producing a nuclear explosion, such a detonation usually spreads a certain amount of plutonium into the atmosphere and across the surrounding landscape. As such, safety experiments are also known as plutonium dispersal tests.

Such experiments were necessary because aircraft crashes and other operational and logistic accidents involving nuclear weapons could result in one-point detonation of the weapon's high explosive components, producing no nuclear yield but contaminating the local area with radioactive materials. Project 57 was designed to study the particle physics of plutonium, biomedicine of animals exposed to the fallout, and decontamination of plutonium-contaminated surfaces. According to Chuck Hansen's book **U.S. Nuclear Weapons: The Secret History**, the weapon used was an XW-25 warhead, with a design yield of 1.5 kilotons. A formerly secret document detailing the minutes of the first meeting on Project 57, states that the weapon was to be "fired on the ground at the bottom detonator."

The first challenge of Project 57 was to select a test site. A lengthy discussion at the first project meeting focused on a choice between "Papoose Lake with adjoining valleys and the Groom Lake Valley lying due north of it" both outside the Nevada Test Site. Both sites were considered equal from an operational viewpoint, but the decision was ultimately based on soil contamination levels from previous testing. Samples taken by K.H. Larson of UCLA indicated that "in the first inch of cover, maximum plutonium backgrounds differed by a factor of 60." Soil in the Groom Lake area contained a maximum of 0.5 micrograms of plutonium per square meter versus 30 around Papoose Lake. After reviewing these results, according to the minutes of the first meeting, "the choice of Groom Lake Valley went uncontested." The Project 57 test area was added to the NTS as Area 13, a 10 mile by 16 mile block of land abutting the northeast boundary of the Test Site, and partially overlapping the Watertown facility. The overlap area was not considered part of Area 13. Ground Zero for the shot was only five miles northwest of Groom Lake and seven miles from the main part of the airbase. Personnel approaching the site from the NTS would drive over Groom Pass from Yucca Flat, then head north on Valley Road for about eight miles.

A formerly secret AEC report dated March 14, 1957 describes the new test area, stating that it "is not contaminated to a degree that would effect the experiment, and, when contaminated, will not interfere with the conduct of the PLUMBOB nuclear tests which are scheduled to begin in May 1957. The Armed Forces Special Weapons Project has obtained approval for the use of the land for the test." An appendix to the report contained a letter to Brigadier General Alfred D. Starbird from Maj. Gen. A.R. Luedecke, USAF, Chief of the AFSWP further explained that "entry into the area has also been approved and has been coordinated with the agency which has been using the Range." The XW-25 warhead was flown to the airstrip at Yucca Flat, then trucked to Watertown. It was stored in Building 10 prior to being moved to Area 13 for final placement.

The Project 57 shot was originally scheduled for early April, but was pushed back several times. Personnel at

Watertown were undoubtedly evacuated before the shot in case of unfavorable winds that could spread plutonium over the airbase, or an unexpected nuclear yield. Evacuation must have been terribly inconvenient to flight test and training operations at Watertown. According to declassified documents, most of the delays were due to unfavorable weather conditions.

Finally, on the morning of 24 April, the signal was sent to the detonator, and the warhead's high explosive charge destroyed the weapon. Although there had been no obvious atomic explosion, a three-man team in protective clothing was dispatched to determine whether or not any beta or gamma radiation hazard existed from a partial nuclear yield. There was none, but all personnel entering the area were required to wear full protective suits and respirators to shield themselves from alpha radiation. Plutonium emits alpha particles, the weakest form of radiation. It can be blocked by a sheet of paper or even human skin. If inhaled, however, even microscopic quantities will cause cancer in soft tissues such as the lungs. Additionally, plutonium has a half-life of 24,000 years. Project 57 contaminated over 895 acres with plutonium dust and fragments. The exact amount of plutonium expended for the test remains classified.

Initial readings at radiation monitoring sites indicated no detectable fallout at Watertown. According to a declassified telex dated from the day after the shot, air samplers were "operating in all populated areas," and would be checked "after a five day seasoning period and it (was) expected that readings (would) be minor." After all samples were studied, it was determined that there was minor alpha activity for 12 days following the shot, but it was "well below operational guidelines."

As described in an AEC report on Off-Site Radiological Safety Activities For Project 57, there were two high-volume air samplers located at Watertown and fallout trays located on the roofs of the Air Weather Building, and a building behind the Maintenance Shop. Minor alpha counts were detected in the trays. Samples of rainwater were collected eleven hours after shot time when a brief shower passed across Area 13 and then across Watertown. The samples contained about both alpha and beta particles. Water from the Deer Camp Watering Hole east of Area 13 was also sampled, but only contained a small amount of alpha radiation.

Radiation Safety (Rad-Safe) workers practiced decontamination techniques on the experimental surfaces at Area 13. The extent and distribution of plutonium contamination was mapped and the contaminated area fenced off and posted with signs denoting Internal Radiation Hazard. Contaminated equipment was disposed of in waste burial sites adjacent to Valley Road within Area 13. The Project 57 site lay abandoned and nearly forgotten for more than 20 years. Nearby Watertown, designated Area 51 in 1960, grew into a thriving clandestine flight test center.

In 1981, the Department of Energy Nevada Operations (DOE-NV) sought funding through the Surplus Facilities Management Program (SFMP) for the decontamination and decommissioning of Area 13. The application for funding was submitted by Arden E. Bicker of Reynolds Electrical and Engineering Company (REECO). In the application, Bicker describes Area 13 as being "approximately five miles from a public road and directly adjacent to the site of a rapidly growing military installation." In fact, the contaminated zone was located along side Valley Road, which is the primary thoroughfare from Area 51 to the town of Rachel in Sand Springs Valley to the north of Area 13. The "public road" described by Bicker was the road to Groom Mine. Three years later, the road, mine, and most of the Groom Mountains were seized by the Air Force to prevent public access, and provide additional security for Area 51.

A draft of the SFMP response to the application describes the request "to provide funding beginning in fiscal year 1983 to enable DOE to remove contaminated surface soil from Area 13 and dispose of it in appropriate disposal facilities on the Nevada Test Site." Estimates of contaminated soil volumes indicated that it would take 10 years to complete the clean-up if the funding was made available. The application was reviewed by the SFMP Facility Acceptance Review Board to determine whether the site was eligible.

The Review Board discussed the fact that Area 13 was off-site from the NTS, on the Nellis Air Force Range, Presumably then, it might be the responsibility of the Air Force to decontaminate the site (or leave it alone). Also, the Board wondered if it was even appropriate to include a parcel of contaminated ground in the SFMP since it was not actually a "facility" per se. The Review Board's most pressing questions were rooted in the "Requirements for Acceptance" portion of the SFMP Facility Acceptance Procedure, the rules and regulations for inclusion in the SFMP. These requirements stated that "the facility shall be in a radiologically safe condition." Specifically, a current

radiation/contamination survey of the facility and surrounding area had to be available, structures and monitoring equipment had to be adequate to contain and monitor any radioactivity, and security systems and procedures had to be adequate to prevent unauthorized entry. The Review Board was very concerned about these points.

At the time of the original application for SFMP acceptance, the most recent radiological survey of Area 13 had been taken in 1977. Results were reported only for land within the 895 acre contaminated zone. The Board took issue with the fact that "additional Pu (plutonium) migration within the site since the time of the 1977 survey, and dispersal of Pu outside the site boundaries were not discussed in the DOE-NV request." The application had also stated that "minimal DOE surveillance is being performed at Area 13 because the contaminated area is not within direct control of DOE." The Board held off on accepting Area 13 into SFMP, stating that "with the limited information available, the board was unable to assess the current radiological safety of Project 57."

The Board made several recommendations to DOE-NV that would allow the Project 57 site to meet the guidelines for SFMP funding. A new radiological survey was required to determine the extent and migration of plutonium from the fenced contaminated zone. A hazards analysis had to be performed, with particular emphasis on assessing the predicted radiation exposure of workers at the new construction site. DOE-NV had to determine an acceptable concentration level for plutonium in the soil (for any levels detected after the clean up. The Board also required that DOE-NV provide a description of safety measures that would ensure that plutonium would not continue to migrate offsite. DOE-NV followed the Board's recommendations, and the site was subsequently accepted into the Surplus Facilities Management Program. According to DOE documents, the initial phase of the operation was set to begin in October 1982. First of all, a preliminary site characterization was made for both the Project 57 contaminated zone and the inactive contaminated waste dumps adjacent to Valley Road. Also included for in the Fiscal Year (FY) 1993 budget were perimeter survey work, pathway and criteria analysis, clean-up technique investigation, engineering design and equipment specification, and procurement of mobile laboratory equipment. This phase was scheduled to be completed in September 1983 at a total cost of \$500,000.

Next, heavy equipment was procured for the excavation of contaminated soil. Four 30-ton ore haulers and one earth mover were purchased for \$1,250,000. A water well was drilled for dust suppression support in order to prevent resuspension of plutonium into the atmosphere. Actual decontamination began in January 1984, with the initial effort to remove 40,000 cubic yards of soil. Expenses for FY-1984 totalled \$2,500,000.

Three more 30-ton ore haulers and a 5,000-gallon water tanker were purchased in FY-1985 to support the removal of an additional 90,000 cubic yards of soil. Total costs for FY-1985 were \$2,500,000. The plan called for removal of 100,000 cubic yards of soil per year from FY-1986 through FY-1991 at an annual cost of \$2,500,000.

The decontamination and decommissioning project was scheduled for completion in FY-1992. Tasks included final decontamination, revegetation, demobilization, certification, and production of a final report. Total cost for FY-1992 was \$500,000. The total cost of the project was estimated at \$21,000,000. There are no documents currently available to the public that show whether or not the project remained on schedule and within budget. However, a Russian spy satellite photo from 1988 clearly shows that large amounts of soil had been recently removed from the Project 57 contaminated zone in Area 13. Contaminated soil and debris from Area 13 was stored in approved waste disposal facilities at the Nevada Test Site.

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