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ISOLITE®CG and Bioremediation

"The World's Best Condominium for Microbes" Featuring - ISOLITE®CG - Home for Microbes

Q. Can ISOLITE®CG be used for the clean up of soils?
A. Yes. It is used in a process called BioLuxing ™. BioLuxing is a low-cost solution for the cleaning up of sites that have been contaminated by leaking underground storage tanks and past spills or dumps. BioLuxing is a patented method for in situ bioremediation by creating luxurious conditions underground in the contaminated zone to enhance microbial activity. BioLuxing combines the principles of hydraulic fracturing with the concept of using ISOLITE®CG that serve as both a proppant for fractures and a home for contaminant degrading microbes. ISOLITE®CG which also store air and water, can be pre-inoculated with indigenous microbes and/or selected nutrients prior to injection, or they can be colonized in situ after injection.

Q. This sounds cool, but can you explain it in more detail since I'm not technically oriented?
A. ISOLITE®CG is injected into the ground to create horizontal, hydraulic fractures by a carefully engineered and controlled process. Typical ISOLITE-filled fractures are between 0.5 and 1 inches thick and are roughly circular in shape with a radius of about 20-25 feet. Fracturing is accomplished by pumping a drilling fluid, which encases the ISOLITE, down through a pre-drilled and pipe-cased well. Several pancake-looking fractures can be stacked at selected depths in the pilot wells. [Collectively, these stacked fractures form a BioNet (TM)]. These wells are capped and vented at the surface, allowing permanent access to these underground bioreactors for the future recharging of microbes or nutrients and sources for air injection, if needed. Vent pipes, or vapor extraction wells, are installed near the periphery of the BioNets to enhance air flow. BioNets typically have 2-4 BioLuxes which are connected underground by means of the vent wells which pass through the fractures and the central pilot well.

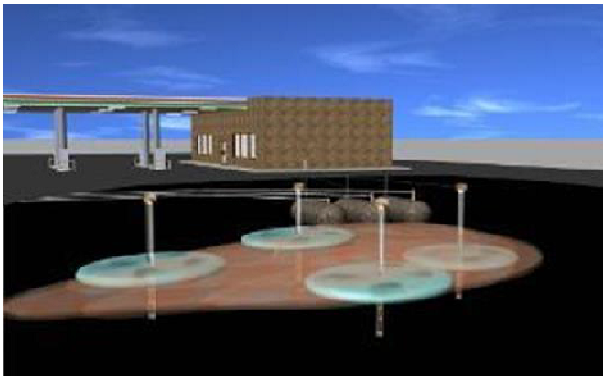
Q. Is this technique effective in many soil types?
A. In situ bioremediation, BioLuxing, is effective in tight, low porosity soils such as clay but may be very competitive in medium to high porosity soils. Hydraulic fractures can be created in and above the groundwater at depths of 40 feet and beyond.

Q. How is contaminated soil dealt with now and how can this technique benefit me?
A. Most contaminated soils are dug up and hauled to a landfill. This soil is still contaminated, but has just been moved to another location. The contamination is still there, but is now someone else's problem. This process is very expensive and when this technique is implemented, the business involved has to close for the duration of the project. BioLuxing is able to treat small to large volumes of soil with no above ground treatment. There is virtually no disruption to

business operations. This can be a welcome change, especially to gas stations that have to do something with their leaking underground storage tanks.

Q. What types of contamination can be broken down so that it is not dangerous any longer?

A. Fresh or weathered gasoline, diesel, jet fuel, kerosene, motor oil, heavy fuel oil, lubricating oils, and crude oils. Other compounds that can be treated are volatile organic compounds (VOC's) such as benzene, toluene, ethylbenzene, and xylene (BTEX): residual semivolatile organic compounds (SVOC's) such as polynuclear aromatic hydrocarbons: and nonvolatile constituents.



Q. Why should I use ISOLITE®CG and BioLuxing?

A. The benefits of BioLuxing are (1) effective in low porosity soils, (2) eliminates future contaminant liability, (3) system can be left in place, (4) operation can be either active or passive, (5) minimizes site disruption, and (6) has low cleanup costs.

Q. Does the EPA recognize this clean up process?

A. Yes. In fact, an EPA Environmental Engineer with the EPA in Denver presented a paper at the HazWaste World/Superfund XVII Conference in Washington, D.C., in October of 1996. The title of the paper is "In Situ Bioremediation of Petroleum in Tight Soils Using Hydraulic Fracturing".

Q. What site was used for this paper?

A. This site was at the Denver Federal Center. The building site was contaminated with cutting oil, used at the Remington Arms Site during WWII, for making shell casings. Initial average soil concentrations of total petroleum hydrocarbons of 5700 mg/kg were reduced to 475 mg/kg within nine months of hydraulic fracturing. The analytical results indicate an average reduction in TPH at the sample locations of 92 percent over the nine-month study period. This project demonstrates that in situ bioremediation using hydraulic fracturing has significant potential as a treatment technology for petroleum contaminated soils.