

Chapter 1

Application of Electrical Resistivity Tomography in Landfill Leachate Detection Assessment



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Abstract Over the years, the use of electrical resistance tomography (ERT) has expanded significantly in engineering applications owing to the competence of the programme involving project duration, cost and data limitation aspects. This investigation was particularly relevant for ERT to assess the level of pollution from waste dumps in Simpang Renggam, Johor, Malaysia. ERT conducted an in-depth investigation using ABEM Terrameter LS 2 devices and Schlumberger protocol configurations in the research area. Furthermore, seven (7) parameter parameters for characterization of leachate have been identified and evaluated for current leachate conditions such as chemical oxygen demand, biological oxygen demand, suspended solids, hydroelectric power, ammonia hydrocarbons, trium and biodegradability ratio. Furthermore, the study was able to determine the existence of chemicals in soils at a depth of 1.5–4.0 m, particularly at low resistivity of 1–10 m due to chemically apparent resistance. Based on the research conducted, the current characteristics of the Simpang Renggam gas station were 1 633.9 mg/L (chemical oxygen demand), 137.41 mg/L (biological oxygen demand), 359.8 mg/L (suspended solids), 7.61 (hydrogen output), 385.29 (hydrogen ammonia), 117.65 (turbidity), and 0.07 (biodegradability ratio), showing that other parameters beyond the value of the local standards set out in the Environmental Quality Leaching from the dump is thought to have been caused by system deficiency in controlling and managing waste, which have been intensified by the current excessive rainfall. In retrospect, the ERT results are workable for recognizing leachate and can therefore be used by the authorities to take instant action to end the ample water disruption in the studied region.

Keywords Pollutants · Electrical resistivity tomography · Landfill leachate

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