

Environmental Restoration Project



ER Site No. 85: Firing Site (Bldg 9920)

ADS: 1335

Operable Unit: Southwest Test Area

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Site History

ER Site 85, Firing Site (Building 9920), is an active test site where both aboveground and subsurface firing tests and reactor meltdown tests were performed. It is located in the Coyote Test Field Area, 1,500 feet east of Technical Area III. The site encompasses four areas in the vicinity of Building 9920. ER Site 85 is on land owned by the U.S. Air Force (USAF), permitted to the U.S. Department of Energy (DOE) and SNL/NM. It is comprised of four firing sites that cover approximately 14.3 acres. The mean elevation of the site is 5,454 feet above sea level. Current and projected land uses for ER Site 85 are industrial.

ER Site 85 lies on the western margin of the Sandia Fault Zone. The geologic material underlying the site consists of thick alluvial sediments that overlie deep bedrock. An alluvial fan and piedmont colluvium overlie the Santa Fe Group Strata. The Santa Fe deposits are estimated to be approximately 3,000 feet thick beneath SWMU 85. The Site-Wide Hydrogeologic Characterization Project (SWHCP) 1994 Annual Report describes the regional geology.

SWHCP soil surveys and surficial mapping provide general soil characteristics for the area around ER Site 85. The dominant soil groups in the area include the Tome very fine sandy loam, and the Tijeras gravely fine, sandy loam. The soils underlying the site are defined as the Tijeras gravely fine sandy loam. The estimated recharge rate for soils in the area range from between 0.002 and 0.071 centimeter (cm) year (yr), which yields downward seepage velocities ranging between 0.03 and 11.8 cm/yr.

Four firing site/test areas are associated with ER Site 85. Explosives were limited to 50 pounds or less during testing. Building 9920 was the control room for the firing sites. Firing Site 1 is located directly west of Building 9920 and is defined by a 20- by 30-foot area adjacent to the building and a smaller 10- by 10-foot area northwest of the building. Firing Site 2 is a series of tanks and pressure vessels, known as the VGES (source of this acronym is unknown) tanks, located about 140 feet west of Building 9920. Firing Site 3 is the former location of an inflatable building. Site 3 was sampled in April 1997, and underwent a risk screening assessment in

September 1997, which showed no significant risk. Firing Site 4 is the location of the Cable Suspension Facility, which is approximately 1,300 feet northwest of Building 9920.

Firing Site 1 is comprised of six small pits excavated to a depth of 6 to 8 feet. Beryllium disks (approximately 100 grams total) were placed in the pits. When an explosive charge was placed on top of the disks and detonated, the beryllium was propelled downward. It is believed that the pit openings were plugged with concrete before the firing tests were conducted. After each test, the pits were covered with approximately 6 inches of soil and ultimately backfilled. Locations of these pits were believed to be either between Building 9920 and the two cable run boxes west of the building, or 30 to 50 feet west of the cable run boxes.

Firing Site 2 is associated with tests conducted in the late 1970s that involved simulating reactor core meltdown scenarios by submerging molten core material in a large VGES tank containing water and observing the reaction. The simulated core material, called corium thermite, was comprised of an alloy of zirconium, nickel oxide, chromium oxide, iron oxide, molybdenum oxide, and about 40 kilograms (kg) of DU. These tests contaminated the soil around the VGES tank with DU. The core material was deposited in the area and the water was pumped onto the ground. The area was later graded.

An aerosol experiment using 100 grams of cesium iodide was also performed in a tank. This tank was vacuumed afterward, and approximately 90 percent of the cesium iodide was recovered.

Dispersion tests were conducted on the surface at either Firing Site 1 or Firing Site 2. These involved blowing up small discs of cadmium sulfide (100 grams total) using 10,000 to 11,000 grams of manganese dioxide per shot. Also tests were performed using lithium hydride shots in an unspecified area. Although the specific locations of these tests are not known, it is believed that they took place in the general areas of Firing Sites 1 and 2.

Firing Site 3 occupies the area known as the "old air building," which was an inflatable building. A series of eight dispersion tests were conducted within the building. Each test involved a charge of 47 to 220 grams of DU powder and 0.5 pound of Composition 4 (O-4) HE. The charge was detonated to study the dispersion of DU while the building trapped the emissions. Plastic sheeting was placed on the unpaved floor of the building to capture the dispersed DU. After the test, aerosolized uranium was allowed to settle onto the plastic, which was then rolled up and disposed of in the [Mixed Waste Landfill](#). The inflatable building has since been removed from the site.

The first test program conducted at the Cable Suspension Facility, Firing Site 4, was the SSAGE-2 tests series. This largest firing site at ER Site 85 covers an area of 13.2 acres. A assembly containing approximately 220 grams of DU was detonated using 0.5 pound of C-4 HE. The assembly fragmented into large pieces rather than aerosolizing as planned. Site personnel recovered about 100 of the 220 grams of DU from this test. This was the only DU experiment conducted at this facility. Approximately 50 to 100 pounds of baratol, which contains barium nitrate, were used in some of the tests at this location. The barium oxide from the explosion was dispersed into the area and was deposited on the soil in the vicinity of the test area.

Most recent testing primarily involved shock-wave experiments using air detonations of hydrogen. Methyl acetylene-propene-propadiene gas and bromofluoromethane were also used. These tests were performed in the structure (flame pad) directly west of Firing Site 2. Because the explosives were gases, no residual material remained in the environment. Therefore, the flame pad area was not investigated.

Constituents of Concern

DU
Beryllium
HE
Lithium
Cadmium Sulfide
Manganese Dioxide
Lead

Current Hazards

There are no current hazards at this site related to contamination of the surface or subsurface soils.

Current Status of Work

In March 1994, a radiological survey was conducted at Site 85 and an additional survey was conducted at Firing Site 4 in March 1996. One area source was defined in the 1994 survey and cleaned up in July 1995. Two point sources were identified at Firing Site 4 in the March 1996 survey and cleaned up in June 1996.

An RFI Work Plan was prepared for Site 85 and submitted to New Mexico Environmental Department(NMED) in March 1996.

In April 1997 the soils at Firing Site 3 were sampled and underwent a risk screening assessment in September 1997 to expedite new construction planned for the site. In June 1997, SNL and NMED reviewed the RFI Work Plan for the remaining sites, and established some additional sampling locations at Firing Site 1. In June 1997, the remaining Firing Sites were sampled.

A risk-based no further action (NFA) proposal for Site 85 was submitted to NMED in September 1998. In December 1999, following review of SNL's response to a Request for Supplemental Information (RSI), NMED indicated that the site was appropriate for NFA approval. This site was approved for removal from SNL's Hazardous and Solid Waste Act (HSWA) permit in July 2000.

Future Work Planned

No additional work is planned.

Waste Volume Estimated/Generated

Twenty-two drums of radioactive waste were generated from the Site [14/85](#) rad VCM.

Information for ER Site 85 was last updated Jan 22, 2003.