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## Monitoring Groundwater Contamination Using Surface Electrical Resistivity and Geochemical Methods

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### ABSTRACT

Surface electrical resistivity has been used as a tool in the detection of groundwater contamination. In this work, five geoelectric soundings with two at waste dumpsites have been carried out in Uyo, Southwestern Nigeria to map the gross layered structure of the refuse as well as the extent of groundwater contamination. The geology of the area (Benin Formation) mainly consists of fine-medium-coarse grained sands. The data of five Schlumberger Vertical Electrical Soundings (VES), with a maximum of AB/2=500 m, were analyzed using Hemkler computer program. In general, there exists a common feature in the resistivity variation pattern of high-low-high-low-high in the area. The result shows a wide range of resistivity variation ranging from 2.0 to 60700  $\Omega$ m. Based on the survey results, the resistivity values less than 75  $\Omega$ m shows contamination due to waste at Eka street and Udo street. Also, the high resistivity value at mechanic village (60700  $\Omega$ m) may be related to the waste oil deposit due to the automobile repair activities. A comparison of the resistivity values and the curve types at the dumpsites (Eka street and Udo street) and other locations show that the two dumpsites have an H curve type indicating contaminated zones, while other locations have a K curve type indicating non contaminated zones. Hydrochemical analysis of groundwater samples collected in the area was also carried out for some physico-chemical parameters. The results produced higher concentration of conductivity, total dissolved solids and chloride values for water collected at close locations to dumpsites than those far away from the dumpsites: an evidence for a quantitative assessment of groundwater contamination.

### KEYWORDS

Groundwater, Uyo Urban, Resistivity, VES, Dumpsites

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