



Foreword

According to the U.S. Environmental Protection Agency, the processes in the framework of natural attenuation include biodegradation, dispersion, dilution, sorption, volatilization, reductive decay, chemical or biological stabilization, transformation and destruction of the contaminants. There is debate on the reliance on dilution/dispersion processes serving as a legitimate means of remediation (as it is part of natural attenuation), as there is no mass reduction. The natural attenuation processes and interactions in the subsurface of contaminated sites are extremely complex and interrelated. Practically, due to the overwhelming number and associated cost of remediation of contaminated sites, we are forced to take advantage of natural attenuation processes in the framework of risk assessment and remediation. Although natural attenuation processes cannot replace traditional active remediation technologies, they can be an important option for some sites depending on the site-specific circumstances, i.e. consideration of sensitive receptors.

A scientifically based, appropriate and, above all, long-term effective management of soil and groundwater contaminants requires a better understanding of natural degradation and plume movement. The evaluation of the effects and information thus gained from natural attenuation investigations can be used for both hazard assessment and remediation process selection. Contaminated sites have a large impact on groundwater systems coincident with groundwater becoming a more relied upon resource for drinking water supply worldwide. There is no question that the more we can limit the migration of contaminants to groundwater systems with a proper balance between active remediation and natural attenuation processes, the better off we will be. It is necessary to investigate whether, how and possibly under which conditions natural attenuation can contribute to reducing risks at sensitive receptors.

This first issue on "natural attenuation" in the journal of *Biodegradation* is a compendium of papers covering a wide-range of topics. The role of

biodegradation processes in the context of natural attenuation will be addressed in this issue in some of the papers; however, it will not necessarily be the focus of each and every paper. Eleven excellent papers are contained herein and address areas such as monitoring, modelling, legal aspects, the fate of chlorinated compounds, and an interesting case study.

A second issue on natural attenuation is planned for the beginning of 2005 and will be devoted to mineral oils, BTEX-compounds, MTBE, polyaromatic hydrocarbons, perchlorate and explosives. The knowledge and experience gained from current or recently completed research projects will merge in this edition along several case studies highlighting the applicability of the natural attenuation strategies.

The editors thank the authors for their cooperation, efforts, and time to finish their contributions; the reviewers for their support; and, last, but not least, the publisher and editors of *Biodegradation* for affording us the opportunity to publish papers in this important field of research and practice.

Editor

PETER WERNER, Ph.D.
Professor of Microbiology
Universität Karlsruhe
Germany

Co-editors

WOOKEUN BAE, Ph.D.
Professor of Civil & Environmental
Engineering at Hanyang University
Republic of Korea

JOSEPH E. ODENCRANTZ, Ph.D.
Principal Civil and Environmental Engineer
Water and Land Offices
Tri-S Environmental
California, USA