Bioremediation of Polychlorinated Biphenyls and Polynuclear Aromatic Hydrocarbons

JOHN R. SMITH AND MARGARET E. EGBE
Aluminum Company of America
Pittsburgh, Pennsylvania

WARREN J. LYMAN
Camp Dresser & McKee
Boston, Massachusetts

24-1 INTRODUCTION

As a result of former industrial activities, certain sites may have varying combinations of soils, sludges, and sediments containing concentrations of organics, such as polychlorinated biphenyls (PCBs) and/or polynuclear aromatic hydrocarbons (PAHs), above acceptable regulatory levels. Often, soil and sediment materials encountered contain nonaqueous phase liquids (NAPLs) that were the original source of the organics, thus creating a soil-sludge or sediment-sludge matrix.

When it is determined that the presence of organics at a site creates a situation of unacceptable risk to public health and/or the environment, remedial action is required to reduce the respective chemical concentrations to acceptable levels and/or to minimize exposure to receptors. Bioremediation can be applied in a manner to achieve both of these goals, often at a lower cost compared with other more energy intensive remedial actions. As defined by the U.S. EPA (1993c): “Bioremediation is an engineered process that uses microorganisms to decompose toxic, hazardous compounds to improve environmental quality and reduce human health risks. As a low energy natural process, it is an attractive alternative to conventional clean-up methods. The process residues are typically non-toxic and are easily reintroduced into the earth’s biogeochemical cycles. Bioremediation technologies are potentially less disruptive to the environment and less expensive than other treatment options.” Here, other treatment options refer to excavation followed by energy intensive treatment (e.g., incineration) and/or landfiling.