



OSWER Innovations Pilot

Performance and Sustainability of Mulch Biowalls for Environmental Cleanup

The Office of Solid Waste and Emergency Response (OSWER) sponsors a series of innovative pilots to test new ideas and strategies for environmental and public health protection. A small amount of money is set aside to fund creative approaches to waste minimization, energy recovery, recycling, land revitalization, and homeland security that maybe replicated across various sectors, industries, communities, and regions. We hope these pilots will pave the way for programmatic and policy recommendations by demonstrating the environmental and economic benefits of creative, innovative approaches to the difficult environmental challenges we face.

BACKGROUND

The effectiveness of using permeable mulch biowalls constructed from mulch and compost to cleanup groundwater contaminated with chlorinated solvents has been variable, and in some cases has not been sufficient to meet performance objectives. Mulch biowalls are installed in trenches oriented perpendicular to groundwater flow to intercept groundwater contaminated with chlorinated solvents. The contaminants are degraded by anaerobic processes to innocuous byproducts. While the technology promotes the recycling of agricultural and landscaping waste products and is a promising, cost-effective remedy for chlorinated solvents (and other contaminants such as perchlorate) in groundwater, it is important to evaluate critical data gaps and to optimize this technology prior to full-scale application.

PROJECT APPROACH/DESIGN

The U.S. Air Force in partnership with the EPA NRMRL will develop and apply the tools and analyses necessary to further our understanding of the reactions that degrade chlorinated solvents in mulch biowalls. Sampling and evaluation of two pilot biowalls, one at Offutt Air Force Base and one at Ellsworth Air Force Base, South Dakota, are proposed for this study. The installation of these biowalls has been funded by the Air Force and

basic groundwater monitoring is being performed. Little is known on the long-term effectiveness of mulch biowalls and the minimum or threshold concentrations of mulch and compost substrate that are required to sustain anaerobic degradation. This project will evaluate these issues by field sampling and use of non-traditional (specialized) laboratory soil analyses, and provide recommendations for long-term design, construction, and operation of mulch biowalls for remediation of chlorinated solvents in groundwater.

INNOVATION

This project expands and optimizes the performance of a new technology that can be applied at contaminated groundwater sites nationwide.

BENEFITS

The use of mulch biowalls to remediate chlorinated solvents in groundwater provides a low-cost alternative to current reactive barriers. Mulch biowalls may save the US government and industry several millions of dollars if the technology is demonstrated for full-scale application. For example, a demonstration biowall at Altus AFB, Oklahoma, has reduced total molar concentrations of chlorinated solvents in groundwater by 85 percent. This reduction in contaminant mass is

helping to prevent the offsite migration of chlorinated solvents in groundwater, which restores offsite groundwater to beneficial use for agricultural purposes. The use of mulch and compost also promotes the recycling of agricultural and landscaping waste products. These low-cost materials can be locally derived and recycled, and may prevent unnecessary disposal to local landfills. Fully demonstrating the long-term effectiveness of mulch biowalls will provide information on how to design and implement full-scale mulch biowalls for government and commercial facilities across the US. Restoring groundwater contaminated with chlorinated solvents to beneficial use reduces risk to human health and the environment and promotes economic development of restored properties.

CONTACTS

Mary Kemp, EPA Region 6, Innovations Workgroup member, 214-665-8358.

For additional information, visit the EPA OSWER Innovations web site at: www.epa.gov/oswer/IWG.htm.