

Laboratory Testing of Woven and Non-Woven Geocomposites for Use in CCB Landfill Drainage Systems

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ABSTRACT

Geocomposite leachate collection systems are increasingly being considered as a replacement for conventional graded sand filters in coal combustion by-product (CCB) landfills. The geocomposite liners are attractive because they are not as thick as the graded sand filters still largely in use. To be a satisfactory substitute for filters constructed of natural materials, the geocomposite must not restrict the flow of leachate to the collection system while, at the same time, prevent the migration of the material to be retained through the filter and into the leachate collection system.

An experimental program designed to test the suitability of non-woven and woven geocomposites in a CCB landfill was performed. In a modified triaxial chamber, the hydraulic conductivity of the geocomposite was measured with several different types of CCB materials (including ponded and silo fly ash, stabilized FGD material, and FGD gypsum). The effluent was collected at several times during the test and the amount of particulate material in the water as a function of the volume of liquid passing through the CCB was determined.

The non-woven geocomposite functioned effectively for all the CCB materials tested except for fly ash. Fly ash was not adequately retained by the non-woven geocomposite.

The woven geocomposite functioned effectively as a primary drainage layer for all the CCB materials investigated. No clogging of the leachate collection system or migration of the CCB material into the leachate collection system was observed for the woven geocomposite. In general, the experimental program conducted on landfilled CCBs demonstrated the suitability of woven geocomposites as filters in a leachate collection system.