

ITRC PROJECT PROPOSAL: **Biowall Technology**

PROPOSAL DATE: June 27, 2008

Proposal Contact:

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Problem Statement (why is this project necessary?)

Biowall technology is a promising emerging technology for enhanced anaerobic bioremediation of contaminants in groundwater; however, there is little guidance on how to design, monitor, and sustain them or on how to screen sites to determine if biowalls are a viable remedial technology.

Although Biowalls are a variety of permeable reactive barriers (PRBs), previous guidance published on the subject of PRBs has largely ignored Biowall technology. A technology guidance document specific to biowalls technology would promote techniques to regulators and those in the environmental field.


In spite of the lack of clear guidance and some resultant regulatory delays, biowalls have been deployed and have treated groundwater contaminated with chlorinated solvents, RDX, perchlorate, and nitrate. Biowalls also have the potential for application to dissolved metals (e.g., hexavalent chromium) and chlorinated organics (such as pesticides, PCBs, and pentachlorophenol).

Advantages of biowalls include:

- Can be applied at sites with low to moderate permeability
- Can be applied at sites with a high degree of heterogeneity
- Can be installed at one-fourth to one-third the cost of zero-valent iron PRBs
- Traditional construction techniques can be used for installation
- Lower operation and maintenance requirements than more engineered systems
- Lower energy requirements than more engineered systems
- Provides a choice for a green remediation technology

Although biowalls may not be suitable for some sites (e.g., depth limitations), they are a promising technology with an increasing number of applications and should be investigated more fully. Biowall technology is considered a green remediation technology because it promotes the recycling of agricultural and landscaping waste products (i.e. mulch). These low-cost materials can be locally derived and recycled, and may prevent unnecessary disposal to local landfills. Additionally, the energy required to maintain a Biowall technology system is very low which also contributes to the "green remediation" label.

Solution / Impact (how will the project impact the environmental marketplace?)

The efforts and output of an ITRC Biowalls team will help the regulatory community become more familiar with the treatment applicability, performance, and mechanisms of biowalls. It will also provide much needed guidance to help regulators and environmental practitioners implement and evaluate plans for biowalls technology at appropriate sites. PRBs are very nearly accepted as a conventional treatment technology but the evaluation of this new treatment material will help the market place become more accepting of an innovative technique to a more conventional technology. Proper usage of biowalls technology can result in  and cost savings as well as add another technology to the environmental remediation arsenal.

Success Measures (how you determine the project impact to the market place)

The success of the project can be established through evaluation of the parts (deliverables) and as a whole. The following are suggested measures:

Tech Reg Document

- State concurrence
- EPA acceptance
- Evidence of use at sites and/or by regulated community/contractors
- Number of guidance documents requested and/or downloaded

<p>Internet Based Training</p> <ul style="list-style-type: none"> • Attendance (including # of students and industry representation, i.e. regulated community, contractor, vender, regulatory – state vs. federal) • Student evaluations (although not common, we could send a follow-up e-mail six to eight weeks after the training event requesting comments/suggestions) <p>Overall Project Success</p> <ul style="list-style-type: none"> • Outreach implementation (papers/posters accepted at conferences, requests for attendance at conferences, seminars, etc.) • Evidence of “follow-on” collaborative efforts with regulatory agencies and/or members of the regulated community (i.e. requests for training and/or additional information) • Team member feedback
<p>Summary of Deliverables (primary project outputs)</p> <p>The main proposed deliverable is an amendment to the current ITRC PRB document, or a separate technical regulatory guidance document. If the project is approved, the team will determine which is most appropriate. The new document will necessitate the revision and update of the existing PRB Internet-based training. At this time, it does not appear likely that a new training class will be developed; however, the project team and the existing PRB training team will determine how to proceed with IBT.</p>
<p>Project Schedule</p> <p>Technical Regulatory Guidance Document – First draft completed by October 31, 2009, Final edit (ready for printer) draft completed by February 15, 2010. IBT revisions – to be conducted concurrently with the tech reg document and in accordance with established ITRC schedules.</p>
<p>Target Audience</p> <p>The primary audience for the Technical and Regulatory document and Internet-based training will be State and Federal regulators, environmental consultants and contractors, and federal agency environmental project managers. The secondary audience for these deliverables will be community stakeholders and the regulated community. The primary means for their dissemination will be through the traditional ITRC channels, secondarily through AFCEE, the Naval Facilities and Engineering Services Center (NFESC), the Army Environmental Command (AEC), the US EPA (e.g., TechDirect, Clu-In), and the Environmental Security Technology Certification Program (ESTCP).</p>
<p>Resources Required</p> <p>Personnel:</p> <ul style="list-style-type: none"> • Co-Team Leaders Kimberly A. Wilson, SC (wilsonka@dhec.sc.gov) and John Doyon, NJ (John.Doyon@dep.state.nj.us) • States that have expressed interest include CA, FL, LA, MA, ME, NC, NJ, SC, VA, and WA • Skill Mix of Team Members – Regulatory, Engineering, Geology, Biology, Chemistry, Business • Sectors represented by Team Members - Federal (DoD, EPA, DOE), State (regulators), Members of the regulated community (stakeholders), Environmental Practitioners (contractors, consultants, venders).
<p>Related Work:</p> <p>This proposal feeds from the Enhanced Attenuation: Chlorinated Organics (EACO) and Permeable Reactive Barriers (PRB) teams. The EACO-PRB team combination is a natural partnership to further the use of in situ biologically based treatment mechanisms. Additionally, AFCEE is completing a protocol on the application of biowalls in the spring of 2008 and subsequent training related to the information in that protocol will assist the partnership in understanding the mechanisms and application of biowalls treatment.</p>