LANDFILL STUDIES AT LOS ALAMOS BY THE ENVIRONMENTAL SCIENCE GROUP

The Environmental Science Group at Los Alamos National Laboratory has performed studies and demonstrations on landfill surface covers and processes that affect landfill performance for the past 18 years. A listing of publications from these efforts is attached.

The guiding principals for these landfill projects are to reduce risks to human health and the environment and to reduce costs associated with post-closure monitoring and maintenance.

These demonstrations and studies can be classed into three general categories:

- materials and their arrangements for landfill covers;
- processes that affect long-term performance of the landfill; and
- post-closure monitoring to measure landfill performance.

Materials used in the construction of landfill covers are critical to control water percolation and surface erosion. Alternative designs for arid and semi-arid sites that use a capillary barrier in which a relatively permeable material is placed over a coarse layer to divert water laterally have been tested. Capillary barriers are not subject to desiccation and cracking that affect clay barriers in dry environments. Because landfill covers have performance periods that extend from 30 to 1000 years, processes that affect long-term integrity have been investigated including biological intrusion by animals and vegetation, subsidence, surface erosion, vegetation establishment and succession, and climate.

Simulation models are used to evaluate the effects of long-term processes on the landfill. After a landfill has been covered, a monitoring period is required to measure its performance. To address this issue, instruments that measure water to determine landfill response have been tested. Automated data collection is another way to reduce costs associated with closure of landfill sites.

Demonstrations of landfill technology are a key component of the work of the Environmental Science Group. Demonstrations have been performed at Los Alamos on existing waste sites (MDA B and G) and at the Engineered Experimental Test Facility. At Hill Air Force Base in Utah, a demonstration was funded by the U. S. Air Force that compared performance of a capillary barrier with an EPA recommended RCRA cap design. The U. S. Navy has funded a demonstration at Kaneohe Marine Corps Base in Hawaii. These demonstrations supply information that modifies precepts and designs in an iterative cycle of study, apply, and evaluate.


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