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Preface

The purpose of this special issue was to give a sample of the current state of practice and research in the area of reactive barriers. In its short and rapid evolution, site remediation has become an area of immense interest in geoenvironmental engineering. From the initial stages when remediation choices were limited to pump-and-treat or containment, in situ remediation has gone a long way with just about every physical, chemical, or biological process exploited in the subsurface. In situ treatment using reactive barriers is a technology that perhaps encompasses more processes and engineering than any other remediation technology. The technology essentially involves installing a wall downgradient of the plume in an attempt to reduce the risk of further migration of the contaminant mass. The wall consists of a material (zero-valent iron, for instance), which can enter into physico-chemical and/or biological processes with the contaminant intercepted at the wall. Various configurations are now in place, ranging from a simple reactive trench to complicated geometries of hanging funnel and gate systems.

For successful performance of reactive barriers, a thorough understanding of local/regional hydrogeology is essential in addition to knowledge of chemical and biological processes occurring in the wall. Hydrogeologic modeling is a crucial element in the implementation of reactive barriers. Aquifer heterogeneities in the subsurface induce an element of risk even when mass transfer processes and the reaction kinetics in the wall are known for certain. It is important to consider these risks during the design and construction phases of reactive barriers. As with any in-situ remediation technology, it is of course essential to monitor and assess the long-term performance of the reactive barriers. This special issue consists of papers addressing all these important aspects of reactive barriers. The Editor hopes that this collection of paper will enhance the environmental community's interest in the reactive barriers and provide impetus to further studies in this evolving subject.