

# Environmental Restoration Project



## ER Site No. 78: Gas Cylinder Disposal Pit (TA-III)

ADS: 1306

Operable Unit: Tech Area III & V

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### Site History

ER Site 78 (Gas Cylinder Disposal Pit) was identified during the 1987 Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) as SWMU Number 31. At that time, the potential for ongoing releases on contaminants to the air and soils was concluded to be high. The findings of the subsequent CEARP investigation were uncertain; therefore, additional investigation was deemed necessary.

The Gas Cylinder Disposal Pit was located in the southeast corner of TA-III, east of the Chemical Waste Landfill (CWL). At one time the excavated pit area of approximately 80 by 180 ft was surrounded by a fence. The fenced area was approximately 100 by 200 ft. The original depth of the pit is not known. Prior to Environmental Restoration's (ER's) investigation, the pit was 10 ft deep and had a 3-ft-high berm around the edges. The south, east, and west faces were steep, whereas the north side of the pit was gently sloped, affording access by truck.

The pit was reportedly dug in 1963, but its use before 1980 is not well documented. Prior to its excavation, the site may have been used to dispose of HE residues by detonation, and in the 1960s and 1970s following the excavation, the pit was used for the disposal of lithium hydride and other reactive chemicals from various SNL laboratories. From 1980 to 1984, the disposal pit was used for the disposal of gas cylinders by detonation with shaped-explosive charges. Some empty cylinders may have been opened longitudinally with a cutting tool and then buried. The cylinders reportedly contained a variety of gases, including some toxic materials and unknown materials that could not be shipped off site. The last reported use of this pit was in 1984. At that time, up to 400 lecture bottles (2-inch-diameter by 15-inches long) were detonated in the pit, although some cylinders were not punctured. This site had also been used occasionally for temporary storage of potentially explosive chemicals. Picric acid, which is highly shock-sensitive in its crystalline form, had also been found inside this disposal pit.

The original sampling scheduled at the site as defined in the RCRA Facility Investigation (RFI) was determined to be too dangerous for worker safety. The primary safety concern was the

presence of gas cylinders that could pose a threat of spontaneous release, resulting in possible explosion and/or the potential for exposure of site workers to toxic compounds. Thus a VCM was conducted to mitigate hazards and complete characterization of the site.

The VCM included two phases. Phase I activities were performed for initial site assessment purposes. A geophysical survey was completed within the Gas Cylinder Disposal Pit (GCDP) and the surrounding area to identify buried metallic objects. Radiological surveys were conducted to collect background information and identify radiological hazards. (The radiological surveys identified an area of thorium-contaminated surface soil near the southern end of the Gas Cylinder Disposal Pit.) Surface soil samples were collected in the pit area to identify chemical and radiological hazards while soil samples were collected outside and surrounding the pit area to establish background, constituent levels.

The primary objectives of the Phase II field activities were the removal, examination and segregation of the GCDP contents, identification of the contaminants of concern, disposal of hazardous, radioactive, mixed and solid wastes, and backfilling the pit with clean materials. A combination of intact and breached gas cylinders and other hazardous materials were excavated and removed. Thorium- and chromium-contaminated soil was drummed and disposed off-site. Contents of cylinders were analyzed and waste was disposed.

A total of seven boreholes were advanced in the GCDP for verification sampling. Two boreholes were advanced in the chromium-impacted thermal battery mound. Two were advanced in the area of the thorium-contaminated soil. And one borehole was advanced in each of the following areas: the suspect burn area, the cylinder mound and an uncontaminated area. The boreholes were advanced to a depth of 5 ft below the pit bottom (which itself was approximately 15 ft bgs), and soil samples were collected at depths of 15 to 16 ft bgs and 19 to 20 ft bgs. The samples were analyzed at an off-site laboratory; the analyses completed, although not inclusive for each sample, were VOCs, SVOCs, HEs, RCRA metals and isotopic uranium, thorium and plutonium.

Arsenic, beryllium, chromium, lead, and silver were detected at concentrations exceeding their respective background concentrations. Only three detections of lead and silver, two detections of arsenic, and one detection of beryllium (in the backfill sample only) and chromium exceeded background. Acetone, methylene chloride, and toluene were the only VOCs detected in the confirmatory samples. All detections were at very low levels, below their respective reporting limits. In addition, both acetone and methylene chloride were detected in the aqueous trip and field blank samples, suggesting they were laboratory-introduced contaminants. Eight SVOCs were detected in the three samples from the off-site backfill material, and one SVOC was detected in two confirmatory samples from the same borehole. All detections were very low concentrations, below their respective reporting limits for the nine SVOCs. No radionuclides were detected above their respective background activities in the gamma spectroscopy data set; however, the minimum detectable activities (MDAs) for uranium-235 and uranium-238 were typically higher than the respective background activities. Cesium-137 was not detected in any of the samples and the MDA was below the background activity of 0.079 picocuries per gram (pCi/g). Thorium, the main radionuclide of concern at the site, was detected in all gamma spectroscopy samples below the background activity of 1.01pCi/g. In the isotopic thorium, uranium, and plutonium data set, there were two detections of thorium-232 that slightly exceeded the background activity of 1.01 pCi/g. The detections were 1.1 pCi/g (+/- 0.25 pCi/g) and 1.7

pCi/g (+/- 0.31 pCi/g). The duplicate sample at one of these locations had thorium-232 activity that was below the background activity (0.71 pCi/g +/- 0.14 pCi/g).

The confirmatory data were used to support a No Further Action Proposal in the TA-III&V Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) report. This report was submitted to the Environmental Protection Agency (EPA) and New Mexico Environment Department (NMED) in July 1996.

## Constituents of Concern

High explosive (HE) residues.  
Hazardous and toxic gases and liquids.  
Radionuclides.  
Solid debris.

## Current Hazards

All cylinders were removed during the Voluntary Corrective Measure (VCM) excavation. Confirmatory sampling revealed some elevated metals and radioactivity but at concentrations below risk levels. Additional sampling is planned for the site at the request of NMED, but any potential remaining contamination would be located at 10 ft below ground surface.

## Current Status of Work

Two Notice of Deficiencies (NODs) were received from NMED, one in July 1997 and the other in March 1998. SNL responded to both of them. NMED has requested that additional sampling and a geophysical survey be completed. A field implementation plan (FIP) containing a sampling and analysis plan was created and presented to NMED for review in July 2001. NMED reviewed and approved the plan.

## Future Work Planned

Currently, SWMU 78 has been used as part of the soil-staging area for the Chemical Waste Landfill (CWL) excavation. The additional work as described in the FIP will be implemented after the CWL soil is removed from the site.

## Waste Volume Estimated/Generated

About 1300 lbs of hazardous waste and 140 cubic yards of radioactively-contaminated soil were generated as a result of the VCM at Site 78.

**Information for ER Site 78 was last updated Jan 23, 2003.**