the experimental series. Suitable temperatures were near 90°C. Almost no evidence of decomposition products was seen. For TEGDP (Fig. 30), furnace temperatures from 90 to 111°C seemed to yield a relatively monodisperse condensation aerosol. There were a number of small peaks in the GC/MS chromatogram of the aerosol material collected at 70°C that did not appear at 90, 110, or 130°C. For OLEI (Fig. 31), the optimum furnace temperature appeared to lie near 110°C. Almost no decomposition products were seen in the aerosol phase at any temperature up to 190°C.

These tests indicated that (1) all four materials (DEHP, PTAEG, TEGDP, and OLEI) exhibited a temperature range in which an aerosol with a narrow size distribution appeared to form by condensation in this generator; (2) only TEGDP showed traces of decomposition products in the aerosol phase at a temperature lower than that needed for producing a narrow condensation aerosol; and (3) it is possible that the test materials may decompose in the aerosol phase sampled. The absence of decomposition products would simpilfy the evaluation of health hazards associated with potential exposures to these aerosols.

Evaluation of A. D. Little Sizer

The ADL particle sizer determines the median size and distribution of the aerosol by measuring the polarization ratio of light scattered at two angles, namely, 82° and 116°. Based on Mie calculations, the range of applicability of the device is claimed only for size distributions having geometric mean diameters between 0.27 and 0.33 µm and geometric standard deviations less than about 1.2.

Evaluation of this size analyzer involved generating a well-defined and nearly monodisperse aerosol within the stated range of applicability of the ADL sizer using the TSI, Inc., Model 3071 Electrostatic Classifier (EC). The response of the ADL sizer was then compared with the size indicated by the EC. This approach was not successful because of leaks in the sizer chamber, deposition of aerosol on the ADL sizer optical windows, and relatively low aerosol concentration produced by the EC. A secondary approach was to note the sizer's response to known polydisperse aerosols and compare them with predictions of the sizer's response based on Mie calculations. This work is still in progress.

GEOLOGICAL INVESTIGATIONS AT TA-54 (WASTE DISPOSAL AREA G)

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Funding Organization: Los Alamos National Laboratory

Introduction

Technical Area 54 (TA-54), Area G, is used for disposal of solid low-level radioactive wastes. Area G is located on a mesa named Mesita del Buey. Mesita del Buey trends southeast and is about 3.2 km long and 0.4 km wide. The surface slopes from an elevation of about 2100 m near its western end to about 2010 m at the eastern end of Area G. It is bounded on the north and south by canyons cut 15 to 30 m below the mesa surface, and several small side drainages serrate the edge of the mesa.

The surface and underlying rocks of Mesita del Buey are ash flows and ash flows of rhyolite tuff that are underlaid by volcanic basalts and interbedded with sediments. The tuff is about 75 m thick. There is no known perched water at Area G between the surface of the mesa and the main aquifer of the Los Alamos area. The main aquifer (capable of municipal and industrial water supply) lies at a depth of 250 m below the surface of Mesita del Buey. Movement of water in the aquifer is to the east and southeast where a part is discharged into the Rio Grande.[1]

In 1956, Area G was designated for the disposal of solid radioactive waste (Fig. 32). The wastes range from potentially contaminated rubber gloves and glassware to parts of obsolete buildings and equipment that cannot be decontaminated. They are buried in pits ranging in size from 9 to 30 m wide, 45 to 180 m long, and 4 to 10 m deep. The waste is placed in layers 1 to 2 m deep and each layer is covered with approximately 0.5 m of crushed tuff. The pits are filled to within 1 m of the land surface and covered with 1.5 to 2 m of crushed tuff. This final cover is slightly mounded above the original grade to encourage surface runoff. Some wastes are placed in vertical shafts, which range from 0.6 to 1.8 m in diameter and up to 20 m deep. Wastes in the shafts are layered with crushed tuff, the same practice used for the pits; the final cover is about 1 m thick.

Guidelines for the construction of pits were issued by the US Geological Survey in 1965.[2] These were revised and reissued in 1980 by the Waste Management Group (HSE-7) and Environmental Surveillance Group (HSE-8) of the Los Alamos National Laboratory.[3] The pits are inspected and photographs taken to determine if they comply with the guidelines.

Construction of Pit 26

Pit 26 was constructed in Area G during 1983 using heavy earthmoving equipment. It is about 95 m long and 15 m wide, with a maximum depth of 10 m. The floor of the pit is ramped at the long dimension to allow construction and vehicle access during disposal operations. The total volume of tuff excavated was 17 000 cm^3. The long dimension of the pit is northeast-southwest. The "spill point" or lowest area is the southwest corner of the pit.

Pit 26 is dug into Unit 2b of the Tshirege Member of the Bandelier Tuff.[4] The unit in the pit consists of two ash flows. Contact between the two flows occurs about 6 m below land surface. The contact is shown by an increase in the amount and size of dark gray devitrified pumice fragments in the top of the ash flow. The contact is nearly horizontal, though in places becomes indistinct. The tuff in both flows is a gray moderately welded tuff, consisting of quartz and sanidine crystals and crystal fragments with a few rock fragments of rhyolite, latite, and pumice in a gray ash matrix.

The tuff in the walls of the pit is broken by joints that formed as the ash flows cooled. Most of the major joints are vertical or nearly vertical. They range from closed to open. Beneath the thin soil zone (less than 0.5 m thick), the joints are filled with clay. At depth the joints may also be

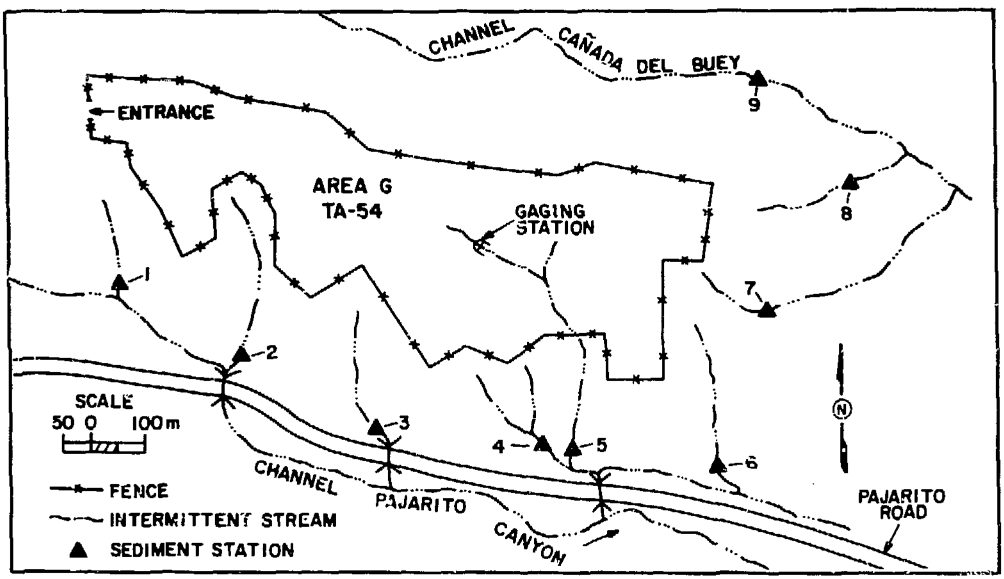

FIGURE 32.
Surface-water gaging station in Area G (TA-54) and sediment sampling stations adjacent to Area G.

weathered with a thin layer of clay. The new joint faces exposed in the pit walls are the result of excavation of the pit. The frequency of the joints is about one master joint for every 2 to 3 m of wall of the pit. This frequency is normal at Area G. The floor of the pit is covered with a layer of crushed tuff. The joint openings in the walls or joint systems in the floor (filled with tuff) are small and do not require remedial action.

The inspection and documentation in November 1983 of Pit 26 indicate that the pit is in compliance with the guidelines and is suitable for disposal of wastes.

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NUCLEAR WASTE POLICY ACT (NWPA) AND HANFORD HIGH-LEVEL WASTE EIS DRAFT REVIEWS

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Nine Environmental Assessments (EAs) have been written by DOE for the NWPA deep geologic repository for disposal of commercial nuclear waste and spent fuel. The Los Alamos reviewers have focused on four drafts of the Nevada and Hanford sites' NWPA EAs. The reviews concentrated on geological, hydrological transportation, and performance assessment aspects.

For the Hanford high-level waste EIS, a preliminary analysis of the Tank Farms inventory in relation to possible disposal options was made and reported to the OEC.