

Monitoring Moisture Movement within the Solid Waste in Landfills

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Conventional MSW landfills are designed and operated in accordance with RCRA Subtitle D, which minimizes amount of moisture entering and retained in the landfill waste. The absence of nutrient i.e. moisture in the waste prolongs the decomposition and can take as much as 50 to 100 years for complete decomposition. This complicates the post closure monitoring period which is currently being set as 30 years, and future development on existing landfills.

The concept of operating a landfill as a bioreactor or enhanced leachate recirculation (ELR) landfill has recently received increased attention. An ELR landfill operates to rapidly transform and degrade the organic matters within the MSW stream. A major aspect of ELR landfill operation is the addition of liquid and recirculation of collected leachate back through the refuse mass. However, the design and operation of a landfill as ELR, however, raises some concerns for stability analysis. The use of relatively low permeability daily cover materials may result in perched leachate conditions. This can result in a build-up of pore water pressure within an isolated zone (Figure 1). Eventually this may cause slope failure. Therefore, during the leachate recirculation, it is important to monitor the moisture distribution within the solid waste so that any possible slope failure can be avoided or leachate recirculation plan can be revised to avoid any possible failure.

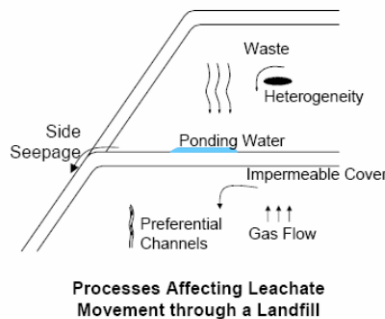


Figure 1 Affects of Impermeable Daily Cover Soils on Slope (ITRC, 2006)

The addition of leachate or water into the solid waste was monitored for the ELR landfill in the City of Denton using Resistivity Imaging (RI). The preliminary results for the current study will be presented (Figure 2).

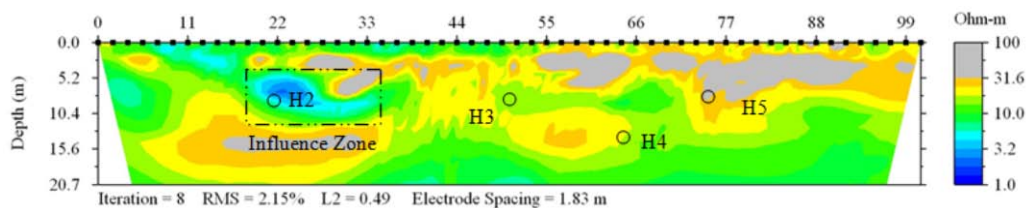


Figure 2 Results of Leachate Recirculation Study

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