In recent years, much attention has been focused on the isolation of hazardous waste in landfills for the protection of human health and the environment. The most prevalent mechanism for isolation has been various landfill liner systems. Prior to the Resource Conservation and Recovery Act (RCRA) in 1976, owners and operators of waste disposal facilities had no federal regulations to specify what type of liner, if any, was used. Many of the owner/operators relied largely on in-situ or recomacted soil liners. The reliance on soil liners has been largely due to the economy of the installation and the idea that soil, being the weathered end product of geologic materials, was chemically inert and resistant to chemical attack by the waste to be isolated. Only in instances where suitable soils were not available would other liner materials be used. Since the inception of RCRA, the requirements for liners have evolved into composite systems consisting of synthetic membranes and soil materials.

In the following sections the various liner types which have been specified are presented. Also discussed is the recent U.S.EPA Minimum Technology requirements and various approaches to meeting these requirements in practice. Among these is the system presently being utilized at the Waste Management of Illinois, Inc., CID Landfill in Calumet City, Illinois.

Liner Systems in Waste Disposal Facilities

A liner system in a modern waste disposal facility should be considered as an element in an overall engineered system. To understand this element, it is beneficial to look at a water balance of a landfill (Figure 1).