



ER Site No. 44: Decontamination Site & Uranium Calibration Pits (TA-II)

ADS: 1303

Operable Unit: Tech Area II

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Site History

ER Site 44 was divided into two separate areas based on historical operations and potential constituents of concern (COC): the Uranium Calibration Pits (UCP) (ER Site 44a) and the Decontamination Area (ER Site 44b).

The UCP, and Site 44a were used to test and calibrate down-hole radiometric logging tools for the National Uranium Resource Evaluation Program. The UCP were located in the center of Technical Area II (TA-II), west of Building 920. The Decontamination Area, Site 44b, was used to decontaminate weapons components and related test materials from the Nevada Test Site. The Decontamination Area, less than 0.1 acre in area, is located on the west side of the former Building 906, near the center of TA-II.

In 1987, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was performed for the entire Sandia National Laboratories / New Mexico (SNL/NM) installation. At that time, ER Site 44, the UCP and the Decontamination Area, were identified as solid waste management unit #130 and were described as having the potential for release of hazardous waste or constituents. A more comprehensive assessment was performed under Phase 1 of the Comprehensive Environmental Assessment and Response Program (CEARP), during which the UCP and Decontamination Area were assessed and, again, were found to require additional

investigation. The scope of the Phase 1 assessment included a literature and records search, interviews with current and former employees, and, in some cases, visual site inspections. No samples and only limited background data were collected during both the RFA and CEARP Phase 1 assessment.

The regional aquifer in the vicinity of ER Site 44 is within the upper unit of the Santa Fe Group. The depth to the regional aquifer in the nearest monitor well to ER Site 44 (TA2-NW1-595) is approximately 520 feet (ft) below ground surface. A shallow water-bearing zone also exists in the vicinity of ER Site 44. The depth to the shallow zone in the vicinity of ER Site 44 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 44 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 at ER Site 44 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 derived 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-veneer facies, which extend westward from the Sandia and Manzanita Mountains. ER Site 44 is near the easternmost limit of the ancestral Rio Grande deposits. Several rift-bounding faults are located east of ER Site 44. The nearest is the Sandia fault-zone, characterized by north-trending, west-dipping normal faults. The westernmost fault is located approximately 1.2 miles east of the site.

ER Site 44a

The UCP consisted of four pits that were constructed in 1978. They were active until 1984. Very limited information exists about the geophysical testing conducted at the UCPs. Initial information was based on employee interviews. No testing reports, description of operations, or engineering drawings are known to exist for the UCP. Construction details and pit contents discussed below were verified during the Voluntary Corrective Measure (VCM).

Construction Details of the UCP:

From west to east, the four pits were numbered sequentially 1 through 4. The distance between the centers of adjacent pits was approximately 6 ft. The four pits were constructed by excavating 4-ft diameter pits to 8 feet deep. A small borehole (about 4.5 inches in diameter) subsequently was drilled in the center of each pit. Boreholes at UCPs 1, 2, and 3 were drilled to approximately 19, 14, and 18 feet deep, respectively. The UCP 4 borehole was drilled to an approximate depth of 206 ft. Four-inch diameter polyvinyl chloride (PVC) pipes were installed into pits 2, 3, and 4 boreholes, and a four-inch diameter steel pipe was installed in the pit 1 borehole. Four 4-ft

diameter by 8-ft long concrete culverts (i.e., hollow concrete pipe) subsequently were lowered by a crane into each of the open pits. After the culverts were in place, a 6-inch thick concrete plug was poured at the bases of pits 1, 3, and 4. Pit 2 did not have a concrete plug base. Although the cement plugs were placed in the culverts, it was assumed that leakage could have occurred between the plug and the culvert. A circular steel plate was placed on top of each pit to serve as a pit cover.

Site History:

Although basic construction details were similar for the four pits, they were used for different uranium (U) calibration operations. Reported materials and processes used at each pit are described below. No information was revealed during the employee interviews, audits, surveys, or the subsequent VCM that indicated material had been removed from the pits during the period of operation.

Uranium Calibration Pit 1

Pit 1 was used to simulate a water-saturated, uranium-bearing sand. The pit was filled with silica sand, which then was saturated with a solution of uranyl nitrate. Ten to twenty pounds of uranium oxide were dissolved with a minimal amount of nitric acid, which subsequently was diluted with distilled water to form the uranyl nitrate solution. The total volume of uranyl nitrate solution was approximately 225 gallons. After the UCP was filled, the solution inadvertently migrated into the soil beneath the pit, where it precipitated in the alkaline soil.

Uranium Calibration Pit 2

Pit 2 had a plastic sheeting bottom and was filled with 4 ft of uranium ore from the Jackpile mine near Grants, New Mexico. Another plastic sheet was placed on top of the ore and 4 ft of clean fill was placed above the sheeting.

Uranium Calibration Pit 3

Pit 3 was lined with a waterproof neoprene fabric liner with sealed seams that extended to the rim of the concrete culvert. The pit was filled with a solution of chromium sulfate.

Uranium Calibration Pit 4

No solutions or other foreign materials were placed into Pit 4. It was designed for background calibrations.

Field Work and Remediation:

The UCP were remediated in the summer of 1994 as a VCM. The UCP culverts were removed one at a time, after interior contents were removed, by excavating approximately 8 ft below grade with a backhoe and then removing each culvert with a crane. Radiological soil screening was performed in the excavation from 4 ft below grade to total depth. After removing each culvert, radiological screening of the soil below the pit was performed. If radiological levels were at background or below, a confirmatory soil sample was taken. If radiological levels were above background, contaminated soil was removed until background levels were achieved, and then a sample was taken at the bottom of the excavation.

The following variations from the above description are noted. At Pit 1, background levels were never obtained in the excavation. Contaminated soil was found for approximately 6 ft beneath the bottom of the concrete plug. Excavation of contaminated soil was ceased when gamma spectrometry results for U were below the preliminary risk-based action level of 28.6 picocuries per gram (pCi/g). Confirmatory soil samples also were taken from the backfill as the excavation was restored to surface grade.

The residual chromate sulfate solution in Pit 3 was pumped out in May 1994 as the first phase of the VCM. The liner was also removed at this time. Vermiculite was added to the pit to absorb a minute amount of solution remaining on the bottom of the culvert.

Confirmatory soil samples analyzed by gamma spectroscopy indicate that U-238 was at or below 2 pCi/g in all samples except for the sample collected below Pit 1. The reported concentration in the sample collected from the bottom of the excavation below Pit 1 was 26 pCi/g. The chromium concentration from the sample collected below Pit 3 was 3.2 milligrams per kilogram (mg/kg).

Site History

The Decontamination Area was used from approximately the late 1960s until the mid-1970s. Weapons components and related test materials from the Nevada Test Site reportedly were decontaminated outside Building 906. These materials may have contained metals and radionuclides. Decontamination (washing off contaminated material with a hose) was conducted on the ground surface west of the building.

Field Work and Remediation: Several rounds of sampling occurred in the Decontamination area, including analyses for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), metals, and radionuclides. No VOCs or SVOCs were detected during an organic vapor survey or a soil vapor investigation. Metals were detected below U.S. Environmental Protection Agency (EPA) action levels and/or below area background levels. Radionuclides, with the exception of Cs-137, all were detected below background levels when the 2 standard deviation error was considered.

The cesium-137 soil contamination was removed in a VCM conducted in November 1996.

Constituents of Concern

Depleted uranium and chromium.

Current Hazards

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

Current Status of Work

A No Further Action (NFA) Proposal was submitted to the New Mexico Environment Department (NMED) in September 1997 for ER Sites 44a and 44b. In May 1999, additional information including a revised risk assessment requested by the NMED were provided by SNL.

ER Site 44a has been recommended for industrial land use. The HI and excess cancer risk for ER Site 44a nonradiological COCs were not calculated because all nonradiological COCs were either below background or proposed Subpart S action levels. The incremental TEDE for radionuclides was well below the recommended dose limit. The incremental excess cancer risk for radionuclides was also much less than risk values calculated from naturally-occurring radiation and from intakes considered background concentration values. All COCs at ER Site 44a were found at depths greater than 5 feet bgs, thus no ecological pathways are expected to exist and no further evaluation of ecological risk is warranted.

ER Site 44b has been recommended for industrial land-use. Due to the presence of several metals in concentrations greater than background levels, it was necessary to perform a human health and ecological risk screening assessment for the site. The human health total and incremental HI and the incremental excess cancer were within the acceptable risk range. Radiological contaminants were not considered in the 44b risk screening assessment because all radiological parameters were detected below their associated maximum background concentration level. Ecological HQs greater than unity were originally predicted for ER Site 44b; however, based on an evaluation of the uncertainties, ecological risks associated with this site were expected to be low.

In December 1999, the NMED deemed ER Site 44a and Site 44b acceptable for NFA. The NFA was approved by NMED in July 2000 after completing the public review and permit modification process.

Future Work Planned

No further work is planned at ER Site 44.

Waste Volume Estimated/Generated

Wastes generated at ER Site 44 include nearly 11 55-gallon drums of hazardous liquid waste; 2 cubic yards of non-regulated concrete debris; 7 55-gallon drums of non-regulated liquid waste; and 68 55-gallon drums of radioactive debris and soils. All wastes have been shipped off-site for disposal.

Information for ER Site 44 was last updated Jan 24, 2003.