Library Assignment

My research topic is on the use of sorbents to wick oil from subsurface wetland ecosystems to the surface to stimulate aerobic biodegredation. Ammoniated bagasse was found by Louisiana State University researchers to be the best biodegradable organic material that effectively absorbs and contains an oil spill for a sufficient time to allow the hydrocarbons to biodegrade rapidly. Unfortunately, ammoniated bagasse is expensive and not in ready supply for oil spills nationwide. Therefore, the effectiveness of different sorbents will be tested by comparing ecosystems and the in situ remediation of spilled oil. The keywords I will use to find information will be: sorbents, oil, water, wetlands, aerobic biodegredation, absorption, and ammoniated bagasse.

The nature of industrial wastewater is often such that conventional physical treatment will not provide an adequate level of treatment. In particular, ordinary settling or flotation processes will not remove ultrafine colloidal particles and metal ions. In these circumstances, natural stabilizing forces (electrostatic repulsion and physical separation) predominate over natural aggregating forces and mechanisms, such as van der Waals forces and Brownian motion, which tend to cause particle contact [1].

Chemical processes in soil treatment systems are used to destroy, fix, or neutralize hazardous compounds [2]. Many processes in other categories may use chemical procedures for the treatment of effluents and gaseous emissions.

Biotreatment of soils contaminated by hydrophobic organic compounds (HOCs) requires measurement techniques to assess the concentration and mobility of trace levels of hydrophobic pore-water constituents [4]. The solubility of interest for HOCs in land biotreatment systems is usually several orders of magnitude lower and such measurements are prone to losses during sampling because of sorption on sampler materials or volatilization and biotransformation in sample collection vessels.

The importance of remediating wetlands is numerous, but a major factor is that organic soil-wetlands, under natural conditions, are net carbon sinks and, therefore, are important links in the global cycling of carbon dioxide and other atmospheric gases. Human alteration of wetlands has caused shifts in the balance of carbon between wetlands and the atmosphere. Previous analyses have not fully considered these shifts, and so the disturbance of carbon storage in organic soil-wetlands of the temperate zone has been reviewed for the past two centuries and compared to other sources of CO_2 from the biosphere [6].

Bibliography

1.) Book: Reynolds, J. P., Jeris, J. S., and Theodore, L. (2002). *Handbook of Chemical and Environmental Engineering Calculations*. John Wiley & Sons, Inc., New York, N.Y. [TP168.R49, Chemical Treatment (CHM)]

2.) Reference Book: Hester, R. E., and Harrison, R. M.. (2001). *Assessment and Reclamation of Contaminated Land.* Royal Society of Chemistry, Cambridge CB4 OWF, U.K., 115-139.

3.) Article from *Compendex*: Jacks, G., and Norrstrom, A. C. (2004). "Hydrochemistry and hydrology of forest riparian wetlands." *Forest Ecology and Management,* 196(2-3), 187-197.

4.) Article from *ASCE's Civil Engineering Database*: McNamara, S. W., and Luthy, R. G. (2005). "Sorbent wicking device for sampling hydrophobic organic compounds in unsaturated soil pore water. I: Design and hydraulic characteristics." *ASCE Journal of Environmental Engineering,* 131(1), 11-20.

5.) Citing article from Science Citation Index (Jacks G): Singh, N., Bhattacharya P., Jacks, G., and Gustafsson, J. E. (2004). "Women and modern domestic water supply systems: Need for a holistic perspective." *Water Resources Management,* 18(3), 237-248.

interesting find! ←

6.) Website: Armentano, T. V., and Menges, E. S. (1986). "Patterns of change in the carbon balance of organic soil-wetlands of the temperate zone." *Journal of Ecology,* 74(3), 755-774, http://md1.csa.com/partners/viewrecord.php?requester=gs&collection=ENV&recid=1440531&q=&uid=787033533&setcookie=yes [accessed 11/17/05].