



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2003HI27B

Title: An Evaluation of Factors Affecting the Transport of Pharmaceutical Compounds and Pathogens in Selected Hawaii Soils for Land Application of Wastewater

Project Type: Research

Focus Categories: Water Quality, Groundwater, Waste Water

Keywords: pharmaceuticals, PPCPs, pathogens, bacteria, viruses, flow through porous media

Start Date: 03/01/2003

End Date: 02/29/2004

Federal Funds: \$23300.00

Matching Funds: \$47007.00

Congressional District: 1st

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Abstract: The State of Hawaii is interested in using effluent at agronomic rate for the irrigation of crops and golf courses overlying drinking water aquifers. This is a shift from traditional ocean disposal as the primary mode of effluent disposal land application. The motive behind this effort is to reduce pressure on water purveyors to find new sources of water for growing population and to make adjustments in pumpage to account for well losses and reduction in well yields as the thickness of the freshwater lens drops with time due to changes in land management practices that affect recharge. Many counties have set goals to use given fractions of wastewater every five-year interval. At agronomic rate of use, the areas devoted to Underground Injection Control (UIC, primarily coastal areas) are not sufficient to meet the mandated reuse. As a result, the City of Honolulu is currently experimenting the feasibility of using wastewater in areas directly overlying potable water aquifers. An earlier study, conducted by the PI, indicated that the Oxisols of Oahu have high retention capacity for bacteria and viruses. High clay content, low pH, presence of large amounts of metal oxides in such soils and flow occurring in unsaturated conditions are considered to have contributed to high rates of pathogen retention. However, the transport characteristics of pathogens for other soils are not known. Further, the presence of pharmaceutical compounds in wastewater and their transport through the soil profile needs further

evaluation. In this project, we will examine the transport in key pharmaceutical compounds and a bacteria and a bacteria virus for several soils of Hawaii. The study will show the comparative transport of pathogens and PPCPs in a suite of Hawaii soils.

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