

Delineation of Oil- Polluted Sites in Ibeno LGA, Nigeria

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Abstract : Ibeno, Nigeria hosts the operational base of Mobil Producing Nigeria Unlimited (MPNU), a subsidiary of ExxonMobil and the current highest oil and condensate producer in Nigeria. Besides MPNU, other multinational oil companies like Shell Petroleum Development Company Ltd, Elf Petroleum Nigeria Ltd and Nigerian Agip Energy, a subsidiary of ENI E&P operate onshore, on the continental shelf and deep offshore of the Atlantic Ocean in Ibeno, Nigeria, respectively. This study was designed to carry out the survey of the oil impacted sites in Ibeno, Nigeria. A combinations of electrical resistivity (ER), ground penetrating radar (GPR) and physico-chemical as well as microbiological characterization of soils and water samples from the area were carried out. Results obtained revealed that there have been hydrocarbon contaminations of this environment by past crude oil spills as observed from significant concentrations of THC, BTEX and heavy metal contents in the environment. Also, high resistivity values and GPR profiles clearly showing the distribution, thickness and lateral extent of hydrocarbon contamination as represented on the radargram reflector tones corroborates previous significant oil input. Contaminations were of varying degrees, ranging from slight to high, indicating levels of substantial attenuation of crude oil contamination over time. Hydrocarbon pollution of the study area was confirmed by the results of soil and water physico-chemical and microbiological analysis. The levels of THC contamination observed in this study are indicative of high levels of crude oil contamination. Moreover, the display of relatively lower resistivities of locations outside the impacted areas compared to resistivity values within the impacted areas, the 3-D Cartesian images of oil contaminant plume depicted by red, light brown and magenta for high, low and very low oil impacted areas, respectively as well as the high counts of hydrocarbonoclastic microorganisms in excess of 1% confirmed significant recent pollution of the study area.

Keywords : oil-polluted sites, physico-chemical analyses, microbiological characterization, geotechnical investigations, total hydrocarbon content

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