

Oily Sludge Bioremediation Pilot Plant Project, Nigeria

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Abstract : Brass terminal, one of the several crude oil and petroleum products storage/handling facilities in the Niger Delta was built in the 1980s. Activities at this site, over the years, released crude oil into this 3 m-deep, 1500 m-long canal lying adjacent to the terminal with oil floating on it and its sediment heavily polluted. To ensure effective clean-up, three major activities were planned: Site characterization, bioremediation pilot plant construction and testing and full-scale bioremediation of contaminated sediment/bank soil by land farming. The canal was delineated into 12 lots and each characterized, with reference to the floating oily phase, contaminated sediment and canal bank soil. As a result of site characterization, a pilot plant for on-site bioremediation was designed and a treatment basin constructed for carrying out pilot bioremediation test. Following a designed sampling protocol, samples from this pilot plant were collected for analysis at two laboratories as a quality assurance/quality control check. Results showed that Brass Canal upstream is contaminated with dark, thick and viscous oily film with characteristic hydrocarbon smell while downstream, thin oily film interspersed with water were observed. Sediments were observed to be dark with mixture of brownish sandy soil with TPH ranging from 17,800 mg/kg in Lot 1 to 88,500 mg/kg in Lot 12 samples. Brass Canal bank soil was observed to be sandy from ground surface to 3m, below ground surface (bgs) it was silty-sandy and brownish while subsurface soil (4-10m bgs) was sandy-clayey and whitish/grayish with typical hydrocarbon smell. Preliminary results obtained so far have been very promising but were proprietary. This project is considered, to the best of technical literature knowledge, the first large-scale on-site bioremediation project in the Niger Delta region, Nigeria.

Keywords : bioremediation, contaminated sediment, land farming, oily sludge, oil terminal

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