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Pump-and-Treat Ground-Water Remediation

A Guide for Decision Makers and Practitioners

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Notice

In September, 1995 the Office of Research and Development completed a reorganization of its Laboratories and Centers. The former Risk Reduction Engineering Laboratory located in Cincinnati, Ohio, the Robert S. Kerr Research Laboratory located in Ada, Oklahoma, the Air and Energy Research Laboratory, located in Research Triangle Park, North Carolina, and the Center for Environmental Research Information located in Cincinnati, Ohio, were merged into the National Risk Management Research Laboratory. No physical relocations were involved. The documents referenced in this guide were published prior to the reorganization: therefore former laboratory/center names are shown as they were at the time of publication.

Foreword

The U.S. Environmental Protection Agency is charged by Congress with protecting the Nation's land, air, and water resources. Under a mandate of national environmental laws, the Agency strives to formulate and implement actions leading to a compatible balance between human activities and the ability of natural systems to support and nurture life. To meet this mandate, EPA's research program is providing data and technical support for solving environmental problems today and building a science knowledge base necessary to manage our ecological resources wisely, understand how pollutants affect our health, and prevent or reduce environmental risks in the future.

The National Risk Management Research Laboratory is the Agency's center for investigation of technological and management approaches for reducing risks from threats to human health and the environment. The focus of the Laboratory's research program is on methods for the prevention and control of pollution to air, land, water and subsurface resources; protection of water quality in public water systems; remediation of contaminated sites and ground water; and prevention and control of indoor air pollution. The goal of this research effort is to catalyze development and implementation of innovative, cost-effective environmental technologies; develop scientific and engineering information needed by EPA to support regulatory and policy decisions; and provide technical support and information transfer to ensure effective implementation of environmental regulations and strategies.

This publication has been produced as part of the Laboratory's strategic long-term research plan. It is published and made available by EPA's Office of Research and Development to assist the user community and to link researchers with their clients.

E. Timothy Oppelt, Director
National Risk Management Research Laboratory

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Tables

Acronyms and Abbreviations

ACL	Alternate concentration limit
CZAEM	Capture Zone Analytic Element Model
DNAPL	Dense non-aqueous phase liquid
DOD/ETTC	Department of Defense Environmental Technology Transfer Committee
EPA	Environmental Protection Agency
GAEP	Geographic Analytic Element Preprocessor
LNAPL	Light non-aqueous phase liquid
LLNL	Lawrence Livermore National Laboratory
MCL	Maximum contaminant level
MCLG	Maximum contaminant level goal
NAPL	Non-aqueous phase liquid
NRC	National Research Council
NTIS	National Technical Information Service
ORD	Office of Research and Development
OSWER	Office of Solid Waste and Emergency Response
PCB	Polychlorinated biphenyl
PCE	Perchloroethylene
RCRA	Resource Conservation and Recovery Act
SVE	Soil vapor extraction
TCE	Trichloroethylene
TI	Technical impracticality
VOC	Volatile organic compound
WHPA	Well Head Protection Area

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