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HYDROCARBONS FLUSHING - FIELD PROJECT

TITLE – Flushing Out Hydrocarbons from Soil-Gravel Medium (2004).

RESEARCH COOPERATOR – T. Parks and C. Main (Stantec Consulting Ltd).

TRIAL OBJECTIVE – To determine the effect of humic substances (**BLACK EARTH Dry Soluble 80**) to flush out hydrocarbons trapped in soil-gravel medium.

EXPERIMENT –

FIELD PROJECT	
Location	South Central Alberta
Contamination	1940s
Geology	Glacofluvial deposits
Texture	Sandy loam (3.0 m deep) Clay till (1.5 m deep)
Gravels - in till (cm diameter)	5 to 8
Water table (m deep)	2.2 to 2.9
Hydraulic conductivity (m/s)	4 x 10 ³
Hydraulic gradient (m/m)	0.01
Porosity	0.25
Flowrate (L/s)	0.1 to 0.4
Experimental area (m ²)	20 x 35
Wells	2.5 to 4.0 m deep
Injection	BLACK EARTH Dry Soluble 80
Duration	August to September, 2004

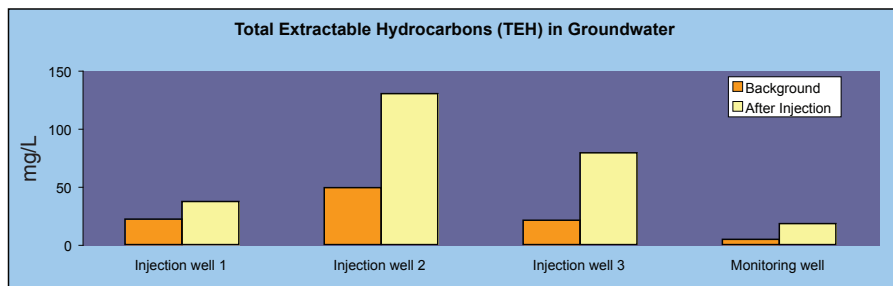
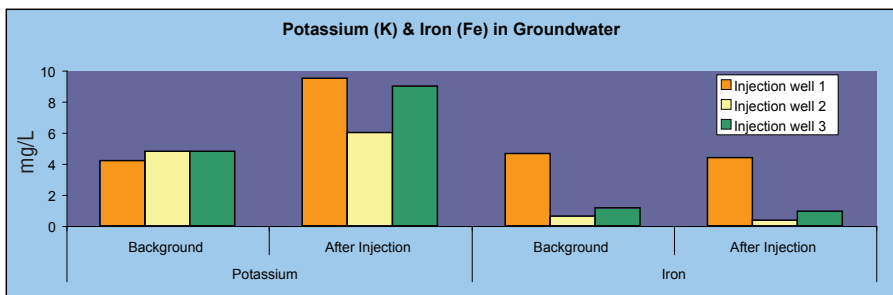
TREATMENT & ANALYSES –

Humic substances perform similarly to surfactant, making hydrocarbons more soluble in water. When applied to trapped hydrocarbons in a soil-gravel medium, humic substances would flush out the contaminant into the groundwater. This contaminant can be treated somewhere else, which is not in the scope of this project.

Background groundwater samples were taken 3 days before the injection. **BLACK EARTH Dry Soluble 80** solution was injected into 3 wells perpendicular to the direction of groundwater flow. Groundwater samples after injection were collected 6 days later from the three injection wells as well as from one monitoring well 28 m downstream. The samples were analyzed for different parameters, including potassium (K), Iron (Fe), and total extractable hydrocarbons (TEH).

RESULTS AND DISCUSSIONS –

BLACK EARTH Dry Soluble 80 increased potassium (K) levels in all three injection wells indicating that this product (containing 15% K) flowed well in the medium. Iron (Fe) levels were lowered indicating that humic substances precipitated iron as expected. Most importantly, this product increased hydrocarbon (TEH) levels in both injection and monitoring wells, indicating that humic substances performed similarly to surfactant flushing out trapped hydrocarbons in the soil-gravel medium. Note: **BLACK EARTH Dry Soluble 80** contains negligible amount of iron and hydrocarbons.



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