

**A FIELD STUDY OF PULSED AIR SPARGING FOR REMEDIATION OF  
PETROLEUM HYDROCARBON CONTAMINATED SOIL AND GROUNDWATER**

**Xiaomin Yang\***

Atlantic Richfield Company (A BP affiliated company)  
28100 Torch Parkway  
Warrenville, IL 60555  
Voice: 630-836-7176  
Fax: 630-836-7193  
Email: [Xiaomin.Yang@BP.com](mailto:Xiaomin.Yang@BP.com)

**Craig Niedermeier**

The RETEC Group, Inc  
Austin, TX

**Dennis Beckmann**

Atlantic Richfield Company (A BP affiliated company)  
Tulsa, OK

**Stephanie Fiorenza**

Atlantic Richfield Company (A BP affiliated company)  
Houston, TX

Results from recent laboratory-scale studies strongly suggest an advantage to operating air sparging systems under pulsed conditions; however, little definitive field data exists to support the laboratory-scale observations. This study aimed to evaluate the field performance of pulsed air sparging during a short-term pilot test and during long-term system operation. Prior to conducting the pulsed field study, an existing air sparging system operated under continuous sparging conditions for two years. Instruments with continuous data logging capabilities were used to monitor the dynamic responses of groundwater and soil vapor parameters to the injected air. An optimum pulsing frequency was determined based on the observed time for the hydrocarbon volatilization and oxygen dissolution rates to reach steady state. Based on the successful results of the short-term pilot test, the air sparging system was set to operate long-term under pulsed conditions at the selected optimum pulsing frequency. Performance monitoring of the air sparging system after two, eight, and twelve months of pulsed operation indicated an increase in the hydrocarbon removal rate by a factor of up to three as compared to continuous operation, resulting in cost savings from shorter treatment time and less energy usage.