

Geophysical Methods Applied For Cost-Effective Site Assessments

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Abstract

Geophysics is typically applied to oilfields as a means of exploration. This is typically performed using seismic techniques and to a lesser extent, potential fields (gravity and magnetic) and electromagnetic induction methods. Geophysics has in the past 30 years become increasingly important in site characterization of the near surface. Some of the uses include clearing borehole locations prior to drilling to locate utilities, piping and underground storage tanks. Due diligence of leased and acquired lands often requires geophysical surveys. There are many areas where near surface geophysics can be applied. Geophysics can be applied as a cost effective tool to save time and money when evaluating a property. These near surface methods will help pinpoint contaminated areas, legacy piping and the potential of groundwater contamination from oilfield brines that may otherwise be an unknown. These surveys can often be conducted by a two person crew, near real time results and at a minimal cost to the customer, often less than \$4,000 per day including an in-field map and interpretation.

This presentation discusses in general the applications of near surface geophysics to oilfield site characterization. General methodologies and applications will be discussed followed by examples of the use of electromagnetic induction for mapping of legacy pipelines, brine spills and groundwater contamination from oilfield brine incidents.

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Raye Lahti is currently employed as AMEC's senior geophysicist, Americas, Minneapolis, Minnesota. His geophysical roots are mineral exploration and geophysical support for groundwater exploration and environmental remediation. He is currently involved in several US based military munitions response projects, mineral exploration consultancy and is the geophysical technical expert for several projects for Kuwait Oil Company including remediation of Gulf War consequences through a United Nations contract. He holds degrees in Environmental Studies and Applied Geophysics from Michigan Technological University. He has presented on topics ranging from Oilfield Brine Contamination to Saltwater Intrusion Mapping of Coastal Aquifers. His Oilfield Clients have included Exxon-Mobil, Anadarko, Chevron, Kuwait Oil Company and others.