

## RAPID ASSESSMENT OF SOIL QUALITY IN OIL REMEDIATION LANDFARMS IN PENNSYLVANIA

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In northwestern Pennsylvania, the plugging of leaking abandoned oil wells generates oil-contaminated soils that the U.S. Environmental Protection Agency remediates in small landfarm plots. In this study, we used a soil quality test kit, developed by the U.S. Department of Agriculture, to assess soil health at ongoing and completed landfarm plots. The kit, which can be assembled from readily available materials, measures numerous physical, chemical and biological components in soil, such as water infiltration, bulk density, aggregate stability, soil slaking, pH, soil respiration, earthworm abundance, and other parameters. In addition, tests for soil water repellency, methanol-extractable TPH and soil toxicity (earthworm, lettuce seed germination, and Microtox) were included. Results showed that residual crude oil components in remediated soil continued to adversely impact the water-holding capacity of soil in landfarm plots. Certain soil quality measurements for oiled soils, such as soil aggregate stability, could not be directly compared to uncompacted soils, but were useful in identifying the spatial distribution of contaminated soils. A simple soil water repellency test proved to be an accurate indicator of both hydrocarbon remediation over the short term and of prior oil contamination in older soils.

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