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### PERFORMANCE CRITERIA FOR CONCRETE AS A BARRIER FOR LEACHATE IN WASTE CONTAINMENT

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#### ABSTRACT

When cementitious materials are used for the containment of waste they act in two different and sometimes conflicting ways. The first is physical containment in which the waste is physically isolated from the environment. The second is chemical containment in which the water passing through the barrier is buffered to high pH thereby substantially reducing the solubility of many harmful species and promoting sorption onto the matrix. Chemical barriers have been extensively researched for nuclear waste containment and this paper reports on a major research programme in which the principles developed in the nuclear work have been applied to non-nuclear work.

The concrete in the current programme is used as a liner below a landfill for domestic waste. In this environment the performance criteria normally applied to structural concrete are often not relevant and other criteria apply. After one or two years of operation the landfill is normally capped and the strength of the concrete is not important. Similarly sulphate attack is harmless and frost resistance is not relevant. The performance criteria which are relevant are the permeability, diffusion coefficient and the chemical buffering capacity.

The paper will report on the evolution of the concept of the concrete barrier from nuclear to non-nuclear waste and the range of tests and site trials that are being carried out to demonstrate performance in a landfill barrier.

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