



ER Site No. 114: Explosive Burn Pit (TA-II)

ADS: 1303

Operable Unit: Tech Area II

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Site History

The Explosives Burn Pit (EBP) area is located outside the western corner of Technical Area-II (TA-II), immediately south of the main access gate. The EBP was reportedly used from the late 1940s through the middle to late 1950s when weapons assembly was discontinued at TA-II. There are no visible indications of the site. Prior to field investigations conducted in 1992 and 1994, the location of the EBP was based on historical air photos and interviews with Sandia National Laboratories (SNL) personnel. It is not very clear from the interviews whether one or two pits were used at the site. Later investigations involved collecting soil samples on a grid to locate the EBP and assess constituents of concern (COCs).

The regional aquifer in the vicinity of ER Site 114 is within the upper unit of the Santa Fe Group. The depth to the regional aquifer in the nearest monitor well to ER Site 114 (TA2-NW1-595) is approximately 520 feet (ft) below ground surface. A shallow water-bearing zone also exists in the vicinity of ER Site 114. The depth of the shallow zone ranges from approximately 267 to 320 feet deep. Monitor wells TA2-SW1-325, TA2-NW1-320, WYO-2, TA2-W-19, and TA2-W-01 are located in the vicinity of ER Site 114 and are screened in the shallow water-bearing zone.

The area is essentially flat, with a gentle slope to the west of approximately 4 percent. Tijeras Arroyo, the largest drainage feature at SNL/NM, is located approximately one half mile from the site. The surface geology consists of unconsolidated alluvial and colluvial deposits derived from the Sandia and Manzanita Mountains. These deposits consist of sediments ranging from clay to gravel derived from the granitic rocks of the Sandia Mountains and greenstone, limestone, and quartzite from the Manzanita Mountains.

Surficial deposits are underlain by the upper unit of the Santa Fe Group. In this area, the piedmont-slope alluvium may be up to 100 ft thick, and the upper Santa Fe unit is approximately 1,200 ft thick. The piedmont-slope alluvium, which was deposited by the ancestral Tijeras Arroyo, is generally coarse-grained sand and gravel. The upper Santa Fe unit was deposited from

5 to 1 million years ago and consists of coarse- to fine-grained fluvial deposits from the ancestral Rio Grande that intertongue with coarse-grained alluvial-fan/piedmont-vener facies, which extend westward from the Sandia and Manzanita Mountains. ER Site 114 is near the eastern most limit of the ancestral Rio Grande deposits.

Conflicting construction details have been reported for the EBP. One SNL/NM report states that the EBP consisted of a 4-ft diameter burn pit, surrounded by a 4- to 5-ft high culvert. However, some former SNL/NM personnel have stated that the site may have consisted of two 4-ft diameter burn pits; another SNL employee also recalled that there were two burn pits, each approximately 4-ft by 2-ft by 2-ft.

Aerial photos taken in 1959 show two disturbed areas in the vicinity of the EBP. After the site was decommissioned in the late 1950s, it was covered with soil by heavy equipment. The soil and heavy equipment left irregularly shaped scars on the surface in the vicinity of the pit area. Some former SNL personnel stated that the location of the two burn pits was 50 ft west of the TA-II perimeter fence, about 100 ft south of the TA-II guard gate. The actual number, dimensions, and exact location(s) of the EBP are not clear from interviews with former SNL/NM personnel. Results of the field investigation conducted in September 1992 and expanded in March 1994 show that at least one EBP was located between 60 and 70 ft southwest of the TA-II perimeter fence.

The exact types and amounts of high explosives (HE) compounds burned in the pit area are not known. During weapons assembly operations, some small blocks of HE that did not meet specifications and shavings of HE from the assembly process were produced as waste. The scraps of HE reportedly were less than one pound each and were disposed by burning in the EBP. Some of the scrap HE burned at the site reportedly contained barium, which is a component in baratol and compound B. The baratol (barium nitrate) commonly was mixed with 2,4,6 trinitrotoluene (TNT). Cyclotrimethylenetrinitramine (RDX) also was burned in the EBP. Other potential COCs that could be associated with the HE compounds include mercury, silver, cadmium, and lead.

Between September 3 and 22, 1992, 185 boreholes were drilled to 6 ft below grade on a 4-ft grid pattern in two locations. The two grid locations were selected by analysis of old aerial photographs of TA II. The two grids were informally named Burn Pit Y (BPY) and Burn Pit Z (BPZ). The 370 soil samples collected from both grids were analyzed for total Resource Conservation and Recovery Act (RCRA) metals and HE compounds. The samples collected in 1992 were not analyzed for volatile organic compounds (VOCs) or semi-volatile organic compounds (SVOCs). However, all samples were field screened for VOCs and for alpha, beta, and gamma radiation using alpha scintillation and GM radiation instruments.

Except at boreholes BPY10,4 and BPY10,5, soil samples collected in the vicinity of the EBP area did not contain metals in concentrations above background data. No mercury was detected in any of the soil samples collected in the vicinity of the EBP.

Soil samples collected from boreholes BPY10,4 and BPY10,5 contained elevated metals concentrations, probably associated with EBP activities.

All soil samples collected in the vicinity of the EBP area were analyzed for HE compounds. Only borehole BPY10,5 contained detectable concentrations of HE at 6 ft. At this location, RDX (also known as cyclonite; hexahydro1,3,5, trinitro 1,3,5 triazine; or cyclotrimethylenetrinitramine) was detected at a concentration of 5.9 mg/kg, and HMX (also known as octahydro1,3,5,7 tetranitro 1,3,5,7 tetrazocine) was detected at 3.1 mg/kg. No other HE compounds (i.e., nitroaromatics or nitramines) were detected in this or any other sample collected in the vicinity of the EBP area above the detection limits of 1 mg/kg.

Between November 11, and December 2, 1993, a passive soil vapor survey was conducted in the vicinity of the EBP area. Except for low levels of benzene, toluene, ethylbenzene, and xylene (BTEX), no other VOCs or SVOCs were identified from the SVS investigation. The BTEX levels are considered low and probably reflect vehicular traffic in the area.

On March 1, 1994, eleven additional shallow boreholes were drilled, extending the grid to the east. Nine boreholes were drilled to six ft; soil was sampled at three and six ft. Two boreholes were drilled to 12 ft; soil was sampled at 9 and 12 ft at existing locations BPY10,4 and 10,5. All samples were analyzed for HE compounds and metals. Three metals of concern, based on background information, were detected above laboratory reporting limits in the following concentrations (mg/kg):

- Barium from 45.9 to 636
- Cadmium from 0.52 to 9.6
- Lead from 10.2 to 45.8

No mercury or silver was detected above laboratory reporting limits in any of the borehole soil samples. Additionally, no HE compounds were detected in any of the borehole soil samples.

Results from the metals analyses indicate that barium levels are generally higher in the 3-ft soil samples than in the 6-ft soil samples. This suggests that no significant migration of the barium has reached depths greater than 3 to 4 ft below grade.

A VCM was completed in 1996. The VCM involved the excavation of a burn pit that was identified by charred debris and discolored soil. Excavated waste debris and soil were disposed as waste material. Additional sampling of the VCM excavations was conducted in 2000 at the request of the NMED to verify the absence of volatile organics and HE material. No anomalous concentrations of constituents of concern were identified. In March 2001, a bulldozer was used to scrape the site in 6-inch lifts to confirm or deny the existence of other unreported burn pits. The site was excavated to between 3 and 4 feet below grade. No further burn pits were located.

Constituents of Concern

HE compounds

VOCs

RCRA metals

Current Hazards

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

Current Status of Work

ER Site 114 was proposed for NFA in June 1996 after sampling events in 1992 and 1994 and VCMs in 1995 and 1996. Information requested by the NMED related to data submittals, additional sampling performed in 2000, and a risk assessment and intrusive investigation to search for other unidentified disposal areas in 2001 are complete. A response to the Request for Supplemental Information was submitted to NMED in December 2002.

Future Work Planned

No additional work is planned for ER Site 114.

Waste Volume Estimated/Generated

Wastes generated at ER Site 114 include 1 cubic yard of non-regulated soil and debris and 2 cubic yards of hazardous soil. All wastes have been disposed off-site.

Information for ER Site 114 was last updated Feb 14, 2003.