

## **Monitored Natural Attenuation; Is It the Panacea?**

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### **Abstract:**

The purpose of this presentation is to familiarize the audience with natural attenuation and present the results of a natural attenuation demonstration. Monitored natural attenuation (MNA) is a remedial option that is more than "just do nothing". It is widely supported by regulators where the appropriate conditions can be demonstrated and can be cost-effective.

### **Paper:**

Natural attenuation is the inherent decrease in groundwater contaminant concentrations through various fate and transport processes, including advection, dispersion, adsorption, and biodegradation. Natural attenuation mechanisms impact the nature and extent of groundwater contaminant plumes, including plumes containing polynuclear aromatic hydrocarbons (PAHs). A variety of methods are available to determine if natural attenuation is occurring at a site, including monitoring plume size and contaminant concentrations over time, and groundwater modeling.

The key to successfully demonstrating natural attenuation is to evaluate existing site conditions and data, and in turn, using this knowledge to develop an effective monitoring program to track the groundwater plume over time. Groundwater modeling can also be used to predict plume behavior and to modify monitoring parameters and controls, as appropriate, to better demonstrate attenuation. There are both primary and secondary indicators of natural attenuation. Primary indicators include monitoring plume mass balances and rates of migration over time, whereas secondary indicators include monitoring aquifer geochemical characteristics and performing microcosm studies.

The focus of this presentation is to present the methodology used to demonstrate the occurrence of natural attenuation of ground water contaminants at the sites. A brief presentation of natural attenuation theory and data requirements will be provided to familiarize the audience with the demonstration process. The presentation will also include a discussion of the existing site conditions and data that support natural attenuation at sites, the additional investigation required to completely evaluate the sites, and the results of the natural attenuation demonstration.