

## **Cooperative Research Centre for Nano-Sized Zero Valent Iron**

### **Description**

During Stage 3 Orica was invited to participate in a Cooperative Research Centre (CRC) project at the University of NSW. The CRC for Waste Management and Pollution Control is trying to develop a commercially viable process for the production of biopolymer coated nano-sized zero valent iron (ZVI) particles. Orica has been invited to participate because of its experience with application of ZVI in the field, and because it may be able to provide a subject site for field scale trials. Other participants include EPA NSW, Sydney Water Corporation, CSIRO and Cleanaway.

### **Objectives**

- To develop a polymer coating of use in both preventing rapid oxidation of nano-sized ZVI articles and in preventing aggregation of these particles
- To assess the cost, benefits and optimal production scenarios of nano-sized ZVI articles without and with selected added catalysts

### **Technology**

ZVI is now an established remediation technology that can degrade most volatile chlorinated hydrocarbon contaminants in groundwater through a process of reductive dechlorination. Nano-sized ZVI particles are potentially easier to install than the conventional granular particles, and, because of their much higher surface area, are more reactive. However, because of this increased reactivity, they are more prone to oxidation (and subsequent loss of active sites) prior to and during installation into the aquifer. The biopolymer coat is intended to prevent oxidation, and to also stop the particles clustering together. It will be biodegradable to allow the ZVI particles to become active once in place in the aquifer.

### **Resources**

Project management: University of NSW  
CRC participants: Orica; EPA NSW; Sydney Water Corporation; CSIRO; and Cleanaway

### **Measures**

- Development of a process to form the nano-sized ZVI particles
- Identification of a suitable biopolymer for coating the ZVI particles without adversely affecting their performance (subject to laboratory scale trials)
- Development of a process to apply the biopolymer coating to the ZVI particles
- Degradation of target compounds in field trials
- Development of commercial applications

### **Timing**

Completion of field trials by end January 2004.

