

2nd International Conference on

POLLUTION CONTROL AND SUSTAINABLE ENVIRONMENT

October 05-06, 2017 London, UK

Improving environmental remediation of hydrocarbon contaminated sites by innovation of 3D mapping technology for soil characterization

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In any drilling operation for oil and gas the risk of contamination above and under the ground is very high. It is noticed that cracking in oil well casing under the ground could contaminate underground water. Furthermore, during oil drilling operation the contaminated soil that will be left behind required remediation technologies for cleaning up the mess. The main objective of this research project is to characterize oil contaminated soil and reveals the unknown physical, chemical, and geotechnical properties including volumes, presence and the impact of oil contamination by the development of innovative novel 3D soil mapping technology for hydrocarbon contaminated sites. Moreover, This research document will support the decision makers on the most suitable environmental strategy and approach to tackle the environmental damages. The objectives of this research achieved by investigating wet and dry oil lakes, sludge pits, and wellheads pits caused by the Gulf War 1991. The 3-D modelling technologies are highly efficient and effective for assessing the spatial distribution of various petroleum hydrocarbon fractions in soils with great contamination depth that makes field sampling highly costly and labour-intensive. The 3-D modeling technologies will allow significant reduction in the number of sampling points while the quality of soil characterization can be assured. In addition, this technology covers larger areas of soil characterization and investigation in time efficient with quality and cost effective which will assured QA/QC with optimum achievement towards HSE requirement. Furthermore, this model could be used to predict the possible impacts of the petroleum hydrocarbons on the groundwater, and guide the sampling outcomes before and subsequent to soil remediation.

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