

ASSESSMENT OF OIL/DIESEL POLLUTION USING 2D/3D ELECTRICAL RESISTIVITY AND GROUND PENETRATING RADAR AT A POWER GENERATING PLANT, IBAFO, SOUTHWESTERN, NIGERIA

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A geophysical investigation involving 2D/3D Electrical Resistivity Tomography and Ground Penetrating Radar methods was carried out at the generator plant house, Ibafo, Southwestern, Nigeria with the aim of assessing diesel/oil waste polluted. The oil/diesel waste has been indiscriminately disposed over the years during servicing and remediation measures is difficult to propose because the depth of the polluted region is largely unknown. 2D electrical resistivity was carried out with Dipole-Dipole on eight survey lines and minimum electrode spacing of 0.3m was used to ensure high near surface resolution. Two 3D electrical resistivity cubes of 3.5 m by 6.5 m were occupied with 0.5 m minimum electrode spacing. Similarly, twenty Ground Penetrating Radar lines with 450MHz antenna were occupied along and perpendicular to the 2D Electrical Resistivity traverses. From the inverted 2D Electrical Resistivity Tomography, possible oil/diesel waste are characterized by relatively high electrical resistivity range of 51 to 1222 Ωm and delineated within the depth range of 0.2 to 2.5 m. Similarly, high resistivity anomalies (62 to 160 Ωm) are suggestive of the polluted regions on the inverted 3D resistivity tomograms. Meanwhile, on the Ground Penetrating Radar, the suspected oil and diesel polluted regions are characterized by amplitude suppression. The mapped anomalous regions correlate with regions that are visibly polluted by oil/diesel waste on the site. These mapped anomalies have been used to generate a depth map showing the spatial variation of suspected polluted region across the investigated area. The result of this study has shown that the diesel/oil pollution is limited to the near surface within the depth of 0.2 to 2.5m. Remediation and mitigation measures can therefore be guided by the generated depth map of oil/diesel pollution.