

Process Design Manual

Land Treatment of Municipal Wastewater Effluents



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Process Design Manual

Land Treatment of Municipal Wastewater Effluents

Land Remediation and Pollution Control Division
National Risk Management Research Laboratory
Office of Research and Development
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Notice

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Foreword

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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.

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National Risk Management Research Laboratory

Abstract

The U.S. Environmental Protection Agency guidance on land treatment of municipal and industrial wastewater was updated for the first time since 1984. Significant new technological changes include phytoremediation, vadose zone monitoring, new design approaches to surface irrigation, center-pivot irrigation, drip and micro-sprinkler irrigation, and capital and operating costs. Also included in the new manual are new performance data on soil-aquifer treatment, a rational model for balancing oxygen uptake with BOD loadings, and industrial wastewater land application guidance, emphasizing treatment of food processing wastewater. Costs and energy use of land treatment technologies are updated.

Slow-rate land treatment remains the most popular type of land treatment system. Many slow-rate systems are now designed as water reuse systems. Trends in distribution have been toward sprinkler and drip irrigation systems.

A CD which accompanies the document contains copies of earlier editions of the land treatment manual and the latest manual for water reuse.

KEYWORDS: land treatment, soil aquifer treatment, spray irrigation, groundwater monitoring, vadose zone sampling, costs

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