

**Performance Monitoring of Permeable Reactive Barriers:
Hydrologic and Geochemical Assessment**

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Permeable reactive barriers are finding widespread use as a cost-effective and minimally intrusive method for remediating a growing range of hazardous and radioactive contaminants. Monitoring the performance of these barriers over time and understanding the processes that impact barrier integrity are critical to addressing issues such as barrier design, predictive modeling, and regulatory compliance. An extensive hydrologic and geochemical dataset has been obtained from a fieldsite in Monticello, Utah, where a zero-valent iron barrier is being used to treat uranium-contaminated groundwater. Barrier performance was evaluated using piezometric measurements, slug tests, borehole flowmeter tests, tracer tests, water quality analyses, and modeling. These data sets provided the basis for evaluating (1) the impact of aquifer and barrier heterogeneity on transport through the barrier, (2) the relative effectiveness of various monitoring techniques, and (3) the effectiveness of barrier design support models and underlying assumptions for predicting and monitoring long-term barrier performance. *Managed for the U.S. Department of Energy under contract number DE-AC05-00OR22725 with University of Tennessee-Battelle LLC.