



TECHNOLOGY TRANSFER

The Bridge Between
Research and Use

New Technology Transfer Publications

Design Manual: Phosphorus Removal (#1001)

This document is the second revision to the original manual published in 1971. The first revision was published in 1975. The manual presents the best developed methods for removing phosphorus from municipal wastewater.

Biological phosphorus removal was not included in either of the previous editions and represents a major addition. The use of lime as a chemical precipitant for phosphorus removal, which received major treatment in the previous edition, is not covered in this revision due to its loss of popularity as a phosphorus removal technique. Phosphorus removal by mineral addition is discussed extensively.

Design information and operating procedures are included for each of the technologies discussed. Case histories and design examples are used to demonstrate application of the technologies. A recommended approach to selecting a phosphorus removal strategy is presented. This approach identifies the required effluent phosphorus limits and screens potential phosphorus-removal techniques to identify those processes capable of meeting the specified requirements. A separate chapter in the manual addresses sludge concerns for phosphorus-removing treatment plants.

Technology Transfer Process Design Manual for Dewatering Wastewater Sludges (#1014)

This manual revises and updates the information on sludge conditioning and dewatering in the Technology Transfer Process Design Manuals for Sludge Treatment and Disposal and Dewatering Municipal Wastewater Sludges. It has been eight and five years, respectively, since the manuals were completed. During that time the regulatory criteria for disposal of sludges by landfilling, combustion, land application and ocean disposal processes have undergone tightening and require the best dewatered sludge that can practically be achieved.

Significant advances have been made in dewatering since preparation of the earlier documents. This new manual considers the upgrading of existing dewatering processes as well as the designing of new ones. It pays particular attention to the needs of small facilities. The manual includes chapters on Air Drying Processes, Mechanical Dewatering Processes, and New Dewatering Technologies.

Seminar Publication: Meeting Hazardous Waste Requirements for Metal Finishers (#4018)

Three seminars were held in the fall of 1986 in Boston, Chicago, and Los Angeles. Support for the seminars came

from the American Electroplaters and Surface Finishers Society, the National Association of Metal Finishers, and the Metal Finishing Suppliers Association. This publication contains edited versions of the material presented at each of the three seminars.

This document provides information on the regulations affecting hazardous wastes discharged by metal finishers. Topics included are the impact of RCRA regulations on both small and large generators, the "delisting" of a specific facility waste from hazardous waste regulation, land disposal bans on hazardous wastes, the use of used oil and hazardous wastes as fuel, criteria for the use of underground storage tanks for hazardous wastes, the relevance of the Clean Water Act to the hazardous wastes discharged by metal finishers, the selection of a responsible hazardous waste transporter and management facility, the costs and benefits of source reductions in metal finishing, materials reuse and recovery, the treatment and management of organic liquids, and the characterization and treatment of aqueous wastes.

User's Guide: Emission Control Technologies and Emission Factors for Unpaved Road Fugitive Emissions (#5022)

During the past decade, research has shown that particulate emissions from open sources such as unpaved roads contribute significantly to ambient particulate matter concentrations in many areas. The current EPA emission trading policy, commonly called the bubble policy, allows excessive emissions from one source to be offset by improved control of another source within the same plant. In implementing the bubble policy, some plants have agreed to reduce fugitive dust emissions in lieu of tighter controls on process emissions.

This document has been prepared to assist control agency personnel in evaluating unpaved road fugitive emissions control plans and to assist industry personnel in the development of effective control strategies for unpaved roads. This document describes control techniques for reducing unpaved road emissions, methods for quantifying or estimating emissions generation, and provides data for estimating the efficiency of the performance of various control technologies. Although fugitive particulate emissions can be reduced by reducing the extent of the source, this document focuses on the use of "add-on" controls which do not affect the size or throughput of the source.

Within this document, fugitive emissions refer to those air pollutants that enter the atmosphere without passing through a stack or duct designed to direct or control their flow. The report discusses uncontrolled fugitive road dust emission factors, control alternatives, estimation of control system performance, and an industrial example (with emphasis on

unpaved road emissions) illustrating the procedural steps for control strategy development, including the capital, operation and maintenance costs of representative controls

Handbook: Retrofitting POTWs for Phosphorus Removal in the Chesapeake Bay Drainage Basin (#6017)

This document assesses the technology, economics, and efficiency of phosphorus removal processes for use in the Chesapeake Bay Drainage basin (CBDB). Since phosphorus removal requirements in the CBDB vary widely with geographic location, this document discusses the feasibility of achieving effluent total phosphorus concentrations of 0.2, 0.5, 1.0, and 2.0 mg/l. The impact of a requirement for either nitrification or nitrogen removal on phosphorus removal processes is also addressed

This handbook presents state-of-the-art information on phosphorus removal to be used by government officials, design engineers, and plant operators in implementing phosphorus removal strategies in the CBDB. Discussions of both chemical and biological phosphorus removal technologies are tailored to reflect those factors specific to the CBDB, i.e., influent phosphorus, effluent phosphorus, and plant type.

Executive Briefing: Injection Well Mechanical Integrity (#9007)

U.S. EPA underground injection control regulations require that all injection wells demonstrate mechanical integrity, which is defined as no significant leak in the casing, tubing or packer; and no significant fluid movement into an underground source of drinking water through vertical channels adjacent to the injection well bore.

A three-phase research project was conducted by the Robert S. Kerr Environmental Research Laboratory to determine state-of-the-art methods available for mechanical integrity testing of injection wells and field test specific analysis methods. This document describes the results of the second and third phases of this research, in which two test wells were constructed for mechanical integrity testing: a "logging well" to test for channels in the cement behind the casing, and a "leak test well" to develop methods for testing the integrity of the tubing, casing and packer as well as locating fluid movement in channels behind the casing.

Environmental Regulations and Technology Report: Biomonitoring to Achieve Control of Toxic Effluents (#10006)

This publication provides National Pollutant Discharge Elimination System (NPDES) program managers, NPDES permit writers, and water quality specialists an example of how biological toxicity testing can be used to evaluate toxic water quality problems.

A study was performed on the Akron, Ohio wastewater treatment plant and its receiving stream, the Cuyahoga River. Although the Akron WWTP is a well-operated municipal treatment facility that achieves excellent reduction in conventional pollutants, the condition of the Cuyahoga River below the Akron outfall is unsuitable for aquatic life for a distance of 10 miles downstream.

The process of identifying a toxicity problem is presented in Chapter 2 from the view of Ohio EPA, U.S. EPA Cincinnati, and U.S. EPA Region 5. A reconnaissance trip was conducted

by U.S. EPA/ERL-Duluth and others to confirm the site selection and to refine the study plan for an onsite test program. The results of this field reconnaissance trip are presented in Chapter 3. The evolution of the study plan (Chapter 4) is presented in view of the site selection data, reconnaissance data, and site description. Chapter 5 contains the results of the onsite testing of effluents and ambient river water. The toxicity source investigation for identifying toxic components and suggesting appropriate treatment technologies is presented in Chapter 6. The conclusions of the site characterization are presented and used to make sample NPDES permit recommendations for the Akron WWTP (Chapter 7). Technical methods are not included in this document, but are referenced as appropriate.

Technology Transfer Meetings

Workshops on Emerging Technologies for Upgrading Existing or Designing New Drinking Water Treatment Facilities

These two-and-a-half day workshops are being sponsored by the Association of State Drinking Water Administrators and the United States Environmental Protection Agency's Offices of Drinking Water and Research and Development. Their purpose is to actively transfer technical information on recently emerging but proven technologies and encourage their incorporation into either the plans for process modifications or construction of new processes. Removal processes for lead, radon, volatile organics, synthetic organics and disinfection byproducts are discussed along with filtration and disinfection technologies.

These workshops will be of value to individuals who approve plans for the construction of new or the upgrading of existing drinking water treatment facilities as well as consulting engineers and drinking water treatment equipment manufacturers

Locations for the workshops are:

St. Louis, Missouri; October 20-22, 1987
Tallahassee, Florida; November 3-5, 1987
San Francisco, California; January 19-21, 1988

For additional information, contact Sheila Rosen, JACA, (215) 643-5466.

Seminar Series: RCRA/CERCLA Treatment Alternatives for Hazardous Waste

This two-day seminar presents an overview and introduction to a wide range of technologies that are entering the application stage or are under development and that are suitable for application to hazardous waste management both from a RCRA or a CERCLA point of view. The seminar is intended principally for entry level personnel who are unfamiliar with the broad range of treatment technologies available today. The seminar focuses on descriptions of the available technologies, their suitability for differing waste streams and waste management problems and their probable costs. Locations for the seminar are:

Seattle, WA, October 20-21, 1987
Boston, MA, November 3-4, 1987
Orlando, FL; November 18-19, 1987
New Orleans, LA December 10-11, 1987

For further information, contact Barbara Cormier, PEER Consultants, 4134 Linden Avenue, Suite 202, Dayton, OH, (513) 252-1222.

Workshop: Superfund Alternative Technologies Workshop

This two-day workshop is aimed at the EPA staff engineers and scientists involved in CERCLA RI/FS, site activities and remedial action design and implementation. The workshop will consist of five sessions and will be devoted to identifying, categorizing and dealing with the problems commonly encountered at sites requiring remediation.

Experts having hands-on experience will participate in each of the working sessions. Their function will be to lend their technical expertise in assisting the attendees to develop and evaluate alternative technologies and to provide some "real world" insight into the reliability and suitability of various technologies to the problem under consideration.

This course will be offered in the regions during the fall and winter of 1987 and spring of 1988. For further information, contact Barbara Cormier, PEER Consultants, 4134 Linden Avenue, Suite 202, Dayton, OH, (513) 252-1222.

Seminar Series: Transport and Fate of Contaminants in the Subsurface

This two-day seminar will provide a brief but intensive overview of the physical, chemical and biological processes that govern the transport and fate of contaminants in the subsurface and the numerous and diverse effects of these processes. A secondary purpose of the seminar is to provide a summary of modeling approaches used to make predictions about the transport and fate of contaminants in the subsurface, and to describe the current and potential Agency uses of such models. The sessions on simulation prediction and management considerations are oriented to program managers.

The seminar presentations have been organized into the following sessions: 1&2, Physical Processes; 3&4, Chemical Processes; 5&6, Biological Processes; 7, Simulation-Prediction; and 8, Management Considerations. These sessions are oriented to a technically-trained, but non-specialized audience. Experience with higher-level mathematics is not required, but an understanding of basic hydrogeologic and chemical concepts, laws and equations is recommended. The majority of these sessions will be spent describing the state-of-the-science of evolving concepts of subsurface contaminant transport processes and the state-of-the-art in using such concepts to solve practical problems. Abundant reference materials will be provided, including summaries of current EPA-funded research projects and their expected products

There is no fee for attending these seminars. Seminar announcements will be sent out this fall. For registration information, contact Mindy Morganstern, (215) 643-5466.

Seminar locations and dates are as follows:

October 26-27, 1987 - Chicago IL
October 27-28, 1987 - Denver CO
November 30-December 1, 1987 - Philadelphia PA
December 1-2, 1987 - Atlanta GA
December 14-15, 1987 - San Francisco CA
December 15-16, 1987 - Seattle WA
January 11-12, 1988 - Kansas City MO
January 12-13, 1988 - Dallas TX
February 1-2, 1988 - New York NY
February 3-4, 1988 - Boston MA

EPA Exhibit at Air Pollution Control Association Annual Meeting and Exhibition

The 80th annual APCA Meeting and Exhibition was June 21-26, 1987 at the Jacob K. Javits Convention Center in New York City. The Office of Research and Development and the Office of Air Quality Planning and Standards participated in displaying the agency's air pollution programs and distributing material to the attendees. The latest monitoring and testing techniques and air and hazardous waste control technologies were presented. Two technology transfer reports, Handbook for Control Technologies for Hazardous Air Pollutants (Publication #6014) and Radon Reduction Techniques for Detached Houses (Publication #5019) were available at the exhibit. EPA will be on hand for next year's June meeting in Dallas, Texas

REQUEST FOR TECHNOLOGY TRANSFER MATERIAL

PROCESS DESIGN MANUALS

- Phosphorus Removal (Sept 1987) 1001
- Municipal Sludge Landfills (Oct 1978) 1010
- Sludge Treatment and Disposal (Oct 1979) 1011
- Onsite Wastewater Treatment and Disposal Systems (Oct 1980) 1012
- Land Treatment of Municipal Wastewater (Oct 1981) 1013
- Supplement for Land Treatment of Municipal Wastewater (Oct 1984) 1013a
- Dewatering Municipal Wastewater Sludges (Sept 1987) 1014
- Municipal Wastewater Stabilization Ponds (Oct 1983) 1015
- Land Application of Municipal Sludge (Oct 1983) 1016
- Electrostatic Precipitator Operation and Maintenance (Sept 1985) 1017
- Odor and Corrosion Control in Sanitary Sewerage Systems and Treatment Plants (Oct 1985) 1018
- Lime/Limestone FGD Inspection and Performance Evaluation Manual (Oct 1985) 1019
- Fabric Filter Operation and Maintenance (June 1986) 1020
- Municipal Wastewater Disinfection (Oct 1986) 1021

TECHNICAL CAPSULE REPORTS

- First Progress Report Wellman-Lord SO₂ Recovery Process - Flue Gas Desulfurization Plant 2011
- Double Alkali Flue Gas Desulfurization System Applied at the General Motors Parma, OH Facility 2016
- Recovery of Spent Sulfuric Acid from Steel Pickling Operations 2017
- Fourth Progress Report Forced-Oxidation Test Results at the EPA Alkali Scrubbing Test Facility 2018
- Particulate Control by Fabric Filtration on Coal-Fired Industrial Boilers 2021
- Bahco Flue Gas Desulfurization and Particulate Removal System 2022
- First Progress Report Physical Coal Cleaning Demonstration at Homer City, PA 2023
- Acoustic Monitoring to Determine the Integrity of Hazardous Waste Dams 2024
- Disposal of Flue Gas Desulfurization Wastes Shawnee Field Evaluation 2028
- Adipic Acid-Enhanced Lime/Limestone Test Results at the EPA Alkali Scrubbing Test Facility 2029
- Benefits of Microprocessor Control of Curing Ovens for Solvent Based Castings 2031

SEMINAR PUBLICATIONS

- Composting of Municipal Wastewater Sludges 4014
- Municipal Wastewater Sludge Combustion Technology 4015
- Protection of Public Water Supplies from Groundwater Contamination 4016
- Meeting Hazardous Waste Requirements for Metal Finishers 4018

BROCHURES

- Environmental Pollution Control Alternatives Reducing Water Pollution Control Costs in the Electroplating Industry 5016
- Environmental Pollution Control Alternatives Centralized Waste Treatment Alternatives for the Electroplating Industry 5017
- Environmental Pollution Control Alternatives Sludge Handling, Dewatering, and Disposal Alternatives for the Metal Finishing Industry 5018

- Radon Reduction Techniques for Detached Houses 5019
- Nitrogen Oxide Control for Stationary Combustion Sources 5020
- User's Guide Emission Control Technologies and Emission Factors for Unpaved Road Fugitive Emissions 5022

HANDBOOKS

- Industrial Guide for Air Pollution Control (June 1978) 6004
- Remedial Action at Waste Disposal Sites (Oct 1985) 6006
- Identification/Correction of Typical Design Deficiencies at Municipal Wastewater Treatment Facilities (Oct 1982) 6007
- Improving Publicly Owned Treatment Works Performance Using the Composite Correction Program Approach (Oct. 1984) 6008
- Septage Treatment and Disposal (Oct 1984) 6009
- Estimating Sludge Management Costs at Municipal Wastewater Treatment Facilities (Oct 1985) 6010
- Permit Writers Guide to Test Burn Data Hazardous Waste Incineration (Sept 1986) 6012
- Stream Sampling for Waste Load Allocation Applications (Sept 1986) 6013
- Control Technologies for Hazardous Air Pollutants (Sept 1986) 6014
- Underground Storage Tank Corrective Action Technologies (Jan 1987) 6015
- Ground Water (March 1987) 6016
- Retrofitting POTWs for Phosphorus Removal in the Chesapeake Bay Drainage Area (Sept 1987) 6017

SUMMARY REPORTS

- Control and Treatment Technology for the Metal Finishing Industry Series Sulfide Precipitation 8003
- Sulfur Oxides Control Technology Series FGD Dual Alkali Process 8004
- Sulfur Oxides Control Technology Series FGD Lime/Limestone Processes 8006
- Control and Treatment Technology for the Metal Finishing Industry Series Ion Exchange 8007
- Control and Treatment Technology for the Metal Finishing Industry Series In-Plant Changes 8008
- Sulfur Oxides Control Technology Series FGD Spray Dryer Process 8009
- Fine Pore (Fine Bubble) Aeration Systems 8010
- Technology Assessment of Sequencing Batch Reactors 8011
- Causes and Control of Activated Sludge Bulking and Foaming 8012

EXECUTIVE BRIEFINGS

- Protecting Health and Safety at Hazardous Waste Sites 9006
- Injection Well Mechanical Integrity 9007

ENVIRONMENTAL REGULATIONS AND TECHNOLOGY PUBLICATIONS

- The Electroplating Industry 10001
- Environmental Regulations and Technology Use and Disposal of Municipal Wastewater Sludge 10003
- Fugitive VOC Emissions in the Synthetic Organic Chemicals Manufacturing Industry 10004
- The National Pretreatment Program 10005
- Biomonitoring to Achieve Control of Toxic Effluents 10006

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