

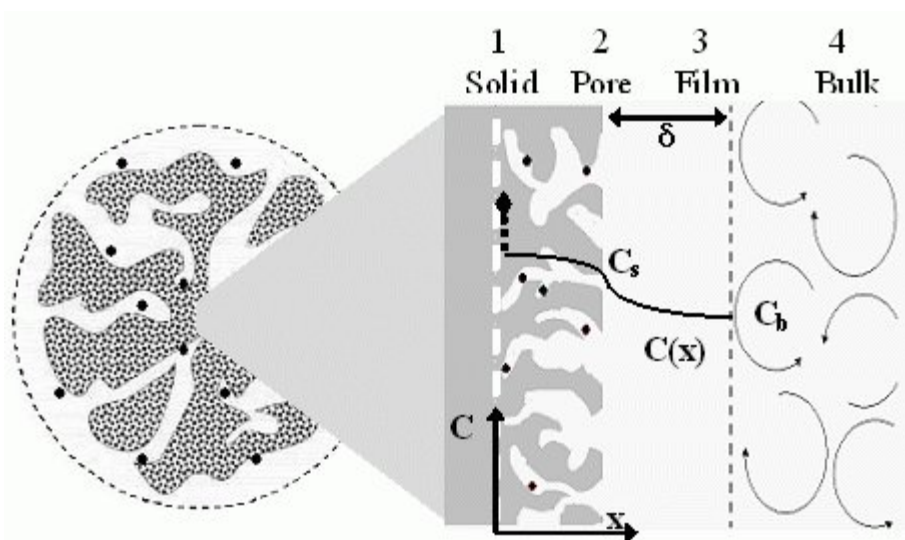
Adsorption/Oxidation Pilot-Scale Study

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Project Overview/Results:

The adsorption/oxidation technology has been investigated under a spectrum of laboratory conditions and appears to represent a viable alternative means to regenerate activated carbon with simultaneous transformation/destruction of the contaminants. EPA-GWERD has a three year cooperative agreement with the University of Arizona to investigate the feasibility of the adsorption/oxidation technology at field-scale.



Potential sources of rate limitation for desorption of adsorbate from the GAC to the bulk liquid (1- desorption; 2-pore diffusion; 3-thin film diffusion; 4-advective transport).

Testing of the technology at pilot-scale using a site specific contaminant stream will provide valuable information regarding the feasibility of the technology under actual operating conditions. Researchers have selected a test site near the University of Arizona where a vacuum extraction system is removing a mixture of contaminants, primarily PCE, that is adsorbed to activated carbon. The study involves Fenton-driven regeneration of PCE contaminated carbon. Interim results indicate that GAC can be regenerated involving various contaminants and different mass transfer and mass transport mechanisms control regeneration.

Arnold, R.G. and Ela, W.P. (In Review, 2006). Pilot Scale Testing of an Innovative Adsorption/Oxidation Technology. Draft: Final Project Report. Cooperative Agreement No. CR 829505. The University of Arizona, Chemical and Environmental Engineering Department. U.S. Environmental Protection Agency,

National Risk Management Research Laboratory, Ground Water and Ecosystem Restoration Division. Ada, OK

Arnold, R.G. and W.P. Ela. 2005. Draft Final Project Report: Pilot-Scale Testing of an Innovative Adsorption/Oxidation Technology. 132 pgs.

De Las Casas, C.L., K.G. Bishop, L.M. Bercik, M. Johnson, M. Potzler, W. P. Ela, A. E. Sáez, S. G. Huling, R. G. Arnold. 2005. "In-place Regeneration of GAC Using Fenton's Reagent". 228th American Chemical Society National Meeting, Philadelphia, PA, August 22-26, 2004.

Kommineni, S.; Ela, W.P.; Arnold, R.G.; Huling, S.G.; Hester, B.J.; Betterton, E.A. 2003. "NDMA Treatment by Sequential GAC Adsorption and Fenton-Driven Destruction." *J. Environ. Eng. Sci.*, (20)4, 361-373.