

Distribution of pollutants in groundwater system at Gemencheh landfill site in Negeri Sembilan, Malaysia

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The landfill site Gemencheh, Negri Sembilan covers an area of 15 acres and is situated about 150 km south of the Malaysian Institute for Nuclear Technology Research (MINT). Ever since its operation in 1981, an estimated 39, 780 metric ton and as high as 1–2 metre of domestic waste has been disposed to the site. This landfill is divided into two sections, the North East area covers the old dumping site whereas the South West represents the new dumping area. The open system domestic waste disposal on the land surface is employed at this site. The Gemencheh landfill site is basically a granitoid covered with residual soil resulted from weathered granitoid process. In general, the residual soil consists of sandy silt or sandy clay or silty sand. Ground water flow in this site is influenced by the recharge areas coming from the North West, the South West and South East directions. Since the refuse has the potential to deteriorate the ground water system, the study of pollutants distribution in landfill area was performed using the integrated nuclear, geophysics and hydrochemical techniques. These techniques have been able to determine the species, the flow velocity, flow direction and the distribution of pollutants in ground water system. From the study, the flow velocity is between 0.1–8.0 metres per day. The variation in flow velocity is depending upon the media involved whether the layer is sandy clay, sandy silt or silty sand. Besides this, the flow velocity is also influenced by the recharge. The flow direction of the pollutants does not follow the regional direction that is to the East but rather to the North East direction. The determination of the chloride, sulfate, nitrate and electrical conductivity shows that the migration of pollutants is localised and confined to the landfill site only.
