

## **eZVI: The Benefits of Abiotic and Anaerobic Remediation**

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**Background/Objectives.** Combining synergetic remedial approaches increases the likelihood of success and reduce remediation costs. Zero valent iron (ZVI) dehalogenates chlorinated ethenes abiotically minimizing potential buildup of dichlorethene and vinyl chloride. ZVI has been difficult to inject and does not diffuse within the aquifer treatment zone which can limit the success of ZVI alone. Emulsified vegetable oil (EVO) has proven effective in anaerobic dechlorination of chlorinated ethenes but can be challenged by aquifer conditions which may result in a buildup of dichlorethene and vinyl chloride. By combining the two technologies, ZVI will abiotic dechlorinate chlorinated ethenes and precondition the aquifer for anaerobic dechlorination extending the longevity of EVO to anaerobic dechlorinate as it diffuses through the aquifer.

**Approach/Activities.** Several factors influence the effectiveness of the synergetic eZVI remediation process. These will be examined through review of three eZVI projects.

1. Understanding the abiotic and anaerobic dechlorination pathways
2. Effect of geotechnical and hydrogeological factors
3. Selecting the most effective composition of eZVI, ratio of ZVI, EVO, nutrients

### **Results/Lessons Learned.**

Case Study #1: Dry Cleaner, Fractured Bedrock

Case Study #2: Superfund Site, Clay, Silt, Sand and Gravel

Case Study #3: Dry Cleaner, Clay Soils

#### **Project Description**

- » Contaminates and Concentrations
- » Contaminate Source,
- » Area

#### **Site Geology/Conceptual Model**

- » Hydrogeology
- » Geology
- » Treatment Zone

#### **Implementation**

- » Injection Method
- » Amendment Estimation Mythology
- » Quantity, Per point, Per foot

#### **Results**

- » Radius of Influence achieved by injection method
- » Evidence of abiotic and anaerobic degradation
- » Contaminate Reduction