

ABSTRACT

Third Intercontinental Landfill Research Symposium
Intended session: **Leaching mechanisms and processes**

Chemical and hydraulic conditions in a deposit for wood-based ash

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It is usually assumed that water can percolate relatively freely through landfills of waste or ash. In some cases, however, dense and impermeable structures can be observed. For example, the mineral phase composition and pore water chemistry of wood-based ash may cause large portions of the material to undergo metamorphosis, including recrystallisation.

Since 1982, ash from Söderenergi AB has been deposited at the Tvetå landfill, owned and operated by Telge Återvinning AB in Södertälje, Sweden. Initially, the fuel was coal, but the vast majority of the material originates from virgin and recovered wood-based fuels. The fuel has also comprised peat, paper and polymers. In 2002, the total amount of material was estimated to about 600 tonnes.

Initially, the rationale for a survey of the properties of the ash deposit was to determine the hydraulic properties as a basis for predicting the environmental impact as well as mapping the chemical composition in order to quality assure the material for future use for landfill covering purposes. In the course of the work it became apparent that ageing processes can make the material impermeable, and, moreover, that similar new material might be used as liners in landfill cover systems.

The characterisation of the site was conducted as follows. Four holes having a total length of about 80 meters were drilled through the ash deposit. Composite samples were taken each meter and were subsequently analysed with respect to chemical composition, moisture content, dissolvable material content, chemical composition of leachate, etc. Comparative simple tests on all specimens were combined with more elaborate tests on selected ones including leach tests and permeability tests.

It was concluded that all water is capillary in nature (or chemically bonded) and may migrate only through diffusion. No water table, or even any significant differences of the moisture content with altitude could be observed. Obviously, precipitation drains off almost exclusively at the surface. Multivariate analysis of the various chemical species reflects the variations initially present in the ashes deposited, but no alterations.

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