

§ Decommissioning and Decontamination (Burial Ground Stabilization) Studies

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The decommissioning and decontamination of retired Hanford facilities and the future use of surrounding landscapes require isolation of contaminated wastes from the biosphere. Burial ground stabilization studies were conducted to determine the effectiveness of physical barriers for isolating contaminated wastes in shallow-land burial sites from plants and animals.

Deep-rooted plants such as tumbleweed (*Salsola kali*) and gray rabbitbrush (*Chrysothamnus nauseosus*) have, on occasion, penetrated the soil covering Hanford shallow-land burial sites. Burrowing animals have also dug through the soil layer over low-level wastes and brought contaminants to the surface. These incidents have prompted investigations into the use of barriers to isolate wastes in shallow-land sites from the biota.

This study was undertaken to determine the effectiveness of using a layer of loose rock between the waste and the surface soil covering to prevent both plant root and animal penetrations. During earlier years of this study, a simulated shallow-land burial facility was constructed. It consisted of a trench partially filled with soil to simulate waste, then covered with approximately 1.2 m of loose rock and finally covered with an upper layer of topsoil about 1 m deep. The facility was enclosed with a fence to retain small mammals and burrowing mice, and harvester ants (*Pogonomyrmex owyheei*) were introduced. The area was seeded with cheatgrass (*Bromus tectorum*), and naturally occurring plant species, including tumbleweed, were allowed to grow on the simulated burial plot.

During this fiscal year, portions of the plot were excavated and examined for evidence of biotic penetrations through the loose stone barrier. Figure 1 shows a diagram of the rooting of tumbleweed and of the observed burrowing pattern of harvester ants and Great Basin pocket mice (*Perognathus parvus*). In general, the ants burrowed through the 1 m

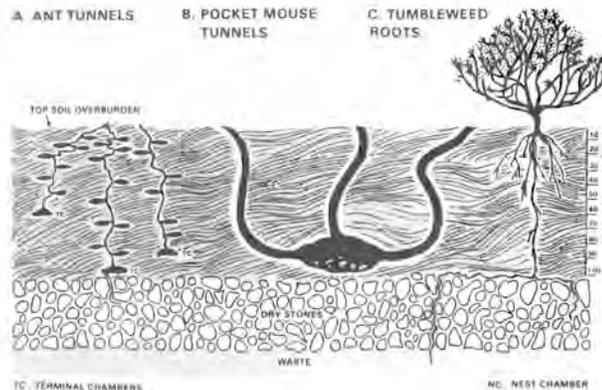


FIGURE 1. Diagram of Rooting of Tumbleweed (*Salsola kali*) and of Observed Burrowing Pattern of Harvester Ants (*Pogonomyrmex owyheei*) and Great Basin Pocket Mice (*Perognathus parvus*)

of soil above the stone layer but did not penetrate it. Mouse tunnels and chambers also were constructed only above the stone. Tumbleweed roots turned and grew horizontally along the upper edge of the stone barrier until they encountered columns of soil that had sifted between the rocks and formed vertical channels. These observations suggest that loose stone barriers can be effective for preventing plants and animals from penetrating to buried waste. Improvements in the barrier design should incorporate an additional (graded) layer of gravel above the stone to keep soil from sifting in between the stones and reducing the barrier effectiveness.