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Technical Advisory #10

BIOMIN'S "TIP OF THE MONTH": Surfactant Flushing→Pump and Treat→Reinjecting of Clean Water into Aquifer→a Treatment Train.

Is "pump and treat" still economical?
Yes, under certain circumstances, when groundwater is remediated. The P&T technology must first of all, include Oilsorb organoclay. This will drastically reduce the cost of using only activated carbon, whose frequent change outs make P&T uneconomical.

Here is a scenario for the most economical system:
An oil spill, leaking fuel tanks or solvents from a paint plant, result in a DNAPL plume. The concentrations of contaminants are above 5 ppm. The first step for a consulting engineer is to evaluate the possibility of surfactant/co-solvent flushing of the aquifer. Surfactant- enhanced aquifer remediation (SEAR) is used to remove trapped oil and other organic hydrocarbons. Surfactants (soaps, detergents) enhance the removal of trapped oil and other hydrocarbons by increasing their solubility and mobilizing them. To accomplish this, laboratory testing and proper design are required, followed by implementation. After the site has been evaluated, and found suitable for using this technology, a system is installed. A pump and treat station is set up downstream, consisting of a pump station, and a tank where the contaminant is de-emulsified by the usual means (acid, electrolyte, polymer). The surfactant is recovered and reused, if possible. The water is then passed through an oil/water separator, and perhaps a yarn wound filter cartridge to remove any suspended solids, followed by an adsorber filled with Oilsorb organoclay and activated carbon. If the pH needs to be raised again, that must be done before the carbon tank to ensure maximum removal capacity (see earlier newsletters on the web site). The water is reinjected into the aquifer upstream. This process is continued for about 6 months, or until the aquifer is stabilized, which means when the concentrations are below 2 ppm or so. At that point, the operation is terminated and replaced by in-situ methods, such as hydrogen and oxygen injection.

The advantages are:

- Money is saved because much lower amounts of the additives for insitu application are required, and the larger molecules have been removed by the organoclay/carbon system.
- This also means that the additives are more targeted, and less needs to be injected.
- Plus, the process is completed much sooner due to the high efficiency of the P&T system. Also, less contaminants are released later on because they where trapped. This makes the party that pays the bill happy!

Information for the "SEAR" process is available the following way:

1. A book entitled "Technical and Regulatory Guidance for Surfactant/Co solvent Flushing of DNAPL Zones" is available from the "Interstate Technology and Regulatory Council (www.itrcweb.org; (540) 557 6085).
2. Consulting: Dr. David Sabatini, U of Oklahoma at Sabatini@ou.edu
3. www.soonercity.ou.edu/sabatini/. Also, look up the concept on google.com.

For other newsletters and technical advisories, look at our web site, Also check us out on our web site: www.biomininc.com You may wish to download them and start a folder. *Additional technical advisories are in process and will be released throughout the coming year.*

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