

Indirect Measurement of Biological Activity to Monitor Natural Attenuation



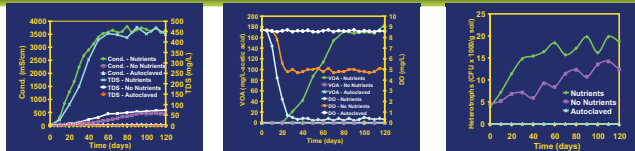
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Why? To improve methods for evaluating the long-term performance of Monitored Natural Attenuation (MNA).

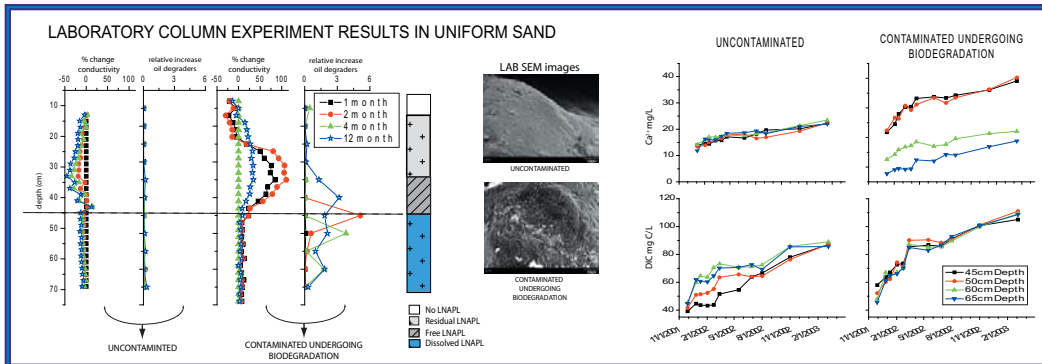
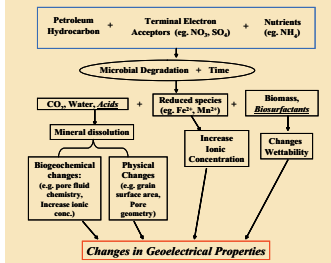
How? Microbial production of organic acids from the metabolism of petroleum hydrocarbons causes an increase in the dissolution of native soil particles, thereby increasing the bulk conductivity — a geoelectrical measurement.

RESULTS FROM LABORATORY SLURRY EXPERIMENTS IN SAND FROM LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL) BIODEGRADATION

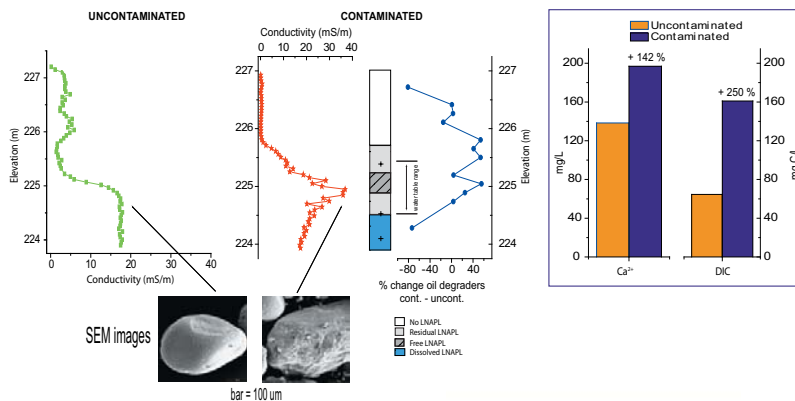


Slurry Experiments show increasing conductivity, increasing TDS, and VOA as DO decreases and microbial population increases

Mechanisms for Geoelectrical Alterations



FIELD INVESTIGATION RESULTS IN GLACIALLY DERIVED SAND



CONCLUSIONS

- 1) Lab and field reveal a conductivity high coincident with contamination, geochemical alterations, mineral etching, and peak microbial productivity.
- 2) Conductive zone most likely due to biological activity and the resulting processes.

IMPLICATIONS

Passive geoelectrical monitoring may provide monitoring and characterization of the biologically mediated breakdown of petroleum hydrocarbons.

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