



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: PR2481

Title: Development of Novel Dual-Function Media Matrix for Protecting Water Resources from Noxious Organic Wastes - Phase II

Focus Categories: Groundwater, Solute Transport

Keywords: Water Resources, Contaminant Transport, Infiltration, Landfill Materials, Waste Disposal, Sludge, Wastewater Treatment, Depth Filter

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Abstract

The dual-functionality property of combinations of soils, sand, gravel and biosorbents is utilized by Mother Nature with a purpose to protect water resources from noxious wastes that are injected in landfills, caves and wells/aquifers. The wastes should be contained within the media matrix by adsorption and encapsulation, and allowed to biodegrade in-situ and through biofiltration. All this should take place in a finite time. However, dual-functionality of natural media must be optimized to sustain continual injection of wastes without pollution, and to lessen failure of natural media properties upon contact with rainfall infiltration, flooding, and rising water table. In this proposal, novel dual-function media will be developed for protecting water resources from noxious organic wastes. The wastes to be handled will be obtained from tuna plant wastewater containing oil and grease, odorous particulate solids and sludge. The media will be optimized to handle the presence of oil, grease and odorous substances.

Chemical, food and pharmaceutical industries are tackling problems associated with noxious wastes disposal. Technologies available on the market are not cheap. Yet regulatory pressures from communities are forcing re-evaluation and subsequent closing of suspected injection sites. Thus, there is urgent need to find economical methods for handling noxious wastes while preserving water resources.

Dual-function filters will be developed for handling complex solid-liquid separation. The media will be optimized for handling wastewater containing oils/tars, grease, odorous solids and sludge. Wastewater streams containing these substances are major pollutants, yet it is difficult to separate them from wastewater since they readily foul any conventional filter. The notion of dual-functionality will be applied to develop novel media matrix with optimized properties: to trap the wastes, immobilize them and initiate accelerated in-situ biodegradation and biofiltration.