

RCRA CLOSURE OF MATERIALS DISPOSAL AREA P, LOS ALAMOS NEW MEXICO

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Material Disposal Area P (MDA-P) is undergoing clean closure under the Resource Conservation and Recovery Act (RCRA) as regulated by the New Mexico Environmental Department. The MDA-P is located on the north-facing slope of Canyon de Valle, an ephemeral drainage in Technical Area 16 of the Laboratory. It was operated from 1950 to 1984 and received materials from the burning of high explosives (HE), HE-contaminated equipment and material, barium nitrate, construction debris from the D&D of Manhattan-era buildings, as well as empty drums and miscellaneous containers, trash and vehicles. The burning operations were conducted at facilities adjacent to, and south of MDA-P. Disposal was conducted by pushing materials over the edge of the engineered slope, resulting in lateral accretion of the landfill and partial encroachment into the stream course. The closure will be conducted in two phases. Phase I, in progress, will be the complete removal of all landfill materials, decontamination of debris, treatment of contaminated soils, and offsite recycle and disposal as appropriate. Phase II will consist of verification sampling, a risk assessment for potential residual contamination, and a Closure Certification report. Phase I removal activities started with a series of test pits excavated in late-1997 to provide data on the southern extent of the landfill for haul road design and construction. Results of the test pits indicate that: 1) pieces of detonatable HE are present in the landfill that pose serious danger to personnel and equipment; and 2) the extent of barium contamination may exceed initial volume estimates by nearly an order of magnitude. To mitigate the dangers of a detonation, a computer-controlled, remotely-operated, 25 metric ton, hydraulic excavator has been assembled, tested and deployed to perform all initial excavation operations. Pieces of HE will be hand sorted from soils to remove the potential for detonation, then field screened for barium and HE, and staged for onsite treatment and stabilization, if required. Phase I is scheduled to be completed in mid-year FY 99. Phase II will depend on budgetary constraints.

Figure 1, is a photograph of MDA-P from the north. The site is located at the explosives burning grounds at Technical Area 16, also known as S-Site at Los Alamos National Laboratory.



Figure 1.

The landfill comprises a debris wedge that extends from the flat lying surface to the bottom of the canyon. The relief on Canyon de Valle, in the foreground, is approximately 100 feet. The landfill extends down the north facing slope of the canyon into the active stream below. The smaller east lobe of the landfill primarily received wastes from the open burning of high explosives (HE) and HE-contaminated debris at the TA-16 Burning Grounds in the background. The major contaminants expected are barium and HE compounds. The lined, trench below the east lobe was constructed, along with 2 other trenches to contain any surface runoff from the landfill during removal and closure. The larger, west lobe of the landfill primarily received construction debris, including concrete sumps, pipes, and asbestos-containing materials.

Figures 2 and 3, are historic and recent photographs of the upper east side of MDA-P.



Figure 2.

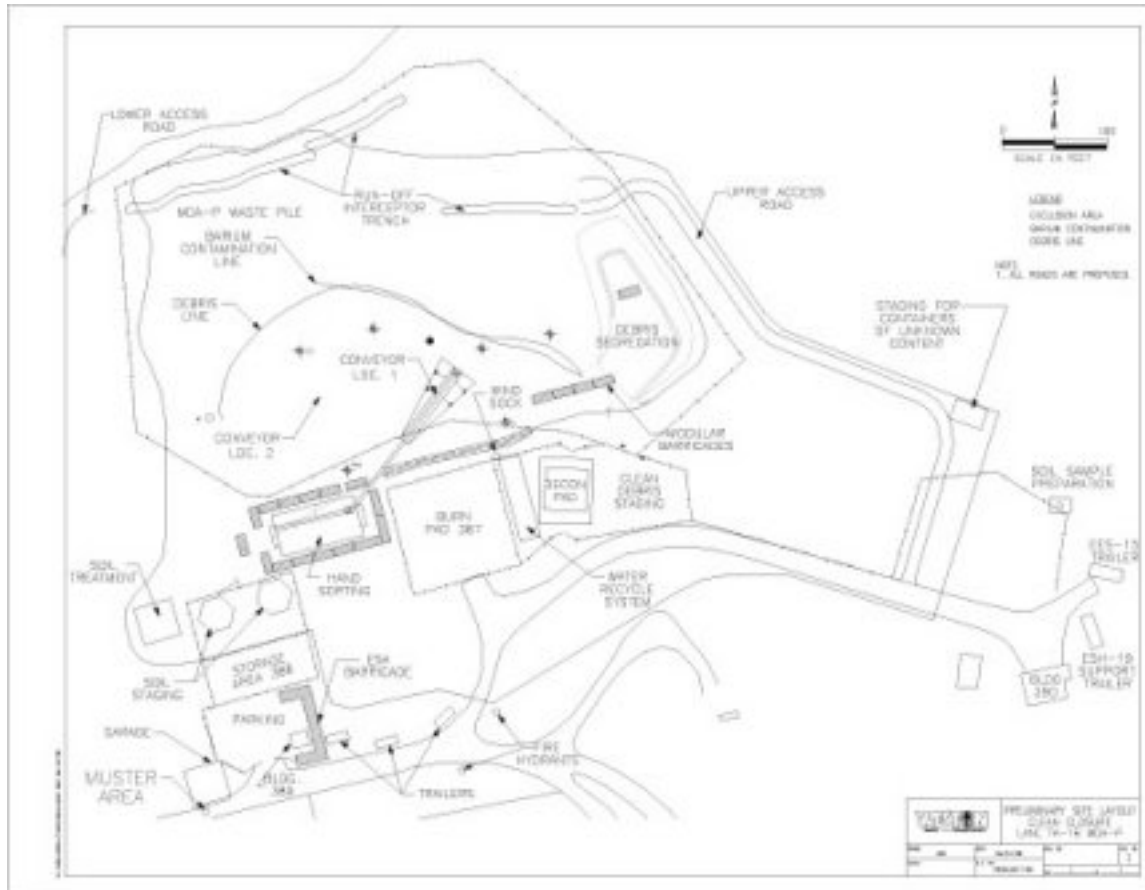
The black and white historic photograph was taken in 1965, the recent photograph in 1996.



Figure 3.

The historic photograph yields some information, along with employee interviews and scant documentation of types of waste materials in the landfill. A low ridge of rocks in the foreground was useful in determining the sequential advance of the landfill over time. Most of the materials in the landfill were supposed to have been burned or flashed before disposal. Incomplete burns and partial detonations apparently resulted in some HE materials being buried with other ash and debris.

Figures 4 and 5, are a map, aerial photograph of MDA-P, and adjacent burning



grounds. The photograph shows the close proximity between the inactive landfill and the active facilities.



Figure 5.

The active burn pad lies at the center of the map and photograph. The map indicates the locations of facilities installed to support the landfill removal, including areas for material segregation and decontamination, soil sorting and treatment, staging for containers of unknown content, and runoff and runoff controls. Although not depicted on this map, safe work zones were calculated and plotted for reasonable maximum detonation overpressures and fragmentation protection. Since this is an explosives research and development facility, unexploded ordnance is not anticipated.

In late 1997, 6 test pits were excavated to determine the extent of debris, soil contamination and amount and location of soils that could be used for borrow materials. The test pits on the east lobe revealed pieces of HE that exceed 3 inches in diameter. As anticipated, the test pits on the west revealed asbestos-containing materials and construction debris, in addition to a large volume of clean soil that has since been used for site construction projects to support the landfill removal.

Figure 6, is a photograph of the track-mounted excavator, modified to operate by remote, computer control. The remotely-operated excavator has 4 video cameras, and a set of computer and radio equipment.



Figure 6.

The 2 antennas are for video and hydraulic control channels. The operator sits in a control booth approximately 300-400 feet away from the active excavation. The MDA-P landfill is designated a "Heterogeneous Area" therefore soils and debris must be initially excavated and handled remotely. Soil and debris is then inspected by high-explosives experts with military explosive ordnance disposal (EOD) training.

Figure 7, is a photograph of the portable blast barricade.



Figure 7.

All excavation operations are monitored from a safe distance by EOD personnel from this, or a similar barricade. Radio communications between the robot operator and spotters are essential for efficient operation. Once the spotters have inspected the materials, they can be removed by conventional heavy equipment fitted with Lexan™ blast shields. If the explosive loading limits are exceeded, operations must cease until the materials are removed from the area.

Figure 8, is a photograph of the soil sorting conveyor equipment.



Figure 8.

Soils with suspect HE materials must pass inspection by the team of EOD technicians. All pieces of HE capable of detonation must be removed from the soil and rendered safe for handling. The HE is passed to normal channels for storage and destruction. The soils are field screened for barium, HE, and other stains or contaminants, and staged for treatment and sampling, as appropriate.

Figure 9, is a photograph of typical debris tangle from the west lobe of the landfill.



Figure 9.

This photograph was taken the first day of excavation. After inspection, all large debris is subjected to hot-water washing. Debris is then staged for sampling and recycling, if possible. Decontamination water is staged in 20,000 gallon tanks and sampled in batches

Figures 10a and 10b are photographs of the LANL hazmat team preparing to remotely open several sealed containers. A surface clearance of the landfill before excavation started resulted in the recovery of several dozen small containers of unknown content.



Figure 10a.

The containers were staged in a prepared area east of other operations. These containers are managed through routine LANL waste management personnel. The hazmat team provides initial inspection and access to facilitate characterization sampling and disposal.



Figure 10b.

Figure 11, is a photograph of the storm water storage tanks.



Figure 11.

Each of the 3 runoff trenches is pumped to a storage tank where the water is sampled and analyzed before it can be used for dust control or other re-application. A common contaminant has been asbestos, so the water is filtered and then re-applied. The filters comprise part of the asbestos waste stream.