MAPPING GROUNDWATER SPRINGS BENEATH A LANDFILL LINER

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Composite liner systems for landfills that satisfy of Subtitle D regulations require the placement of a subbase with a hydraulic conductivity of at least 1x10-6 cm/sec. Compacted clay is commonly used to achieve such low hydraulic conductivity values. Additionally, to maximize the air space available for the placement of waste, the construction of the cell involves excavating to a depth below original grade that is determined by the locales groundwater exclusionary zone. Unfortunately, changes in groundwater head levels can bring groundwater to surface on the side-slopes beneath the newly-lined landfill cell. Water discharging beneath the side slope of a lined cell can cause failure of the liner system. If the spring discharge is addressed early enough (i.e., pre-waste placement), then liner failure can be minimized with post construction remedial measures.

Soon after the installation of a composite liner at a landfill cell in western Pennsylvania, a sub-liner spring developed on a side slope. The water running down the interface between the liner and the base grade threatened to damage the liner system. Fortunately, the subbase to the liner system was constructed of a compacted clay-rich earthen material. Several frequency domain electromagnetic terrain conductivity meters (FDEM) with multiple dipole spacings were deployed to map the groundwater plume. The shallow focused FDEM was able to map the plume in detail as the groundwater wetted the subbase clay layer. The landfill operator was able to pull back the liner and install a French drain to channel the water away from the liner.