



## ER Site No. 54: Pickax Site (Thunder Range)

ADS: 1335

Operable Unit: Southwest Test Area

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### Site History

ER Site 54 is located near the southwest corner of Kirtland Air Force Base (KAFB), south of Magazine Road and west of University Ranch Road. The site occupies 446 acres in an area called South Thunder Range. The site is essentially flat, with a slight slope to the west, at an average elevation of 5,420 feet above mean sea level (AMSL). Approximately 200 craters and trenches caused by past explosives testing are present in the area. Crater depths range from 0 feet (filled in) to one crater that is 30 feet deep. The depth of the trenches range from 0 to 10 feet. Desert grasses and cacti are the only significant vegetation in the area. An additional area, known as the TNT Site, is immediately east of ER Site 54. Unexploded TNT was discovered in this area, which occupies approximately 0.25 acres. The TNT site was characterized and remediated and has never officially had a site number assigned, or been added to the permit.

The surficial geology at ER Site 54 is characterized by a veneer of aeolian sediments that are underlain by alluvial fan or alluvial deposits. Based on drilling records of similar deposits at KAFB, the alluvial materials are highly heterogeneous, composed primarily of medium to fine silty sands with frequent coarse sand, gravel, and cobble lenses. The alluvial deposits probably extend to the water-table. Vegetation consists predominantly of grasses including grama, muhly, dropseed, and galleta. Shrubs commonly associated with the grasslands include sand sage, winter fat, saltbrush, and rabbitbush. Cacti are common, and include cholla, pincushion, strawberry, and prickly pear.

The water-table elevation is approximately 4,940 feet AMSL at this location, with a depth to groundwater of approximately 480 feet. Local groundwater flow is believed to be in a generally west to northwest direction. The nearest production wells are northwest of the site and include KAFB-2, KAFB-4, and KAFB-7 which are approximately 4.9 to 6.4 miles away. The nearest groundwater monitor wells to the site are the group of wells installed around the Chemical Waste Landfill in the southeast corner of TA III. These wells are located approximately 0.4 miles northeast of ER Site 54.

ER site 54 was used for more than 100 shallow subsurface explosive tests between 1958 and 1967. At the time, there was interest in using nuclear devices to dig canals or deep water ports. In order to understand the dynamics of crater and trench formation with relation to explosive yield and depth of detonation, scaled tests using conventional HE material were conducted. According to complete process knowledge, no nuclear materials were used at SNL/NM. The nuclear portion of these tests were conducted at Nevada Test Site. The unexploded TNT discovered at the TNT Site was likely from path testing activities that SNL/NM conducted in the 1960's.

SNL/NM Tests involved the detonation of HE in single charges, charges at multiple depths in the same hole, rows of charges at a single depth, and rows of charges at multiple depths. The tests involved the burial of explosive charges below ground level, detonation of the charges and studying the dimensions of crater or trench produced. Only HE materials were involved; no other hazardous materials were used in any of the tests.

There were three distinct types of tests based on the type and amount of explosives used and the depths at which they were detonated. The explosive charges in the majority of tests were buried from 2 to 14 feet beneath the surface. These tests used 8 to 256 pounds of trinitrotoluene (TNT). A second type of test involved the detonation of 1,000 pounds of TNT or nitromethane in each test. These test charges were buried at a depth of 10 to 20 feet. A small number of these tests (approximately 8) were conducted. In the third type of test, either 30, 478, or 30,000 pounds of Composition-B was detonated in a single test, depending on which reference was cited. The test detonation occurred 47.9 feet below ground level. Composition-B is a mixture of 60% cyclonite (RDX) and 40% TNT.

The Pickax area is currently part of the 5000-ft [sled track](#) buffer area and is not used for testing.

## Constituents of Concern

HE

## Current Hazards

There are no current hazards at this site related to contamination of the surface or subsurface soils. There is a low potential for uncovering explosives that did not go high order during testing. Therefore, any activities that require grading should proceed with caution.

## Current Status of Work

Site background investigation for the RCRA Facility Investigation (RFI) is complete. Sampling was conducted at the large crater and five other randomly selected trenches and craters. Boreholes were drilled and sampled. Only one sample found any trace of HE and that sample was below risk-based action levels.

A proposal for a confirmatory sampling no further action (NFA) was submitted to the regulatory agencies for review in October 1996. A request for supplemental information to the NFA proposal was submitted by the New Mexico Environment Department (NMED) in 1998. In December 1999, following review of SNLs response to a Request for Supplemental Information (RSI), NMED indicated that the site was acceptable for NFA. The NFA was approved by NMED in July 2000 after completing the public review and permit modification process. A SWMU Assessment Report for the TNT Site was submitted to NMED in September 2002.

## **Future Work Planned**

No additional work is planned for this site.

## **Waste Volume Estimated/Generated**

No waste was generated.

**Information for ER Site 54 was last updated Jan 22, 2003.**